Final Environmental Assessment

Long-Term Renewal of Water Service Contracts in the Black Butte Unit, Corning Canal Unit, and Tehama-Colusa Canal Unit of the Sacramento River Division Central Valley Project, California

February 2005

Bureau of Reclamation
Mid-Pacific Region
2800 Cottage Way
Sacramento, California 95825-1898

ES. EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

In accordance with Section 3404(c) of the Central Valley Project Improvement Act (CVPIA), the Bureau of Reclamation (Reclamation) proposes to renew the long-term water service contracts for water contractors in the western Sacramento Valley for a period of 25 years or 40 years, depending on water use. These contractors currently receive water under an interim contract that will expire on February 28, 2006. By renewing these contracts in early 2005, Reclamation would continue delivering approximately a maximum of 322,000 acre-feet of Central Valley Project (CVP) water to the contractors from March 2005 for 25 years to the year 2030 or 40 years to 2045.

The CVP is divided into nine divisions, of which the Sacramento River Division is one. The Sacramento River Division, authorized on September 29, 1950, includes the Corning Canal Unit and the Tehama-Colusa Canal Unit; the Black Butte Unit was incorporated in 1963. The Sacramento River Division contains 18 water contractors served primarily by the Tehama-Colusa Canal (TCC) and the Corning Canal, in Tehama, Glenn, Colusa, and Yolo Counties, although additional districts west of the TCC that receive CVP water from Black Butte Reservoir are also included. Water contractors covered in this document are listed in Table ES-1.

The previous long-term CVP water service and repayment contracts in the Corning Canal and the Tehama-Colusa Canal Units expired in 1994. These CVP contractors have continued to deliver CVP water since 1994 under a series of five interim renewal contracts (IRC). The existing IRCs for the Corning Canal and Tehama-Colusa Canal Unit contractors are scheduled to expire in 2006. The five CVP contracts in the Black Butte Unit are Binding Agreement Contracts and are scheduled to expire in 2020, 2024, or 2010. Under the proposed action the Agricultural or Agricultural/Municipal and Industrial (M&I) contracts would be renewed in 2005 as long term contracts for a period of 25 years. The M&I contracts would be renewed for 40 years.

Table ES-1
Water Contractors in West Sacramento Valley/Sacramento River Division

Unit/Contractor	Contract Quantity (acre-feet)
Tehama-Colusa Canal Unit	
Colusa County WD	62,200
Colusa, County of	See Subcontractors below
Colusa County WD	5,965
Cortina WD	1,700
Four-M WD	5,700
Glenn Valley WD	1,730
Holthouse WD	2,450
La Grande WD	2,200
Myers Marsh Mutual Water Company	255
Davis WD	4,000
Dunnigan WD	19,000
Glide WD	10,500
Kanawha WD	45,000
Kirkwood WD	2,100
La Grande WD	5,000
Orland-Artois WD	53,000
Westside WD (1 and 2)	65,000
Corning Canal	
Corning WD	23,000
Proberta WD	3,500
Thomes Creek WD	6,400
Other	
Stony Creek WD	2,920
Stonyford	40
Whitney Construction	25
4-E WD	20
US Forest Service	55

Note: WD = Water District

Two alternatives that would accomplish the purpose and need of the proposed action, as well as a no action alternative, are evaluated in this environmental assessment (EA).

ES.2 PURPOSE AND NEED FOR ACTION

The CVPIA, Title XXXIV of the Reclamation Projects Authorization and Adjustment Act of 1992 (Public Law 102-575), amended the previous authorizations of the CVP to include fish and wildlife protection, restoration, and mitigation as project purposes having equal priority with irrigation and domestic uses and fish and wildlife

enhancement as a project purpose equal to power generation. Section 3404(c) of the CVPIA directs the Secretary of Interior to:

> " . . . upon request, renew any existing long-term repayment or water service contract for the delivery of water for a period of 25 years and may renew such contracts for successive periods of up to 25 years each . . . (after) appropriate environmental review, including preparation of the environmental impact statement required in section 3409 . . . ."

Section 3409 of the CVPIA required the Secretary to prepare a programmatic environmental impact statement (PEIS) to evaluate the direct and indirect impacts and benefits of implementing CVPIA. Reclamation and the US Fish and Wildlife Service (Service), a co-lead for the PEIS, released the final PEIS in October 1999 (Reclamation 1999a). This EA tiers off the PEIS to evaluate potential site-specific environmental impacts of renewing the long-term water service contracts for the Sacramento River Division contractors. The purpose of this project is to renew the water service contracts with the contractors consistent with the provisions of CVPIA. The project alternatives will include the terms and conditions of the contracts which include tiered water pricing.

Long-term contract renewal (LTCR) is needed to:

- Continue beneficial use of water, developed and managed as part of the CVP, with a reasonable balance among competing demands, including the needs of irrigation and domestic uses; fish and wildlife protection, restoration, and mitigation; fish and wildlife enhancement; power generation; recreation; and other water uses consistent with requirements imposed by the State Water Resources Control Board (SWRCB) and the CVPIA;
- Incorporate certain administrative conditions into the renewed contract to ensure CVP continued compliance with current federal reclamation law and other applicable statutes; and
- Allow the continued reimbursement to the federal government for costs related to CVP construction and operation.

The area of analysis for this EA is the land within each district/county of the Sacramento River Division project area and land in the vicinity of the districts that may be affected by the proposed action. The analysis for this EA was conducted for projected conditions in 2026, the originally proposed 25-year contract renewal period. Because the process was delayed and the current proposed 25-year contract renewal period is now 2030, the analysis was revisited to review the economic results as a result of extending the renewal period. It was determined that the basic assumptions of land use, cropping patterns, etc. have not changed because the future conditions were assumed at full delivery, therefore the results have not changed. The analysis that was originally completed applies to the current proposed contract period of 2030.

ES.3 DESCRIPTION OF ALTERNATIVES

Three alternatives were identified for the renewal of long-term contracts between Reclamation and the Sacramento River Division contractors. The alternatives present a range of water service agreement provisions that could be implemented for long-term contract renewals. The No Action Alternative consists of renewing existing water service contracts as described by the Preferred Alternative of the PEIS. In November 1999, Reclamation published a proposed long-term water service contract, which is the basis of this EA's Alternative 2. In April 2000, the CVP Contractors presented an alternative long-term water service contract, which is the basis of this EA's Alternative 1. Reclamation and the CVP Contractors continued to negotiate the CVP-wide terms and conditions with these proposals serving as "bookends." This EA also considers these proposals with the No Action Alternative as bookends to be considered for the environmental documentation to evaluate the impacts and benefits of the renewing long-term water service contracts.

ES.4 SUMMARY OF CONCLUSIONS

Potential impacts associated with implementing the No Action Alternative, Alternative 1, and Alternative 2 are listed in Table ES-2 and described in detail in Chapter 3 of this EA. As shown in Table ES-2, no significant impacts would occur with implementation of these alternatives.

Table ES-2
Summary of Potential Impacts

Resource	No Action Alternative	Alternative 1	Alternative 2
Agricultural Economics	Colusa County and Orland-Artois water districts would have to pay the highest Full-Cost-Rate of any of the Sacramento River Division contractors if tiered pricing were adopted.	Same as under the No Action Alternative.	The Davis and Kirkwood water districts on the Tehama-Colusa Canal and the Corning Water District on the Corning Canal would have the largest dollar increases in water rates in the West Sacramento Valley.
	Total irrigated acreage within the service area in 2030 is projected to be approximately 95,000 acres in an average hydrologic year and approximately 82,000 acres in a dry hydrologic year.	Same as under the No Action Alternative.	About 65,000 acres, or approximately 68 percent of the service area in 2030, is projected to be fallowed under the worst-case scenario of an average hydrologic year following five dry hydrologic years, in response to water costs. Model runs imply that there would be no incremental impacts on irrigated acreage within the affected districts in a dry year following five years of either dry, average, or wet hydrologic conditions, when compared to the No Action Alternative in a year of dry hydrologic conditions.
	Total Gross Value of Production in 2030 is projected to be $73 million dollars under average hydrologic conditions and $66 million dollars in dry hydrologic conditions.	Same as under the No Action Alternative.	Under the worst-case scenario of an average hydrologic year following five dry hydrologic years, about $40 million, or almost 55 percent of the area's total projected gross value of production of about $73 million dollars, would be lost (in 1999 dollar terms). In addition, there would be a total decline in net farm revenue of about $2.7 million. These impacts would derive entirely from increased CVP water rates relative to No Action.
	Total regional economic output (in 1991 terms) was approximately $2.6 billion, with about 38,300 full-time equivalent jobs and about $1.1 billion of income.	Same as under the No Action Alternative.	Under the worst-case scenario of a dry year following five years of dry hydrologic conditions related to the No Action Alternative in a year of dry hydrologic conditions, there would be a loss of net farm revenues of about $400,000. These

Table ES-2
Summary of Potential Impacts *(continued)*

Resource	No Action Alternative	Alternative 1	Alternative 2
			impacts would derive entirely from increased CVP water rates relative to No Action. The agricultural output in the Tehama-Colusa-Glenn county area could decrease by about 5 percent, while overall industrial output would be expected to decrease by about 3.2 percent from No Action levels. Overall employment in the region would be expected to decrease by about 2.6 percent, and overall income by place of work in the region would be expected to decrease by about 3.8 percent.
Water Resources	Minimal changes in average water use over time are expected, with short-term fluctuations greater in magnitude than the long-term change. Reductions in CVP deliveries are likely to lead to local, short-term increases in groundwater use. Reductions in irrigation are also likely to result in reductions in groundwater recharge, affecting down gradient farmers.	Same as under No Action Alternative.	Under the worst-case scenario of a sequence of dry years followed by an average year, water purchases by the contractors could be greatly reduced, and might drive some districts out of business. Groundwater use would be localized in areas with substantial groundwater resources.
Land Use Resources	Total irrigated acreage within the service area is projected to be approximately 95,300 acres in 2030 in an average hydrologic year.	Same as under No Action Alternative.	Implementing Alternative 2 would not have a direct effect on land uses. Loss of 65,000 irrigated acres under the worst-case scenario of an average hydrologic year following five dry years would be at least a substantial, temporary land use change.
Biological Resources	Winter-run, Spring-run and Fall/Late fall-run Chinook salmon and Central Valley steelhead would be negatively affected by RBDD operations and water diversion in the Sacramento River Division, although a fish screen exists at the RBDD.	Same as under No Action Alternative.	Same as under No Action Alternative, plus additional impacts on species and habitat affected by a reduction in agricultural lands. Loss of 20,000 acres of rice and small grain production would reduce food and habitat sources for special status species, such as the giant garter snake,

Table ES-2
Summary of Potential Impacts *(continued)*

Resource	No Action Alternative	Alternative 1	Alternative 2
			Aleutian Canada goose and the sandhill crane, by about 5% in the Sacramento Valley. In some cases agricultural lands are being restored to native riparian habitat by various projects. The reduction of return flows associated with the loss of 65,000 irrigated acres under the worst-case scenario would have a local impact on habitat and species in wetland and riparian areas fed by these flows. US Fish and Wildlife Service issued a final Biological Opinion on February 15, 2005, indicating that the proposed action would not adversely affect listed species.
Social Conditions and Environmental Justice	There should be no significant impact on population, income, or employment levels or predicted growth in Colusa, Glenn, and Tehama counties from implementing the No Action Alternative. Minority or low-income populations would not be disproportionately affected by implementing the No Action Alternative.	Same as under No Action Alternative.	The precise outcome of the increase in water prices would probably vary from farm to farm; however, it is probable that agricultural employment levels in each district would drop under the worst-case scenario of an average hydrologic year following five dry years. Direct and indirect impacts to employment are possible, but overall impacts to the Sacramento Valley region are not likely to be large because employment levels are increasing and most of the increase is expected outside the agricultural sector. Any negative impact on agricultural employment would be reflected in the migrant farmworker community, which is predominately minority and low-income.
Recreational Resources	No impacts to the use or enjoyment of recreational opportunities in the project vicinity are expected under the No Action Alternative.	Same as under No Action Alternative.	Recreation opportunities in the Sacramento River Division project area and vicinity are expected to remain unchanged.

Table ES-2
Summary of Potential Impacts *(continued)*

Resource	No Action Alternative	Alternative 1	Alternative 2
Indian Trust Assets	No impacts to Indian Trust Assets would occur.	Same as under No Action Alternative.	Same as under No Action Alternative.
Cultural Resources	No direct impacts to cultural resources would be expected under the No Action Alternative. Indirect impacts could result if it were to lead to changes in agricultural practices or land use. However, the No Action Alternative would be expected to have a small potential for influencing decisions on future agricultural practices and land use.	Same as under No Action Alternative.	Anticipated changes to cultural resources could result from removing land from agricultural production. If land currently planted is left fallow, there may be a beneficial effect to preserving archaeological resources; however, if this land is not managed to prevent erosion, there could be impacts to archaeological resources. If land taken out of agricultural use is developed for commercial, industrial, or residential uses, there could be impacts related to ground-disturbing activities.
Geology and Soils	Under prolonged dry conditions, some of the marginally productive lands might be permanently withdrawn from irrigation. Fallowing and permanent withdrawal of land that has been cultivated could result in increased potential for soil erosion, if the land were not managed to prevent it.	Same as under No Action Alternative.	If approximately 65,000 acres were taken out of irrigation, it would likely have a severe effect on soils. If large tracts of land were taken out of irrigation relatively rapidly, it would be difficult to manage the land to prevent erosion.
Air Quality	There would be no net increase in emissions and therefore No Action would not be subject to the Clean Air Act conformity rule.	Same as under No Action Alternative.	The predicted change in cropping patterns is anticipated to result in increases in ozone precursor emissions (from fugitive dust). However, the indirect effects of altered crop patterns on air pollutant emissions are not expected to have a noticeable impact on overall air quality conditions in the Sacramento Valley.
Visual Resources	Anticipated changes to agricultural viewsheds under the No Action Alternative would be minimal.	Same as under No Action Alternative.	Agricultural viewsheds under Alternative 2 would be similar to existing conditions and the impact would be minimal.

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CHAPTER 1
PURPOSE AND NEED

1.1 INTRODUCTION

In accordance with Section 3404(c) of the Central Valley Project Improvement Act (CVPIA), the Bureau of Reclamation (Reclamation) proposes to renew the long-term water service contracts for water contractors in the western Sacramento Valley for a period of 25 or 40 years, depending on water use. These contractors currently receive water under an interim contract that will expire on February 28, 2006. By renewing the long-term contracts in early 2005, Reclamation would continue delivering Central Valley Project (CVP) water to the contractors for 25 years for agricultural and municipal/industrial (M&I) purposes of use, or 40 years for M&I purposes of use only, from March 1, 2005, through February 28, 2030

The CVP was authorized in 1935 and is the largest water storage and delivery system in California, covering 35 of the state's 58 counties. The CVP is divided into nine divisions, of which the Sacramento River Division is one. The Sacramento River Division, authorized on September 29, 1950, is further divided into the Tehama-Colusa Canal Unit and the Corning Canal Unit; the Black Butte Unit was incorporated in 1963. The Sacramento River Division contains 18 contractors served primarily by the Tehama-Colusa Canal (TCC) and the Corning Canal, in Tehama, Glenn, Colusa, and Yolo Counties, although additional districts west of the TCC that receive CVP water from Black Butte Reservoir are also included. Water contractors in the Sacramento River Division covered in this document are listed in Table 1-1 and locations of those contractors receiving more than 100 acre-feet (af) of water are shown in Figure 1-1. Appendix F provides a copy of a representative water service contract; Appendix G provides maps of all the applicable service areas.

Two alternatives that would accomplish the purpose and need of the proposed action, as well as a no action alternative, are evaluated in this environmental assessment (EA). Reclamation has prepared this EA to determine if renewing the Sacramento River Division long-term water service contracts would result in any site-specific significant

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Whitney Construction	25
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Note: WD = Water District

1-1 Sacramento River Division – Regional Location

impacts to the natural or human environment. This EA has been prepared pursuant to and in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 USC§ 4321-4370d), the Council on Environmental Quality (CEQ) regulations on implementing NEPA (40 CFR Parts 1500-1508), and Reclamation's NEPA handbook (Bureau of Reclamation 1990).

1.2 PURPOSE AND NEED FOR ACTION

The CVPIA, Title XXXIV of the Reclamation Projects Authorization and Adjustment Act of 1992 (Public Law 102-575), amended the previous authorizations of the CVP to include fish and wildlife protection, restoration, and mitigation as project purposes having equal priority with irrigation and domestic uses, and fish and wildlife enhancement as a project purpose equal to power generation. Section 3404(c) of the CVPIA directs the Secretary of Interior to:

" . . . upon request, renew any existing long-term repayment or water service contract for the delivery of water for a period of 25 years and may renew such contracts for successive periods of up to 25 years each . . . (after) appropriate environmental review, including preparation of the environmental impact statement required in section 3409 . . ."

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The purpose of this project is to renew the Sacramento River Division water service contracts, consistent with the provisions of CVPIA. The project alternatives will include the terms and conditions of the contracts and tiered water pricing.

Long-term contract renewal (LTCR) is needed to:

- Continue beneficial use of water, developed and managed as part of the CVP, with a reasonable balance among competing demands, including the needs of irrigation and domestic uses; fish and wildlife protection, restoration, and mitigation; fish and wildlife enhancement; power generation; recreation; and other water uses consistent with requirements imposed by the State Water Resources Control Board (SWRCB) and the CVPIA;
- Incorporate certain administrative conditions into the renewed contracts to ensure CVP continued compliance with current federal reclamation law and other applicable statutes; and

- Allow the continued reimbursement to the federal government for costs related to CVP construction and operation.

The area of analysis for this EA includes portions of Tehama, Glenn, Colusa and Yolo Counties within the boundaries of the Sacramento River Division contractors that may be affected by the proposed action. The analysis for this EA was conducted for projected conditions in 2026, the initially proposed 25-year contract renewal period. Because the process was delayed and the current proposed 25-year contract renewal period is now 2030, the analysis was revisited to review the economic impacts as a result of extending the renewal period. It was determined that the basic assumptions of land use, cropping patterns, etc. have not changed because the future conditions were assumed at full delivery, therefore the results have not changed. The analysis that was originally completed applies to the current proposed contract period of 2030.

1.3 PUBLIC INVOLVEMENT

On October 15, 1998, Reclamation published a notice of intent (NOI) in the Federal Register to announce the preparation of environmental documents for long-term renewal of CVP water service contracts. Interested parties were encouraged to attend scoping meetings and informational workshops to comment on the environmental documents. Scoping meetings were held at eight locations throughout the CVP service area. Reclamation prepared a scoping report, documenting the process, in April 1999 (Reclamation 1999b).

The Draft EA was circulated for public and agency review for 30 days. This public comment period provided an opportunity for the public to review the issues addressed in the impact analysis and to offer comments on any aspect of the process. Comments on the Draft EA have been responded to and appropriate revisions were made in the Final EA. The Draft EA was revised and recirculated for public comment for a 30-day period in September 2003, and again in July 2004 following negotiations of the draft contract and finalization of the Biological Assessment.

1.4 RELATED ACTIVITIES

There are several activities being implemented by Reclamation as part of the obligation to manage and operate the CVP. The following discussion identifies these activities and describes their relation to the renewal of the Sacramento River Division water service contracts. Related studies and projects that have been conducted recently or are currently being completed are summarized in Table 1-2.

Table 1-2
Related Activities

Project or Study and Lead Agency	Summary
Long-Term Contract Renewal of Other Existing CVP Water Service Contracts – Reclamation	Reclamation is in negotiation with other CVP water contractors for renewal of long-term contracts.
Renewal of Sacramento River Settlement Contracts - Reclamation	
CALFED Bay-Delta Program – CALFED	Established in May 1995, the consortium of federal and state agencies is charged with the development of a long-term solution to the Delta water concerns. CALFED is completing an EIR/EIS as part of this process. Renewal of Long-Term CVP Contracts is assumed within the CALFED EIR/EIS.
Coordinated Operating Agreement (COA) and Operations Criteria and Plan (OCAP) Update – US Bureau of Reclamation and California Department of Water Resources	Provisions and requirements of the CVPIA, SWRCB Order 1641, the CALFED Bay-Delta Program, and other agency mandates require that the existing operational roles and responsibilities of the SWP and CVP be reviewed and updated to provide appropriate long-term operating criteria and procedures for the two primary water storage and delivery projects affecting waterways of the Central Valley. The OCAP Biological Opinion (BO) was completed in August of 2004.

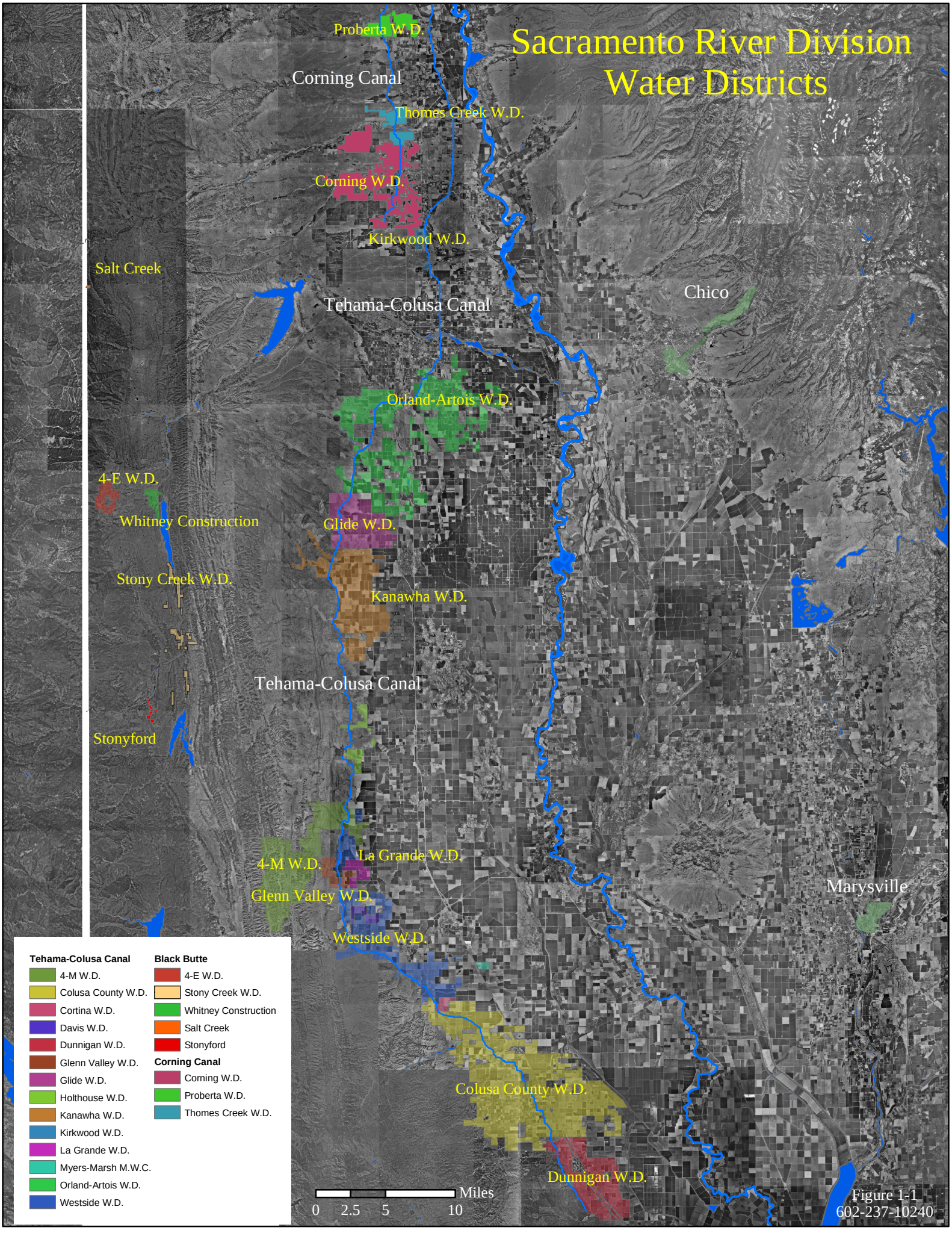

Figure 1-1
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CHAPTER 2
DESCRIPTION OF ALTERNATIVES

2.1 INTRODUCTION

This chapter summarizes the long-term water service contract negotiations process and descriptions of the alternatives considered in this EA.

2.2 LONG-TERM WATER SERVICE CONTRACT NEGOTIATIONS PROCESS

The CVPIA states that the Secretary of Interior shall, upon request, renew any existing long-term irrigation repayment or water service contract for the delivery of CVP water for a period of 25 years and may renew such contracts for successive periods of up to 25 years each. Consistent with the Act of June 21, 1963, Public Law 88-44 (77 Stat. 68), Municipal and Industrial (M&I) contracts shall be renewed for successive periods of up to 40 years each under terms and conditions that are mutually agreeable. The CVPIA also states that no renewals shall be authorized until appropriate environmental review, including the PEIS, has been completed. The PEIS provided a programmatic environmental analysis and identified the need for site-specific environmental documents for the long-term contract renewal process.

The CVPIA also stated that contracts that expire prior to the completion of the PEIS may be renewed for interim periods. The interim renewal contracts reflect existing Reclamation law, including modifications due to Reclamation Reform Act and applicable CVPIA requirements. The initial interim contract renewals were negotiated in 1994 with subsequent renewals for periods of up to two years to provide for continued water service. Many of the provisions from the interim contracts were assumed to be part of the contract renewal provisions in the description of the PEIS Preferred Alternative.

In 1998, the long-term contract renewal process was initiated. Reclamation reviewed the interim contract provisions that were consistent with Reclamation law and other requirements, comments from the Draft PEIS, and comments obtained during the interim contract renewal process. Reclamation proposed that the provisions of the long-term contract applicable to all water service contractors would be negotiated with

representatives of all CVP water service contractors. Following the acceptance of the CVP-wide provisions, Reclamation proposed that division-specific provisions would be negotiated and contractor-specific provisions would be negotiated. Reclamation also proposed that all water service contracts except for Central San Joaquin Irrigation District, Stockton East Water District, and Colusa Drain Mutual Water Company would be renewed pursuant to this action. Contract renewals for these three contractors would be delayed until the completion of water management studies for their primary sources of CVP water, the Stanislaus River and the Sacramento River.

Reclamation published the initial proposed contract in November 1999. There were several negotiations sessions throughout the next six months. The CVP water service contractors published a counter-proposal in April 2000. The November 1999 proposal represents one "bookend" for negotiations and the April 2000 proposal represents the other "bookend." The results of the negotiations are reflected in the subsequent proposals. The primary differences between the proposals are summarized in Table 2-1 at the end of this chapter.

2.3 ISSUES CONSIDERED AS PART OF LONG-TERM CONTRACT RENEWALS

The long-term contract renewal process addressed several other issues in addition to the contract provisions. These issues include the needs analyses, changes in service areas, and water transfers.

2.3.1 Needs Analyses

The water rights granted to the CVP by the State Water Resources Control Board (SWRCB) require the Federal government to determine if the water is being used in a beneficial manner. The needs analysis methodology was developed to indicate that the CVP water is being used beneficially. The needs analysis was computed for each contractor within the various divisions or units of the CVP using a multiple-step approach. First, the existing water demand was calculated for each contractor. For agricultural contractors, crop acreage, cropping patterns, crop water needs, effective precipitation, and conveyance losses were reviewed. For M&I contractors, residential, commercial, industrial, institutional, recreational, and environmental uses; landscape coefficients; system losses; and landscape acreage were reviewed. Second, future changes in water demands based upon crops, M&I expansion, and changes in efficiencies were reviewed. Third, existing and future non-CVP water supplies were identified for each contractor including groundwater and other surface water supplies. The initial calculation of CVP water needs was limited by the assumption that groundwater pumping would not exceed the safe yield of the aquifer. In addition, the actual water needs were calculated at each division or unit level to allow for intra-regional transfers on an annual basis.

Beneficial and efficient future water demands were identified for each unit. The demands were compared to available non-CVP water supplies to determine the need for CVP water. If the need was less than contract amounts, the CVP water service contract amount could be reduced. Because the CVP was initially established as a supplemental water supply for areas without adequate supplies, the needs for most contractors are at

least equal to the CVP water service contract and frequently exceeded the previous contract amount. Consequently, this environmental analysis does not include increased total contract amounts and the CVP contract amount will be limited by the existing CVP contract, unless additional water can be provided without harm to other water users and can be stored, delivered, and used consistent with applicable laws, including the Endangered Species Act.

2.3.2 Changes in Water Service Areas

This environmental analysis does not consider future changes in water service area boundaries for use of CVP water. Any future changes to water service area boundaries for use of CVP water will be evaluated in separate technical and environmental analyses.

2.3.3 Water Transfers

Several different types of transfers are considered for long-term contract renewals. Intra-CVP contract transfers have occurred regularly throughout the CVP and are frequently limited to scheduling changes between adjoining districts. Reclamation has historically issued and will continue to address these types of transfers under separate environmental analysis.

It is recognized that water transfers will continue to occur and that the CVP long-term contracts will provide the mechanism. Because CVPIA has allowed these transfers, as evaluated in the PEIS for the Preferred Alternative, the No Action Alternative includes water transfer provisions. These provisions for transfers are also included in both Alternatives 1 and 2. However, it is difficult to identify all of the water transfer programs that could occur with CVP water in the next 25 years. Reclamation will continue to require separate environmental documents for proposed transfers, and will work toward establishing criteria and protocols to allow rapid technical and environmental review of future proposed transfers.

2.4 DEVELOPMENT OF ALTERNATIVES

Three alternatives were identified for the renewal of long-term contracts between Reclamation and the Sacramento River Division contractors. The alternatives present a range of water service agreement provisions that could be implemented for long-term contract renewals. The No Action Alternative consists of renewing existing water service contracts as described by the Preferred Alternative of the PEIS. In November 1999, Reclamation published a proposed long-term water service contract. In April 2000, the CVP Contractors presented an alternative long-term water service contract. Reclamation and the CVP Contractors continued to negotiate the CVP-wide terms and conditions with these proposals serving as "bookends." This EA also considers these proposals with the No Action Alternative as bookends to be considered for the environmental documentation to evaluate the impacts and benefits of the renewing long-term water service contracts.

2.4.1 No Action Alternative

The No Action Alternative assumes renewal of long-term CVP water service contracts for a period of 25 years in accordance with implementation of CVPIA as described in

the PEIS Preferred Alternative. The PEIS Preferred Alternative assumed that most contract provisions would be similar to many of the provisions in the 1997 CVP Interim Renewal Contracts, which included contract terms and conditions consistent with applicable CVPIA requirements. In addition, the No Action Alternative assumes tiered pricing provisions and environmental commitments as described in the PEIS Preferred Alternative. The provisions of the No Action Alternative are summarized in Table 2-1. These provisions were described in the Final PEIS.

Several applicable CVPIA provisions are summarized in the description of the No Action Alternative as they are addressed in a different manner in Alternatives 1 and/or 2, and therefore could result in changes in environmental impacts or benefits. These issues include tiered water pricing, definition of M&I water users, water measurement, and water conservation.

Tiered Water Pricing. Tiered water pricing in the No Action Alternative is based upon use of a "80/10/10 Tiered Water Pricing from Contract Rate to Full Cost Rate" including appropriate Ability-to-Pay limitations. Under this approach, the first 80% of the maximum contract total would be priced at the applicable Contract Rate. The next 10% of the contract total would be priced at a rate equal to the average of the Contract Rate and Full Cost Rate. The final 10% of the contract total would be priced at Full Cost Rate. The terms "Contract Rate" and "Full Cost Rate" are defined by the CVP rate-setting policies, P.L. 99-546, and the Reclamation Reform Act (RRA), respectively. The Contract Rate for irrigation and M&I water includes the contractor's allocated share of CVP main project operations and maintenance (O&M), O&M deficit, if any, and capital cost. The contract rate for irrigation water does not include interest on capital. The contract rate for M&I water includes interest on capital computed at the CVP M&I interest rate. The Full Cost rate for irrigation and M&I water includes interest at the RRA interest rate.

In addition to the CVP water rate, contractors are required to pay a Restoration Charge on all deliveries of CVP water. Reclamation law and policy provides full or partial relief to irrigation contractors on Restoration Charges and the capital rate component of the water rate and is based upon local farm budgets. Ability-to-Pay relief, relative to the irrigation water rate, is fully applicable only to the first 80% of the contract total. Ability-to-Pay relief is not applicable to the third tier water rate. The second tier may reflect partial Ability-to-Pay relief, as it is equal to the average of the first and third tiers. The Ability-to-Pay law and policy do not apply to CVP O&M costs, municipal or industrial water rates, CVP distribution facilities, or non-CVP water costs.

The prices of CVP water used in the No Action Alternative are based upon 1994 irrigation and municipal/industrial CVP water rates.

Definition of Municipal and Industrial Users. The definition of M&I users was established in portions of a 1982 Reclamation policy memorandum. In many instances, the definition of municipal users is easily definable. However, with respect to small tracts of land, the 1982 memorandum identified agricultural water as agricultural water

service to tracts that can support $5,000 gross income for a commercial farm operation. The memorandum indicates that this criterion can be generally met by parcels greater than 2 acres. Based on this analysis, the CVP has generally applied a definition of five acres or less for M&I uses in the CVP for many years. The CVP contractors can seek a modification for a demonstrated need of agricultural use on parcels between two and five acres in size and request such a modification from the Contracting Officer.

Water Measurement. The No Action Alternative includes water measurement at every agriculture turnout or M&I service connection to measure CVP water deliveries. It is assumed that if other sources are commingled with the CVP water, including groundwater or other surface waters, that the measurement devices would report gross water deliveries. Additional calculations would be required to determine the exact quantity of CVP water. However, if groundwater or other surface waters are delivered by other means to the users, the No Action Alternative did not include additional measurement devices except as required by individual users' water conservation plans.

Water Conservation. The water conservation assumptions in the No Action Alternative include water conservation actions for municipal and on-farm uses assumed in the DWR Bulletin 160-93; and conservation plans completed under the 1982 Reclamation Reform Act consistent with the criteria and requirements of the CVPIA. Such criteria address cost-effective Best Management Practices that are economical and appropriate, including measurement devices, pricing structures, demand management, public information, and financial incentives.

2.4.2 Alternative 1

Alternative 1 is based upon the proposal presented by CVP water service contractors to Reclamation in April 2000. However, there were several issues included in the April 2000 proposal that could not be included in Alternative 1 because they are not consistent with existing Federal or state requirements or would require a separate Federal action, as described below.

- The April 2000 proposal includes Terms and Conditions to provide a highly reliable water supply, and provisions to improve the water supply capabilities of the CVP facilities and operations to meet this goal - *These issues were not included in Alternative 1 because these issues would require additional Federal actions with separate environmental documentation and also limit the Secretary's obligation to achieve a reasonable balance among competing demands as required by the CVPIA. Currently Reclamation is completing the least cost plan to restore project yield in accordance with Section 3408(j) of CVPIA and under the CALFED program.*
- The April 2000 proposal includes language to require renewal of contracts after 25 years upon request of the contractor - *The study period for this EA is 25 years which coincides with the contract period applicable to irrigation contracts and required by CVPIA. Renewal after 25 years would be a new Federal Action and would require new environmental documentation.*

- The April 2000 proposal did not include provisions for compliance with biological opinions - *Biological consultations are required by the Consultation and Coordination requirements established by Executive Order for all Reclamation activities. These are binding on Reclamation and provisions are needed to address this requirement.*
- The April 2000 proposal included provisions for water transfers - *It is recognized that water transfers will continue and that the CVP long-term contracts will provide the mechanisms for the transfers. However, it would be difficult to identify all of the water transfer programs that could occur with CVP water in the next 25 years. Reclamation would continue with separate environmental documents for transfers, and will establish criteria for rapid technical and environmental review of proposed transfers.*
- The April 2000 proposal includes provisions for transfer of O&M requirements - *It is recognized that transfers of operation and maintenance to the group of contractors will continue and that the CVP long-term contracts will provide the mechanisms for such transfers. However, it would be difficult to identify all of the operation and maintenance transfer programs that could occur with CVP water in the next 25 years. Reclamation would require separate environmental documents for such transfers.*
- The April 2000 proposal includes provisions for resolution of disputes - *Assumptions for resolution of disputes were not included in Alternative 1 and at this time would not appear to affect environmental conditions.*
- The April 2000 proposal includes provisions for expansion of the CVP service areas by the existing CVP water contractors - *The study area for the long-term contract renewal process is defined by the existing service area boundaries. Expansion of the service area boundaries would be a new Federal Action and would require separate environmental documentation.*

The April 2000 proposal did include several provisions that were different than the assumptions for No Action Alternative and those provisions are included in Alternative 1, as summarized in Table 2-1. The April 2000 proposal also included several provisions that involve specific language changes that would not significantly modify CVP operations in a manner that would affect the environment as compared to the No-Action Alternative but could affect specific operations of a contractor, as described in Table 2-1.

It should be noted that the tiered pricing requirements (including unit prices for CVP water) and definition of M&I users in Alternative 1 would be the same as in the No Action Alternative.

2.4.3 Alternative 2

Alternative 2 is based upon the proposal presented by Reclamation to CVP water service contractors in November 1999. However, there were several provisions included in the November 1999 proposal that are not going to be included in Alternative 2. These provisions would constitute a separate Federal action, as described below.

- The November 1999 proposal includes provisions for the contractor to request approval from Reclamation of proposed water transfers - *Water transfers were not included in Alternative 2 because such actions cannot be definitely described at this time, and essentially constitute a separate Federal action and require separate environmental documentation.*
- The November 1999 proposal includes provisions for transfer of O&M to third parties - *Operations and maintenance transfers were not included in Alternative 2 because these actions would be a separate Federal action and require separate environmental documentation.*

The November 1999 proposal did include several provisions that were different than the assumptions for No Action Alternative and included in Alternative 2, as summarized below and in Table 2-1. The primary differences are related to tiered pricing and the definition of M&I users.

Tiered Water Pricing. Tiered water pricing in Alternative 2 is based upon a definition of "Category 1" and "Category 2" water supplies. "Category 1" is defined as the quantity of CVP water that is reasonably likely to be available for delivery to a contractor and is calculated on an annual basis as the average quantity of delivered water during the most recent five year period. For the purposes of this Alternative, the "Category 1" water supply is defined as the "contract total." "Category 2" is defined as that additional quantity of CVP water in excess of Category 1 water that may be delivered to a contractor in some years. Under Alternative 2, the first 80% of Category 1 volume would be priced at the applicable Contract Rate for the CVP. The next 10% of the Category 1 volume would be priced at a rate equal to the average between the Contract Rate and Full Cost Rate as defined by Reclamation law and policy. The final 10% of the Category 1 volume would be priced at the Full Cost Rate as required by the CVPIA. All Category 2 water, when available, would be priced at Full Cost Rate. It should be noted that Category 1 and Category 2 volumes will change every year based upon the average deliveries for the "most recent five years," with limited exception, based upon the findings of the water needs assessment. Alternative 2 assumes the sum of Category 1 and Category 2 water is equal to the maximum quantity included in the contractors' existing water service contract. The quantity is the same as the No Action Alternative and Alternative 1. The terms "Contract Rate" and "Full Cost Rate" are discussed under Tiered Pricing for the No Action Alternative. The same Ability-to-Pay adjustments would be applicable to Restoration Charges and tiered water rates as described in the No Action Alternative.

The prices of CVP water used in Alternative 2 are based upon irrigation and M&I CVP water rates presented in the November 17, 1999 Financial Workshop Handouts 1 and 2.

Definition of Municipal and Industrial Users. The definition of M&I water includes all tracts less than or equal to five acres unless the Contracting Officer is satisfied that the use of such water meets the definition of "Irrigation Water."

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED

2.5.1 Nonrenewal of Long-term Contracts

Nonrenewal of existing contracts is considered infeasible based on Section 3404(c) of the CVPIA. This alternative was considered but eliminated from analysis in this EA because Reclamation has no discretion not to renew the contracts.

2.5.2 Reduction in Contract Amounts

Reduction of contract amounts was considered in certain cases but rejected from analysis. The reason for this is twofold. First, water-needs analyses have been completed for all contracts and in almost all cases the needs exceed or equal the current total contract amount. Secondly, in order to implement good water management, the contractors need to be able to store or immediately use water available in wetter years when more water is available. By quantifying contract amounts in terms of the needs analyses and the CVP delivery capability, the contractors can make their own economic decisions. Allowing the contractors to retain the full water quantity gives the contractors assurance that the water will be available to them for storage investments. In addition the CVPIA, in and of itself, achieves a balance in part through its dedication of significant amounts of CVP water, and actions to acquire water for environmental purposes.

2.6 SELECTION OF THE PREFERRED ALTERNATIVE

It is anticipated that the final contract language and the long-term contract renewal Preferred Alternative will represent a negotiated position between Alternatives 1 and 2. Therefore, it is anticipated that the impacts will be either equal to or less than those identified for Alternative 1, Alternative 2, or No Action Alternative.

2.7 SUMMARY OF CONCLUSIONS

Potential impacts associated with implementing the No Action Alternative, Alternative 1, and Alternative 2 are listed in Table 2-2 and described in detail in Chapter 3 of this EA. As shown in Table 2-2, no significant impacts would occur with implementation of these alternatives.

Table 2-1
Comparison of Contract Provisions Considered in Alternatives

Provision	No Action Alternative Based on PEIS and Interim Contracts	Alternative 1 Based on April 2000 Proposal by Contractors	Alternative 2 Based on November 1999 Proposal by Reclamation
Explanatory Recitals	Assumes water rights held by CVP from SWRCB for use by water service contractors under CVP policies	Assumes CVP Water Right as being held in trust for project beneficiaries that may become the owners of the perpetual right.	Same as No Action Alternative
	Assumes that CVP is a significant part of the urban and agricultural water supply	Assumes CVP as a significant, essential, and irreplaceable part of the urban and agricultural water supply	Same as No Action Alternative
	Assumes increased use of water rights; the need to meet water quality standards and fish protection measures, and other measures that constrain the use of CVP water	Assumes that CVPIA impaired ability of CVP to deliver water	Same as No Action Alternative
	Assumes the need for the 3408(j) study	Assumes implementation of yield increase projects per 3408(j) study	Same as No Action Alternative
	Assumes that loss of water supply reliability would have impact on socioeconomic conditions and change land use	Assumes that loss of water supply reliability would have significant adverse socioeconomic and environmental impacts in CVP service area	Same as No Action Alternative
Definitions			
"Charges"	Charges defined as payments required in addition to Rates	Assumes rewording of definition of Charges to exclude both Rates and Tiered Pricing Increments	Same as No Action Alternative
"Category 1 and Category 2"	Tiered Pricing as in PEIS	Not included	Tiered Pricing for Categories 1 and 2
"Contract Total"	Contract Total described as Total Contract	Same as No Action Alternative	Described as basis for Category 1 to calculate Tiered Pricing
"Landholder"	Landholder as described in existing Reclamation Law	Assumes rewording to specifically define Landholder with respect to ownership, leases, and operations	Assumes rewording to specifically define Landholder with respect to ownership and leases

Table 2-1
Comparison of Contract Provisions Considered in Alternatives *(continued)*

Provision	No Action Alternative Based on PEIS and Interim Contracts	Alternative 1 Based on April 2000 Proposal by Contractors	Alternative 2 Based on November 1999 Proposal by Reclamation
"M&I Water"	Assumes rewording to provide water for irrigation of land in units less than or equal to five acres as M&I water unless Contracting Officer satisfied use is irrigation	M&I water described for irrigation of land in units less than or equal to two acres	Same as No Action Alternative
Terms of Contract - Right to Use Contract	Assumes that contracts may be renewed	States that contract shall be renewed	Same as No Action Alternative
	Assumes convertibility of contract to a 9(d) contract same as existing contracts	Includes conditions that are related to negotiations of the terms and costs associated with conversion to a 9(d) contract	Same as No Action Alternative
Water to be Made Available and Delivered to the Contractor	Assumes water availability in any year with existing conditions. Assumes water delivery per contract requirements, if available.	Similar to No Action Alternative	Actual water availability in a year is unaffected by Categories 1 and 2
	Assumes compliance with Biological Opinions and other environmental documents for contracting	Not included	Same as No Action Alternative
	Assumes that current operating policies strive to minimize impacts to CVP water users	Assumes that CVP operations will be conducted in a manner to minimize shortages and studies to increase yield shall be completed with necessary authorizations	Same as No Action Alternative
Time for Delivery of Water	Assumes methods for determining timing of deliveries as in existing contracts	Assumes minor changes related to timing of submittal of schedule	Same as No Action Alternative
Point of Diversion and Responsibility for Distribution of Water	Assumes methods for determining point of diversion as in existing contracts	Assumes minor changes related to reporting	Same as No Action Alternative
Measurement of Water Within District	Assumes measurement for each turnout or connection for facilities that are used to deliver CVP water as well as other water supplies	Assumes measurement at delivery points	Assumes similar actions in No Action Alternative but applies to all water supplies
Rates and Method of Payment for Water	Assumes Tiered Pricing is total water quantity. Assumes advanced payment for rates for two months.	Assumes Tiered Pricing is total water quantity. Assumes advanced payment for rates for one month.	Assumes Tiered Pricing is total water quantity. Assumes advanced payment for rates for six months.

Table 2-1
Comparison of Contract Provisions Considered in Alternatives *(continued)*

Provision	No Action Alternative Based on PEIS and Interim Contracts	Alternative 1 Based on April 2000 Proposal by Contractors	Alternative 2 Based on November 1999 Proposal by Reclamation
Non-interest Bearing Operation and Maintenance Deficits	Assumes language from existing contracts	Same as No Action Alternative	Same as No Action Alternative
Sales, Transfers, or Exchanges of Water	Assumes continuation of transfers with the rate for transferred water being the higher of the sellers' or purchasers' CVP cost of service rate	Assumes continuation of transfers with the rate for transferred water being the purchasers' CVP cost of service rate	Same as No Action Alternative
Application of Payments and Adjustments	Assumes payments will be applied as in existing contracts	Assumes minor changes associated with methods described for overpayment	Same as No Action Alternative
Temporary Reduction - Return Flows	Assumes that current operating policies strive to minimize impacts to CVP water users	Assumes minor changes associated with methods described for discontinuance or reduction of payment obligations	Same as No Action Alternative
Constraints on Availability of Project Water	Assumes that current operating policies strive to minimize impacts to CVP water users	Assumes Contractors do not consent to future Congressional enactments which may impact	Same as No Action Alternative
Unavoidable Groundwater Percolation	Assumes that some of applied CVP water will percolate to groundwater	Same as No Action Alternative	Same as No Action Alternative
Rules and Regulations	Assumes that CVP will operate in accordance with then existing rules	Assumes minor changes with right to non-concur with future enactments retained by Contractors	Same as No Action Alternative
Water and Air Pollution Control	Assumes that CVP will operate in accordance with then existing rules	Same as No Action Alternative	Same as No Action Alternative
Quality of Water	Assumes that CVP will operate in accordance with existing rules without obligation to operate towards water quality goals	Same as No Action Alternative	Same as No Action Alternative
Water Acquired by the Contractor Other than from the United States	Assumes that CVP will operate in accordance with existing rules	Assumes changes associated with payment following repayment of funds	Same as No Action Alternative
Opinions and Determinations	PEIS recognizes that CVP will operate in accordance with existing rules	Assumes minor changes with respect to references to the right to seek relief	Same as No Action Alternative
Coordination and Cooperation	Not included	Assumes that coordination and cooperation between CVP operations and users should be implemented and CVP users should participate in CVP operational decisions	Not included

Table 2-1
Comparison of Contract Provisions Considered in Alternatives *(continued)*

Provision	No Action Alternative Based on PEIS and Interim Contracts	Alternative 1 Based on April 2000 Proposal by Contractors	Alternative 2 Based on November 1999 Proposal by Reclamation
Charges for Delinquent Payments	Assumes that CVP will operate in accordance with existing rules	Same as No Action Alternative	Same as No Action Alternative
Equal Opportunity	Assumes that CVP will operate in accordance with existing rules	Same as No Action Alternative	Same as No Action Alternative
General Obligation	Assumes that CVP will operate in accordance with existing rules	Similar to No Action Alternative	Same as No Action Alternative
Compliance with Civil Rights Laws and Regulations	Assumes that CVP will operate in accordance with existing rules	Same as No Action Alternative	Same as No Action Alternative
Privacy Act Compliance	Assumes that CVP will operate in accordance with existing rules	Same as No Action Alternative	Same as No Action Alternative
Contractor to Pay Certain Miscellaneous Costs	Assumes that CVP will operate in accordance with existing rules	Similar to No Action Alternative	Same as No Action Alternative
Water Conservation	Assumes compliance with conservation programs established by Reclamation and the State	Assumes conditions similar to No Action Alternative with the ability to use State standards which may or may not be identical to Reclamation's requirements	Same as No Action Alternative
Existing or Acquired Water or Water Rights	Assumes that CVP will operate in accordance with existing rules	Same as No Action Alternative	Same as No Action Alternative
Operation and Maintenance by Non-federal Entity	Assumes that CVP will operate in accordance with existing rules and no additional changes to operation responsibilities under this alternative	Assumes minor changes to language that would allow subsequent modification of operational responsibilities	Assumes minor changes to language that would allow subsequent modification of operational responsibilities
Contingent on Appropriation or Allotment of Funds	Assumes that CVP will operate in accordance with existing rules	Assumes minor changes to language	Same as No Action Alternative
Books, Records, and Reports	Assumes that CVP will operate in accordance with existing rules	Assumes changes for record keeping for both CVP operations and CVP users	Same as No Action Alternative
Assignment Limited	Assumes that CVP will operate in accordance with existing rules	Assumes changes to facilitate assignments	Same as No Action Alternative
Severability	Assumes that CVP will operate in accordance with existing rules	Same as No Action Alternative	Same as No Action Alternative
Resolution of Disputes	Not included	Assumes a Dispute Resolution Process	Not included
Officials Not to Benefit	Assumes that CVP will operate in accordance with existing rules	Same as No Action Alternative	Same as No Action Alternative

Table 2-1
Comparison of Contract Provisions Considered in Alternatives *(continued)*

Provision	No Action Alternative Based on PEIS and Interim Contracts	Alternative 1 Based on April 2000 Proposal by Contractors	Alternative 2 Based on November 1999 Proposal by Reclamation
Changes in Contractor's Service Area	Assumes no change in CVP water service areas absent Contracting Officer consent	Assumes changes to limit rationale used for non-consent and sets time limit for assumed consent	Same as No Action Alternative
Notices	Assumes that CVP will operate in accordance with existing rules	Same as No Action Alternative	Same as No Action Alternative
Confirmation of Contract	Assumes Court confirmation of contract	Not included - Assumption is Court confirmation not required	Same as No Action Alternative

Table 2-2
Summary of Potential Impacts

Resource	No Action Alternative	Alternative 1	Alternative 2
Agricultural Economics	Colusa County and Orland-Artois water districts would have to pay the highest Full-Cost-Rate of any of the Sacramento River Division contractors if tiered pricing were adopted.	Same as under the No Action Alternative.	The Davis and Kirkwood water districts on the Tehama-Colusa Canal and the Corning Water District on the Corning Canal would have the largest dollar increases in water rates in the West Sacramento Valley.
	Total irrigated acreage within the service area is projected to be approximately 95,000 acres in 2030, under average hydrologic conditions, and approximately 82,000 acres in 2030, under dry hydrologic conditions.	Same as under the No Action Alternative.	About 65,000 acres, or approximately 68 percent of the service area, is projected to be fallowed in an average hydrologic year following five dry hydrologic years, in response to water costs. Model runs imply that there would be no incremental impacts on irrigated acreage within the affected districts in a dry year following five years of either dry, average, or wet hydrologic conditions, when compared to the No Action Alternative in a year of dry hydrologic conditions.
	Total Gross Value of Production is projected to be $73 million dollars in 2030 under average hydrologic conditions and $66 million dollars in dry hydrologic conditions.	Same as under the No Action Alternative.	In an average hydrologic year following five dry hydrologic years, about $40 million, or almost 55 percent of the area's total projected gross value of production of about $73 million dollar, would be lost (in 1999 dollar terms). In addition, there would be a total decline in net farm revenue of about $2.7 million. These impacts would derive entirely from increased CVP water rates relative to No Action.
	Total regional economic output (in 1991 terms) was approximately $2.6 billion, with about 38,300 full-time equivalent jobs and about $1.1 billion of income.	Same as under the No Action Alternative.	In a dry year following five years of dry hydrologic conditions related to the No Action Alternative in a year of dry hydrologic conditions, there would be a loss of net farm revenues of about $400,000. These impacts would derive entirely from increased CVP water rates relative to No Action.

Table 2-2
Summary of Potential Impacts *(continued)*

Resource	No Action Alternative	Alternative 1	Alternative 2
			The agricultural output in the Tehama-Colusa-Glenn county area could decrease by about 5 percent, while overall industrial output would be expected to decrease by about 3.2 percent from No Action levels. Overall employment in the region would be expected to decrease by about 2.6 percent, and overall income by place of work in the region would be expected to decrease by about 3.8 percent.
Water Resources	Minimal changes in average water use over time are expected, with short term fluctuations greater in magnitude than the long-term change. Reductions in CVP deliveries are likely to lead to local, short-term increases in groundwater use. Reductions in irrigation are also likely to result in reductions in groundwater recharge, affecting down gradient farmers.	Same as under No Action Alternative.	When a sequence of dry years is followed by an average year, water purchases by the contractors could be greatly reduced, and might drive some contractors out of business. Groundwater use would be localized in areas with substantial groundwater resources.
Land Use Resources	Total irrigated acreage within the service area is projected to be approximately 95,300 acres in 2030, under average hydrologic conditions.	Same as under No Action Alternative.	Implementing Alternative 2 would not have a direct effect on land uses. Loss of 65,000 irrigated acres would be at least a substantial, temporary land use change.

Table 2-2
Summary of Potential Impacts *(continued)*

Resource	No Action Alternative	Alternative 1	Alternative 2
Biological Resources	Winter-run, Spring-run and Fall/Late fall-run Chinook salmon and Central Valley steelhead would be negatively affected by RBDD operations and water diversion in the Sacramento River Division. A fish screen exists at the RBDD which reduces entrainment impacts.	Same as under No Action Alternative.	Same as under No Action Alternative plus additional impacts on species and habitat affected by a reduction in agricultural lands. Loss of 20,000 acres of rice and small grain production would reduce food sources for special status species, such as the sandhill crane, and would reduce habitat sources for such species as the giant garter snake, by about 5% in the Sacramento Valley. The reduction of return flows associated with the loss of 65,000 irrigated acres would have a local impact on habitat and species in wetland and riparian areas fed by these flows.
Social Conditions and Environmental Justice	There should be no significant impact on population, income, or employment levels or predicted growth in Colusa, Glenn, and Tehama counties from implementing the No Action Alternative. Minority or low-income populations would not be disproportionately affected by implementing the No Action Alternative.	Same as under No Action Alternative.	The precise outcome of the increase in water prices would probably vary from farm to farm; however, it is probable that agricultural employment levels in each district would drop under the worst-case scenario of an average hydrologic year following five dry years. Direct and indirect impacts to employment are possible, but overall impacts to the Sacramento Valley region are not likely to be large because employment levels are increasing and most of the increase is expected outside the agricultural sector. Any negative impact on agricultural employment would be reflected in the migrant farm worker community, which is predominately minority and low-income.
Recreational Resources	No impacts to the use or enjoyment of recreational opportunities in the project vicinity are expected under the No Action Alternative.	Same as under No Action Alternative.	Recreation opportunities in the TCC and Corning Canal project area and vicinity are expected to remain unchanged.

Table 2-2
Summary of Potential Impacts *(continued)*

Resource	No Action Alternative	Alternative 1	Alternative 2
Indian Trust Assets	No impacts to Indian Trust Assets would occur.	Same as under No Action Alternative.	Same as under No Action Alternative.
Cultural Resources	No direct impacts to cultural resources would be expected under the No Action Alternative. Indirect impacts could result if it were to lead to changes in agricultural practices or land use. However, the No Action Alternative would be expected to have a small potential for influencing decisions on future agricultural practices and land use.	Same as under No Action Alternative.	Anticipated changes to cultural resources could result from removing land from agricultural production. If land currently planted is left fallow, there may be a beneficial effect to preserving archaeological resources; however, if this land is not managed to prevent erosion, there could be impacts to archaeological resources. If land taken out of agricultural use is developed for commercial, industrial, or residential uses, there could be impacts related to ground-disturbing activities.
Geology and Soils	Under prolonged dry conditions, some of the marginally productive lands might be permanently withdrawn from irrigation. Fallowing and permanent withdrawal of land that has been cultivated could result in increased potential for soil erosion, if the land were not managed to prevent it.	Same as under No Action Alternative.	If approximately 65,000 acres were taken out of irrigation, it would likely have a severe effect on soils. If large tracts of land were taken out of irrigation relatively rapidly, it would be difficult to manage the land to prevent erosion.
Air Quality	There would be no net increase in emissions and therefore No Action would not be subject to the Clean Air Act conformity rule.	Same as under No Action Alternative.	The predicted change in cropping patterns is anticipated to result in increases in ozone precursor emissions (from fugitive dust). However, the indirect effects of altered crop patterns on air pollutant emissions are not expected to have a noticeable impact on overall air quality conditions in the Sacramento Valley.
Visual Resources	Anticipated changes to agricultural viewsheds under the No Action Alternative would be minimal.	Same as under No Action Alternative.	Agricultural viewsheds under Alternative 2 would be similar to existing conditions and the impact would be minimal.

CHAPTER 3
AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND ENVIRONMENTAL COMMITMENTS

3.1 PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

On October 30, 1992, the President signed into law the Reclamation Projects Authorization and Adjustment Act of 1992 (Public Law 102-575) that included Title XXXIV, the Central Valley Project Improvement Act. The CVPIA amended the previous authorizations of the CVP to include fish and wildlife protection, restoration, and mitigation as project purposes having equal priority with irrigation and domestic uses and fish and wildlife enhancement as a project purpose equal to power generation. Through the CVPIA, the Department of Interior is developing policies and programs to improve environmental conditions that were affected by operations, management, and physical facilities of the CVP. The CVPIA also includes tools to facilitate larger efforts in California to improve environmental conditions in the Central Valley and the San Francisco Bay-Delta system. The PEIS addressed potential impacts and benefits implementing provisions of the CVPIA. The PEIS was prepared by Reclamation and the Service.

The analysis in the PEIS was intended to disclose the probable region-wide effects of implementing the CVPIA and provide a basis for selecting a decision among the alternatives. The PEIS was developed to allow subsequent environmental documents to incorporate PEIS analysis by reference and limit the need to re-evaluate the region-wide and cumulative impacts of CVPIA. In some cases, worst-case assumptions were used to maximize the utility of the analysis for tiering within the scope of the impacts analyzed in the PEIS.

As the project-specific actions are considered, the lead agencies must determine if the specific impacts were adequately analyzed in the PEIS. If the actions under consideration were previously evaluated and the impacts of such actions would not be greater than those analyzed in the PEIS or would not require additional mitigation

measures, the actions could be considered part of the overall program approved in the PEIS Record of Decision (ROD). In such a case, an administrative decision could be made that no further environmental documentation could be necessary. If a tiered document is appropriate, the tiered document may be an EIS or an EA. The tiered documents can use the PEIS by reference to avoid duplication and focus more narrowly on the new alternatives or more detailed site-specific effects. Therefore, only changes from the alternatives considered in the PEIS would be addressed in detail in the tiered documents.

3.1.1 Localized Impacts of PEIS on Preferred Alternative

The primary impact to CVP water service contractors, as described in the PEIS, is not due to contract provisions, but rather to the implementation of CVPIA. The re-allocation of CVP water to fish and wildlife purposes under CVPIA reduced average annual CVP water deliveries to water service contractors from 2,270,000 acre-feet/year under the PEIS No-Action Alternative to 1,933,000 acre-feet/year under all of the PEIS alternatives, including the Preferred Alternative. The reduction occurred differently for various classifications of users, as summarized below.

- Average Annual CVP Water Deliveries for Agricultural water service contractors located in the Sacramento Canals Unit decreased 12 percent from pre-CVPIA Affected Environment conditions.
- Average Annual CVP Water Deliveries for Municipal water service contractors located in the Sacramento Canals Unit decreased 4 percent from pre-CVPIA Affected Environment conditions.

3.2 AGRICULTURAL ECONOMICS

3.2.1 Affected Environment

Agricultural Water Cost, Land Use and Economics

The following provides a brief characterization of the cost of CVP water as well as land use for each of the Sacramento River Division contractors potentially impacted by contract renewal.

Table 3.2-1 presents the 1994 cost-of-service rates published by Reclamation for each contractor's/district's agricultural "contract water" to preserve consistency with the PEIS. While these rates change annually in response to adjustments for inflation, their magnitude relative to other costs, which are also inflating, remains essentially the same. Thus, use of these data does not affect the conclusions.

The table also shows the maximum amount of CVP water that can be delivered directly to each contractor under their CVP contracts.

Table 3.2-1
1994 Irrigation Contract Maximum and Cost of Service Rates (1994)

Contractors	Contract Maximum (Acre-Feet)	Cost-of-Service Rate 1994 ($/Acre-Foot)
Tehama-Colusa Canal		
Colusa County WD[a]	68,165	$24.51
County of Colusa[b]		
Cortina WD	1,700	$17.67
Four-M WD	5,700	$16.34
Glenn Valley WD	1,730	$17.15
Holthouse WD	2,450	$17.61
Myers Marsh Mutual Water Company	255	$21.01
Davis WD	4,000	$18.59
Dunnigan WD	19,000	$19.56
Glide WD	10,500	$17.35
Kanawha	45,000	$19.24
Kirkwood WD	2,100	$16.62
La Grande WD[c]	7,200	$17.82
Orland-Artois WD	53,000	$23.36
Westside WD[d]	65,000	$20.45
Corning Canal		
Corning WD	23,000 + 2,300	$27.74
Proberta WD	3,500 + 2,000	$24.11
Thomes Creek WD	6,400 + 2,000	$21.64

Source: Reclamation.

a. Colusa County WD is comprised of one contract for 62,200 acre-feet and a subcontract for 5,965 acre-feet under the County of Colusa's Contract -- See Footnote b.
b. County of Colusa Contract is subcontracted to the districts in italics. Not shown are subcontracts to Colusa County WD, La Grande WD and Westside WD; these contract amounts are included with the respective contracts -- See Footnotes a, c and d.
c. La Grande WD is comprised of one contract for 5,000 acre-feet and a subcontract for 2,200 acre-feet under the County of Colusa's Contract -- See Footnote b.
d. Westside WD is comprised of one contract for 25,000 acre-feet and a subcontract for 40,000 acre-feet under the County of Colusa's Contract -- See Footnote b.

Table 3.2-2 characterizes the cropping patterns in each of the potentially affected water districts as reported to Reclamation in 1996. The table reveals a fairly wide range of cropping patterns within and between the service areas. While many have a proportionally large share of their lands receiving CVP contract water in vegetable and fruit and nut crops, a number of service areas are planted predominantly to cereal and forage crops such as wheat, rice and sugar beets.

Table 3.2-3 presents the combined cropping pattern for lands served by CVP contract water delivered through the Tehama-Colusa and Corning Canals both in terms of acres and percentages. The table indicates that the cropping patterns for the two service areas have a fairly similar balance of cereal and fruit and nut crops, while they differ significantly with respect to forage, field and vegetable crops.

Table 3.2-4 presents a number of statistics drawn from the 1997 Census of Agriculture that help to characterize the agricultural economy and land use in the affected counties which comprise economic subregions 2 and 3b of the PEIS, referred to as the Region in this EA. The table reveals that Tehama County has almost as much land in farms as the region's two other affected counties combined. However, Tehama County also has substantially less than half the irrigated acreage and a significantly lower amount of harvested acreage than either of the two other counties. The average market value of agricultural products sold per harvested acre in Tehama County in 1997 is estimated at $1,726 compared to $1,072 for Glenn County and less than $1,000 for Colusa County.

A comparison of Tables 3.2-3 and 3.2-4 reveals that in 1997 the agricultural lands that received CVP water deliveries within the region under the Sacramento River Division CVP contracts (105,369 acres) represented less than 20 percent of the irrigated land within the three affected counties (582,368 acres).

Regional Economy

Colusa County

Colusa County's largest industrial sector is agriculture, accounting for almost 30 percent of recent employment in the county. The county's 2003 unemployment rate of 17.6 percent is quite high when compared to the statewide average of 5.3 percent for the same year (California Employment Development Department 2003). According to the California Employment Development Department, Colusa County's historically high rate of unemployment is largely the result of significant seasonal fluctuations in labor demand within the agricultural sector. In 2001, Colusa County ranked 45th out of California's 58 counties with respect to per-capita income (US Bureau of Economic Analysis 2002).

Glenn County

While Glenn County, like its neighbor to the south Colusa County, has a large agriculture sector, the economic dependence of Glenn County on agriculture is not as great. The government sector constitutes the largest employer in the county, and after

Table 3.2-2
Cropping Pattern Potentially Affected Districts (1996)

	Tehama-Colusa Canal Contractors												Corning Canal Contractors				
Crop	Colusa County WD	Cortina WD	Davis WD	Dunnigan WD	Four-M WD	Glenn Valley WD	Glide WD	Holthouse WD	Kanawha	Kirkwood WD	La Grande WD	Myers Marsh Mutual Water Company	Orland-Artois WD	Westside WD	Corning WD	Proberta WD	Thomes Creek WD
	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)
Cereal Crops	3,269	130	215	1,683	190	142	4,466	43	8,234	0	775	40	10,188	3,421	848	783	770
Forage Crops	1,340	80	0	658	209	26	245	0	676	178	0	0	5,232	494	1,131	1,382	290
Field Crops	2,163	50	183	1,237	125	90	216	54	3,859	0	0	10	1,266	2,895	8	130	0
Vegetable Crops	3,018	0	489	1,148	485	200	39	265	207	0	0	70	182	3,310	0	0	0
Fruit and Nuts	19,764	343	0	1,353	0	0	165	48	325	150	0	0	9,748	2,118	2,676	243	293
Miscellaneous[1]	36	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	29,590	603	887	6,087	1,009	458	5,131	410	13,301	328	775	120	26,616	12,238	4,663	2,538	1,353
	Cropping Pattern																
Cereal Crops	11.0%	21.6%	24.2%	27.6%	18.8%	31.0%	87.0%	10.5%	61.9%	0.0%	100.0%	33.3%	38.3%	28.0%	18.2%	30.9%	56.9%
Forage Crops	4.5%	13.3%	0.0%	10.8%	20.7%	5.7%	4.8%	0.0%	5.1%	54.3%	0.0%	0.0%	19.7%	4.0%	24.3%	54.5%	21.4%
Field Crops	7.3%	8.3%	20.6%	20.3%	12.4%	19.7%	4.2%	13.2%	29.0%	0.0%	0.0%	8.3%	4.8%	23.7%	0.2%	5.1%	0.0%
Vegetable Crops	10.2%	0.0%	55.1%	18.9%	48.1%	43.7%	0.8%	64.6%	1.6%	0.0%	0.0%	58.3%	0.7%	27.0%	0.0%	0.0%	0.0%
Fruit and Nuts	66.8%	56.9%	0.0%	22.2%	0.0%	0.0%	3.2%	11.7%	2.4%	45.7%	0.0%	0.0%	36.6%	17.3%	57.4%	9.6%	21.7%
Miscellaneous[1]	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Sources: Reclamation 1996; Dornbusch & Company 2000.

1. Miscellaneous includes nursery and family gardens and orchards

Table 3.2-3
Summary of Cropping Pattern
Sacramento River Division Contractors (1996)

Crop	(a) Tehama-Colusa Canal	(b) Corning Canal	(a)+(b) Total
	(acres)	(acres)	(acres)
Cereal Crops	32,796	2,401	35,197
Forage Crops	9,138	2,803	11,941
Field Crops	12,148	138	12,286
Vegetable Crops	9,413	0	9,413
Fruit and Nuts	34,014	3,212	37,226
Miscellaneous[1]	44	0	44
Total	97,553	8,554	106,107
Cereal Crops	33.6%	28.1%	33.2%
Forage Crops	9.4%	32.8%	11.3%
Field Crops	12.5%	1.6%	11.6%
Vegetable Crops	9.6%	0.0%	8.9%
Fruit and Nuts	34.9%	37.5%	35.1%
Miscellaneous[1]	0.0%	0.0%	0.0%

Sources: Reclamation 1996; Dornbusch & Company 2000.

1. Miscellaneous includes nursery and family gardens and orchards

Table 3.2-4
Census of Agriculture Statistics (1997)

Statistic	Colusa County	Glenn County	Tehama County	Total Affected Region
Land in Farms (acres)	430,958	482,583	885,426	1,798,967
Average size of farm (acres)	532	406	650	535
Total Farms (No.)	810	1,189	1,362	3,361
Percent of Farms less than 9 acres (%)	7.0%	13.8%	18.4%	14.0%
Irrigated Land (acres)	276,562	220,235	85,571	582,368
Total Harvested Cropland (acres)	287,630	212,848	62,038	562,516
Total Market Value of Agricultural Products Sold ($000s)	$276,538	$228,221	$107,102	$611,861
Market Value of Agricultural Products Sold per Acre Harvested	$961	$1,072	$1,726	$1,088
Total Net Returns from Agricultural Sales ($000s)	$69,987	$54,117	$25,171	$149,275
Net Returns from Agricultural Sales per Acre Harvested	$243	$254	$406	$265

Sources: US Census Bureau 1997; Dornbusch & Company 2000.

agriculture, the county's largest non-governmental employment is concentrated in the retail trade and services sectors. In 2001, farm employment accounted for approximately 18.6 percent of total county employment compared to retail trade that accounted for about 15 percent of employment. Glenn County's unemployment rate in 2001 was 11.2 percent (California Economic Development Department 2002). In 2001, the county

ranked 56th out of California's 58 counties with respect to per capita income (US Bureau of Economic Analysis 2002).

Tehama County

Retail trade is the largest industrial sector in Tehama County, accounting for about 25.1 percent of the county's employment base in 2001, followed by services at 19.1 percent. In 2001, farm employment represented about 8 percent of the county's total employment base. The California Employment Development Department projects that the county's government services, and retail trade sectors are expected to account for almost 88 percent of total growth in employment from 1999 to 2006 (California Economic Development Department 2002). Tehama County's unemployment rate in 2001 was 6.4 percent, down sharply from early in the previous decade. Interestingly, Tehama County ranks between both Colusa and Glenn Counties in per capita income. In 2001, the County ranked 50th out of California's 58 counties with respect to per capita income (US Bureau of Economic Analysis 2002).

Affected Region

Table 3.2-5 summarizes 1991 industrial output, employment and Income by Place-of-Work for the entire affected region (Colusa, Glenn and Tehama Counties). Data from 1991 were used over more current information to be consistent with the temporal setting of the regional economic analysis presented in the PEIS for the CVPIA. California's Employment Development Department reported that the unemployment rate in 1991 for Colusa, Glenn and Tehama Counties was 17.5 percent, 14.3 percent and 11.1 percent, respectively.

Table 3.2-5
Estimated Output, Employment and Income by Place-of-Work Affected Region (1991)

Industrial Sector	Output ($Millions)	Employment (FTE Jobs)	Income POW ($Millions)
Agriculture	539.3	8,126	213.7
Mining	32.3	78	10.2
Construction	171.4	1,919	54.9
Manufacturing	764.0	4,511	218.6
Transportation	213.2	1,438	85.6
Trade	208.3	6,381	112.1
FIRE	220.8	1,938	129.9
Services	305.2	7,458	125.5
Government	159.4	6,313	153.3
Total	2,614.1	38,162	1,103.8

Sources: Minnesota Implan Group 1991; Dornbusch & Company 2000.
Notes:
FTE = full time equivalent
POW = place of work
FIRE = fire, insurance, real estate

3.2.2 Environmental Consequences

The estimated agricultural economic and land use impacts of the contract renewal alternatives are presented for the No Action Alternative and Alternatives 1 and 2.

Alternative 1 is ostensibly identical to the No Action Alternative framework with respect to those elements such as water rate setting and acreage limitations that may impact the socio-economies and land use within the affected region. All of the impacts of Alternative 2 are presented in terms of the incremental change relative to No Action conditions.

Methodology

The larger CVP contractors within the Sacramento River Division service area participating in, and therefore, potentially impacted by, the long-term contract-renewal process are agricultural water districts and do not require Municipal & Industrial (M&I) water. The contracts which do involve M&I water supply small amounts (<2,000 af) of water to small, very slowly growing communities and, like the other contractors, have no prospect for acquiring more water through the long-term contract renewal process. Accordingly, this section does not include a discussion of the methodology used to evaluate potential CVP M&I water-associated impacts.

The analysis of potential impacts on agricultural land use and economics of the Sacramento River Division CVP contract renewal is conducted at the level of the specific CVP contractors that would be affected. The analysis of potential regional economic impacts of the Sacramento River Division CVP contract renewal is conducted at a broader regional level. For the analysis, this region or "affected region" is defined as the three-county area including Tehama, Colusa and Glenn Counties. Some of the agricultural lands that would be directly affected by the Sacramento River Division CVP contract renewal lie within northern Yolo County. Yolo County, however, was not included in the affected region for the agricultural and regional economic impact components of analysis since the service areas of water districts within Yolo County receiving CVP water under the Sacramento River Division CVP contracts is relatively small compared to the irrigated land base of the county. Accordingly, the Sacramento River Division CVP contract water makes only a small contribution to the Yolo County agricultural and overall economy. Including Yolo County in the affected region would misleadingly dilute the indicated magnitude of the anticipated agricultural and regional impacts of the contract renewal alternatives. While certainly the secondary economic effects of the alternative CVP contract renewal proposals may extend outside of the three-county region, it is reasonable to anticipate that the majority of those impacts would be incurred within that region. Ultimately, it is the localized effects of contract renewal that is most relevant to local community plan evaluation.

Agricultural Water Cost, Land Use and Economic Impacts

The assessment of the demographic and agricultural water cost, land use and economic impacts under Alternatives 1 and 2 were based on the agricultural economic impact assessment models developed for the CVPIA PEIS (Reclamation 1999a). A detailed description of those models is presented in the Agricultural Economics and Land Use technical appendix in the PEIS. In summary, the PEIS agricultural economic and land use models were designed to estimate the potential direct impact of CVPIA-associated changes on agricultural water rates and supply/reliability on agricultural users, including

land use, water use, gross value of crop production and farmer net revenue from irrigation.

Agricultural economic and land use impacts identified in the PEIS resulted from the introduction of 80-10-10 tiered pricing, the addition of a restoration charge on each acre-foot of delivered water and the projected cost to individual CVP contractors to acquire alternative water supplies to mitigate water delivery reductions caused by CVPIA-mandated in-stream and refuge flows not offset through conservation. The PEIS agricultural economic impacts were obtained from the Central Valley Production Model (CVPM). The CVPM is a highly sophisticated tool that predicts farmer response to changes in the price and availability of resource inputs, particularly water. The types of response mechanisms built into the model include land fallowing, crop switching, changes in ground water pumping, etc. These responses ultimately have implications for the total value of crop production, land and water use and the net revenues to farmers subsequent to an event such as CVPIA implementation or contract renewal.

The CVPM as formatted for the PEIS produces output for each of 22 separate sub-regions within California's Central Valley (for reporting purposes in the PEIS, these sub-regions were aggregated into four larger regions). Almost all of the CVP contractor lands served by the Corning Canal are included in CVPM sub-region 2. CVP contractor lands served by the TCC comprise all of CVPM sub-region 3B. Accordingly, the output of the CVPM runs for sub-regions 2 and 3B were used to estimate the agricultural economic and land use implications for Sacramento River Division contractors under the No Action Alternative and Alternatives 1 and 2 for CVP contract renewal. Estimates of gross value of farm production derived from CVPM for these regions was combined with recent cropping-pattern information for the Sacramento River Division contractors to derive district-specific estimates of gross value of production under the alternative contract renewal proposals. However, due to the method of aggregation of the CVPM and associated model results developed for the PEIS it was not possible to accurately present the anticipated net revenue impacts of the contract renewal alternatives by individual water contractors served by the Sacramento River Division. Therefore, the net revenue impacts of contract renewal are derived for all the districts combined. This modeling constraint has no influence on the analysis of the potential regional economic effects of the contract alternatives since the regional analysis is conducted for all of the water districts combined to start with (as discussed in the next section).

As noted previously, Alternative 2 would increase the CVP agricultural acreage limitation from two to five acres. This change could cause some of the affected districts' agricultural users to lose their CVP agricultural designation, forcing them to purchase all of their water at M&I rates unless they can demonstrate they are indeed viable agricultural operations. For these users, Alternative 2 would have an additional impact to their cost of water beyond those generated by proposed CVP water rate-setting revisions alone. This potential impact is also addressed in the CVPM analysis, but is not a major issue within the Sacramento River Division service areas.

Regional Economic Impacts

The assessment of regional economic impacts under Alternatives 1 and 2 for CVP contract renewal applies the same data sources, models and model assumptions used for the regional economic impact analysis in the CVPIA PEIS. A detailed description of those data sources, models and model assumptions are presented in the Regional Economics technical appendix in the PEIS (Reclamation 1999a).

In summary, the PEIS regional economic impact model was designed to estimate the regional employment, output and income impacts that would result from anticipated changes in M&I, agricultural and recreation water use and cost due to CVPIA implementation. For this assessment the CVP project area was aggregated into seven sub-regions, which include both CVP and non-CVP lands. CVP contractors served by the Sacramento River Division were included in the PEIS Sacramento River Region, which accounts for about eighteen percent of the Central Valley's agricultural production on a dollar basis.

The input-output model IMPLAN (Impact Analysis for Planning) was the primary tool used to quantify the potential regional economic impacts of CVPIA implementation in the PEIS and accordingly, to assess regional economic impacts of CVP contract renewal. A detailed description of the IMPLAN model is provided in the IMPLAN Model Technical Appendix to the PEIS (Reclamation 1999a). Briefly, IMPLAN is used to quantify impacts from changes in policy and resource allocation. The model provides estimates of the total (or multiplied) economic effects that result from an initial stimulus to an industrial sector (e.g., construction, transportation & utilities, etc.). As in the current case, the stimulus might be a reduction in consumer spending in the retail sector due to escalation of household water bills.

IMPLAN is extremely useful for characterizing the economic interdependence of different sectors of an economy. Changes in the purchases and sales in one sector of an economy can affect numerous other sectors. Economists call the sum of these changes multiplier effects. There are many different kinds of economic multipliers. There are sales or output multipliers that are estimates of the effect on total private sector sales resulting from an initial change in sales. There are employment and income multipliers that are estimates of a change's effect on jobs and income in an area. There are also value-added multipliers. All of these multipliers provide estimates of the impacts on an economy from a change in output (or jobs or income) in one or more of its sectors. IMPLAN's multipliers are typically expressed for every $1 million of spending. For example, if the total employment multiplier in the construction sector for an area's economy were estimated to be 22, a $1 million drop in spending in that sector would be expected to result in the loss of 22 jobs (both directly in construction and secondarily in other sectors as a result of changes in construction-related spending). IMPLAN multipliers are derived from long-run average relationships between commercial sectors. Accordingly, the regional economic impacts of the contract renewal alternatives under consideration were evaluated only for the long-run average hydrologic condition (average hydrologic condition). Under the short-run drought condition scenario (dry hydrologic condition), it is likely that the economic impacts indicated by the IMPLAN

model would be overstated since short-run effects tend to be smaller than long-run effects (delayed response).

1991 Colusa, Glenn, and Tehama County IMPLAN data were used for this EA's analysis to be consistent with the PEIS (these were the most current available data at the time). As with the PEIS, the analysis focuses on three economic variables, industrial output, employment and Income by Place of Work (Income POW). Income POW is defined as the sum of employee compensation, proprietor's income and other property income. The Sacramento River Division contract renewal IMPLAN analysis is also aggregated into the same industrial sector groupings as reported in the PEIS.

Estimated regional economic impacts of Alternatives 1 and 2 are presented in terms of the incremental change from the No Action Alternative. The 1991 baseline IMPLAN data are the primary data used to characterize the affected economic environment (existing conditions) in the affected region. These data are also adjusted to account for the anticipated incremental regional economic impact of the Preferred Alternative for CVPIA implementation. This adjusted IMPLAN data serves as the No Action contract renewal economic conditions. All of the IMPLAN data are presented in 1991 dollars. Accordingly, while the estimated incremental cost impacts of Alternatives 1 and 2 are presented in 1999 dollars, those costs are converted to 1991 dollars for the regional economic impact analysis. In this manner, the magnitude of the potential economic impacts is evaluated in consistent 1991 dollars. The baseline data were used throughout the analysis because substantial changes to the structure of the affected region economy in 2030, independent of the contract renewals, are not anticipated and cannot be predicted without substantial speculation. This approach is consistent with the PEIS.

Agricultural Water-Cost-Related Regional Economic Impacts. If the cost of CVP water for the Sacramento River Division increases, it could affect the local economy in two ways. First, if those water cost increases result in changes to agricultural production, then local gross revenues from the sale of crops may also change (estimated using CVPM as discussed previously). The regional economic impacts of a change in gross crop revenues are estimated by inputting those projected revenue changes directly into the appropriate crop sector within the IMPLAN model (e.g., hay sector, rice sector, etc.). Second, irrespective of the impact on crop production, changes in the cost of water also affect farm income. When farm income changes, it affects farmer capital investment expenditures and the level of farmer household consumption expenditures. Consistent with the PEIS, it is assumed for the analysis of the Sacramento River Division contract renewal that any impacts to farm income anticipated to result from contract-renewal water cost escalation would be split between farm investment and household consumption. The estimated impact on farm investment spending changes is input directly into the IMPLAN sector for Farm Machinery. The estimated impact on consumer spending is input into the model based on recorded household allocation of spending across all industrial sectors of the economy (final demands).

No Action Alternative

Agricultural Water Cost, Land Use and Economics

Agricultural Water Cost. Table 3.2-6 presents the estimated 1999 CVP water rates by pricing tier for each of the potentially affected Sacramento River Division contractors. In 1999, these rates would have applied to 80-10-10 tiered pricing on CVP delivered water under the No Action Alternative for contract renewal. The table indicates that the Dunnigan and Orland-Artois water districts would have to pay the highest Full-Cost-Rate of any of the Sacramento River Division contractors if tiered pricing were to be applied under the No Action Alternative. It should be noted that the table does not account for the potential influence of the contractors' ability-to-pay relief status on the actual rates they would pay for CVP contract water under the No Action Alternative. This ability-to-pay relief is accounted for in the models used to estimate the potential economic effects of contract renewal under Alternative 2.

Agricultural Land Use

Average Hydrologic Conditions. Table 3.2-7 shows the projected year 2030 irrigated acres by the Sacramento River Division contractor and crop group under the No Action Alternative assuming average hydrologic conditions.

Table 3.2-6
1999 Irrigation Water Rates Under 80-10-10 Tiered Pricing
Sacramento River Division Contractors No Action Alternative

	Cost-of-Service Rate	Midpoint	Full-Cost-Rate
Tehama-Colusa Canal	1st tier (80%)	2nd tier (10%)	3rd tier (10%)
Colusa County WD	$26.66	$47.47	$68.28
Cortina WD	$17.99	$23.50	$29.00
Davis WD	$19.12	$24.07	$29.02
Dunnigan WD	$20.44	$58.94	$97.43
Four-M WD	$15.69	$21.97	$28.24
Glenn Valley WD	$17.67	$23.22	$28.77
Glide WD	$16.94	$21.81	$26.67
Holthouse WD	$17.53	$22.93	$28.32
Kanawha	$18.75	$25.33	$31.91
Kirkwood WD	$16.09	$21.90	$27.71
La Grande WD	$17.93	$23.18	$28.43
Myers Marsh Mutual Water Company	$23.26	$27.15	$31.03
Orland-Artois WD	$22.97	$60.80	$98.62
Westside WD	$21.20	$30.16	$39.11
Corning Canal			
Corning WD	$25.97	$39.69	$53.40
Proberta WD	$23.45	$27.99	$32.52
Thomes Creek WD	$19.75	$24.69	$29.63

Source: Reclamation 2000; Dornbusch & Company 2000.

Table 3.2-7
Irrigated Acres of Potentially Affected Contractors
No Action Alternative
AVERAGE Hydrologic Condition (2030)

	Tehama-Colusa Canal Contractors														Corning Canal Contractors		
Crop	Colusa County WD (acres)	Cortina WD (acres)	Davis WD (acres)	Dunnigan WD (acres)	Four-M WD (acres)	Glenn Valley WD (acres)	Glide WD (acres)	Holthouse WD (acres)	Kanawha (acres)	Kirkwood WD (acres)	La Grande WD (acres)	Myers Marsh Mutual Water Company (acres)	Orland-Artois WD (acres)	Westside WD (acres)	Corning WD (acres)	Proberta WD (acres)	Thomes Creek WD (acres)
Pasture	859	0	0	149	0	0	311	0	357	171	0	0	3,634	219	946	858	91
Alfalfa	1,684	140	0	1,036	365	0	190	0	908	49	0	0	5,082	645	87	91	173
Sugar Beets	815	0	0	0	0	0	0	0	3,823	0	0	0	962	0	0	0	0
Other Field Crops	2,261	58	211	1,429	144	134	249	62	3,346	87	0	12	2,029	3,377	7	431	0
Rice	71	0	0	161	0	31	2,008	0	1,450	0	754	0	4,164	960	687	395	0
Truck Crops	59	0	129	68	116	0	0	179	34	0	0	0	0	14	0	0	0
Tomatoes	2,052	0	246	748	253	139	27	54	119	0	0	49	126	2,288	0	0	0
Deciduous Orchards	15,832	275	0	1,084	0	0	132	38	260	120	0	0	7,462	1,697	2,443	222	268
Small Grain	1,154	47	78	551	69	40	915	16	2,467	0	18	14	2,231	901	87	320	703
Sub-Tropical Orchards[1]	0	0	0	0	0	0	0	0	0	0	0	0	1,000	0	0	0	0
Total	24,789	519	664	5,225	947	344	3,832	349	12,765	427	772	75	26,691	10,101	4,257	2,317	1,235

Sources: Reclamation 1996-1999, 1997, 1999a; Dornbusch & Company 2000; CH2M Hill 2000.

[1] Within the crop production reports submitted annually by the contractors to the Bureau of Reclamation, it appears that olives have been classified under the crop category "Deciduous Orchards," as opposed to "Sub-tropicals." This misclassification, however, has no material impact on the evaluation of the potential regional economic and associated social impacts of the CVP long-term contract renewal alternatives under consideration. Like olives, which are technically sub-tropical, apples, peaches, plums and other deciduous orchard crops are considered to be higher valued crops that display similar economic characteristics (in terms of average profitability, high investment cost, long-term maturity, cultural requirements, etc.). As a result, the production of those crops would be expected to be similarly affected by changes to water supply, reliability and cost irrespective of how they are broadly classified (e.g., deciduous orchard, sub-tropical, etc.).

Table 3.2-8 summarizes the data presented in Table 3.2-7. Specifically, the table shows by crop group and canal the acres of land projected to receive CVP contract water in 2030 under the No Action Alternative assuming average hydrologic conditions. The table indicates that the total irrigated acreage within the Sacramento River Division CVP service area is projected to be approximately 95,000 acres in 2030 under average hydrologic conditions.

Dry Hydrologic Conditions. Table 3.2-9 shows projected 2030 irrigated acres by Sacramento River Division contractor and crop group under the No Action Alternative assuming dry hydrologic conditions.

Table 3.2-10 summarizes the data presented in Table 3.2-9. Specifically, the table shows by crop group and canal the acres of land projected to receive CVP contract water in 2030 under the No Action Alternative and assuming dry hydrologic conditions. The table indicates that the total irrigated acreage within the Sacramento River Division service area is projected to be approximately 82,000 acres in 2030 under dry hydrologic conditions.

Table 3.2-8
Irrigated Acres of Sacramento River Division Contractors
Average Hydrologic Condition
SUMMARY
No Action Alternative (2030)

Crop	(a) Tehama-Colusa Canal (acres)	(b) Corning Canal (acres)	(a)+(b) Total (acres)
Pasture	5,700	1,895	7,595
Alfalfa	10,100	351	10,451
Sugar Beets	5,600	0	5,600
Other Field Crops	13,400	438	13,838
Rice	9,600	1,083	10,683
Truck Crops	600	0	600
Tomatoes	6,100	0	6,100
Deciduous Orchards	26,900	2,933	29,833
Small Grain	8,500	1,109	9,609
Sub-Tropical Orchards	1,000	0	1,000
Total	87,500	7,810	95,310

Sources: Reclamation 1996-1999, 1997, 1999a; Dornbusch & Company 2000; CH2M Hill 2000.

Table 3.2-9
Irrigated Acres of Potentially Affected Contractors
No Action Alternative
DRY Hydrologic Condition (2030)

	Tehama-Colusa Canal Contractors													Corning Canal Contractors			
Crop	**Colusa County WD**	**Cortina WD**	**Davis WD**	**Dunnigan WD**	**Four-M WD**	**Glenn Valley WD**	**Glide WD**	**Holthouse WD**	**Kanawha WD**	**Kirkwood WD**	**La Grande WD**	**Myers Marsh Mutual Water Company**	**Orland-Artois WD**	**Westside WD**	**Corning WD**	**Proberta WD**	**Thomes Creek WD**
	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)
Pasture	648	0	0	112	0	0	234	0	269	129	0	0	2,741	166	918	833	89
Alfalfa	1,267	105	0	780	275	0	143	0	684	37	0	0	3,824	485	86	90	172
Sugar Beets	742	0	0	0	0	0	0	0	3,482	0	0	0	876	0	0	0	0
Other Field Crops	1,755	45	164	1,109	112	104	194	48	2,597	67	0	9	1,575	2,621	7	426	0
Rice	46	0	0	104	0	20	1,297	0	937	0	487	0	2,689	620	687	395	0
Truck Crops	59	0	129	68	116	0	0	179	34	0	0	0	0	14	0	0	0
Tomatoes	1,918	0	230	699	236	130	25	51	111	0	0	45	118	2,138	0	0	0
Deciduous Orchards	15,832	275	0	1,084	0	0	132	38	260	120	0	0	7,462	1,697	2,443	222	268
Small Grain	842	34	57	402	50	29	667	11	1,799	0	13	11	1,627	657	85	313	688
Sub-Tropical Orchards	0	0	0	0	0	0	0	0	0	0	0	0	1,000	0	0	0	0
Total	23,110	459	579	4,357	789	283	2,693	328	10,173	354	500	65	21,913	8,398	4,227	2,279	1,216

Sources: Reclamation 1996-1999, 1997, 1999a; Dornbusch & Company 2000; CH2M Hill 2000.

Table 3.2-10
Irrigated Acres of Sacramento River Division Contractors
DRY Hydrologic Condition
SUMMARY
No Action Alternative (2030)

Crop	(a) Tehama -Colusa Canal (acres)	(b) Corning Canal (acres)	(a)+(b) Total (acres)
Pasture	4,300	1,840	6,140
Alfalfa	7,600	348	7,948
Sugar Beets	5,100	0	5,100
Other Field Crops	10,400	433	10,833
Rice	6,200	1,083	7,283
Truck Crops	600	0	600
Tomatoes	5,700	0	5,700
Deciduous Orchards	26,900	2,933	29,833
Small Grain	6,200	1,086	7,286
Sub-Tropical Orchards	1,000	0	1,000
Total	74,000	7,722	81,722

Sources: Reclamation 1996-1999, 1997, 1999a; Dornbusch & Company 2000; CH2M Hill 2000.

Agricultural Economics

Average Hydrologic Condition. Table 3.2-11 shows the projected year 2030 gross value of production by the Sacramento River Division contractor and crop group under the No Action Alternative and assuming average hydrologic conditions.

Table 3.2-12 summarizes the data presented in Table 3.2-11. Specifically, the table shows by crop group and canal the projected gross value of farm production on lands receiving CVP contract water in 2030 under the No Action Alternative and assuming average hydrologic conditions. The table indicates that the total Gross Value of Production within the Sacramento River Division service area is projected to be approximately $73 million dollars in 2030 under average hydrologic conditions (in year 1999 dollars).

Dry Hydrologic Conditions. Table 3.2-13 shows the projected 2030 gross value by the Sacramento River Division contractor and crop group under the No Action Alternative and assuming dry hydrologic conditions.

Table 3.2-11
Gross Value of Production of Potentially Affected Contractors
No Action Alternative
AVERAGE Hydrologic Condition (Year 2030 in 1999 Dollars)

	Tehama-Colusa Canal Contractors												Corning Canal Contractors				
Crop	Colusa County WD ($000s)	Cortina WD ($000s)	Davis WD ($000s)	Dunnigan WD ($000s)	Four-M WD ($000s)	Glenn Valley WD ($000s)	Glide WD ($000s)	Holthouse WD ($000s)	Kanawha ($000s)	Kirkwood WD ($000s)	La Grande WD ($000s)	Myers Marsh Mutual Water Company ($000s)	Orland-Artois WD ($000s)	Westside WD ($000s)	Corning WD ($000s)	Proberta WD ($000s)	Thomes Creek WD ($000s)
Pasture	$131	$0	$0	$23	$0	$0	$47	$0	$54	$26	$0	$0	$552	$33	$144	$130	$14
Alfalfa	966	80	0	594	209	0	109	0	521	28	0	0	2,914	370	50	52	99
Sugar Beets	635	0	0	0	0	0	0	0	2,981	0	0	0	750	0	0	0	0
Other Field Crops	1,096	28	102	693	70	65	121	30	1,622	42	0	6	984	1,637	4	209	0
Rice	64	0	0	147	0	28	1,825	0	1,318	0	685	0	3,785	873	625	359	0
Truck Crops	219	0	476	250	427	0	0	660	127	0	0	0	0	53	0	0	0
Tomatoes	1,602	0	192	584	197	108	21	42	93	0	0	38	99	1,786	0	0	0
Deciduous Orchards	18,000	312	0	1,232	0	0	150	44	296	137	0	0	8,483	1,929	2,778	252	304
Small Grain	351	14	24	168	21	12	278	5	750	0	5	4	678	274	26	97	214
Sub-Tropical Orchards	0	0	0	0	0	0	0	0	0	0	0	0	1,515	0	0	0	0
Total	$23,064	$435	$794	$3,690	$924	$214	$2,552	$780	$7,762	$233	$691	$48	$19,760	$6,955	$3,626	$1,100	$631

Sources: Reclamation 1996-1999, 1997, 1999a; Dornbusch & Company 2000; CH2M Hill 2000.

Table 3.2-12
Gross Value of Production of Potentially Affected Contractors
AVERAGE Hydrologic Condition
SUMMARY
No Action Alternative (Year 2030 in 1999 Dollars)

Crop	(a) Tehama-Colusa Canal ($000s)	(b) Corning Canal ($000s)	(a)+(b) Total ($000s)
Pasture	$866	$288	$1,154
Alfalfa	5,791	202	5,992
Sugar Beets	4,366	0	4,366
Other Field Crops	6,497	212	6,709
Rice	8,725	984	9,709
Truck Crops	2,211	0	2,211
Tomatoes	4,762	0	4,762
Deciduous Orchards	30,583	3,334	33,917
Small Grain	2,584	337	2,921
Sub-Tropical Orchards	1,515	0	1,515
Total	$67,900	$5,357	$73,257

Sources: Reclamation 1996-1999, 1997, 1999a; Dornbusch & Company 2000; CH2M Hill 2000.

Table 3.2-13
Gross Value of Production of Potentially Affected Contractors No Action Alternative
DRY Hydrologic Condition (Year 2030 in 1999 Dollars)

	Tehama-Colusa Canal Contractors											Corning Canal Contractors				
Crop	Colusa County WD ($000s)	Cortina WD ($000s)	Davis WD ($000s)	Dunnigan WD ($000s)	Four-M WD ($000s)	Glenn Valley WD ($000s)	Glide WD ($000s)	Holthouse WD ($000s)	Kanawha ($000s)	Kirkwood La WD ($000s)	La Grande WD ($000s)	Myers Marsh Mutual Water Company ($000s)	Orland-Artois WD ($000s)	Westside WD ($000s)	Corning WD ($000s)	Proberta WD ($000s)	Thomes Creek WD ($000s)
Pasture	$99	$0	$0	$17	$0	$0	$36	$0	$41	$20	$0	$0	$418	$25	$140	$127	$13
Alfalfa	729	60	0	448	158	0	82	0	393	21	0	0	2,200	279	49	52	98
Sugar Beets	580	0	0	0	0	0	0	0	2,723	0	0	0	685	0	0	0	0
Other Field Crops	854	22	80	539	54	51	94	24	1,263	33	0	4	766	1,275	4	207	0
Rice	42	0	0	95	0	18	1,182	0	854	0	444	0	2,452	565	625	359	0
Truck Crops	219	0	478	251	428	0	0	662	127	0	0	0	0	53	0	0	0
Tomatoes	1,502	0	180	547	185	102	20	40	87	0	0	36	92	1,674	0	0	0
Deciduous Orchards	18,057	313	0	1,236	0	0	151	44	297	137	0	0	8,510	1,935	2,778	252	304
Small Grain	257	10	17	123	15	9	203	3	549	0	4	3	496	200	26	95	209
Sub-Tropical Orchards	0	0	0	0	0	0	0	0	0	0	0	0	1,520	0	0	0	0
Total	$22,338	$406	$755	$3,257	$841	$180	$1,769	$772	$6,334	$211	$448	$43	$17,140	$6,007	$3,621	$1,091	$625

Sources: Reclamation 1996-1999, 1997, 1999a; Dornbusch & Company 2000; CH2M Hill 2000.

Table 3.2-14 summarizes the data presented in Table 3.2-13. Specifically, the table shows by crop group and canal the projected gross value of farm production on lands receiving CVP contract water in 2030 under the No Action Alternative and assuming dry hydrologic conditions. The table indicates that the total Gross Value of Production within the Sacramento River Division service area is projected to be about $66 million dollars in 2030 under dry hydrologic conditions (in year 1999 dollars).

Table 3.2-14
Gross Value of Production of Sacramento River Division Contractors
DRY Hydrologic Condition
SUMMARY
No Action Alternative (Year 2030 in 1999 Dollars)

Crop	(a) Tehama-Colusa Canal ($000s)	(b) Corning Canal ($000s)	(a)+(b) Total ($000s)
Pasture	$656	$280	$935
Alfalfa	4,371	199	4,571
Sugar Beets	3,989	0	3,989
Other Field Crops	5,058	210	5,268
Rice	5,653	984	6,637
Truck Crops	2,218	0	2,218
Tomatoes	4,464	0	4,464
Deciduous Orchards	30,681	3,334	34,015
Small Grain	1,891	330	2,220
Sub-Tropical Orchards	1,520	0	1,520
Total	$60,500	$5,337	$65,837

Sources: Reclamation 1996-1999, 1997, 1999a; Dornbusch & Company 2000; CH2M Hill 2000.

Regional Economy

Table 3.2-15 summarizes projected year 2030 industrial output, employment and Income by Place-of-Work for the entire affected region (Colusa, Glenn, and Tehama Counties) under the No Action Alternative. Consistent with the PEIS, the figures are presented in 1991 terms.

Alternative 1

Agricultural Water Cost, Land Use and Economics

Alternative 1 is assumed to have similar effects on agricultural water costs, land use, and economics within the affected region as the No Action Alternative. Therefore, there are no environmental impacts of this alternative.

Table 3.2-15
Estimated Output, Employment and Income by Place-of-Work
Affected Region (1991)
No-Action Alternative

Industrial Sector	Output ($Millions)	Employment (FTE Jobs)	Income POW ($Millions)
Agriculture	$550.1	8,218	$215.6
Mining	32.5	80	10.3
Construction	171.5	1,920	54.9
Manufacturing	770.8	4,569	222.2
Transportation	212.7	1,434	85.4
Trade	208.6	6,384	112.3
FIRE	221.5	1,944	130.3
Services	305.6	7,462	125.7
Government	159.5	6,313	153.4
Total	$2,632.7	38,322	$1,110.0

Source: Minnesota Implan Group 1991; Dornbusch & Company 2000.

Regional Economy

Alternative 1 is assumed to have similar effects on the regional economy within the affected region as the No Action Alternative. Therefore, there are no environmental impacts of this alternative.

Alternative 2

The discussion of the economic impacts from Alternative 2 primarily focuses on the worst-case scenario of an average hydrologic year following five dry hydrologic years. However this scenario is only one of nine possible scenarios, and is not considered to be the most likely outcome.

Agricultural Water Cost, Land Use and Economics

Table 3.2-16 presents the incremental impact on Sacramento River Division contractors CVP water rates relative to rates under the No Action Alternative. Table 3.2-17 presents the data in Table 3.2-16 converted to percentage terms. This table indicates that the largest dollar increases in rates would occur in Davis and Kirkwood WDs on the TCC, and Corning Water District on the Corning Canal. It should be noted that the table does not account for the potential influence of the contractors' ability-to-pay relief status on the actual rates they would necessarily pay for CVP contract water under Alternative 2. However, the models used to assess the impacts of water rate changes under Alternative 2 on agricultural production and land use assume that existing ability to pay-relief for Sacramento River Division contractors would remain in effect.

Agricultural Land Use. Table 3.2-18 shows the estimated incremental impacts of Alternative 2 relative to the Average Hydrologic conditions under the No Action Alternative on irrigated acreage within the potentially affected Sacramento River Division.

Table 3.2-16
1999 Proposed Irrigation Water Rates
Incremental Increase Relative to No Action Alternative
Sacramento River Division Contractors
Alternative 2

	Cost-of-Service Rate	Midpoint	Full-Cost-Rate
Tehama-Colusa Canal	1st tier (80%)	2nd tier (10%)	3rd tier (10%)
Colusa County WD	$6.61	$10.69	$14.76
Cortina WD	$1.72	$2.43	$3.13
Davis WD	$10.59	$14.44	$18.28
Dunnigan WD	$5.33	$8.50	$11.67
Four-M WD	$6.91	$12.79	$18.67
Glenn Valley WD	$7.58	$11.61	$15.63
Glide WD	$1.44	$2.35	$3.26
Holthouse WD	$5.01	$7.57	$10.12
Kanawha	$3.15	$5.39	$7.63
Kirkwood WD	$10.32	$17.92	$25.52
La Grande WD	$4.81	$7.06	$9.31
Myers Marsh Mutual Water Company	$3.19	$3.28	$3.37
Orland-Artois WD	$2.95	$4.74	$6.53
Westside WD	$6.38	$10.53	$14.68
Corning Canal			
Corning WD	$10.63	$16.35	$22.06
Proberta WD	$2.47	$3.30	$4.12
Thomes Creek WD	$8.30	$12.20	$16.10

Source: Reclamation 1999b; Dornbusch & Company 2000.

An average hydrologic year follows five dry hydrologic years in the CVP contractor service areas. An average hydrologic year following five dry years could have a substantial impact on irrigated acreage in the region, possibly resulting in as many as 65,000 acres being taken out of production. It is not anticipated that Alternative 2 would have any incremental impacts in an average hydrologic year following five average or wet hydrologic years despite the incremental increase in CVP water rates proposed under Alternative 2 (see Table 3.2-17). It is also not anticipated that Alternative 2 would have any incremental impacts on irrigated acreage within the affected districts in a dry year following five years of either dry, average or wet hydrologic conditions when compared to projected land use under the No Action Alternative in a year of dry hydrologic conditions.

Table 3.2-19 summarizes the data presented in Table 3.2-18. Specifically, the table shows by crop group and canal the incremental impact of Alternative 2 compared to the No Action Alternative on the acres of land under irrigated crop production projected to receive CVP contract water in 2030 in an average hydrologic year following

Table 3.2-17
1999 Proposed Irrigation Water Rates
Incremental Percentage Increase Relative to No Action Alternative
Sacramento River Division Contractors
Alternative 2

	Cost-of-Service Rate	Midpoint	Full-Cost-Rate
Tehama-Colusa Canal	1st tier (80%)	2nd tier (10%)	3rd tier (10%)
Colusa County WD	25%	23%	22%
Cortina WD	10%	10%	11%
Davis WD	55%	60%	63%
Dunnigan WD	26%	14%	12%
Four-M WD	44%	58%	66%
Glenn Valley WD	43%	50%	54%
Glide WD	9%	11%	12%
Holthouse WD	29%	33%	36%
Kanawha	17%	21%	24%
Kirkwood WD	64%	82%	92%
La Grande WD	27%	30%	33%
Myers Marsh Mutual Water Company	14%	12%	11%
Orland-Artois WD	13%	8%	7%
Westside WD	30%	35%	38%
Corning Canal			
Corning WD	41%	41%	41%
Proberta WD	11%	12%	13%
Thomes Creek WD	42%	49%	54%

Source: Reclamation 1999b; Dornbusch & Company 2000.

Table 3.2-18
Incremental Impacts on Irrigated Acres of Sacramento River Division Lands
Average Hydrologic Condition Following 5-Years Dry Condition
Alternative 2 (2030)

	Change Compared to Average No Action																
	Tehama-Colusa Canal Contractors												Corning Canal Contractors				
Crop	Colusa County WD (acres)	Cortina WD (acres)	Davis WD (acres)	Dunnigan WD (acres)	Four-M WD (acres)	Glenn Valley WD (acres)	Glide WD (acres)	Holthouse WD (acres)	Kanawha	Kirkwood WD (acres)	La Grande WD (acres)	Myers Marsh Mutual Water Company (acres)	Orland-Artois WD (acres)	Westside WD (acres)	Corning WD (acres)	Proberta WD (acres)	Thomes Creek WD (acres)
Pasture	-859	0	0	-149	0	0	-311	0	-357	-171	0	0	-3,634	-219	-946	-858	-91
Alfalfa	-1,684	-140	0	-1,036	-365	0	-190	0	-908	-49	0	0	-5,082	-645	-87	-91	-173
Sugar Beets	-771	0	0	0	0	0	0	0	-3,619	0	0	0	-910	0	0	0	0
Other Field Crops	-2,261	-58	-211	-1,429	-144	-134	-249	-62	-3,346	-87	0	-12	-2,029	-3,377	-7	-431	0
Rice	-71	0	0	-161	0	-31	-2,008	0	-1,450	0	-754	0	-4,164	-960	-687	-395	0
Truck Crops	-10	0	-22	-11	-19	0	0	-30	-6	0	0	0	0	-2	0	0	0
Tomatoes	-1,278	0	-153	-466	-157	-87	-17	-34	-74	0	0	-30	-79	-1,425	0	0	0
Deciduous Orchards	-1,942	-34	0	-133	0	0	-16	-5	-32	-15	0	0	-915	-208	-300	-27	-33
Small Grain	-1,154	-47	-78	-551	-69	-40	-915	-16	-2,467	0	-18	-14	-2,231	-901	-87	-320	-703
Sub-Tropical Orchards[1]	0	0	0	0	0	0	0	0	0	0	0	0	-100	0	0	0	0
Total	-10,032	-278	-464	-3,936	-755	-292	-3,706	-146	-12,258	-322	-772	-56	-19,145	-7,738	-2,114	-2,123	-1,001

Sources: Reclamation 1996-1999, 1997, 1999a; Dornbusch & Company 2000; CH2M Hill 2000.

[1] Within the crop production reports submitted annually by the contractors to the Bureau of Reclamation, it appears that olives have been classified under the crop category "Deciduous Orchards," as opposed to "Sub-tropicals." This misclassification, however, has no material impact on the evaluation of the potential regional economic and associated social impacts of the CVP long-term contract renewal alternatives under consideration. Like olives, which are technically sub-tropical, apples, peaches, plums and other deciduous orchard crops are considered to be higher valued crops that display similar economic characteristics (in terms of average profitability, high investment cost, long-term maturity, cultural requirements, etc.). As a result, the production of those crops would be expected to be similarly affected by changes to water supply, reliability and cost irrespective of how they are broadly classified (e.g., deciduous orchard, sub-tropical, etc.).

Table 3.2-19
Incremental Impacts on Irrigated Acres of Sacramento River Division Lands
Average Hydrologic Condition Following 5-Years Dry Condition
SUMMARY
Alternative 2 (2030)

Crop	(a) Tehama-Colusa Canal		(b) Corning Canal		(a)+(b) Total	
	No-Action Average (acres)	Alt. 2 Incremental Change (acres)	No-Action Average (acres)	Alt. 2 Incremental Change (acres)	No-Action Average (acres)	Alt. 2 Incremental Change (acres)
Pasture	5,700	-5,700	1,895	-1,895	7,595	-7,595
Alfalfa	10,100	-10,100	351	-351	10,451	-10,451
Sugar Beets	5,600	-5,300	0	0	5,600	-5,300
Other Field Crops	13,400	-13,400	438	-438	13,838	-13,838
Rice	9,600	-9,600	1,083	-1,083	10,683	-10,683
Truck Crops	600	-100	0	0	600	-100
Tomatoes	6,100	-3,800	0	0	6,100	-3,800
Deciduous Orchards	26,900	-3,300	2,933	-360	29,833	-3,660
Small Grain	8,500	-8,500	1,109	-1,109	9,609	-9,609
Sub-Tropical Orchards	1,000	-100	0	0	1,000	-100
Total	87,500	-59,900	7,810	-5,237	95,310	-65,137

Sources: Reclamation 1996-1999, 1997, 1999a; Dornbusch & Company 2000; CH2M Hill 2000.

five dry hydrologic years. The table indicates that of the total of about 95,000 acres of irrigated land within the Sacramento River Division service area directly affected by long-term CVP contract renewal, about 65,000 acres or approximately 68% is projected to be fallowed in an average hydrologic year following five dry hydrologic years. This would constitute a substantial effect on agricultural use.

Agricultural Economics. Table 3.2-20 shows the projected 2030 incremental change in gross value of production by Sacramento River Division contractors and crop groups under Alternative 2. Alternative 2 could result in a significant reduction of production within the affected service areas in an average hydrologic year following five dry years. This would result in a total reduction of gross production value in the affected service areas of approximately $40,000,000. This would constitute a substantial effect on agricultural economics. It is not anticipated that Alternative 2 would have any incremental impacts in an average hydrologic year following five average or wet hydrologic years despite the fairly large incremental increase in CVP water rates proposed under Alternative 2. It is also not anticipated that Alternative 2 would have any incremental impacts on gross value of production within the affected service areas in a dry year following five years of either dry, average, or wet hydrologic conditions relative to land use under the No Action Alternative in a year of dry hydrologic conditions.

Table 3.2-20
Incremental Impacts on Gross Value of Production of Potentially Affected Service Areas
Average Hydrologic Condition Following 5-Years Dry Condition
Alternative 2
(Year 2030 in 1999 Dollars)

	Tehama-Colusa Canal Contractors														Corning Canal Contractors		
Crop	Colusa County WD	Cortina WD	Davis WD	Dunnigan WD	Four-M WD	Glenn Valley WD	Glide WD	Holthouse WD	Kanawha	Kirkwood WD	La Grande WD	Myers Marsh Mutual Water Company	Orland-Artois WD	Westside WD	Corning WD	Proberta WD	Thomes Creek WD
	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)
Pasture	-$131	$0	$0	-$23	$0	$0	-$47	$0	-$54	-$26	$0	$0	-$552	-$33	-$144	-$130	-$14
Alfalfa	-966	-80	0	-594	-209	0	-109	0	-521	-28	0	0	-2,914	-370	-50	-52	-99
Sugar Beets	-601	0	0	0	0	0	0	0	-2,821	0	0	0	-710	0	0	0	0
Other Field Crops	-1,096	-28	-102	-693	-70	-65	-121	-30	-1,622	-42	0	-6	-984	-1,637	-4	-209	0
Rice	-64	0	0	-147	0	-28	-1,825	0	-1,318	0	-685	0	-3,785	-873	-625	-359	0
Truck Crops	-36	0	-79	-42	-71	0	0	-110	-21	0	0	0	0	-9	0	0	0
Tomatoes	-998	0	-120	-364	-123	-68	-13	-26	-58	0	0	-24	-61	-1,113	0	0	0
Deciduous Orchards	-2,424	-42	0	-166	0	0	-20	-6	-40	-18	0	0	-1,143	-260	-341	-34	-37
Small Grain	-351	-14	-24	-168	-21	-12	-278	-5	-750	0	-5	-4	-678	-274	-26	-97	-214
Sub-Tropical Orchards	0	0	0	0	0	0	0	0	0	0	0	0	-151	0	0	0	0
Total	-$6,668	-$164	-$325	-$2,195	-$494	-$173	-$2,414	-$177	-$7,205	-$114	-$691	-$34	-$10,978	-$4,568	-$1,189	-$882	-$364

Sources: Reclamation 1996-1999, 1997, 1999a; Dornbusch & Company 2000; CH2M Hill 2000.

Table 3.2-21
Incremental Impacts on Gross Value of Production of Potentially Affected Contractors
Average Hydrologic Condition Following 5-Years Dry Condition
SUMMARY
Alternative 2
(Year 2030 in 1999 Dollars)

Crop	(a) Tehama-Colusa Canal		(b) Corning Canal		(a)+(b) Total	
	No Action Average ($000s)	Alt. 2 Incremental Change ($000s)	No Action Average ($000s)	Alt. 2 Incremental Change ($000s)	No Action Average ($000s)	Alt. 2 Incremental Change ($000s)
Pasture	$866	-$866	$288	-$288	$1,154	-$1,154
Alfalfa	5,791	-5,791	202	-202	5,992	-5,992
Sugar Beets	4,366	-4,132	0	0	4,366	-4,132
Other Field Crops	6,497	-6,497	212	-212	6,709	-6,709
Rice	8,725	-8,725	984	-984	9,709	-9,709
Truck Crops	2,211	-369	0	0	2,211	-369
Tomatoes	4,762	-2,967	0	0	4,762	-2,967
Deciduous Orchards	30,583	-4,119	3,334	-409	33,917	-4,528
Small Grain	2,584	-2,584	337	-337	2,921	-2,921
Sub-Tropical Orchards	1,515	-151	0	0	1,515	-151
Total	$67,900	-$36,200	$5,357	-$2,432	$73,257	-$38,632

Sources: Reclamation 1996-1999, 1997, 1999a; Dornbusch & Company 2000; CH2M Hill 2000.

Table 3.2-21 summarizes the data presented in Table 3.2-20. Specifically, the table shows by crop group and canal service area grouping, the incremental impact of Alternative 2 compared to the No Action Alternative on the gross value of crop production projected to receive CVP contract water in 2030 in an average hydrologic year following five dry hydrologic years. The table indicates that under this hydrologic scenario, about $40 million, or almost 55% of the area's total projected gross value of production of about $73 million dollars would be lost (in 1999 dollar terms). Under this scenario, production of pasture, alfalfa, rice, other field crops, and small grains would cease entirely among the Sacramento River Division contractors.

In addition to changes to the gross value of production anticipated under Alternative 2, the fallowing of land and increased cost of CVP water would also impact net farm income (or revenues). Table 3.2-22 summarizes the incremental net revenue impacts anticipated under Alternative 2 in an average hydrologic year following five dry condition years. This scenario would result in the greatest economic effects under Alternative 2. The table shows that the total decline in net farm revenue of about $2.7 million is the result of approximately $6.4 million related to fallowing irrigated land offset by avoided CVP water costs of about $3.7 million. It is anticipated that Alternative 2 would have much smaller incremental impacts on net farm revenues in an average hydrologic year following five average or wet hydrologic years. These impacts would be derived entirely from increased CVP water rates relative to the No Action Alternative.

Table 3.2-22
Estimated Net Farm Revenue Impacts
Average Hydrologic Condition Following 5-Years Dry Condition
Affected Region
(1999)

Cause of Net Revenue Change	Average Hydrologic Year Following Five Dry Years ($millions)
Fallowed Land	-$6.4
Groundwater Pumping Cost	0.0
Irrigation Cost	0.0
CVP Water Cost	3.7
Higher Crop Prices	0.0
Total	-$2.7

Sources: Reclamation 1996-1999, 1997, 1999a; Dornbusch & Company 2000; CH2M Hill 2000.

It is also anticipated that Alternative 2 would have a negative incremental impact on net farm revenues within the affected water service areas in a dry year following five years of dry hydrologic conditions relative to the No Action Alternative in a year of dry hydrologic conditions. These impacts would be derived entirely from increased CVP water rates relative to the No Action Alternative and are estimated at about $400,000. Alternative 2 is not projected to have any impact on net farm revenues within the affected service areas in a dry year following five years of average or wet hydrologic conditions relative to the No Action Alternative in a year of dry hydrologic conditions.

Regional Economy

Table 3.2-23 summarizes the sector-specific and total anticipated incremental impacts on industrial output within the affected region under Alternative 2 assuming average hydrologic conditions following five years of dry hydrologic conditions. These impacts would result from the escalation of CVP agricultural water rates and increased CVP acreage limitations, and the associated changes in farmer net income and gross value of agricultural production within the affected water service areas. The table indicates that Alternative 2 would directly result in a decrease of the agricultural output in Colusa, Glenn, and Tehama Counties by about 5 percent from baseline No Action levels (or by more than $27 million in 1991 dollars). At the same time, overall industrial output in the region would be expected to decrease by about 3.2 percent if Alternative 2 were implemented.

Table 3.2-24 summarizes the sector-specific and total anticipated incremental impacts on employment within the affected region under Alternative 2 assuming average hydrologic conditions following five years of dry hydrologic conditions. The table indicates that agricultural employment in Colusa, Glenn, and Tehama Counties, consistent with output, could decrease by about 6.4 percent from baseline No Action levels under Alternative 2 (or a loss of almost 523 jobs). At the same time, overall employment in the region would be expected to decrease by about 2.6 percent if Alternative 2 were implemented.

Table 3.2-23
Affected Region Output Impacts – Alternative 2
(1991 Comparative Basis)

Industrial Sector	No Action Average Condition ($Millions)	Alternative 2	
		Incremental Change from No Action ($Millions)	Incremental Change from No Action (%)
Agriculture	$550.1	-$27.4	-5.0%
Mining	32.5	-0.4	-1.2%
Construction	171.5	-0.6	-0.3%
Manufacturing	770.8	-33.4	-4.3%
Transportation	212.7	-6.5	-3.1%
Trade	208.6	-4.7	-2.3%
Finance, Insurance & Real Estate	221.5	-5.2	-2.3%
Services	305.6	-6.1	-2.0%
Government	159.5	-1.3	-0.8%
Total	$2,632.7	-$85.5	-3.2%

Sources: Minnesota Implan Group 1991; Dornbusch & Company 2000.

Table 3.2-24
Affected Region Employment Impacts – Alternative 2
(1991 Comparative Basis)

Industrial Sector	No Action Average Condition (FTE Jobs)	Alternative 2	
		Incremental Change from No Action (FTE Jobs)	Incremental Change from No Action (FTE Jobs)
Agriculture	8,218	-523	-6.4%
Mining	80	0	0.0%
Construction	1,920	-9	-0.5%
Manufacturing	4,569	-132	-2.9%
Transportation	1,434	-46	-3.2%
Trade	6,384	-106	-1.7%
Finance, Insurance & Real Estate	1,944	-46	-2.4%
Services	7,462	-134	-1.8%
Government	6,313	-9	-0.1%
Total	38,322	-1,004	-2.6%

Source: Minnesota Implan Group 1991; Dornbusch & Company 2000.

Table 3.2-25 summarizes the sector-specific and total anticipated incremental impacts on income by place-of-work[1] within the affected region under Alternative 2 assuming average hydrologic conditions following five years of dry hydrologic conditions. The table indicates that the region's agricultural income by place-of-work could decrease by about 8 percent from baseline No Action levels under Alternative 2 (or by over $17 million in 1991 dollars). At the same time, overall income by place-of-work in the region would be expected to decrease by about 3.8 percent if Alternative 2 were implemented.

3.2.3 Cumulative Impacts

While shifts in cropping patterns, changes in the number of irrigated acres, and increased water conservation are expected due to impacts on water usage under all alternatives, the alternatives are not expected to contribute substantially to cumulative impacts on regional agricultural economics, but there could be substantial local impacts.

Table 3.2-25
Affected Region Income by Place-of-Work Impacts – Alternative 2
(1991 Comparative Basis)

		Alternative 2	
Industrial Sector	**No Action Average Condition ($Millions)**	**Incremental Change from No Action ($Millions)**	**Incremental Change from No Action ($Millions)**
Agriculture	$215.6	-17.24	-8.0%
Mining	10.3	-0.16	-1.6%
Construction	54.9	-0.23	-0.4%
Manufacturing	222.2	-9.93	-4.5%
Transportation	85.4	-3.17	-3.7%
Trade	112.3	-3.10	-2.8%
Finance, Insurance & Real Estate	130.3	-3.73	-2.9%
Services	125.7	-3.08	-2.5%
Government	153.4	-1.48	-1.0%
Total	$1,110.0	-42.12	-3.8%

Sources: Minnesota Implan Group 1991; Dornbusch & Company 2000.

[1] Income by place-of-work includes employee earnings, proprietor's income and other property income.

3.3 WATER RESOURCES

3.3.1 Affected Environment

Agricultural Land Use

The study area consists of land areas and water bodies influenced by water diversions or return flow of irrigation water served by the Sacramento River Division of the CVP. The Sacramento River Division was added to the CVP in 1950 and includes the Red Bluff Diversion Dam (completed in 1964), the Corning Canal (built in 1959), and the Tehama-Colusa Canal (completed in 1980). Black Butte Dam, which was completed by the US Army Corps of Engineers in 1963, was included in the Sacramento River Division in 1970. Black Butte Dam was designed primarily for flood control, but also supplies surplus water to the Sacramento River Division and the Orland Project for irrigation (Stene 1994).

Before construction of the Sacramento River Division, about 45,000 acres in the Division's future service area received irrigation. By 1989, Tehama-Colusa and Corning Canals were supplying water to irrigate 100,019 acres, as well as 20,000 acres of wildlife refuges (Stene 1994).

The service area of the Corning Canal lies within the Sacramento-Lower Thomes watershed (Hydrologic Unit No. 18020103). The service area of the Tehama-Colusa Canal lies within the Sacramento-Stone Corral watershed (Hydrologic Unit No. 18020104). Both of these watersheds are classified by the State of California as Category I (Impaired) Non-Priority Watersheds (SWRCB 2000). The classification was made by the State Water Resources Control Board (SWRCB) based on evaluation of available data and public comments. Category I watersheds are considered to be candidates for increased restoration activities due to impaired water quality, presence of endangered aquatic species, and/or because they are considered to contain impaired aquatic or terrestrial habitat. Most of the watersheds in the state are considered to be Category I watersheds. As of January 2000, 44 watersheds had been identified as "priority watersheds," due to a combination of high value, high risk, and high opportunity for improvement. Non-priority watersheds have lower priority for receiving restoration funds.

The Red Bluff Diversion Dam diverts water from the Sacramento River into the TCC. The TCC has an initial capacity of 2,530 cubic feet per second (cfs), including water for discontinued salmon mitigation and enhancement facilities, diminishing to 1,700 cfs at its terminus near the junction of Interstate Highway 505 and Interstate 5, in Yolo County.

The Corning Canal diverts water from the TCC, about one-half mile below the Red Bluff Diversion Dam. The Corning Canal is designed to convey water to lands that are too high in elevation to be served from the TCC. The initial capacity of the Corning Canal is 500 cfs.

Figure 3.3-1 shows the amount of water that Sacramento River Division contractors have diverted since 1976, as a percentage of their total contract amounts. Also plotted is the combined unimpeded runoff from the four major tributaries to the Sacramento River below Shasta Dam. A combined unimpeded runoff of 17.9 million acre-feet is defined as "average." The shading pattern in the bar graph on Figure 3.3-1 indicates the type of water year as classified by the State of California. Although the water year classification has regulatory significance, the water year types are presented here to help illustrate the variability in annual runoff within the Sacramento Valley. As can be seen in the figure, deliveries rose steadily as the TCC was being completed, and then fell rapidly in response to the dry years beginning in 1987. Due to increased overall demand for water, changes in water management, (including more stringent requirements for maintaining Delta outflow and instream flows for anadromous fish), and greater cooperation between the state and federal water projects, water contractors were able to divert only about 50 to 75 percent of their contract amounts during the past five years, in spite of relatively high runoff.

Corning Canal Contractors. The Corning Canal currently serves three water districts. The amount of land irrigated by the districts has varied widely in past years, as has the amount of water delivered to the districts. However, the historical data suggest that cropping patterns have not been highly correlated with short-term availability of water, but instead may be related to conditions occurring over several years. For example, 1995 was the first in a sequence of five wet or above normal runoff years, but it followed a sequence of low runoff years that began in 1987. In 1995, the districts diverted on average about 40 percent of their contract water, and had about 54 percent of their acreage under irrigation. During the next four years, as hydrologic conditions improved, the districts responded in different ways. Farmers in the Proberta Water District planted a larger percentage of acres in more water-intensive crops, such as rice. Farmers in the Thomes Creek Water District, which already had much of its irrigated land in permanent crops, did not make a similar shift. In addition, water deliveries served by the Corning Canal decreased in 1997 and 1998, in spite of the fact that these continued to be high runoff years, as some districts dropped out during this period due to the costs of water. Average diversions in 1995, 1996 and 1999 were about half of the contract amount, but average diversions in 1997 and 1998 were about 34 percent and 26 percent of contract quantities, respectively. Table 3.3-1 summarizes average water use data during this period for the three Corning Canal districts.

TCC Contractors. The water contractors served by the TCC, with the exception of the Kirkwood Water District, lie south of Stony Creek, below the Black Butte Reservoir, and west of the Glenn-Colusa Canal and the Colusa Basin Drain. The TCC is the most westerly canal, and therefore supplies water to lands with the highest elevations in the area.

Between the contractors served by the TCC and the Sacramento River are the Glenn-Colusa Irrigation District and several other Sacramento River Settlement Contractors

Figure 3.3-1
Comparison of Natural Runoff (Basis for Sacramento River Index) and Water Delivered to Sacramento River Division Contractors as Percent of Contract Amount (Tehama-Colusa and Corning Canal Contractors Combined)

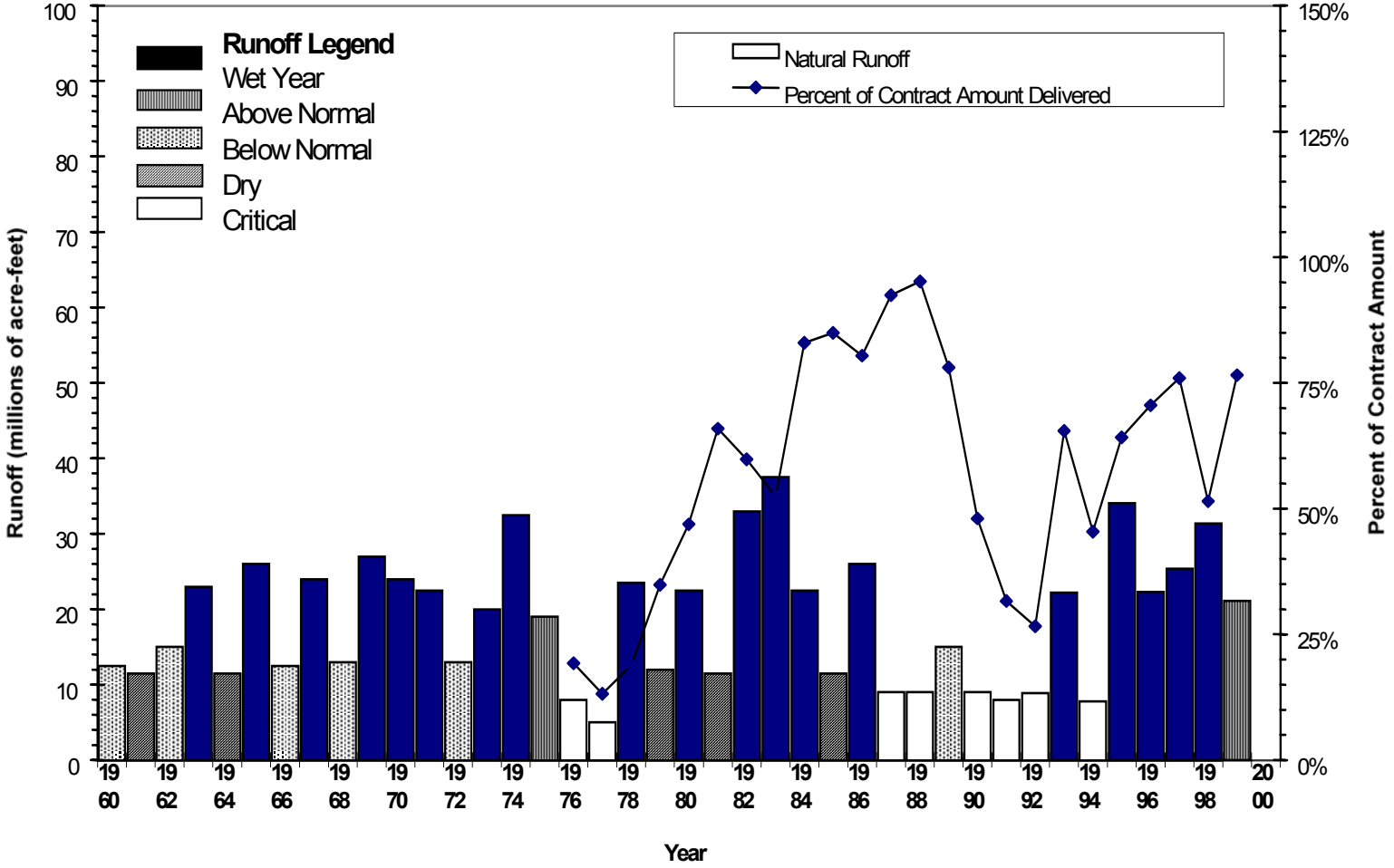


Table 3.3-1
Water Use Summary for Corning Canal Water Districts (1995-1999)

District	Contract Quantity (1) (acre-feet)	Average Deliveries (acre-feet)	Deliveries as Percent of Contract Amount	Total Acres in District	Irrigated Acres (percent of total acres)	Percent of Irrigated Acres in Rice	Percent of Total Acres Planted in Permanent Crops (fruits and nuts)	Percent of Irrigated Acres in Permanent Crops
Proberta	5,500	2,446	44%	2,438	90%	16%	10%	11%
Thomes Creek	8,400	2,296	33%	2,030	59%	5%	51%	86%
Corning	25,300	9,860	39%	10,913	45%	11%	25%	55%
Combined Districts	39,200	15,082	38.5%	15,381	54%	6%	26%	47%

(1) Quantities are for prior to 1998. In 1998 Reclamation purchased water from the Corning Canal Contractors. Since 1998, the contract quantities are: Proberta WD 3,500 AFY; Thomes Creek WD 6,400 AFY; Corning WD 23,000 AFY; combined districts 32,900 AFY.

Source: Reclamation 2000

that occupy lower land. Some of the water applied as irrigation on the uplands recharges the groundwater and flows east into these lower lands. This recharge represents water that is potentially recoverable for irrigation of lands to the east of the study area. Table 3.3-2 summarizes water use data for the past five years for the principal water contractors served by the TCC. The water contractors are listed in the table from north to south.

Table 3.3-2 shows that there are significant differences between contractors in the amounts of land devoted to different classes of crops. For example, the percentage of irrigated land planted in rice ranges from none to 73 percent, with the average overall being about 10 percent. Rice is a water intensive crop, and requires about 4 acre-feet or more per acre per year. The LaGrande Water District had the largest percentage of acres in rice during the period. Similarly, districts had widely different percentages of land planted in permanent crops (orchards and vineyards). Colusa and Orland-Artois water districts each had large numbers of acres and a large percentage of their irrigated lands planted in these crops. As a result, even though some contractors have almost no lands planted in permanent crops, the combined water contractors have about 40 percent of their irrigated acres planted in permanent crops.

Regulations and Agreements That Affect CVP Operations

The following summary, taken from the CVPIA PEIS, describes the regulatory decisions and agreements that affect the distribution of CVP water in the study area (Reclamation 1999a).

Prior to the passage of CVPIA, the operation of the CVP was affected by SWRCB Decisions 1422 and 1485, and the Coordinated Operations Agreement (COA). Decisions 1422 and 1485 identify minimum water flow and water quality conditions at specified locations, which are to be maintained in part through the operation of the CVP. The COA specifies the responsibilities shared by the CVP and SWP for meeting the requirements of Decision 1485.

Beginning in 1987, a series of actions by the SWRCB, US Environmental Protection Agency (EPA), the National Marine Fisheries Services (NMFS, now NOAA Fisheries), and the Service affected interim water flow and water quality standards in the Delta. However, at the time CVPIA was enacted (October 1992), the water quality standard in the Delta remained D-1485, and the CVP and SWP were operated in accordance with the COA to maintain this requirement.

In December 1994, representatives of the Federal and State governments and urban, agricultural and environmental interests agreed to the implementation of a Bay-Delta protection plan through the SWRCB, to provide ecosystem protection for the Bay-Delta Estuary. Shortly thereafter, SWRCB Order 95-06 superseded D-1485. The coordinated operations of the CVP and SWP continue to be based on the COA, but modified as needed on an annual basis.

Table 3.3-2
Water Use Summary for TCC Water Contractors (1995-1999)

District	Contract Quantity (acre-feet)	Average Deliveries (acre-feet)	Deliveries as Percent of Contract Amount	Total Acres in District	Irrigated Acres (percent of total acres)	Percent of Irrigated Acres in Rice	Percent of Total Acres Planted in Permanent Crops (fruits and nuts)	Percent of Irrigated Acres in Permanent Crops
Colusa County	68,165	38,559	37%	40,661	70%	2%	52%	
Cortina WD	1,700	1,098	65%	575	94%	0%	6%	
Davis WD	4,000	1,887	47%	965	91%	0%	0%	
Dunnigan WD	19,000	12,389	65%	9,937	63%	1%	16%	
4-M WD	7,700	2,104	37%	1,649	60%	0%	3%	
Glenn Valley WD	1,730	870	50%	770	43%	18%	4%	
Glide WD	10,500	10,290	98%	7,929	62%	40%	3%	
Holthouse WD	2,450	1,326	54%	1,720	26%	7%	6%	
Kanawha WD	45,000	32,234	72%	14,733	86%	11%	5%	
Kirkwood WD	2,100	661	31%	1,016	32%	0%	15%	45%
LaGrande WD	7,200	4,673	65%	1,392	89%	73%	0%	
Myers Marsh MWD	255	163	64%	264	38%	0%	0%	
Orland-Artois WD	53,000	48,761	92%	26,918	91%	14%	38%	42%
Westside WD	65,000	48,566	75%	15,453	82%	8%	17%	21%
Combined Districts	285,800	203,478	71%	122,966	77%	10%	30%	39%

CVP Water Contracts

Before construction of the CVP, many irrigators on the west side of the Sacramento Valley and elsewhere relied primarily on groundwater. With the completion of CVP facilities in these areas, the irrigators signed agreements with Reclamation for the delivery of CVP water as a full or supplemental supply. Several municipalities also have similar contracts.

These contracts are based on the CVP water rights, many of which originated from applications filed by the state in 1927 and 1938 to advance the California Water Plan. After the Federal Government was authorized to build the CVP, those water rights were transferred to Reclamation, which made applications for the additional water rights needed for the CVP.

During development of the CVP, the United States entered into long-term contracts with many of the major water rights holders in the Central Valley. In part, the CVP is operated to satisfy downstream water rights, meet the obligations of the water rights contracts, and deliver project water to CVP water service contractors. Within the study area, most districts are Water Service Contractors.

CVP water service contracts are between the United States and individual water users or contractors/districts and provide for an allocated supply of CVP water to be applied for beneficial use. In addition to CVP water supply, a water service contract can include a supply of water that recognizes a previous water right. The purposes of a water service contract are to stipulate provisions under which a water supply is provided, to produce revenues sufficient to recover an appropriate share of capital investment, and to pay the annual operations and maintenance costs of the project.

Water availability for delivery to CVP water service contractors during periods of insufficient water supply is determined based on a combination of operational objectives, hydrologic conditions, and reservoir storage conditions. Reclamation is required to allocate shortages among water service contractors within the same service area, as individual contracts and CVP operational capabilities permit.

Groundwater

Sacramento Valley Basin. The northern third of the Central Valley regional aquifer system is located in the Sacramento River Region. This region extends from Redding in the north to the Delta in the south. DWR identifies this portion of the Central Valley Aquifer as the Sacramento Valley and Redding basins, which cover over 5,500 square miles. This discussion refers to these basins collectively as the Sacramento Valley Groundwater Basin.

In the Sacramento Valley Groundwater Basin, a long-term dynamic link between the groundwater and surface water system has been maintained on a regional basis. The greatest gains to streams from groundwater occurred during the 1940s when groundwater storage was highest in the Sacramento Valley Groundwater Basin. Discharge to streams was lowest during and immediately following the 1976 to 1977

drought and during the 1987 to 1992 drought periods. In some areas of the southern portion of the Sacramento Valley Region where groundwater levels have continued to decline, such as in parts of Yolo and Sacramento counties, streams that formerly gained flow from the subsurface now lose flow through seepage to adjacent groundwater systems.

Aquifer recharge to the Sacramento Valley Groundwater Basin has historically occurred from deep percolation of rainfall, the infiltration from streambeds, and subsurface inflow along the basin boundaries. Most of the recharge for the Central Valley occurs in the northern and eastern sides of the valley where the precipitation is greater. With the introduction of agriculture to the region, aquifer recharge was augmented by deep percolation of applied agricultural water and seepage from irrigation distribution and drainage canals. Groundwater accounts for about 30 percent of the basin's water supply. The basin has an estimated perennial yield of 2.4 million acre-feet. Groundwater pumping in the Sacramento Valley Groundwater Basin is estimated to be near the perennial yield in average years, but exceeds it by about one million acre-feet in drought years (DWR 1998). Currently, groundwater withdrawals exceed the perennial yield by more than 33 thousand acre-feet per year (about 1.4 percent of the perennial yield). Overdraft conditions are expected to nearly triple in the basin, to about 85 thousand acre-feet, by 2020. Most of the overdraft is expected to occur in the Sacramento, Placer, and El Dorado County areas (DWR 1998).

Land subsidence due to groundwater level declines has been identified in the southwestern part of the Sacramento River Region, near Davis and Zamora. By 1973 land subsidence in this area had exceeded approximately 1 foot, and was reported to be approximately 2 feet in the area east of Zamora and west of Arbuckle (Lofgren and Ireland 1973). Localized land subsidence was reported in the Davis-Zamora area during the 1988-1992 drought period (Yolo County 2000b). Land subsidence monitoring has continued since 1973 (Yolo County 2000b). Groundwater quality is generally excellent; however, areas of local groundwater contamination or pollution exist.

High water tables contribute to subsurface drainage problems in several areas of the Sacramento Valley Groundwater Basin. High water tables in portions of Colusa County, particularly along the Sacramento River, periodically impair subsurface drainage functions of the Colusa Basin Drain and other local drainage facilities. In many reaches of the Sacramento River, flows are confined to a broad, shallow man-made channel with stream bottom elevations higher than adjacent ground surface elevations. During extended periods of high streamflows, seepage-induced water logging can occur on adjoining farmlands, particularly in areas where local groundwater is in contact with the river.

Most of the water districts served by the Sacramento River Division lie within the Sacramento Valley Groundwater Basin. The western margin of the groundwater basin in the area north of Stony Creek and Black Butte Reservoir, served by the Corning Canal, is at an elevation of about 600 to 800 feet mean sea level (msl). South of Black Butte Reservoir the basin margin is at an elevation of about 250 feet msl. South of Stony

Creek, the TCC closely follows the basin margin. The canal terminates in the Dunnigan Water District, near the eastern edge of the Dunnigan Hills, at an elevation of about 100 feet msl. Thus, some of the lands in the study area lie outside of the Sacramento Valley Groundwater Basin. For example, the western portion of the Kanawha Water District, most of the lands within the 4-M Water District, and the western part of the Westside Water District are outside the Sacramento Valley Groundwater Basin.

Precipitation on the west side of the Sacramento Valley is relatively low, averaging about 15 to 20 inches per year. Near, or outside of, the basin margin well yields are relatively low. Many water districts do not operate wells, although individual landowners may pump groundwater to supplement their project water. Historical groundwater use ranges widely by district. In 1989, which was a year of below normal runoff to the Sacramento Valley preceded by two critical low runoff years, the amounts of groundwater pumping to supplement project water deliveries were reported by several water districts. The Corning and Thomes Creek water districts pumped 1,000 acre-feet and 2,500 acre-feet, respectively. This was equivalent to 4.5 percent of the water received from the CVP by the Corning Water District, and 48 percent of the water received by the Thomes Creek Water District in those years. The Proberta Water District, however, did not report any groundwater use that year.

The Colusa County Water District reported pumping 22,039 acre-feet of groundwater in 1989, which was equivalent to 36 percent of the water deliveries received from the CVP that year. Spread over the number of acres reportedly irrigated in 1989, this amounted to an average of 0.5 acre-feet per acre from groundwater. The Colusa County Water District lies entirely within the Sacramento Valley basin. The groundwater quantities noted here are from data reported in the most recent water conservation plans submitted by the districts. Equivalent data are lacking from water districts that were exempt from the requirement to prepare a water conservation plan. The Dunnigan Water District, also entirely within the Sacramento Valley basin, reported pumping 2,700 acre-feet of groundwater in 1989, representing about 20 percent of the water they received from the CVP. Kanahwa Water District pumped a small amount (174 acre-feet) of groundwater in 1989. Orland-Artois Water District pumped 12,104 acre-feet of groundwater, or about 30 percent of the water delivered from the CVP. As with the Colusa County Water District, this amounted to about 0.5 acre-feet per acre of land irrigated that year. The other large water district, Westside, did not report pumping any groundwater. The district does not own any wells, although individual landowners operate private wells.

3.3.2 Environmental Consequences

No Action Alternative

Surface Water

Water Deliveries. Under the No Action Alternative, Reclamation would negotiate contract water quantities with the contractors based on the water needs assessment prepared by Reclamation (Reclamation 2000b). Table 3.3-3 summarizes the results of

the water needs assessment for each of the Sacramento River Division contractors. The subcontracted water of the Colusa County Water District and the Westside Water District are combined in the table with the water directly contracted by these two districts.

Table 3.3-3
Summary of Water Needs Assessment Quantities
(all quantities are 2030 values)

District	Contract Amount (ac-ft)	Ground water Supply (ac-ft)	Net Transfers (ac-ft)	Total Water Supply (ac-ft)	Net Total Agr. Demand (ac-ft)	Unmet Demand (ac-ft)	Average Irrigated Acres (acres)	Average Water Required per acre
Corning WD	23,000	5,800	0	28,800	34,061	5,261	10,170	3.30
Proberta WD	3,500	1,000	0	4,500	7,696	3,196	2,405	3.20
Thomes Creek WD	6,400	700	0	7,100	6,332	-768	1,827	3.40
Subtotal Corning Canal Contractors	**32,900**	**7,500**	**0**	**40,400**	**48,089**	**7,689**	**14,402**	**3.30**
Colusa County	68,165	22,000	0	90,165	136,029	45,864	38,832	3.40
Dunnigan WD	19,000	6,500	0	25,500	31,844	6,344	9,848	3.20
Glide WD	10,500	0	0	10,500	33,316	22,816	8,329	4.00
Kanawha WD	45,000	174	0	45,174	56,893	11,719	16,255	3.50
Orland Artois WD	53,000	13,700	0	66,700	100,964	34,264	32,569	3.10
Westside WD	65,000	0	0	65,000	60,937	-4,063	17,621	3.20
Total Non-Exempt TCC Contractors	**260,665**	**42,374**	**0**	**303,039**	**419,983**	**116,944**	**123,454**	**3.33**

Source: Reclamation 2000b

Model results, described in the economic analysis in Section 3.2, indicate that under the No Action alternative dry hydrologic conditions could result in a reduction on the order of about 15 percent in irrigated acreage throughout the study area overall. Such a reduction would not necessarily affect all water contractors in the same way. Among the ways in which a reduction in irrigated acres might occur is that higher value permanent crops would continue to be irrigated, while marginally productive lands are shifted to crops that require minimal or no water (e.g., dry pasture or wheat). It is possible, therefore, that in some districts, the amount of water delivered might remain similar to existing conditions in spite of hydrologic conditions and reductions in irrigated acreage. More likely, there would be permanent shifts from low value, high water consuming crops, such as rice, smaller reductions in permanent crops, and temporary fluctuations in the amount of acres planted in higher value seasonal crops, depending on hydrologic conditions. This scenario would result in minimal changes in average water use over time, with short-term fluctuations greater in magnitude than the long-term change.

Groundwater

The CVPM assumes that there would be no groundwater use in the TCC service areas. However, although groundwater is not considered a viable long-term substitute for CVP water, some contractors are able to supplement their CVP water deliveries with

groundwater, which helps them soften the impacts of dry years. In the Corning Canal districts, groundwater is generally more plentiful than in the TCC districts. Groundwater use, however, is increasingly subject to regional management, as local agencies are formed under AB3030 or other authorities. In general, groundwater management will probably take the form of defining the sustainable yield of the local groundwater resources, requiring permits to extract groundwater, conserving riparian habitat, and generally limiting the amount of groundwater available as a supplement to CVP deliveries.

In the absence of enforceable groundwater management programs, reductions in CVP deliveries are likely to lead to local, short-term increases in groundwater use. Reductions in irrigation are also likely to result in reductions in groundwater recharge, affecting down gradient farmers. In the worst case, groundwater pumping by downgradient users, including those outside the study area, may slow the regional movement of groundwater toward the Sacramento River. By increasing the residence time of the groundwater, and recirculating it through irrigation recharge, the quality of the groundwater may decline. The amount of degradation, while impossible to quantify, is likely to be minor.

Alternative 1

Surface Water

Alternative 1 does not differ substantially from the No Action alternative in terms of the amount of surface water used or the way in which the water is used. Therefore, no impact is expected relative to No Action as a result of implementing Alternative 1.

Groundwater

Since water use would be the same under Alternative 1 as under the No Action alternative, no impact on groundwater resources is expected relative to result from Alternative 1.

Alternative 2

Surface Water

Model results indicate that large reductions in water purchases would occur, compared to the No Action alternative, as a result of Alternative 2. The reductions occur in the model because the model assumes that water users would not buy high-priced water. If they opt not to buy the amount of water available in good years, then the average quantity delivered would gradually decrease relative to the No Action alternative.

If water users were able to absorb the higher cost of water, and decided to purchase all of the water available each year in spite of the higher cost, then water deliveries under Alternative 2 would be the same as under the No Action alternative. Water users can be expected to have different abilities to pay, and therefore some water users would not be as highly affected by price as others. Farmers who can pass on the costs to consumers, who can spread costs over a long time period, who cannot afford to reduce their water use (for example because they have investments in permanent crops such as orchards),

or who can afford reduced profits, might continue to purchase as much water as is available. If so, then cropping patterns might be expected to shift toward high value and permanent crops, and away from low value and water intensive crops. As discussed in Section 3.2, the CVPM shows that when a sequence of dry years is followed by an average year, water purchases by the Sacramento River Division contractors overall could be greatly reduced. Such an impact might be severe enough to drive some contractors out of business, leaving a smaller base across which to spread operating costs. This could lead to further price increases, possible loss of additional water users, and possible threats to the viability of the Tehama Colusa Canal Authority (TCCA). This would be a substantial impact on surface water resource management relative to the No Action alternative.

Groundwater

Any substantial reduction in CVP water deliveries such as described above would put pressure on districts and individual farmers to find alternative sources of water to meet their demands for water. Groundwater is one of the alternative sources that might be exploited. Some districts have negligible groundwater resources, while others have substantial groundwater resources. Moreover, the degree to which districts could share groundwater would be limited by local ordinances designed to prohibit mining of groundwater.

It is unlikely that groundwater could supply a substantial portion of the total demand in any district over the long term. Therefore, if surface water deliveries are substantially and permanently reduced under Alternative 2, it is unlikely that groundwater would be substituted. Groundwater use would be localized in areas with substantial groundwater resources, such as on alluvial fans or in small isolated groundwater basins. Reliance on groundwater resources in the absence of a groundwater management program could result in substantial local impacts on groundwater resources.

3.3.3 Cumulative Impacts

The following projects have been identified within the study area. Potential cumulative impacts are discussed under each project. While shifts in cropping patterns, number of irrigated acres, and increased water conservation are expected due to impacts on water usage under all three alternatives, the alternatives are not expected to contribute significantly to cumulative impacts on water resources.

Integrated Resources Management Program for Flood Control in the Colusa Basin. A 1995 study by the Colusa Basin Drainage District identified projects to meet six objectives: protect against flood and drainage damages, preserve and enhance agricultural production, capture surface or storm water for increased water supplies, facilitate groundwater recharge to help reduce overdraft and land subsidence, improve and enhance wetland and riparian habitat, and improve water quality. A Draft Programmatic Environmental Impact Statement/Draft Programmatic Environmental Impact Report (DEIS/DEIR) for the proposed Resources Management Program for Flood Control in the Colusa Basin was released on June 2, 2000 for public comment.

Some projects selected for feasibility and preliminary design studies have potential water supply benefits, including two small onstream reservoirs and one groundwater recharge project (DWR 1999). The Colusa Basin Drainage District has investigated the potential to construct two small reservoirs as part of its integrated watershed management project--a 2.2 thousand acre-feet (taf) Wilson Creek Reservoir west of Orland in Glenn County, and a 16.9 taf Golden Gate Reservoir on Funks Creek near Maxwell in Colusa County. The estimated average annual runoff at the Wilson Creek site is 2.4 taf. The construction cost is estimated at $3.3 million. The primary purpose of the proposed reservoir would be flood control, although it offers limited water supply benefits. Golden Gate Reservoir would be formed by a 76-foot high, earthfill dam; this dam site is also a component of the Sites/Colusa Reservoir, a CALFED storage option. The estimated average annual runoff at the Golden Gate Dam site is 8.6 taf and the construction cost estimate for the dam and reservoir is $2.5 million. According to DWR, these reservoirs proposed by the Colusa Basin Drainage District are too small to provide enough carryover storage to significantly increase local drought year water supply reliability.

Potential Impacts. Much of the present supply for agricultural water users in the Colusa Basin comes from return flows from CVP water contractors. These irrigation return flows have become an increasingly unreliable supply for Colusa Basin Drain diverters as a result of increased water conservation measures by upstream water users. To the extent that changes in cropping patterns, greater irrigation efficiency, or reduction in irrigated acreage may result from the project, this may result in further reductions in groundwater recharge and return flows from lands served by the Sacramento River Division.

Lower Stony Creek Watershed Management. Reclamation, under a SWRCB permit condition, developed a Task Force and Technical Team to develop a fish, wildlife, and water use management plan for lower Stony Creek. This Plan was prepared in 1998 (Reclamation, 1998).

Glenn County received funding in 2000 for forming a landowner group to discuss problems along lower Stony Creek and to recommend land management practices to address them. Glenn County is seeking funding to continue planning a lower Stony Creek watershed restoration program to address the recommendations and findings from both the Plan and from the landowner group. (UC Davis 2000)

Potential Impacts. With reduction in irrigation as a result of changes in pricing incentives, some land may be converted to range, dryland agriculture, or may be fallowed. Cultivated soils typically lose some of the structure and profile characteristics that resist erosion in natural soils. It may take years for vegetative cover to become established on land that has previously supported only a limited range of crop plant types, and during the conversion period, the land may be more susceptible to wind erosion in the dry season, and to erosion by storm runoff in the wet season. The result could be a loss of soil and gullying. Agriculture provides an economic incentive to manage the land and prevent erosion, which may be abruptly reduced when the land is

no longer as productive. Watershed restoration efforts would help to reduce these impacts.

Tehama County Groundwater Management Planning. In 1992, the Tehama County Board of Supervisors amended its county code to enact urgency ordinances prohibiting groundwater mining within the county and extraction of groundwater for export without a permit from the board. In 1996, the Tehama County Flood Control and Water Conservation District adopted a resolution of intent to develop a countywide AB 3030 plan and prepared a draft plan to serve as the basis for developing agreements with groundwater users.

Potential Impacts. Groundwater management would probably reduce the potential for long-term groundwater impacts associated with potential shifts to either greater reliance on groundwater or reductions in groundwater recharge that may be associated with long-term contract renewal alternatives.

Glenn County Groundwater Management Planning. Glenn County enacted a groundwater ordinance in 1977. This ordinance required a permit to export groundwater outside the county. A permit can be issued only if it is found that export will not result in overdraft, adverse impacts to water levels, or water quality degradation. The Board of Supervisors may impose permit conditions.

Potential Impacts. Groundwater management would probably reduce the potential for long-term groundwater impacts associated with potential shifts in reliance on groundwater or reductions in groundwater recharge that may be associated with long-term contract renewal alternatives.

Sites Reservoir Offstream Storage Project. In August 2000, the Glenn-Colusa Irrigation District and the Tehama-Colusa Canal Authority entered into a joint planning Memorandum of Understanding (MOU) with other Calfed agencies to proceed with the review and planning of the Sites Reservoir (Calfed 2000). The MOU set August 2004 as the deadline for completing all environmental documentation of the project.

The proposed location of Sites Reservoir is about 10 miles west of Maxwell, in the Antelope Valley, and is two to three miles west of the TCC. Sites Reservoir is proposed to be filled primarily by pumped diversions from the Sacramento River during peak flow periods in winter months. To minimize potential impacts of existing diversions on Sacramento River fisheries, Sites would release water back into valley conveyance systems (such as the Glenn -Colusa Irrigation District Canal and TCC) in exchange for water that would otherwise have been diverted from the Sacramento River. This undiverted summer water could become available for other downstream uses in the Bay-Delta (NCA 2001), relieving demand for instream environmental uses that might otherwise have to be made up by reductions in deliveries of contract water. The proposed reservoir would have a capacity of 1.9 million acre-feet or more (NCA 2001; DWR 1998b). A Feasibility Study is under preparation to evaluate various project options.

As a related project, Calfed is considering enlargement of the TCC between the Red Bluff Diversion Dam and Funks Reservoir (Calfed 1997a). Calfed has also considered increasing the capacity of the TCC from Funks Reservoir to Bird Creek in Yolo County, and extending the canal to a proposed conveyance facility in an enlarged Lake Berryessa, in Yolo County (Calfed 1997b).

***Potential Impacts**:* The MOU of August 2000 states that "specific allocations of water to meet project purposes, including those allocations necessary to meet the needs of local interests," will be addressed in future planning agreements. Thus, the water supply benefits of the proposed Sites Reservoir project to local water users have not yet been quantified. The proposed project is expected to make more water available during average and dry years to local municipal and agricultural water users, as well as making increasing water supplies available in other parts of the state. The project could also provide local flood control benefits. The project would inundate Antelope Valley, eliminating existing demand for water there. However, this is not expected to have a significant impact on water resources, since no project water is currently delivered to Antelope Valley.

Storage of water in the proposed Sites Reservoir could adversely impact its chemical composition. Minerals, organic matter, and human-introduced contaminants present in Antelope Valley rock and soils could dissolve in or be mobilized by the stored water and would then be released during average or dry years when this water would potentially represent a large proportion of the water delivered to local water users. Future studies will further identify the potential for these impacts. However, at this stage of the planning process, the impacts are not expected to be significant because the resultant concentrations of dissolved minerals are expected to be small, and the delivered water would be required to meet primary drinking water standards.

3.4 LAND USE

3.4.1 Affected Environment

Agricultural Land Use

Introduction

The affected environment discussion for agricultural resources includes farmland classifications and agricultural land use. Although the potential impact on agricultural land use would be limited to the Sacramento River Division contractors, this discussion addresses all of Tehama, Colusa, Glenn, and Yolo counties because the economic effects resulting from impacts to agriculture would extend throughout the region.

Farmland Classifications

Important Farmland Map Categories. The Natural Resource Conservation Service (NRCS) is responsible for maintaining an inventory of the nation's farmlands. In order to map these lands, the NRCS designates four basic types of important farmland: prime farmland, farmland of statewide importance, unique farmland, and farmland of local importance. Prime farmland and farmland of statewide importance may be used for crops, pasture, range, forestry, or other uses but may not be used for urban or water uses. The California Department of Conservation Farmland Mapping and Monitoring Program provides biennial mapping of California's important farmlands.

Prime farmland is available land best suited for producing food, feed, forage, fiber, and oilseed crops. Prime farmland has the soil quality, growing season, and moisture supply needed to produce a sustained high yield of crops when treated and managed (including water management) according to current farming methods.

Farmland of statewide importance is land other than prime farmland that has a good combination of physical and chemical characteristics for producing crops. These lands differ from prime farmland in that they may have minor shortcomings, such as greater slope or less ability to store soil moisture.

Unique farmland does not meet the criteria for prime farmland or farmland of statewide importance but is used for producing specific high-value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high quality or high yields of a specific crop when treated and managed according to modern farming methods. Examples of such crops are citrus, olives, avocados, rice, grapes, and cut flowers.

Farmland of local importance is land other than prime, statewide, or unique that is producing crops or that has the capability of producing crops and may be important to the local economy. These lands are identified by a local committee made up of concerned agencies that review the lands under this category at least every five years.

Interim Farmland Map Categories. Interim farmland maps are prepared for specific agricultural counties lacking modern soil surveys; this includes Colusa County. The

farmland categories used do not depend on modern soil survey information. Two categories of interim farmland are mapped in lieu of the important farmland categories—irrigated farmland and nonirrigated farmland. Irrigated farmland is cropped land with a developed irrigation water supply that is dependable and of adequate quality. Nonirrigated farmland is land on which agricultural commodities are produced on a continuing or cyclic basis using stored soil moisture.

Farmland Protection Act. The Farmland Protection Act (Pub. L. 97-98) of 1981 requires all federal agencies to consider the effect of programs on farmland. Federal agencies are required to develop criteria to evaluate the effect of federal programs on the conversion of agricultural lands to nonagricultural uses. Federal agencies must, to the extent practicable, consider alternatives or mitigation that lessen the impact on farmland conversion.

Williamson Act. The California Land Conservation Act of 1965 (Williamson Act) established a voluntary tax incentive program for preserving agricultural and open space land. To be eligible for the Williamson Act program, land must be within a county-designated agricultural preserve. Lands under Williamson Act contracts are restricted to agricultural use, and the property owner is taxed according to the income that the land is capable of generating in agriculture. Williamson Act contracts extend for ten years and are automatically renewed unless a notice of nonrenewal is issued or an application for cancellation of the contract is approved. Cancellation of the contract requires that the purpose be consistent with the Williamson Act or that it be in the public interest.

County Land Use Designations

Tehama County. Unincorporated lands in Tehama County are composed primarily of non-urban land uses. The Tehama County General Plan functions as the official county policy in the allocation and distribution of different land uses in the unincorporated areas. The land use maps attached to the plan show the spatial or geographic application of the Tehama County General Plan land use policies. According to the Tehama County Planning Area Mapping System for the Central I-5 and South I-5 Areas, the majority of land within the Proberta, Thomes Creek, and Corning water districts is designated as Cropland (10 - 40-acre minimum parcel size). Other land use designations in the vicinity of these districts include General Industrial and General Commercial along portions of the I-5 corridor (Tehama County 1983).

Glenn County. The Glenn County General Plan Land Use Diagram functions as the official county policy in the allocation and distribution of different land uses in the unincorporated areas. According to the Glenn County General Plan Land Use Diagram, most land within the Orland-Artois, Glide, and Kanawha water districts is designated as Intensive Agriculture (40-acre minimum). The 4-E and Stony Creek water districts and the US Forest Service, Whitney Construction, and Stonyford contractors, are designated Foothill Agriculture/Forestry, which is used to preserve foothill areas of the county by providing for areas of intensive and extensive agricultural uses.

The Intensive Agriculture classification is used to identify areas suitable for commercial agriculture, which provide a major segment of the county's economic base. Additional objectives of this land use designation are to protect the agricultural community from encroachment of unrelated land uses, which, by their nature, would be injurious to the physical and economic well-being of the agricultural community, to accommodate lands under Williamson Act contracts, and to encourage preservation of agricultural land that contains state-designated Important Farmlands or Locally Significant Farmlands. Examples of permitted uses considered appropriate under this classification include, but are not limited to, growing and harvesting field crops, grain and hay crops, growing and harvesting fruit and nut trees, vines and vegetables, pasture and grazing land, and animal raising operations. The minimum parcel size is 40 acres and maximum building intensity is one residential unit per 40 acres (Glenn County 1993b).

Colusa County. Most existing land uses in the applicable Colusa County water districts consist of general agriculture, orchards, and rangeland. The Colusa County Generalized Land Use Plan functions as the official county policy in the allocation and distribution of different land uses in the unincorporated areas. According to the Colusa County Generalized Land Use Plan, most of land within the Four-M, Glenn Valley, Holthouse, LaGrande, Cortina, Westside, Colusa County, and Davis water districts and the Myers March Mutual Water Company are designated agriculture-general (A-G) or agriculture-upland (A-U).

The A-G designation is generally used for orchard and crop production. Residences in these areas are related to agricultural operations. County-wide, residential densities in A-G areas average one family per 100 to 400 acres. However, densities are considerably higher in the orchard areas near Arbuckle and Williams and along the Sacramento River. The A-G areas presently are zoned as Exclusive Agriculture and are subject to 10-acre minimum lot size requirements. The A-G designation has been applied to 419,000 acres in Colusa County, encompassing most of the Sacramento valley floor; this represents a little over half (57 percent) of the county's total land area (Colusa County 1989).

Lands designated A-U are used for cattle and sheep grazing, and are intermixed with undeveloped, uninhabited forests, chaparral, and grasslands. Soils are generally fair to poor and are not conducive to crop production. Residential densities presently average less than one family per 1,000 acres. The A-U designation has been applied to 183,000 acres in Colusa County, encompassing most of the Coast Range foothills; this represents about a quarter of the county's total land area (Colusa County 1989).

Yolo County. The Yolo County General Plan functions as the official county policy in the allocation and distribution of different land uses in the unincorporated areas. The general plan integrates a number of community area plans, including the Dunnigan Area General Plan, which includes portions of the Dunnigan Water District in northern Yolo County (Yolo County 1981). According to the Dunnigan Vicinity General Plan Map of the County of Yolo (Yolo County 2000), most of land within the Colusa County Water District (far southern portions) and the Dunnigan Water District is designated either Agriculture General (A-G) or Agriculture Exclusive (A-E). The A-G designation is

suitable for those parcels of land in agricultural production but not under the protection of the Williamson Act. The A-E designation indicates areas under Williamson Act contract provisions (Yolo County 1981).

County Agricultural Land Use Patterns

Tehama County. In 1998, there were approximately 952,500 acres of agricultural land in Tehama County, slightly decreased from approximately 953,150 acres in 1992. In 1998, there were approximately 77,600 acres of prime farmland, 19,400 acres of farmland of statewide importance, 19,500 acres of unique farmland, 129,700 acres of farmland of local importance, and 706,300 acres of grazing land. The total amount of irrigated farmland (defined as prime farmland, farmland of statewide importance, and unique farmland) slightly increased during this period, from approximately 116,400 acres to 116,500 acres (California Department of Conservation 2000b).

According to the Department of Conservation, approximately 113 acres of farmland in Tehama County were taken out of cultivation between 1996 and 1998. Of that total, 20 acres (17.7 percent) were converted to urban use. Land taken out of cultivation but not urbanized can be farmed in the future (California Department of Conservation 2000b). Additionally, 5,065 acres of farmland in Tehama County were committed to nonagricultural use. Typically, this is fallowed, wooded, or range land undergoing sanitary sewer installation or land for which bonds or assessments have been issued for public utilities.

Glenn County. In 1998, there were approximately 584,450 acres of agricultural land in Glenn County, slightly decreased from approximately 586,200 acres in 1992. In 1998, there were approximately 168,450 acres of prime farmland, 88,600 acres of farmland of statewide importance, 11,100 acres of unique farmland, 140,000 acres of farmland of local importance, and 176,300 acres of grazing land. The total amount of irrigated farmland (defined as prime farmland, farmland of statewide importance, and unique farmland) also decreased about 3 percent during this six-year period, from approximately 276,000 acres to 268,150 acres (California Department of Conservation 2000b).

According to the Department of Conservation, approximately 775 acres of farmland in Glenn County were taken out of cultivation between 1996 and 1998. Of that total, 53 acres (6.8 percent) were converted to urban use. Land taken out of cultivation but not urbanized can be farmed in the future (California Department of Conservation 2000b). Additionally, 2,450 acres of farmland in Glenn County were committed to nonagricultural use. Typically, this is fallowed land on the outskirts of communities that is undergoing sanitary sewer installation or land for which bonds or assessments have been issued for public utilities.

Colusa County. In 1998, there were approximately 575,400 acres of agricultural land in Colusa County, slightly decreased from approximately 577,000 acres in 1992. In 1998, there were approximately 329,000 acres of irrigated farmland, 11,500 acres of nonirrigated farmland, and 234,900 acres of grazing land. The total amount of irrigated

farmland decreased only slightly from the 1992 total of 329,750. According to the Department of Conservation, approximately 440 acres of farmland in Colusa County were put into cultivation between 1996 and 1998.

Yolo County. In 1998, there was approximately 557,000 acres of agricultural land in Yolo County, slightly decreased from approximately 565,200 acres in 1992. In 1998, there were approximately 265,900 acres of prime farmland, 18,200 acres of farmland of statewide importance, 55,250 acres of unique farmland, 74,300 acres of farmland of local importance, and 143,350 acres of grazing land. The total amount of irrigated farmland (defined as prime farmland, farmland of statewide importance, and unique farmland) also decreased during this period, from approximately 351,100 acres to 339,350 acres (California Department of Conservation 2000b).

According to the Department of Conservation, approximately 7,105 acres of farmland in Yolo County were taken out of cultivation between 1996 and 1998. Of that total, 1,042 acres (14.6 percent) were converted to urban use. Land taken out of cultivation but not urbanized can be farmed in the future (California Department of Conservation 2000b). Additionally, 2,400 acres of farmland in Yolo County were committed to nonagricultural use. Typically, this is land undergoing sanitary sewer installation or land for which bonds or assessments have been issued for public utilities.

Yolo County ranks second of all California counties in tomato and safflower production. Farmland in Yolo County is expected to face continuing development pressure. The California Department of Finance projects that the population of Yolo County will grow from 172,500 in July 2000 to 262,400 in July 2020. The Farmland Mapping and Monitoring Program survey found that land conversion in Yolo County was occurring in the following areas: warehouse and industrial complexes along I-5 in eastern Woodland, large houses near the municipal golf course and the "Wildhorse" community in Davis, including an 18-hole golf course on a former orchard, new houses along I-505 in Winters, and warehousing on prime land west of I-80 and south of the California Highway Patrol Academy in West Sacramento (California Department of Conservation 2000a).

Agricultural Land Use for the TCC and Corning Canal Contractors

Table 3.2-2 in Section 3.2, Agricultural Economics, characterizes the cropping patterns in each of the potentially affected water districts as reported to the Bureau of Reclamation in 1996. The table reveals a fairly wide range of cropping patterns within and between districts. As stated in Section 3.2, while many districts have a proportionally large share of their lands receiving CVP contract water in vegetable and fruit and nut crops, a number of districts are planted predominantly to cereal and forage crops such as wheat, rice, and sugar beets.

Municipal and Industrial Land Use

No major M&I contractors are part of the Sacramento River Division contractors; however, Colusa County, Corning, Dunnigan,, Stony Creek, Stonyford, the US Forest

Service, and Whitney Construction west of the TCC receive minor amounts of CVP water for M&I use.

3.4.2 Environmental Consequences

Impacts to land use depend primarily on changes that may affect agricultural productivity and conflict with applicable land use plans of the county where the districts are located.

No Action Alternative

Under the No Action Alternative, total irrigated acreage within the service area is projected to be approximately 95,300 acres in 2030 under average hydrologic conditions. The largest single crop type would be deciduous orchards (29,833 acres), followed by rice (10,683 acres) and alfalfa (10,451 acres).

Alternative 1

Alternative 1 is assumed to have similar agricultural land use patterns as the No Action Alternative. Therefore, there are no environmental impacts of this alternative.

Alternative 2

Implementing Alternative 2 would not have a direct effect on land uses for the Sacramento River Division contractors. Renewing long-term water contracts under Alternative 2 would not involve constructing facilities that would alter current land uses nor would it involve installing structures that would conflict with existing land use plans.

Under Alternative 2, of the approximately 95,300 acres of irrigated land within the service area directly affected by long-term CVP contract renewal, about 65,000 acres or approximately 68 percent is projected to be fallowed in an average hydrologic year following five dry hydrologic years (see Section 3.2, Agricultural Economics). This represents an indirect substantial land use change compared to the No Action Alternative.

3.4.3 Cumulative Impacts

Implementation of Alternatives 1 or 2 would not contribute significantly to cumulative impacts to land use.

3.5 BIOLOGICAL RESOURCES

The Sacramento River Division includes 18 water contractors served primarily by the Corning and Tehama-Colusa Canals in Tehama, Glenn, Colusa, and Yolo counties (Corning Canal and Tehama-Colusa Canal Units). The majority of these service areas are west of Interstate 5; however, a few service areas straddle the interstate. The Stony Creek Water District in the Black Butte Unit is located in Glenn County.

3.5.1 Affected Environment

Vegetation/Habitat

Figures 3.5-1, 3.5-2, and 3.5-3 show the service area boundaries overlaid on the habitat and vegetation cover maps created by the California GAP Analysis Program. Table 3.5-1 gives acreages of these habitat types within each district. The agricultural acres may not correspond exactly with the total irrigated acreage data provided in the most recent water needs assessments submitted to Reclamation.

The contractors within the Sacramento River Division project area primarily use the contract water for agricultural irrigation. In fact, the majority of the land within and surrounding the service areas in the Sacramento Valley floor is classified as agricultural land and nonnative grassland. Pockets of riparian areas, coastal/valley freshwater marsh, permanently flooded lacustrine, and blue and valley oak woodland punctuate the project area. The following descriptions of these habitat types have been prepared from the CVPIA PEIS.

Agricultural

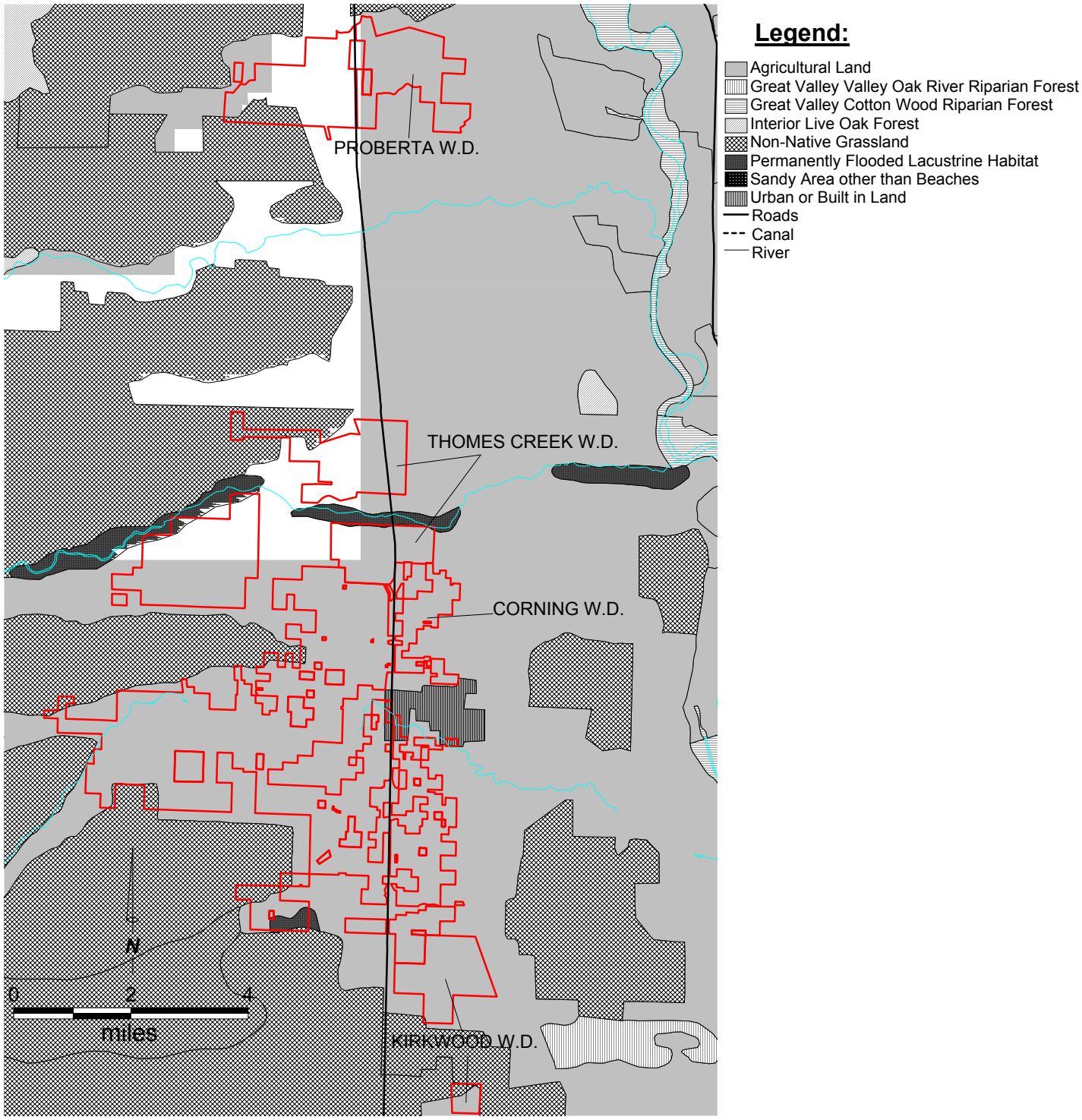
Agricultural production in the project area consists of row crops, pasture, grains, rice, orchards and vineyards. Representative acres of crop types in each service area for 1999 are shown in Table 3.5-1.

Orchard-Vineyard

Orchards of fruit or nut-bearing trees and grape vines are planted in a uniform pattern with little understory and are intensively managed. Wildlife species associated with vineyards include the deer mouse *(Peromyscus maniculatus),* mourning dove *(Zenaida macroura),* and black-tailed hare *(Lepus californicus).* American crows *(Corvus brachyrhynchos),* western scrub jay *(Aphelocoma californica),* northern flicker *(Colaptes auratus),* Lewis' woodpecker *(Melanerpes lewis),* and California ground squirrel *(Spermophilus beecheyi)* feed on the nut crops. The fruit crops from orchards provide additional food for yellow-billed magpies *(Pica nuttalli),* American robin *(Turdus migratorious),* northern mockingbird *(Mimus polyglottos),* black-headed grosbeak *(Pheucticus melanocephalus),* gray squirrel *(Sciurus caroliniensis),* raccoon *(Procyon lotor),* and mule deer *(Odocoileus hemionus).*

Row Crops

Row crops in the project area include crops such as tomatoes, beans, and sugar beets. While intensive management and the use of chemicals to control pests limit the use of row crops by wildlife, rodent species such as California vole *(Microtus Californicus),* deer



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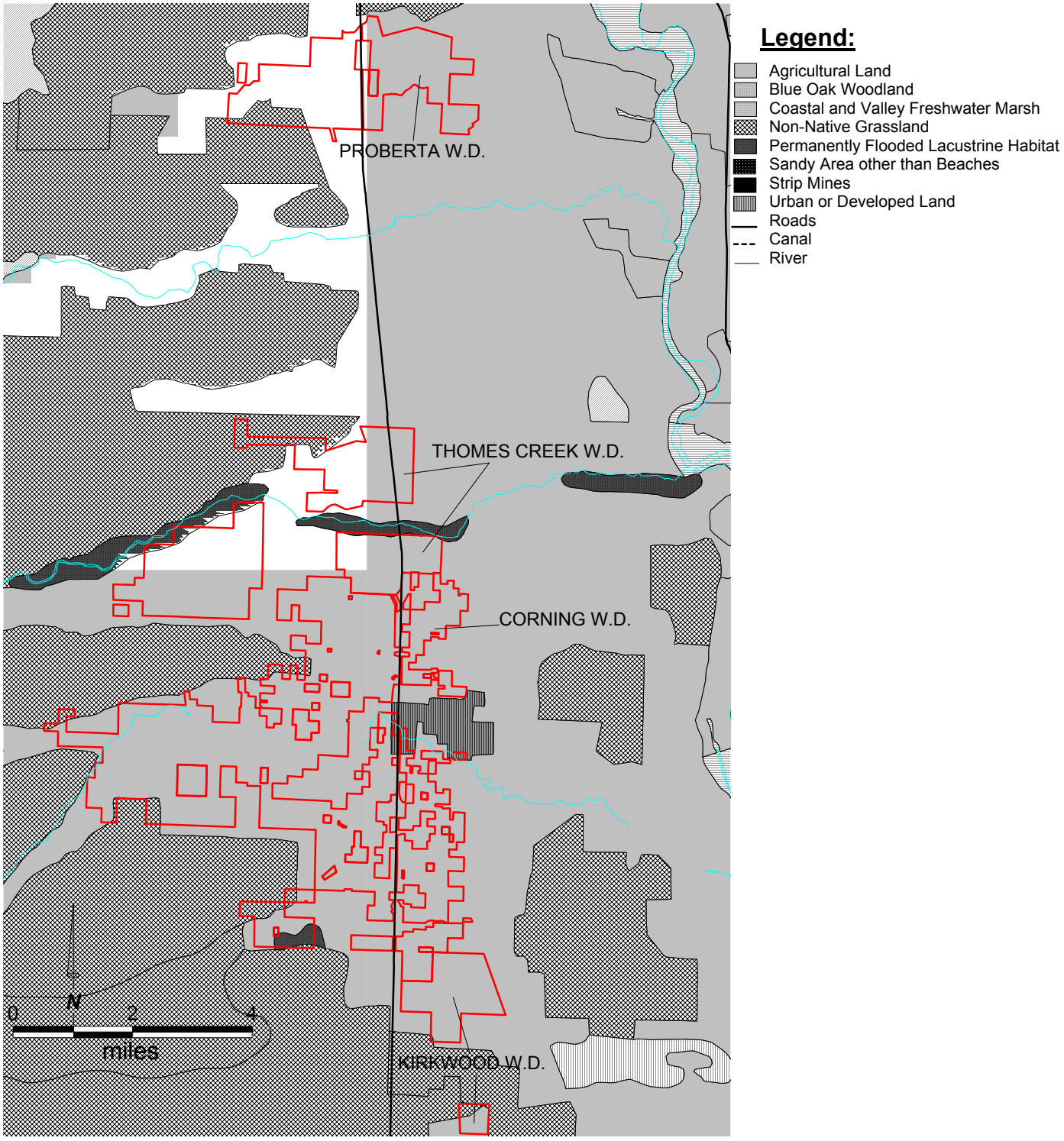
Included in this area are the Corning Canal water contractors (Proberta WD, Thomes Creek WD, and Corning WD).

Vegetative Habitat - Tehama County Area of Potential Effect

Tehama, Glenn, Colusa, and Yolo Counties, California

Figure 3.5-1



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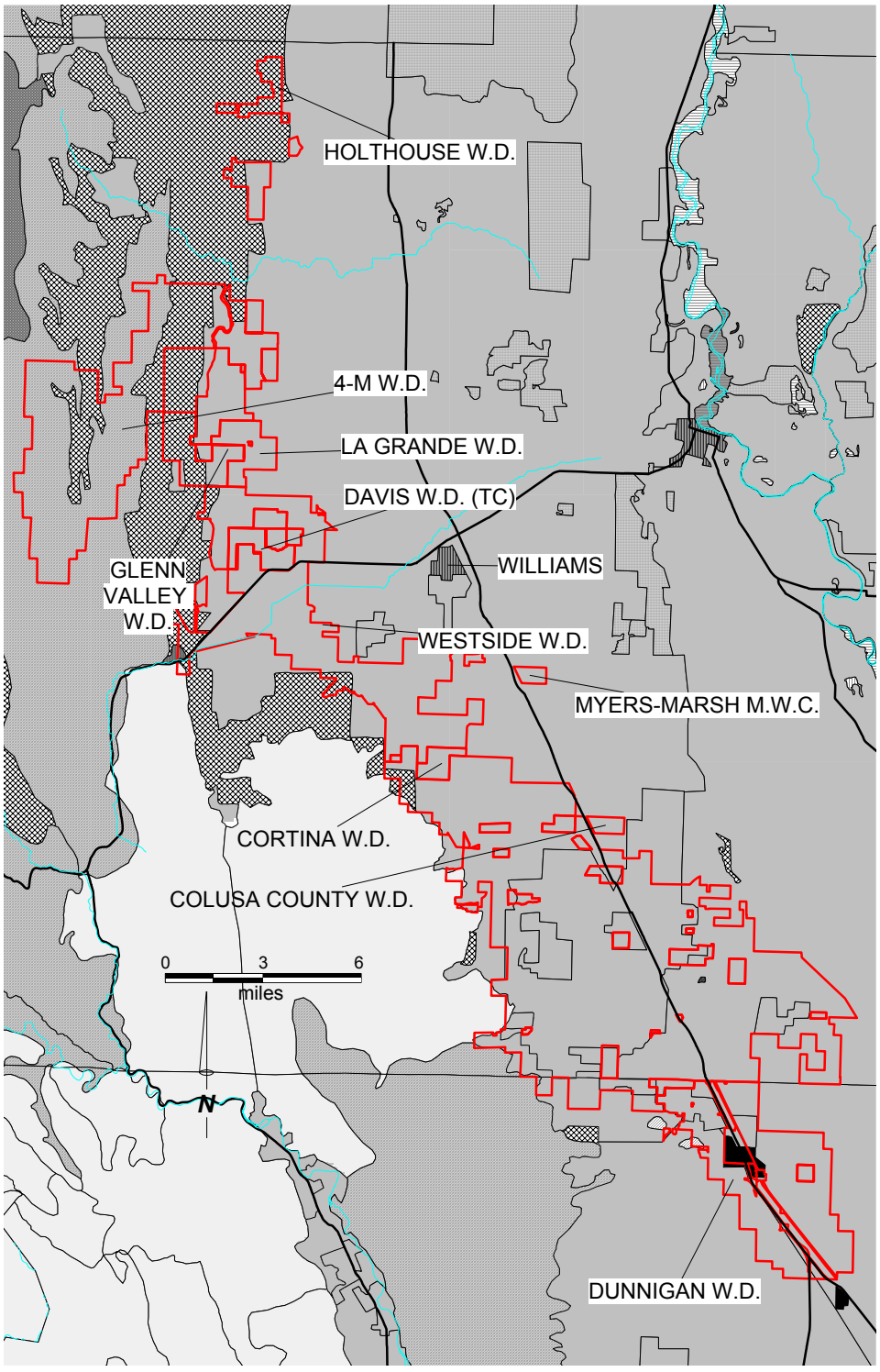
Included in this area are the northen Tehama-Colusa Canal water contractors (Orland-Artois WD, Glide WD, Kanawha WD). Although various contractors west of the canals (4-E WD, Stoney Creek WD, US Forest Service, Whitney Construction, and Stoneyford).

Vegetative Habitat - Glenn County Area of Potential Effect

Glenn County, California

Figure 3.5-2



Legend:

- Agricultural Land
- Blue Oak Woodland
- Chamise Chaparral
- Coastal and Valley Freshwater
- Eucalyptus
- Foothill Pine-Oak Woodland
- Great Valley Cottonwood Riparian Forest
- Non-Native Grassland
- Permanently Flooded Lacustrine Habitat
- Urban or Developed Land
- Roads
- Canals
- Rivers

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Included in this area are the southern Tehama-Colusa Canal water contractors (Holthouse WD, Glenn Balley WD, 4-M WD, La Grande WD, Davis WD, Westside WD, Meyers Marsh MWC, Cortina WD, Colusa County WD, Dunnigan WD).

Vegetative Habitat - Colusa and Yolo Counties Area of Potential Effect

Colusa and Yolo Counties, California

Figure 3.5-3

Table 3.5-1
Habitat Types in the Service Areas of the Sacramento River Division

	Agriculture	Blue Oak Woodland	Valley Oak Woodland	Foothill Pine/Oak Woodland	Coast Range Mixed Coniferous	Eucalyptus	Chamise Chaparral	Nonnative Grassland	Coastal/Valley Freshwater Marsh	Perm. Flooded Lacustrine	Sandy	Urban	Strip Mines
Tehama-Colusa Canal Unit													
Colusa County WD	45,042	68		386				362		19			
County Of Colusa													
subcontractor 4-M WD	1,800	11,489						4,306					
subcontractor Glenn Valley WD	718							1,261					
subcontractor Holthouse WD	816							1,179					
subcontractor Myers Marsh MWC	1,750												
subcontractor LaGrande WD	1468												
subcontractor Cortina WD	614												
Davis WD	1,017												
Dunnigan WD	7,525		52			206		2,974					
Glide WD	6,098							3,326					
Kanawha WD	15,384							1,150					
Kirkwood WD	1,110							46					
La Grande WD													
Orland-Artois WD	30,388							794	75	0.1			58
Westside WD (1 and 2)	16,344	137		48				1,098					
Corning Canal Unit													
Corning WD	12,318							322		104	100	88	
Proberta WD	2,717							220					
Thomes Creek WD	3,175							195					
Other													
Stony Creek WD		114					0.4						
Stonyford	NA												
Whitney Construction	NA												
USFS Conservation Camp	NA												
4-E WD		0.9		16	1,771								

Note: The habitat acres for each service area were calculated by overlaying service area boundaries on the habitat maps (Figures 3.5-1, 3.5-2, 3.5-3) generated from the California Gap Analysis Program data. NA means data not available.

mouse, and California ground squirrel forage in row crops. These rodent populations are preyed on by Swainson's hawks *(Buteo Swainsoni),* red-tailed hawks *(B. jamaicensis),* and black-shouldered kites *(Eulanus leucurus majuslus).*

Grain

Grains crops such as barley, wheat, corn, and oats are planted in the fall and harvested in the spring. Although intensive management and use of chemicals to control pests and diseases reduces the value of grain crops to wildlife, the young green shoots of these crops provide important foraging opportunities for such species as greater white fronted geese *(Anser albifrons),* tundra swans *(Cygnus columbianus),* and wild pigs *(Sus scrofa).* Other species, including red-winged blackbirds *(Agelaius phoeniceus),* Brewer's blackbirds *(Euphagus cyanocephalus),* ring-necked pheasants *(Phasianus colchicus),* various waterfowl, and

western harvest mice *(Reithrodontomys megalotis)* feed on the seeds produced by these plants.

Rice

Cultivated rice in the Central Valley has some of the attributes found in seasonal wetlands; however, the intensive management of this habitat reduces many of the benefits found in pristine wetlands. Flooded rice fields provide nesting and foraging habitat for waterfowl and shorebirds. The grain produced by this crop provides important forage for many wildlife species. After harvest, waste grain is fed upon by waterfowl (e.g., mallards *[Anas platyrhynchos]* and Canada geese *[Branta canadensis]*), sandhill cranes *(Grus canadensis),* California voles, and deer mice. Raptors, including northern harriers (*Circus cyaneus*), black-shouldered kites, and ferruginous hawks *(Buteo regalis)* feed upon rodents in this habitat. Irrigation ditches used to flood rice fields often contain dense cattail vegetation. These ditches provide habitat for wildlife species, such as the Virginia rail *(Ralius limicola),* American bittern *(Botaurus lentiginosus),* snowy egret *(Egretta thula),* marsh wren *(Cistothorus palustris),* common yellowthroat *(Geothlypis trichas),* and the song sparrow *(Melospiza melodia).*

Grassland

Grassland communities once occupied vast portions of the Central Valley region. Historically, the grasslands consisted of perennial bunch grass species such as needle grass, bunch or blue grass and three-awn *(Stipa pulchra, S. cernua, Poa scalbrella,* and *Aristida divaricata,* respectively). However, agricultural cultivation and livestock grazing introduced annual grasses, which have largely eliminated the native perennial grasslands. Annual grasses found in grassland vegetation include wild oat *(Avena fatua),* soft chess *(Bromus hordeaceous),* ripgut grass *(B. diandrus),* medusa head *(Taeniatherum caput-medusae),* wild barley *(Hordeum spontaneum),* red brome *(Bromus madritensis* ssp. *rubens),* and slender fescue *(Festuca rubra trichophylla).* Forbs commonly encountered in grassland vegetation include long-beaked filaree (*Erodium botrys*), redstem filaree *(Erodium cicutarium),* dove weed *(Eremocarpus setigerus),* clovers (*Trifolium* spp.), Mariposa lilies *(Calochortus nuttallii),* popcornflower *(Plagiobothrys kingii),* and California poppy *(Eschscholzia californica).*

Grassland habitats are important foraging areas for black-shouldered kite, red-tailed hawk *(Buteo jamaicensis),* Swainson's hawk, northern harrier, American kestrel *(Falco sparverius),* yellow-billed magpie, loggerhead shrike *(Lanius ludovicianus),* savannah sparrow *(Passerculus sandwichensis),* American pipit *(Anthus rubescens),* mourning dove, Brewer's blackbird, red-winged blackbird, and a variety of swallows (Family *Hirundinidae*). Birds such as killdeer *(Charadrius vociferus),* ring-necked pheasant, western kingbird *(Tyrannus verticalis),* western meadowlark *(Sturnella neglecta),* and horned lark *(Eremophilia alpestris)* nest in grassland habitats. Grasslands also provide important foraging habitat for the coyote *(Canis latrans)* and badger *(Taxidea taxus)* because this habitat supports large populations of small prey species, such as the deer mouse, California vole, pocket gopher *(Thomomys* ssp.*),* and California ground squirrel. Common reptiles and amphibians of grassland habitats include western fence lizard *(Sceloporus occidentalis),* common kingsnake *(Lampropeltis getula),* western rattlesnake *(Crotalus viridis),* gopher

snake *(Pituophis catenifer),* common garter snake *(Thamnophis sirtalis),* western toad *(Bufo boreas),* and western spadefoot toad *(Scaphiopus hammondii).*

Nonnative Grassland

Nonnative grasslands border the western-most boundaries of the districts (Figures 3.5-1, 3.5-2, 3.5-3) and occur in significant portions of Glide, 4-M, Glenn Valley, and Holthouse water districts. Smaller portions of Colusa County, Westside, Kanawha, Orland-Artois, Corning, Thomes Creek, and Proberta water districts include nonnative grasslands. Typically these areas of nonnative grasslands are grazed or are or have been cultivated for grain crops. In some cases, for example 4-M Water District, the nonnative grassland areas are too steep for cultivation and have predominantly served only as lands for grazing use.

Native Valley Needlegrass Grassland

A pocket of native valley needlegrass grassland is located in Colusa County along Salt Creek 10 miles west of Williams bounded by Rt. 20, Tehama Colusa Canal, and Leesville Road/Walnut Drive (Colusa County 1989). Figure 3.5-3 indicates that a portion of this valley needlegrass grassland is located in the western-most portion of Westside Water District. However, the Westside Water District has recently completed the legal process for detaching that portion of the District as well as other small parcels (Personal Communication, Lisa Weber, Westside Water District, September 20, 2000). Hence, the native valley needlegrass grassland is now outside the Westside Water District.

This community is dominated by the tussock-forming purple needlegrass *(Nassella pulchra);* naturalized annual forbs and grasses are also common. Valley needlegrass grassland is found on fine-textured soils that receive ample water during winter. This community is much reduced in its historical range, which includes the Sacramento, San Joaquin, and Salinas Valleys and the Los Angeles Basin. Valley needlegrass grassland occurs in the Sacramento River and San Joaquin River, Tulare Lake, and Delta regions.

Permanently Flooded Lacustrine Habitat

Lacustrine habitats include wetlands and deepwater habitats that are situated in a topographic depression or a dammed river channel. They tend to lack trees and shrubs, with greater than 30 percent aerial coverage of persistent emergents, emergent mosses or lichens, and typically exceed 8 ha (20 acres). Lacustrine waters may be tidal or nontidal, but ocean derived salinity is always less than 0.5 percent. The Lacustrine System is bounded by upland or by wetland dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens. Water in a permanently-flooded lacustrine habitat covers the land surface throughout the year in all years and vegetation is composed of obligate hydrophytes.

Figures 3.5-1, 3.5-2, and 3.5-3 show that both the Corning and Colusa County water districts contain permanently-flooded lacustrine habitat. The portion in Colusa County Water District is located east of Interstate 5 and north of Petroleum Creek and covers 19 acres. However, recent ground truthing by a representative of the Colusa County Water District indicates that permanently flooded habitat does not exist as indicated by

the GAP data shown in Figure 3.5-3 (Emrick 2000). The portion in Corning Water District encompasses 104 acres and is located in the southern most tip of the district to the west of Interstate 5.

Coastal and Valley Freshwater Marsh

This wetland community occurs on sites permanently flooded with slow-moving freshwater, where deep, peaty soils tend to accumulate. It is dominated by densely spaced perennial, emergent grass-like plants. Bulrushes *(Scirpus* ssp.*)* and cattails *(Typha latifolia)* dominate individually or together and may be supplemented with verbena *(Salvia verbenacea),* smartweed *(Polygonum* spp.*),* rose mallow (also known as California hibiscus, *Hibiscus lasiocarpus*) as well as some rush *(Juncus* ssp.*)* and sedge *(Scirpus* ssp.*)* species. Coastal and valley freshwater marsh is common in the Sacramento Valley in floodplain areas such as river oxbows. It also occurs along the fringes of perennially flooded drainage ditches, canals, ponds, and lakes and in coastal valleys near river mouths. This community is found in the Sacramento River, San Joaquin River, Tulare Lake, and Delta regions.

Freshwater marshes of the Central Valley provide important habitat for waterfowl and a variety of other bird species, including grebes (Family *Podicipedidae*), herons (family *Addenda*), egrets *(Egretta* ssp.*),* bitterns (family *Ardeidae*), coots *(Fulica* ssp.*),* rails (family *Rallidae*), as well as various shorebirds, and hawk and owl species. Other wildlife which may occur are the muskrat *(Ondatra zibethicus),* raccoon, opossum *(Didelphis virginiana),* and beaver *(Castor canadensis).* Many other upland species such as ring-necked pheasant, California quail *(Callipepla californica),* black-tailed hare, and desert cottontail *(Sylvilagus audubonii)* take cover and forage at the margins of wetland habitats. Many reptiles and amphibians such as common garter snake, aquatic garter snake *(Thamnophis couchi),* Pacific treefrog *(Hyla Regilla),* and bullfrog *(Rana cateshiana)* also breed and feed in freshwater habitats of the region.

The Orland-Artois Water District contains 75 acres of coastal and valley freshwater marsh.

Vernal Pools

Vernal pools found in small depressions with an underlying impermeable layer are isolated wetlands within grassland vegetation. Vernal pools develop in shallow basins that form in flat-to-hummocky terrain. Soil durapans underlying the basins prevent water infiltration and the nearly level terrain inhibits surface runoff. Saturated soil conditions cause the water table to become exposed because it is "perched" on the durapan. Hence, surface water accumulates in the basins, forming a seasonal wetland.

Vernal pools are important communities because of their current scarcity. Vernal pools support an ephemeral (part of the year) flora dominated by terrestrial annual species, with perennial (year-round) and aquatic species often contributing significant cover. Vernal pool species flower throughout the spring, resulting in conspicuous zonation patterns formed by consecutively blooming species around drying pool margins. Characteristic dominant plants include popcornflower, low barley *(Hordeum depressum),*

Genus *downingia* species, coyote-thistle *(Cirsium occidentale* var. *californicum),* goldfield *(Lasthenia chrysostoma),* meadowfoam *(Limnanthes floccosa* ssp. *floccosa),* owl's clover *(Castilleja* ssp.*),* mint plants *(Pogogyne* ssp.*),* woolly marbles *(Psilocarphus* ssp.*),* and various *Navarretia* species.

Although vernal pools are an ephemeral aquatic habitat, invertebrates and amphibians also have adapted to this resource. When standing water is available, California tiger salamanders *(Ambystoma californiense),* western spadefoot toads, and Pacific treefrogs may use the pools for egg-laying and for the development of young. Aquatic invertebrates, such as giant fairy shrimp *(Branchinecta gigas),* tadpole shrimp *(Lepidurus packardi),* clam shrimp *(Eocyzicus spp,),* water flea *(Cladoceran* spp.*),* copepods *(Copepoda* spp.*),* and crawling water beetles *(Brychius hungerfordi),* may also inhabit vernal pools. In winter and spring, water birds such as mallards, cinnamon teal *(Anas cyanoptera),* killdeer, California gulls *(Larus californicus),* green-backed herons *(Butorides striatus),* great blue herons *(Ardea herodias),* and great egrets *(Casmerodius albus)* may use vernal pools for resting and foraging grounds. Western kingbirds *(Tyrannus verticalis),* black phoebes *(Sayornis nigricans),* and Say's phoebes *(Sayornis saya)* feed on flying insects above vernal pools.

Since both nonnative and native grassland habitat occur within some of the water districts in the project area, vernal pools may exist. Those acres of nonnative grassland that have been cultivated in the past or are presently cultivated are less likely to support vernal pools. However, nonnative grassland areas that are not cultivated or are predominantly used for grazing, such as those in the 4-M Water District, may support vernal pools. In fact, many vernal pool-dependent species can coexist with grazing on these grasslands. Large acreages of nonnative grassland also are found in the Dunnigan and Glide Water Districts, as indicated in Table 3.5-1.

Valley Foothill Hardwood

The hardwood vegetation within and surrounding the project area consists of three types of oak woodland, which occur at increasing elevation respectively: valley oak woodland, blue oak woodland, and foothill pine and oak woodland.

Valley Oak Woodland

Valley oak woodland occurs at low elevations. The density of valley oaks ranges from open canopy to a more forest-like closed canopy. While valley oaks *(Quercus alba)* dominate, other trees such as western sycamore *(Platanus racemosa),* interior live oak *(Quercus fusiformis),* northern California black walnut *(Juglans hindsii),* box elder *(Acer negundo),* and blue oak *(Quercus douglasii)* may be present. The understory is predominantly comprised of grasses and forbs; however, shrubs, such as poison oak *(Rhus quercifolia),* California coffeeberry *(Rhamnus californica),* blue elderberry *(Sambucus caerulea),* and blackberries *(Rubus ursinus),* may be found.

The Stony Creek and 4-E water districts and the town of Stonyford contain valley oak woodland within their boundaries.

Blue Oak Woodland

Blue oak woodland typically occurs at higher elevations than valley oak woodland. The blue oaks provide an open canopy and are associated with other tree species such as interior live oak and foothill pine. The understory is predominantly annual grasses and forbs such as filarees *(Erodium* ssp.*),* brome grasses *(Bromus* ssp.*),* wild oat, and fiddlenecks *(Amsinckia* spp.*);* however, perennial grasses such as needlegrasses and melic grasses may also occur. Shrubs species such as California coffeeberry, buck brush *(Ceanothus cuneatus),* poison oak , California buckeye *(Aesculus californica),* western redbud *(Cercis occidentalis),* and manzanita *(Arctostaphylos* ssp.*)* may be found.

A significant portion of the 4-M Water District is comprised of blue oak woodland.

Foothill Pine and Oak Woodland

At higher elevations, foothill pine begins to intermix with oak species. When blue oak forms the majority of the overstory, the understory is comprised of grasses and forbs. At increasing elevations, live oak replaces blue oak and shrubs such as red root *(Ceanothus* spp.*),* manzanita, spiny redberry *(Rhamnus crocea),* and western redbud occur in the understory

The Colusa County, Westside, and 4-E water districts contain foothill pine and oak woodland.

Riparian

Riparian habitat in the project area exists along ephemeral streams that pass through the district boundaries. The most significant riparian forest in the region exists along the Sacramento River. Figure 3.5-3 does not show major riparian forest areas within the project area; however, the Dunnigan Area General Plan indicates that riparian habitat exists along Dunnigan and Buckeye Creeks (Yolo County 1981).

Wildlife

The Sacramento River Valley region supports a wide variety of wildlife species. The valley provides the most important wintering habitat for the millions of waterfowl that migrate along the Pacific Flyway. In fact, the 53,000 acres within the Sacramento National Wildlife Refuge Complex supports almost half of the valley's migratory birds. The grain crops and flooded rice fields in the project area provide supplementary foraging habitat for migratory waterfowl.

The Sacramento River and significant tributaries support anadromous fish as well as other fisheries. These fisheries resources have been addressed by the CVPIA PEIS and the supporting Draft Programmatic Biological Opinion for Operation of the CVP and Implementation of the CVPIA.

The East Park-Capay Deer *(Odocoileus hemionus columbianus)* herd stretches the length of Colusa County west of Interstate 5. Hence, the herd's range encompasses the contractors in Colusa County (Colusa County 1989).

Special Status Species

Special status species include those listed or proposed for listing by the US Fish and Wildlife Service (Service) or the California Department of Fish and Game (CDFG) as endangered, threatened, or rare, as candidate species for listing, or as species of concern. Wildlife resources listed by the Service and CDFG as potentially occurring in the vicinity of the Sacramento River Division include invertebrates, fish, reptiles, amphibians, birds, and mammals (including bats). Plants listed or proposed to be listed by the California Native Plant Society (CNPS) as rare or endangered are also included. Special status species are provided varying levels of legal protection under federal and state endangered species acts.

The Service identified the following species as potentially occurring in or near the region of influence (ROI), and Reclamation updated the list by service area and added critical habitat information in 2004. The updated lists by service area were provided to the Service in March 2004. Special status species potentially occurring in the project area are listed in the table in Appendix C. The list was created from a search of the California Natural Diversity Database for the USGS 7.5-minute quadrangles encompassing the project area and from a list prepared by the Service on September 20, 2000, for the same quadrangles. This comprehensive list was compiled using data collected from the California Natural Diversity Database (CNDDB), the Service, and the Point Reyes Bird Observatory.

Special status plant, invertebrate, amphibian, reptile, fish, bird, and mammal species are known to occur in these quadrangles, which encompass a broader area than the project boundaries. Given the wide geographic scope of the project area, many of the habitats suitable for these species occur in the project area. Consequently, 72 species have the potential to occur in the project area. The table in Appendix C indicates the habitat types found within the project area (as shown in Figures 3.5-1, 3.5-2, 3.5-3) that may potentially provide suitable habitat for these species.

This section provides a summary of the habitat requirements of those species that are either federally or state listed as threatened or endangered and that have the potential to occur in the project area.

3.5.2 Plants

All of the federally listed threatened and endangered plant species in Table C-1 can occur in the ROI, based on habitat requirements. They are described in detail below.

Hoover's Spurge (FT/CNPS 1B)

Hoover's spurge *(Chamaesyce hooveri),* a federally listed species with CNPS 1B status, is an annual herb. It is found most commonly in vernal pools on alluvial fans, ancient river terraces, volcanic mudflow, and clay substrate from 25 to 130 meters (USFWS 2003a; CDFG 2004a). The main threat to this species is habitat degradation resulting from grazing and habitat loss due to conversion of grassland for development (CDFG 2004a). Most of the extant populations are in or near Vina Plains of Tehama and Butte Counties (USFWS 2003a). There are three CNDDB occurrences of this species within the ROI,

all of which are in Logandale USGS 7.5-minute quadrangle, along the Sacramento National Wildlife Refuge.

Palmate-Bracted Bird's-Beak (FE/SE, CNPS 1B)

Palmate-bracted bird's-beak *(Cordylanthus palmatus)* is both federally and California-listed as endangered and has a CNPS 1B status. This California endemic occurs in valley and foothill grassland, chenopod or shadscale scrub, meadow and seep, and wetlands. Agricultural conversion is the primary factor in the decline of palmate-bracted bird's-beak. Urban expansion, changes in the hydrologic regime (seasonal water cycles and movements), road maintenance, and off-road vehicle use are among the numerous factors threatening the remaining populations. This species is known to occur in the Sacramento Valley, Livermore Valley (Alameda County), and San Joaquin Valley. The CNDDB indicates three occurrences within the ROI. One is in the Arbuckle USGS 7.5 quadrangle, at the Colusa National Wildlife Refuge and the other two are in Sacramento National Wildlife Refuge, in the Logandale USGS 7.5-minute quadrangle.

Colusa Grass (FT/SE, CNPS 1B)

Colusa grass *(Neostapfia colusana)* is a federally listed threatened and a California-listed endangered plant, with a CNPS status of 1B. This California endemic is predominantly found on the clay bottom of large or deep vernal pools when the pools are flooded. It also inhabits the alkali banks of intermittent streams common to the Central Valley grassland communities. The remaining 40-plus populations are threatened by the loss or degradation of vernal pool habitat due to overgrazing, agricultural conversion, and flood-control projects. Historically, Colusa grass was abundant in the lowest foothill "gooseland" vernal pools of Colusa and Stanislaus Counties. The present-day distribution of Colusa grass is restricted to scattered vernal pools in Stanislaus and Merced Counties, plus an occurrence in Solano County and another in Yolo County. The CNDDB indicates that one population was observed within the USGS 7.5-minute Logandale quadrangle, but that population has been extirpated. No extant populations are known within the ROI.

Hairy Orcutt Grass (FE/SE, CNPS 1B)

Hairy Orcutt grass *(Orcuttia pilosa)* is both federally and California-listed as endangered, with a CNPS status of 1B. This California endemic occurs in vernal pools with adobe soils of 25 to 125 meters under vernally flooded conditions, and it almost always occurs under natural conditions in wetlands. Hairy Orcutt grass is slowly declining throughout its range. Populations have been regularly affected by free-ranging cattle and horses that are allowed to wallow in vernal pools and by urban expansion. This species' historic distribution includes the eastern margins of Sacramento and San Joaquin Valleys, from Tehama County south to Stanislaus County and through Merced and Madera Counties (USFWS 1997a). Ten of the 34 historic populations have been extirpated. The CNDDB indicates four populations of hairy Orcutt grass within the project area, within the Sacramento National Wildlife Refuge in the Logandale USGS 7.5-minute quadrangle (CDFG 2004a).

Slender Orcutt Grass (FT/SE,CNPS 1B)

Slender Orcutt grass *(Orcuttia tenius),* an annual in the grass family *(Poeceae),* is a federally and California-listed species and CNPS 1B species. It inhabits vernal pools in valley grassland and blue oak woodland (USFWS 2004) and is endemic to the Sacramento Valley. This species is threatened by degradation of vernal pool habitat or loss as a result of agricultural conversion and development (CDFG 2004a). The species is restricted to northern California, in areas of the Sacramento Valley, from Siskiyou County to Sacramento County (USFWS 2004). Of the existing 59 native populations, most are found in Shasta County and Tehama County (USFWS 2004). There are no CNDDB records of this species within the ROI.

Solano Grass (FE/SE, CNPS 1B)

Solano grass *(Tuctoria mucronata),* also known as Crampton's tuctoria, is a federally and California-listed endangered species and CNPS 1B species. It inhabits vernal pools in valley and foothill grasslands (CDFG 2004a). Agricultural conversion and development are thought to have reduced available habitat for this species. Changes to hydrology and grazing may be causing further decline in the remaining populations (CDFG 2004a). This species is endemic to Solano and Yolo Counties. Solano grass may have been more widely distributed in the flooded areas of the Sacramento Valley (USFWS 2004). There are no CNDDB records of this species within the ROI.

Greene's Tuctoria (FE/R, CNPS 1B)

Greene's tuctoria *(Tuctoria greenei),* also known as Greene's Orcutt grass, is a federally listed endangered and CNPS 1B species, and is considered by the state as rare. It occurs in vernal pools in valley and foothill grassland from 30 to 1,065 meters. Grazing has been identified as a past and present threat to the survival of this species (CDFG 2004a), whose historical range included portions of the Sacramento and San Joaquin Valleys (USFWS 2004). Current populations are limited to Shasta, southern Tehama, Butte, Glenn, and eastern Merced Counties (USFWS 2004). There are no CNDDB records of this species within the ROI.

Indian Valley Brodiaea (FSC/SE, CNPS 1B)

The Indian valley brodiaea *(Brodiaea coronaria* ssp. *rosea)* is a federal species of concern and a state endangered plant, which occurs in chaparral, valley grassland, or closed-cone pine forest plant communities and often is found in serpentine substrate. It is a monocot in the family *Liliaceae* and is a perennial herb that is native to and endemic to California. It is equally likely to occur in wetlands or non-wetlands. There are CNDDB records of this species within the ROI.

Boggs Lake Hedge-Hyssop (-/SSC, CNPS 1B)

Boggs Lake hedge-hyssop (*Gratiola heterosepala*) is a federal species of concern and state endangered plant. It occurs under vernally flooded conditions in lake-margin, vernal pool, and edge habitats and is found almost always under natural conditions in wetlands. It is a dicot in the family *Scrophulariaceae* and an annual herb that is native to California, occurring from California to Oregon. The CNDDB indicates two occurrences of this species within the ROI.

Milo Baker's Lupine (FSC/ST, CNPS 1B)

Lupinus milo-bakeri is a federal species of concern and a state-listed threatened plant, which occurs in foothill woodland or valley grassland plant communities and often is found in disturbed habitats. It is a dicot in the family *Fabaceae* and is an annual herb native to and endemic to California. It can be found along road sides or ditches. The CNDDB indicates one occurrence of this species within the ROI.

Red Mountain Catchfly (FSC/SE, CNPS 1B)

Red mountain catchfly *(Silene campanulata* ssp. *campanulata)* is a federal species of concern and a state-listed endangered plant that occurs in chaparral or yellow pine forest plant communities and often is found in serpentine substrate. It is a dicot in the family *Caryophyllaceae* and is a perennial herb native to and endemic to California. There are no CNDDB records of this species within the ROI.

3.5.3 Invertebrates

All four of the federally listed threatened and endangered invertebrate species in Table 3 can occur in the ROI, based on their habitat requirements. However, they are generally confined to undeveloped areas along the rivers and creeks or are associated with vernal pools.

Conservancy Fairy Shrimp (FE/-)

Conservancy fairy shrimp *(Branchinecta conservatio)* is a federally endangered species that inhabits the highly turbid water in vernal pools that form in cool wet months. Fairy shrimp are not known to occur in permanent bodies of water and depend on seasonal fluctuations in their habitat, such as absence or presence of water during specific times of the year. The remaining populations are imperiled by a variety of human activities, primarily urban development, water supply/flood control projects, and conversion of land to agricultural use. The conservancy fairy shrimp is known from several disjunct populations: Vina Plains, north of Chico in Tehama County, south of Chico in Butte County, Jepson Prairie in Solano County, Sacramento National Wildlife Refuge in Glenn County, near Lake Yosemite and Haystack Mountain in Merced County, and the Lockewood Valley of northern Ventura County. The CNDDB indicates one occurrence of this species within the ROI, in the Sacramento National Wildlife Refuge, in the Logandale USGS 7.5-minute quadrangle.

Vernal Pool Fairy Shrimp (FT/-)

The vernal pool fairy shrimp *(Branchinecta lynchi)* is a federally threatened species that inhabits vernal pools. The remaining populations are imperiled by a variety of human activities, primarily urban development, water supply/flood control projects, and conversion of land to agricultural use. There are 32 known populations of the vernal pool fairy shrimp along the length of the Central Valley to Tulare County and along the central portion of the Coast Range, as well as four additional disjunct populations. The CNDDB indicates four locations where this species is found within the ROI. One population spans Black Butte Dam and Henleyville USGS 7.5-minute quadrangles, following a Pacific Gas and Electric pipeline and access road (CDFG 2004a). A second population is known from Corning and Gerber USGS 7.5-minute quadrangles at the

Thomes Creek Restoration site five miles northwest of Corning. Additional populations have been recorded at a restoration site nine miles west of Orland (Fruto NE USGS 7.5-minute quadrangle), and another recorded approximately four miles south of Red Bluff (Gerber USGS 7.5-minute quadrangle) (CDFG 2004a).

Vernal Pool Tadpole Shrimp (FE/-)

The vernal pool tadpole shrimp *(Lepidurus packardi)* is a federal endangered species that is found in grass-bottomed swales of unplowed grasslands in mud-bottomed and highly turbid pools. The remaining populations are imperiled by a variety of human activities, primarily urban development, water supply/flood control projects, and conversion of land to agricultural use. The vernal pool tadpole shrimp is known from 18 populations in the Central Valley, ranging from east of Redding in Shasta County south to the San Luis National Wildlife Refuge in Merced County, and from a single vernal pool complex on the San Francisco Bay National Wildlife Refuge in the city of Fremont, Alameda County. The CNDDB indicates one recorded observation of vernal pool tadpole shrimp within the ROI. This population was found in roadside ditches within the Williams USGS 7.5-minute quadrangle between the towns of Williams and Delphos.

Valley Elderberry Longhorn Beetle (FT/-)

Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)* is federally listed as a threatened species and is found in grasslands, woodlands, and upland areas near rivers in California's Central Valley. The beetle relies on elderberry shrubs *(Sambucus* ssp.*)* to reproduce. The primary threats to survival of the beetle include loss and alteration of habitat by agricultural conversion, inappropriate grazing, levee construction, stream and river channelization, removal of riparian vegetation and rip-rapping of shoreline, recreational, industrial and urban development, and nonnative animals, such as the Argentine ant, which may eat the early phases of the beetle. The valley elderberry longhorn beetle's current distribution is patchy throughout the remaining riparian forests of the Central Valley from Redding to Bakersfield. The CNDDB indicates there are records of 14 populations within the ROI; one population was observed in the Rumsey USGS 7.5-minute quadrangle near Cache Creek. Five populations were observed within the Red Bluff East USGS 7.5-minute quadrangle, three by the Sacramento River, one by Millrace Creek, and one by Salt Creek. Four occurrences are recorded in the Foster Island USGS 7.5-minute quadrangle, including one population 1.68 miles northeast and 2.7 miles northwest of the Glenn-Colusa Canal pumping station (CDFG 2004a). One population each was observed at the USGS 7.5-minute quadrangles of Grimes, Glenn, Gerber, and Black Butte Dam.

3.5.4 Fish

There are six species of federally listed endangered or threatened fish that have been identified by the Service as occurring or potentially occurring in the ROI (USFWS 2004, Table 3). They are two runs of Chinook salmon, Central Valley steelhead, Sacramento splittail, Coho salmon, and Delta smelt, and all occurred historically in the ROI. These species are described in detail below.

Chinook Salmon, Winter-Run (FE/SE), Spring-Run (FT/ST), Fall/Late Fall-Run (FC/SSC)

There are three Central Valley Chinook salmon *(Oncorhynchus tshawytscha*) evolutionary significant units *(*ESU), fall/late-fall, winter, and spring, that are grouped based on the timing of their spawning migrations (Goals Project 2000). The fall/late fall-run Chinook is a federally designated species of concern and state-listed species of concern. The spring-run Chinook is a federally and California-listed threatened species, and winter-run Chinook is a federally and California-listed endangered species. The primary threats to the Sacramento Valley population are the drastic changes to the Sacramento River basin, including blockage of migration due to dams and other water diversions, increasing water temperatures, agricultural and industrial pollution, and drought conditions. Historically, Chinook salmon ranged as far south as the Ventura River, California, and as far north as the Russian Far East. These three salmon runs are now found most commonly in the Sacramento headwater, such as snow-dominated streams of the Sierra and the rain-dominated watersheds above Shasta Dam. Human influences on stream habitat and fishing pressures caused populations to decline such that the only remaining winter-run Chinook (king) salmon breed in the Sacramento River and its tributaries. The CNDDB indicates only one of the Central Valley Chinook salmon ESUs has been recorded within the ROI. The winter-run ESU was recorded within the Red Bluff East and Gerber USGS 7.5-minute quadrangles. The migration and spawning of these Chinook salmon ESUs have been negatively affected by RBDD operations and water diversion in the Sacramento River Division (NOAA Fisheries 1993, Reclamation 2004a).

Coho Salmon (So OR/No CA)(FT/SE)

There are no CNDDB records of this species within the ROI. This species is unlikely to occur within the project-affected waterways, based on local distribution and drainage patterns.

Central Valley Steelhead (FT/-)

The Central Valley steelhead *(Oncorhynchus mykiss),* a federally listed threatened species, historically spawned in perennial and seasonal tributaries throughout the Central Valley. The introduction of other races of steelhead has resulted in a population that can be found in the Central Valley in any month. Degradation of streams is due to obstruction of spawning habitat by dams, insufficient quality of water due to water diversion, and degradation of water quality due to logging, development, and industrial effluent and urban runoff. Steelhead are likely to have migrated through, to have spawned, or to have been reared in most coastal streams in Washington, Oregon, and California, as well as many inland streams in these states and in Idaho (NOAA Fisheries 1998). Presently, the species distribution extends from the Kamchatka Peninsula, east and south along the Pacific coast of North America, to approximately Malibu Creek in southern California, though many populations are believed to have been extirpated or to be in decline at historic coastal streams (NOAA Fisheries 1998). There are no CNDDB records of this species within the ROI, but an individual was identified in the Colusa drainage near the point where the CC and GCID canals come close together (Holt 2002). The migration and spawning of the Central Valley steelhead have been negatively affected by RBDD operations and water diversion in the Sacramento River Division (Reclamation 2004a).

Delta Smelt (FT/ST)

Delta smelt *(Hypomesus transpacificus)* is a federally listed threatened species. The delta smelt is adapted to living in fresh and brackish water and occupies estuarine areas with salinities below two grams per liter. It rarely occurs in estuarine waters with more than 10 to 12 parts per thousand salinity, which is about one-third the salinity of seawater (Ganssle 1966, in Moyle 1976). Because of substantial human-caused changes in the relative ratios of seasonal freshwater outflows, the center of delta smelt abundance has shifted to the Sacramento River channel in the delta since 1981 (Moyle 1992). This species historically occurred from Suisun Bay upstream to Sacramento on the Sacramento River and Mossdale on the San Joaquin River (Moyle 1992). It is the only smelt endemic to California and the only true native estuarine species found in the delta (Moyle 1989; Stevens et al. 1990; Wang 1986). Delta smelt historically congregated in upper Suisun Bay and Montezuma Slough (mainly from March to mid-June), when the Sacramento and San Joaquin river flows were high. There are no CNDDB records of this species within the ROI.

3.5.5 Amphibians and Reptiles

The California tiger salamander is a federally proposed species for listing and a California species of special concern which may occur in the ROI. Both the California red-legged frog and the giant garter snake, both of which are federally listed threatened species, could occur in the ROI, based on habitat requirements. These species are described below in more detail.

California Tiger Salamander (PT/SSC)

The California tiger salamander *(Ambystoma californiense)* needs underground refuges and may use ground squirrel burrows. It breeds in vernal pools or other seasonal water sources. The California tiger salamander is found in the Central Valley and adjacent foothills and coastal grasslands. Urbanization has had drastic effects on populations of California tiger salamander, which has been eliminated from an estimated 55 to 58 percent of its historic breeding sites and has lost an estimated 75 percent of its habitat (USFWS 2004a). There are three distinct population segments, in Sonoma County, Central California (which includes the Bay Area, Central Valley, southern San Joaquin Valley, Central Coast Range regions), and Santa Barbara (USFWS 2003b). The CNDDB indicates no extant population recorded within the ROI. Four extirpated populations were noted at Bird Valley, Dunnigan, Willows, and Zamora USGS 7.5-minute quadrangles.

California Red-Legged Frog (FT/SSC)

The California red-legged frog *(Rana aurora draytonii)* is a federally listed threatened species and a California-listed species of concern. The California red-legged frog needs a distinct habitat, with both aquatic and riparian components. It tends to inhabit moist areas, streams and ponds with slow or still water, such as marshes and swamps, wetlands, aquatic areas, flowing or standing waters, riparian scrubs, riparian woodlands, and riparian forest. California red-legged frogs have been virtually extirpated from the floor of the Central Valley despite their historic presence in numbers large enough for commercial harvest. Factors that have caused the degradation of the frog's habitat

include disturbance to riparian zones by cattle and feral pigs, erosion, and introduction of nonnative predators. Historically this species extended along the coast from the vicinity of Point Reyes National Seashore, Marin County, and inland from the vicinity of Redding, Shasta County, southward to northwestern Baja California, Mexico (CDFG 2004b). Current distribution is limited to 248 streams or drainages in 31 counties (USFWS 2004e). There are no CNDDB records of this species within the ROI.

Giant Garter Snake (FT/ST)

The giant garter snake *(Thamnophis gigas)* is a federally listed and California-listed threatened species. To protect itself from predators, the giant garter snake often remains concealed in vegetation surrounding freshwater marshes, sloughs, and canals. The distribution and abundance of the giant garter snake is decreasing due to wetlands management practices in the Central Valley, including diking, channeling, and draining. The giant garter snake occurs in the Central Valley, from Gridley south to the Mendota Wildlife Area in Fresno County. The current range has shrunken considerably since 1940, when giant garter snakes ranged 100 miles north of the current northern boundary and as far south as Buena Vista Lake (approximately 200 miles south of the current southern boundary). Suitable habitat for the giant garter snake exists in the ROI, particularly in rice fields and irrigation ditches, and CNDDB indicates 10 populations are known to this area.

3.5.6 Birds

The two federally listed as threatened bird species designated by the Service as having the potential to occur in the area, as well as the three state listed bird species, also could occur in the ROI, based on habitat requirements. These species are described in more detail below.

Bald Eagle (FPD/SE, FP)

The bald eagle *(Haliaeetus luecocephalus)* is currently federally proposed for delisting but is still considered a federally threatened and California-listed endangered species. Bald eagles typically build large nests of sticks in tall old-growth conifers. Threats to population arise from recreation and development activities in preferred habitat, shooting, electrocution, poisoning, and pesticide contamination. Although it was previously more widespread in California, and breeding pairs are found further south, most bald eagles breed at altitudes up to 2,100 meters (7,000 feet) in the northern portion of the state. The wintering habitat for the bald eagle is much larger and includes most areas of California, except for extremely hot desert areas and at very high altitudes (Thelander et al. 1994). The CNDDB indicates a nesting pair at Stony Gorge Reservoir territory, on the west edge of Stony Gorge Reservoir, 20 miles west of Willows (CDFG 2004), which falls within the ROI.

Northern Spotted Owl (FT/-)

Northern spotted owl *(Strix occidentalis caurina),* a federally listed threatened species, is usually found in old-growth coniferous forests that are structurally diverse and that are at least 150 years old. The owls have large home ranges and require forested areas of at least 4,000 acres. This species is in decline as a result of extensive loss and degradation

of suitable habitat. In California, the northern spotted owl range is bounded on the south by Marin and Napa Counties, on the east by Modoc and Lassen Counties, and on the north by Del Norte and Siskiyou Counties (Thelander et al. 1994). The 4-E Water District, in the foothills west of Stony Gorge Dam, has some coniferous forest but only about half of the amount necessary for the home range of one owl pair; however, adjacent lands might support owls. The blue oak woodland habitat in the 4-M Water District may provide a fairly large area of habitat that is suitable, but not ideal, to support the owl. The presence of suitable or marginal habitat in a portion of the ROI and its vicinity make it possible that the spotted owl may occur there. There are no CNDDB records of this species within the ROI.

Swainson's Hawk (FSC/ST)

Swainson's hawk *(Buteo Swainsoni)* is a state-listed threatened species. Swainson's hawks may forage in virtually all the habitats at the west Sacramento Valley area. They occur in Great Basin grassland, riparian forest, riparian woodlands, valley, and foothill grassland communities with adjacent suitable foraging areas (such as grasslands or alfalfa or grain fields that support rodent populations). They are also sometimes associated with freshwater wetlands.

Greater Sandhill Crane (-/ST,FP)

The greater sandhill crane *(Grus Canadensis tabida)* is state listed as threatened and is a fully protected species. It breeds in wetlands and feeds in different habitat types, such as meadows, irrigated pastures, grainfields, bogs, fens, marshes, and nearby fields. Cranes like to roost together at night for safety in an open expanse of shallow water. The sandhill crane uses the Sacramento Valley, mainly just south of Sacramento, but they can be found throughout the valley. They can be found in agricultural areas depending on the amount of standing water available in the fields. There are no CNDDB records of greater sandhill cranes within the ROI.

Bank Swallow (FSC/ST)

The bank swallow *(Riparia riparia)* is state listed as threatened. It is listed as a nesting bird in the area by the Service. The bank swallow is a neotropical migrant and requires vertical banks or cliffs with fine-textured or sandy soils near streams, rivers, lakes, or the ocean to dig nesting holes. There are CNDDB records of this species within the ROI.

3.5.7 Mammals

There are no federally listed threatened or endangered mammal species designated by the Service as possibly occurring in the ROI.

Pacific Fisher (FSC/SSC)

Pacific fisher *(Martes pennanti pacifica)* is a federal and state-listed species of concern. It inhabits north coast coniferous forests, old growth, and riparian forests. It uses cavities, snags, logs, and rocky areas for cover and denning. No CNDDB records exist for this species within the ROI, but suitable habitat may occur within the area.

Small-Footed Myotis Bat (FSC/-)

Small-footed myotis bat (*Myotis ciliolabrum)* is a federal species of concern. It prefers open stands in forests, woodlands, and brushy habitats and roosts in caves, buildings, crevices, and sometimes under bark and bridges. Habitat suitable for this species is present within the ROI, although there are no CNDDB records of it within this area.

Long-Eared Myotis Bat (FSC/-)

Long-eared myotis bat *(Myotis evotis)* is a federal species of concern. It inhabits coniferous forests in mountain areas and roosts in small colonies in caves and buildings and under tree bark. Habitat suitable for this species is present within the ROI, although there are no CNDDB records of it within this area.

Fringed Myotis Bat (FSC/-)

Fringed myotis bat (*Myotis thysanodes)* is a federal species of concern. This species can be found in a wide variety of habitats, including pinyon-juniper, valley foothill hardwood, and hardwood-conifer forests. It uses caves, mines, buildings, and crevices for maternity colonies and roosts. Habitat suitable for this species is present within the ROI, although there are no CNDDB records of it within this area.

Yuma Myotis Bat (FSC/SSC)

Yuma myotis bat *(Myotis yumanensis)* is a federal and state species of concern. This species lives near lakes, creeks, or ponds and roosts by day under building sidings or shingles. Habitat suitable for this species is present within the ROI, although there are no CNDDB records of it within this area.

San Joaquin Pocket Mouse(FSC/-)

San Joaquin pocket mouse *(Perognathus inornatus inornatus)* is a federal species of concern. It inhabits coastal scrub and valley and foothill grasslands with friable soils. Habitat suitable for this species is present within the ROI. The CNDDB indicates multiple occurrences within the project ROI.

Pale Townsend's Big-Eared Bat (FSC/SSC)

Pale Townsend's big-eared bat *(Plecotus townsendii pallescens)* is a federal and state species of concern. It is found in mesic habitats in all but subalpine and alpine areas and roosts in caves, mines, tunnels, buildings, or other human-made structures. It gleans from brush or trees or feeds along habitat edges (CDFG 2004). Habitat suitable for this species is present within the ROI, although there are no CNDDB records of it within this area.

3.5.8 Environmental Consequences

This section discusses potential impacts to biological resources that would occur under each alternative due to changes in water use related to implementation of the alternatives. The main habitat types within the service area boundaries are agricultural cover and nonnative grassland. These habitat types, as well as the small areas of freshwater marsh and lacustrine habitat, would be most sensitive to changes in water use. Potential impacts would occur if water use changed due to contract terms, which

indirectly led to a shift in crop patterns or a change in land use. For example, a reduction in water use might result in a shift from water intensive crops to dry crops such as grains or result in land being left fallow. On the other hand, an increase in water use might result in nonnative grassland being cultivated. Similarly, impacts might occur if changes in water use altered the inflows to the freshwater marsh, lacustrine, and riparian areas in the project area.

No Action Alternative

The migration and spawning of the winter-run, spring-run and fall/late fall-run Chinook salmon and Central Valley steelhead are being negatively affected by RBDD operations and water diversion in the Sacramento River Division (NOAA Fisheries 1993). Gate closures limit upstream and downstream migration of anadromous fish and reduce water quantity in certain portions of the ROI which lowers water suitability for these species. The water diverted from the Sacramento River at the RBDD into the Corning and Tehama-Colusa Canals is screened, however entrainment of anadromous fish in unscreened diversions from lower Stony Creek via the Constant Head Orifice (CHO) into the Tehama-Colusa Canal can be an additional source of mortality. Since 2000 Reclamation has operated fyke nets at the head of the CHO during diversions into the TCC to capture and release downstream any salmonids that could be entrained, via a BO from NOAA Fishereis, although fall-run have been the predominant species caught. The effects of limiting migration at the RBDD together with some minimal entrainment into the TCC at the CHO can combine to lower the reproductive success of the runs that utilize the ROI and contribute to their population level decline. Consultation for these impacts, which would continue to occur under the No Action Alternative, was conducted between Reclamation and NOAA Fisheries and is addressed for the RBDD in the Operation of the Federal Central Valley Project and the California State Water Project Biological Opinion, the OCAP BA, and the OCAP BO (NOAA Fisheries 1993, Reclamation 2004a). Impacts on lower Stony Creek are being addressed between Reclamation and NOAA Fisheries in the Biological Opinion for Water Management on Lower Stony Creek where consultations are ongoing, and a final BO is expected in March of 2006 (Reclamation 2004b).

The economics analysis for the No Action Alternative shows that in 2030 land in production would range from 95,000 acres under average hydrologic conditions to 82,000 acres under dry hydrologic conditions. The crops with value to wildlife for forage, such as rice and small grains, would decrease on the order of a few thousand acres between the average and dry hydrologic conditions. A change in return flows of irrigation water between the average and dry hydrologic conditions would have minimal impact on riparian, freshwater marsh and lacustrine habitats within the service areas. Such special status species as sandhill crane that forage in the rice and grain fields would not be affected by these minor variations in the number of acres in rice and grain production.

Alternative 1

Impacts under Alternative 1 are expected to be similar to those described for the No Action Alternative because the water pricing system will be similar.

Alternative 2

Alternative 2 would impact biological resources, although the Service has issued a BO stating that the proposed action would have no adverse effect on listed species (USFWS 2005). The economic analysis (Section 3.2) indicates that Alternative 2 would not change the irrigated acreage compared to the No Action Alternative, except for the case when 2030 is an average hydrologic year following five dry hydrologic years. In this case, approximately 65,000 acres in the service area would be fallowed because CVP water by that point would be too expensive for irrigated crops. This represents 68 percent of the 95,000 acres estimated to be irrigated in 2030 for average hydrologic conditions under the No Action Alternative. Almost a third of these fallowed acres would result from a reduction in rice and small grain production, as shown in Table 3.2-19.

This loss of rice and small grain production would impact special status species that forage on these crops within the Sacramento River Division. The greater sandhill crane, for example, forages on the crops while other species such as the Swainson's hawk and the giant garter snake forage on rodents supported by the grain crops. However, the loss of approximately 20,000 acres of crops within the Sacramento River Division accounts for about five percent of the 469,000 acres of rice fields in the Central Valley that provide waste grain for some of the migratory species. In addition, because the 53,000 acres of national wildlife refuges near the project area now have secure water supplies, the reductions would account for little more than 4 percent of the wetlands available as resting habitat.

The reduction of return flows to streams and water districts that would result from 65,000 acres going fallow, which would occur when an average hydrologic year follows five dry years, may have a local impact on the level of flows in streams and irrigation ditches and the wetland and riparian habitat along these waterways. Species dependent upon these flows and habitats would be affected. The reduction of return flows may reduce flows and water levels in local streams and irrigation ditches. The reduced flows may dewater wetland, marsh and riparian areas, which may stress the vegetation and result in fewer species foraging or residing in these habitats. If these conditions are sustained for multiple years, then the local impacts may become more pronounced. However, any CVP water not purchased by the Sacramento River Division contractors either would remain in the CVP system or would be purchased by other contractors. To the extent that other contractors used this water for agricultural irrigation, return flows would benefit habitat and species found in riparian and wetland areas along streams and irrigation ditches elsewhere in California. To the extent that the water remained in rivers, streams, and bypasses operated or controlled by the CVP, habitat and species also would benefit outside of the project area.

Since 65,000 acres would be fallowed in a year of average hydrologic conditions following five years of dry hydrologic conditions, nonnative grasslands, which have the potential to support vernal pools, would not be at risk for cultivation. Because vernal pools are fed by winter and spring rains, they are not dependent upon irrigation water or return flows to form. Potential negative impacts on vernal pools are unlikely and would be limited to minor hydrological regime changes. Consequently, vernal pool species,

such as Hoover's spurge, palmate-bracted bird's-beak, Colusa grass, conservancy fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp, are not likely to be affected. There are no direct or indirect impacts on either the valley elderberry longhorn beetle or on riparian habitat in which the blue elderberry, its host plant, is found. Project-related actions are unlikely to negatively affect habitat and prey availability for sensitive amphibians or reptiles occurring in the project area, such as the California red-legged frog, California tiger salamander and giant garter snake. Runoff from agricultural use of the conveyed water could run into and contribute to wetlands, pools, and streams, which support these species. However the project may result in lower habitat quality by contaminating water with agricultural wastewater, which would likely include pesticide and organic matter. Pesticides have been identified as a potential factor in the decline of amphibians, such as the California red-legged frog (Sparling et al. 2001). Birds are likewise unlikely to suffer a decline in foraging and roosting habitat as a result of the proposed action but may be affected by the dissemination of pesticides. Bioaccumulation of toxins in species, such as the bald eagle, foraging in the action area could occur as the result of pesticides in the return flow of irrigation water and the uptake. Prey, such as fish, would ingest contamination through diet and respiration, which would then be further concentrated in the bald eagle.

Anadromous fish would be affected by the proposed action. Effects could include lower water quality, change in water quantity, and entrainment. The limited distribution of Coho salmon in southern Oregon and northern California within the action area means little to no chance for entrainment impacts due to lowered instream levels from the proposed action. Contract renewal could affect the Central Valley steelhead in terms of water conveyance. Lower water level affects were analyzed as part of the Long-Term Central Valley Project and State Water Project OCAP BA (Reclamation 2004a), and it was determined that water levels in the Upper Sacramento River would still be sufficient to support all Central Valley steelhead life stages. Other than at the RBDD any adverse impacts on fish in the Sacramento River Division system are expected only as a result of water use or conveyance, not water supply. Water conveyance is not controlled by Reclamation, other than in its oversight to ensure reasonable and beneficial uses, nor is the use of private diversion facilities under Reclamation's control. Any impacts on fish as a result of water conveyance need to be addressed by the water users.

The proposed action of contract renewal could affect the Chinook salmon spring-run and winter-run ESUs only in terms of water conveyance. The effects of water conveyance are not believed to prevent the Upper Sacramento River from providing suitable flows for most life stages of Chinook salmon year-round (Reclamation 2004a). Chinook salmon tend to spawn in the mainstem of rivers or larger tributaries with suitable substrate. All current runs of Chinook salmon have been known to spawn in the Sacramento River and tributaries from Colusa north to Keswick Dam, with the best spawning habitat being upstream of the RBDD.

However, during dry years the temperature may reach levels that are detrimental to survivorship. Even with increased temperatures due to lowered water levels in the Sacramento River, incubation conditions for winter-run Chinook are estimated to cover

98 percent of winter-run spawning (Reclamation 2004a). Winter-run salmon spawn directly in the Sacramento River and depend on cold water releases from Shasta Dam to allow them to hold for several months until they spawn in early summer (Behnke 2002). The winter-run is currently limited to the 70 miles below Keswick Dam (Moyle 2002), from Redding to Tehama.

Spring-run salmon spawn in higher streams with adequate spring fed run-off to keep summer water temperatures low. They hold in the stream for several months before spawning in the summer. The majority of spring-run salmon spawn in tributaries of the Sacramento River such as Butte, Deer and Mill Creeks. Only a small percentage of the Spring-run ESU spawns in the Sacramento River (Reclamation 2004a) so no population level impact is expected.

The proposed action would affect the amount and timing of freshwater flow in the Sacramento River and Delta, which in turn affects Delta smelt survivorship. By allowing for a maximum amount of water to be conveyed to CVP contractors, this long-term contract renewal may cause indirect take of Delta smelt. Modifying the flow may lead to increased predation of the Delta smelt or cause them to locate in such a way that causes increased smelt mortality (Reclamation 2004a). However, there would be little to no net loss of water flow in the Delta due to diversions from the Trinity River (Holt 2004).

Water use may affect anadromous fish by the return flow of irrigation water, which may be contaminated by pesticides and fertilizers. Agricultural contamination would combine with other contamination sources to lower water quality of Glenn County water bodies which this ESU may inhabit. The effect of such contamination on salmonid survivorship is not well known, but it may lower reproductive success by making the species more susceptible to disease or predation. Although more study is needed, continued agricultural runoff as a result of project actions is unlikely to have population level effects on this coho salmon ESU. Water diversion could also be responsible for entraining listed fish species. Entrainment in the Sacramento River is possible, but unlikely due to the efficiency of the screens at Red Bluff. Entrainment is possible at the diversion structures located in lower Stony Creek; however Reclamation biologists monitor potential entrainment during the irrigation season. Reclamation is also conducting an anadromous fish monitoring program on lower Stony Creek, and after three years (2001-2004) no steelhead adults or juveniles have been collected. Separate consultations for entrainment at both the Red Bluff Diversion Dam and lower Stony Creek, which are approximately 52 river miles away from each other, are in place or are ongoing. Red Bluff Diversion Dam's effects on the migration, spawning, and production of anadromous fish is fully analyzed in the OCAP BA (Reclamation 2004a).

3.5.9 Cumulative Impacts

Implementing the proposed action would not contribute significantly to cumulative impacts on sensitive species or critical habitat. The proposed action would result in no changes to the infrastructure, physical disturbances, or water delivery because no changes are expected in water purchased by the contractors or in acreage cultivated.

Special-status species with the potential to occur in the Sacramento River Division could be affected by actions unrelated to the implementation of the long-term contract renewals. These actions could include the following:

- Decrease in lands used for agriculture and a conversion of agricultural lands to M&I use;
- Continued agricultural or urban activities using groundwater or other surface water supplies only; and
- Any potential urban development and associated impacts in the M&I only contract areas.

Identification of the location, nature, and extent of such non-federal actions is speculative.

Some landowners may choose to dryland farm their land or to rely on groundwater wells to supply their irrigation needs. If there were no continuing deliveries under renewed CVP contracts or increases in water pricing, groundwater pumping might increase. Land fallowing could also increase, which could improve habitat conditions for listed species.

It is unlikely that planted acreage could increase from baseline conditions. The decrease in CVP water reliability and falling commodity prices have had a tendency to discourage new farming operations.

Conversion of agricultural land to M&I uses by the landowner could result in adverse cumulative effects on listed species, although the likelihood of this action to occur to any great extent is minimal. Any listed species displaced from agricultural lands could still make use of the remaining available agricultural habitat. In addition, the Central Valley Project Conservation Program has contributed funding to projects that have converted agricultural land to native riparian habitat. These projects have occurred along the Sacramento River, predominantly in the Sacramento River Conservation Area between Red Bluff and Colusa, benefiting a great diversity of native wildlife species.

Listed fish species could be entrained at the Red Bluff Diversion Dam in Tehama County and on Stony Creek in Glenn County, when water is being diverted. This impact has been addressed in a past consultation (NOAA Fisheries 1993) and as an ongoing Section 7 consultation with the Service and NOAA Fisheries (Reclamation 2004a and 2004b).

Cumulative CVP impacts were addressed in the CVPIA PEIS and are incorporated here by reference. Beyond those cumulative impacts discussed in the CVPIA PEIS and BO, there are no additional cumulative impacts that would result from long-term water service contract renewals in the Sacramento River Division.

3.6 SOCIAL CONDITIONS AND ENVIRONMENTAL JUSTICE

3.6.1 Affected Environment

This section describes general economic and sociological characteristics of the project area. Most observations will be made at the county level because impacts are unlikely to be felt solely within the limited boundaries of the Sacramento River Division.

Population and Income

Four counties are in the project area. Yolo County is not included since only the Dunnigan Water District is within Yolo County and socioeconomic effects would not substantially affect the rest of the County. Tehama County is the most populous and the least dependent upon agriculture, with only 8.2 percent of its workforce in agriculture. Colusa County has the highest per capita income, as shown in Table 3.6-1. Tehama, Glenn, and Colusa counties all expect population growth over the next twenty-five years of greater than 50 percent (California Employment Development Department 2000, 2000a, 2000b).

Poverty levels are relatively high in the project area: 17 percent of Colusa, 26 percent of Glenn, and 24 percent of Tehama County children under 18 live in poverty (Umbach 1997). Glenn and Tehama Counties also have lower per capita incomes than Colusa County (United States Department of Commerce 2000).

Table 3.6-1
Population Estimates and per capita income

	Population January 2000	Expected Population by 2030	Per Capita Income 1998
Colusa County	18,750	54,995	$20,287
Glenn County	27,100	59,242	$16,882
Tehama County	56,200	96,511	$17,600
Total	102,050	210,748	

Source: California Department of Finance 2000; US Department of Commerce 2002.

Employment

Figures for 1999 indicate total (farm and nonfarm) civilian employment in Tehama, Colusa, and Glenn Counties is 43,820 out of a total of 102,050 residents (California Employment Development Department 2000a, 2000b, 2000c).

Unemployment levels in the project area are significantly higher than they are in the rest of the state or the rest of the country. As shown in Table 3.6-2, recent figures indicate that the unemployment rate in the three counties ranges from 6.7 percent (in Tehama County) to 15.8 percent (in Colusa County), as compared to 5.2 percent for the state of California and 4.2 percent for the country as a whole (California Employment Development Department 2000, 2000a, 2000b).

Table 3.6-2
June 2000 Unemployment Rates for Colusa, Glenn, and Tehama Counties in 1999

County	Unemployment Rate (percent)
Colusa	15.8
Glenn	11
Tehama	6.7

Source: California Employment Development Department 2000a, 2000b, 2000c.

All three counties expect both population and employment in the area to grow, however it is expected that most of the jobs growth will be in services and retail trade, rather than agriculture (California Employment Development Department 2000, 2000a, 2000b). Therefore future agricultural employment figures are not expected to differ greatly from current levels.

Agricultural employment figures vary seasonally. Colusa County agricultural employment varied from a high of 4,100 in July of 1999 to a low of 1,650 in January of 2000. Glenn County agricultural employment figures varied from a high of 2,250 in October 1999 to a low of 1,280 in January of 2000. Tehama County's agricultural employment varied from 2,210 in October of 1999 to 950 in March of 2000 (California Employment Development Department 2000e, 2000f, 2000g). These changing figures are probable indicators of the presence of a seasonal/migrant worker population in the project area. While strict reliance on demographic reporting is not advisable because of under reporting and possible illegal status of migrant workers, one can make conservative estimates based on the information available.

As detailed in Section 3.2, there are 1189 farms in Glenn County, 1362 farms in Tehama County, and 810 farms in Colusa County. Total agricultural employment in the three county project area is estimated at approximately 7,100 (California Employment Development Department 2000, 2000a, 2000b).

Table 3.6-3
Farms and Farmworkers in the Project Area

County	Agricultural Workers	Farms	Estimated Number of Temporary Workers	Total Est. Workers per Farm
Colusa	1650 - 4100	810	2,450	2 – 5
Glenn	1280 – 2250	1189	970	1 – 2
Tehama	950 – 2210	1362	1,260	1 – 2
Total	3880 – 8560	3361	4680	

Source: California Employee Development Department 2000e, 2000f, 2000g; United States Department of Agriculture 2000.

Based on the above estimates, it can be calculated that as many as 4,680 people work as temporary labor on the farms in Colusa, Glenn, and Tehama counties. As of August 2000, total farm employment in the three counties was estimated by the State of California at roughly 7,000 workers, but this figure does not separate temporary work

from permanent full-time employment (California Employee Development Department 2000e, 2000f, 2000g).

Demographics and Environmental Justice

Executive Order 12898 requires federal agencies to identify and avoid disproportionate impacts on minority or low-income communities; therefore it is important to identify any minority or low-income communities in the project area. From 1990 to 1998, the project area population increased in almost every demographic category (Tables 3.6-4 – 3.6-6). Each county has a significant Hispanic and minority population, all of which are expected to grow significantly during the next twenty-five years.

Table 3.6-4
Colusa County Population Totals and Projections with Race/Ethnic Detail

Year	Total	White	Hispanic	Asian/ Pacific Islander	Black	Native American
1990	16,275	10,147	5,424	321	81	302
1998	18,638	10,258	7,562	408	90	320
	Projection					
2000	20973	11092	9074	382	88	337
2005	26092	12188	12930	502	105	367
2010	31110	13159	16807	583	123	438
2015	35945	13970	20686	627	161	501
2020	41398	14687	25283	686	201	541
2025	47410	15407	30455	751	232	565
2030	42220	15983	34593	803	257	584

Source: California Department of Finance 2002e; California Department of Finance 2002a.

Table 3.6-5
Glenn County Population Totals and Projections with Race/Ethnic Detail

Year	Total	White	Hispanic	Asian/ Pacific Islander	Black	Native American
1990	24,798	18,489	4,958	773	131	447
1998	26,848	18,347	6,617	1,242	140	502
	Projection					
2000	29298	19553	7654	1448	141	502
2005	34208	21127	10404	1961	152	564
2010	39055	22426	13263	2530	178	658
2015	43792	23543	16199	3105	234	711
2020	49113	24580	19742	3777	268	746
2025	54809	25565	23617	4518	299	810
2030	59365	26353	26717	5111	324	861

Source: California Department of Finance 2002f; California Department of Finance 2002a.

Table 3.6-6
Tehama County Population Totals and Projections with Race/Ethnic Detail

Year	Total	White	Hispanic	Asian/ Pacific Islander	Black	Native American
1990	49,625	43,081	5124	325	246	849
1998	55,184	46,628	6990	382	327	857
Projection						
2000	56666	47215	7827	387	317	920
2005	62920	51253	9720	474	425	1048
2010	70567	56494	11809	581	550	1133
2015	77239	60605	14067	647	708	1212
2020	83996	64210	16845	754	847	1340
2025	90951	67742	19956	837	988	1428
2030	96,515	70568	22444	903	1101	1498

Source: California Department of Finance 2000g; California Department of Finance 2000a.

As noted above, poverty levels are higher in the three counties than they are in the rest of the state of California. In addition, farmworkers (especially migrant workers) in California tend to be both minority and low-income; however no data are available concerning the ethnic status of particular occupations for the project area.

3.6.2 Environmental Impacts

No Action Alternative

As discussed in Section 3.2, Agricultural Economics, implementation of the No Action Alternative would result in no major impact on population, income, or employment rates in the project area. Most of the growth in these counties is expected to be confined to the non-farm industries. As shown in Table 3.2-15, agricultural jobs in Colusa, Glenn, and Tehama Counties are expected to total 8,218 by 2030, an increase of about 1,200 people, which is not a major change given the overall growth expected in the three-county area. There should be no major impact on population, income, or employment levels or predicted growth in Colusa, Glenn, and Tehama Counties as a result of implementation of the No Action Alternative.

Minority or low-income populations, although expected to increase numerically over the project period, would not be disproportionately affected by the implementation of the No Action Alternative because there is, by definition, no change. Therefore, there would be no environmental justice concerns raised by the No Action Alternative.

Alternative 1

Alternative 1 is assumed to have similar effects on agricultural water costs, land use, economics, and employment within the affected region as the No Action Alternative. Therefore, no major impacts are expected on social conditions or environmental justice in Colusa, Glenn, and Tehama Counties.

Alternative 2

As discussed in Section 3.2, Agricultural Economics, there would be an incremental increase in CVP water rates under Alternative 2 as compared to the No Action Alternative. The implementation of this alternative might have impacts on employment in Colusa, Glenn, and Tehama Counties and within the service areas specifically. The severity of these impacts will depend upon whether the preceding five years were wet, dry, or average, and on whether the particular year being considered is wet, dry, or average.

As identified in Table 3.2-19, under the worst-case scenario of five dry years followed by an average year, approximately 65,100 acres would be taken out of agricultural production in the project area. The precise outcome of the increase in water prices would probably vary from farm to farm; however it is probable that agricultural employment levels in each district would drop under those circumstances.

Direct and indirect impacts to employment are possible. As discussed above, and as addressed in more detail in the agricultural economics section (see Table 3.2-24), as many as 1,000 jobs could be lost in the project area under the worst-case scenario, of which approximately 500 would be in agriculture. However, overall impacts to the Sacramento Valley region are not likely to be large, because employment levels are increasing and most of the increase is expected outside the agricultural industry.

The migrant farmworker community is almost by definition low-income, and is primarily made up of minorities. Therefore, any negative impact on agricultural employment would be reflected in the minority and low-income communities. It is likely that a measurable impact would be felt in these communities as a result of the predicted loss of agricultural jobs under the worst-case scenario. The precise scale and nature of the impact is difficult to determine at this stage, however, given the imprecise data available and the difficulty of adequately predicting choices on the part of farm operators in response to changes in water rates and water availability. Additionally, the worst-case scenario of one average year following five dry years is only one of nine possible scenarios under Alternative 2.

3.6.3 Cumulative Impacts

No cumulative impacts on social conditions or environmental justice are expected from implementation of any of the alternatives identified in this EA.

3.7 RECREATIONAL RESOURCES

3.7.1 Affected Environment

Recreation can be an active or passive use of unimproved open space land or improved recreational facilities. Wildlife areas, areas of scenic, historic and cultural value, lake shores, beaches, and rivers and streams are all examples of open space as a passive use which may have few or no improvements. Parks, golf courses, and sports clubs are all examples of recreation areas that provide for more active uses and have more facility improvements.

Sacramento River

The upper reach of the Sacramento River, above the Red Bluff Diversion Dam (RBDD), is the key water source to the various service areas that comprise the Sacramento River Division. However, the middle reach from the RBDD to the Feather River confluence is the major aquatic recreation resource for the study area. This is a 160-mile segment of the river characterized by slower moving water and a meandering river channel lined with riparian thickets and orchards (California Department of Water Resources 1982, as cited in Reclamation 1997). Although most land along this reach is privately owned, the California Department of Parks and Recreation and Tehama, Glenn, and Colusa counties provide public access points along the middle reach. Water-dependent activities in this reach include boat and shore fishing, swimming, and beach use. Water-contact activities, such as swimming and tubing, are popular because the water is relatively warm compared to the upper reach. Water-enhanced activities include camping and relaxing. Black Butte and Stony Gorge Reservoirs also provide some recreational potential.

Wildlife Refuges

More ducks and geese winter in the Sacramento Valley than in any other areas of the Pacific Flyway. Several wildlife refuges were established in this area to sustain birds through the fall and winter by providing an abundance of food and a place to rest. Recreation activities at national wildlife refuges (NWRs) located in the vicinity of the Sacramento River Division include the Sacramento, Delevan, and Colusa refuges managed as the Sacramento NWR Complex. The proximity of these refuges to several of the service areas in the southern portion of the TCC and Corning Canals, such as the Westside Water District, results in movement of waterfowl into the district grasslands and fields during fall and winter. Within the Westside Water District, in-season hunting of waterfowl, upland game birds, and small mammals is important (Westside Water District 1994).

Most recreation activities on the refuges are associated with the presence of waterfowl. These activities include non-consumptive uses (e.g., wildlife observation and hiking) and consumptive uses (e.g., hunting). Hunting of ducks, geese, coots, snipes, and pheasants is permitted between October and January on portions of all refuges in the Sacramento NWR Complex (USFWS 2000). Fishing does not occur on any refuge in the complex. Certain activities, such as hiking and driving tours, can be restricted when birds are present on the refuges.

Use records indicate that non-consumptive recreation uses, primarily activities associated with wildlife observation, account for most of the use at the refuges. Hunting is the most popular consumptive use. Most visitation to the wildlife refuges occurs in the winter, when waterfowl are present. Use estimates from the Sacramento NWR Complex show that approximately 75 percent of total use occurs between October and January. Summer use (June through August) accounts for only four percent of total use. All hunting occurs between October and January, with approximately 80 percent between November and January.

The primary goal of the NWRs is to provide habitat for waterfowl and other wildlife; therefore, recreation activities that would disturb wildlife are not promoted. Management regulations to control wildlife disturbance may affect recreation at the refuges by preventing access during certain periods or by not providing facilities that would enhance visitation (Reclamation 1997).

3.7.2 Environmental Consequences

Two types of changes related to recreation are considered in the following impact analysis—recreation opportunities and recreation use.

No Action Alternative

Under this alternative it is assumed that there would be no change in water flow conditions to the Sacramento River Division contractors as compared to the Affected Environment. River-related and other recreation opportunities in the project area and vicinity are expected to be similar to conditions described in Section 3.7.1, Affected Environment. No impacts to the use or enjoyment of the Sacramento River or other recreation opportunities in the project vicinity are expected under the No Action Alternative.

Alternative 1

Alternative 1 is assumed to have similar effects to recreation resources as the No Action Alternative. Therefore, there are no environmental impacts of this alternative.

Alternative 2

Under Alternative 2, recreation opportunities in the project area and vicinity are expected to remain unchanged. Changes in Sacramento River water flows would not result from this alternative, and the NWRs, which provide the best duck habitat in the study area, have secure water supplies. Therefore, these resources would not be affected. In addition, no changes to Stony Gorge or Black Butte reservoirs would occur. Therefore, no impacts to the use or enjoyment of the Sacramento River and other recreation opportunities in the project vicinity are anticipated.

3.7.3 Cumulative Impacts

Implementation of Alternatives 1 and 2 would not contribute significantly to cumulative impacts to recreation resources.

3.8 INDIAN TRUST ASSETS

3.8.1 Affected Environment

This section describes Indian Trust Assets in and adjacent to the service areas in the western part of the Sacramento Valley that could be affected by renewal of water service contracts. Indian Trust Assets are legal interests in property that the United States holds in trust for Indian tribes or individuals. The Secretary of the Interior is the trustee for the United States on behalf of recognized tribes. Examples of trust assets are lands, minerals, hunting and fishing rights, and water rights.

Reclamation, in carrying out its activities, shares the responsibility to protect and maintain Indian trust assets reserved by or granted to Indian tribes or individuals by treaty, statute, or Executive Order. Reclamation carries out its activities in a manner that, where possible, protects Indian trust assets and avoids impacts. When it is not possible to avoid impacts to trust assets, compensation or mitigation is provided in consultation with the affected tribes or individuals.

No federally recognized Indian Tribes or assets are within or adjacent to any of the districts in this ROI. Indian Trust Assets do exist within the counties of the west Sacramento Valley and in the general proximity of the project area. Federally recognized Indian rancherias which may be held in trust include the following:

- Grindstone Rancheria in Glenn County, approximately 15 miles west of the Orland-Artois Water District;
- Cortina Rancheria in Colusa County, approximately 10 miles west of the Colusa County Water District;
- Colusa Rancheria in Colusa County, approximately 15 miles east of the La Grande District; and
- Rumsey Rancheria in Yolo County, approximately 20 miles west of the Dunnigan Water District.

Additional Indian Trust Assets in the region include the Gertie Patterson property in Tehama County, approximately 10 miles southeast of the Proberta Water District, and the Santiago McDaniel property in Colusa County, approximately 20 miles west of the Holthouse Water District.

3.8.2 Environmental Consequences

No federally recognized Indian Tribes or trust assets are within or adjacent to the ROI evaluated in this EA or would be affected by continued CVP water delivery. No impacts to Indian trust assets would occur as a result of the long-term contract renewal under any of the alternatives.

3.8.3 Cumulative Impacts

Implementation of Alternatives 1 and 2 would not contribute to cumulative impacts to Indian Trust Assets.

3.9 CULTURAL RESOURCES

3.9.1 Affected Environment

Cultural resources are those aspects of the physical environment that relate to human culture and society, and those cultural institutions that hold communities together and link them to their surroundings. Cultural resources include expressions of human culture and history in the physical environment such as prehistoric or historic archaeological sites, buildings, structures, objects, districts, or other places including natural features and biota which are considered to be important to a culture, subculture, or community. Cultural resources also include traditional lifeways and practices, and community values and institutions.

The affected environment for cultural resources or Area of Potential Effects (APE) consists of the water service areas in the west Sacramento Valley, primarily those served by the TCC and Corning Canal. The APE is the geographic area within which an undertaking may cause changes in the character or use of historic properties. The renewal of water service contracts between Reclamation and the Sacramento River Division contractors is a Federal undertaking that has the potential to affect cultural resources in the service area.

Cultural Resource Types

Cultural resources have been organized into the categories of prehistoric resources, historic resources, and traditional cultural properties (TCPs) and practices. These types are not exclusive and a single cultural resource may have multiple components. Prehistoric cultural resources refer to any material remains, structures and items used or modified by people before the establishment of a Euroamerican presence in the region. Historic cultural resources include architectural resources and other material remains and landscape alterations that have occurred since the arrival of Euroamericans in the region. TCPs and practices refer to places or activities associated with the cultural heritage or beliefs of a living community and that are important in maintaining cultural identity.

Regulatory Setting

The identification of cultural resources and Reclamation responsibilities with regard to cultural resources are addressed by a number of laws, regulations, executive orders, programmatic agreements and other requirements. The principal Federal law addressing cultural resources is the *National Historic Preservation Act* (NHPA) of 1966, as amended (16 USC Section 470), and implementing regulations (36 CFR 800), that describe the process for identification and evaluation of historic properties; assessment of the effects of Federal actions on historic properties; and consultation to avoid, reduce, or minimize adverse effects. The term "historic properties" refers to cultural resources that meet specific criteria for eligibility for listing on the National Register of Historic Places (NRHP). This process does not require preservation of historic properties, but does ensure that the decisions of Federal agencies concerning the treatment of these places result from meaningful considerations of cultural and historic values and of the options available to protect the properties.

Under the NHPA, cultural resources undergo an evaluation process to determine whether a resource is eligible for listing on the NRHP. Resources that are already listed, determined eligible for listing, or are undetermined are afforded a level of consideration under the NHPA Section 106 process. Undetermined resources are those for which eligibility cannot be determined based on current knowledge of the resource and where further work is needed to make an evaluation.

In order to be determined eligible for listing on the NRHP, a resource must meet one or more of the following criteria (36 CFR Part 60):

Criterion A – associated with events that have made a significant contribution to the broad patterns of our history.

Criterion B – associated with the lives of persons significant in our past.

Criterion C – embodies the distinctive characteristics of a type, period, or method of construction.

Criterion D – yielded or may be likely to yield information important in prehistory or history.

The resource must also retain most, if not all, of seven aspects of integrity: location, design, setting, workmanship, material, feeling, and association.

The identification and evaluation of cultural resources for NRHP-eligibility is the responsibility of the lead Federal agency with the concurrence of the State Historic Preservation Officer (SHPO), in this case the California Office of Historic Preservation (OHP). The Advisory Council on Historic Preservation (ACHP), an independent Federal agency, administers the provisions of Section 106 of the NHPA regarding cultural resources and has review and oversight responsibilities defined in 36 CFR 800.

Additional cultural resource management responsibilities of Reclamation are addressed in other sections of the NHPA. It should be noted that the provisions of the NHPA refer only to cultural resources that are tangible properties and that Federal agencies are required by other statutes to consider impacts on traditional cultural and religious practices.

Other major Federal laws, regulations, and executive orders which outline Reclamation's cultural resource responsibilities include: the Archeological Resources Protection Act (ARPA) (16 USC 470aa-47011), the American Indian Religious Freedom Act (AIRFA), as amended (42 USC 1996-1996a), NEPA (42 USC 4321-4370c), Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 3001-3013), Executive Order 11593 - *Protection and Enhancement of the Cultural Environment*, Executive Order 13006 - *Locating Federal Facilities in Historic Properties in Our Nation's Central Cities,* Executive Order 13007 - *Indian Sacred Sites*, Executive Order 13084 - *Consultation and Coordination With Indian Tribal Governments*, and Presidential Memorandum: *Government-to-*

Government Relations with Native American Tribal Governments. The role of Reclamation is to ensure that the process of water contract renewals is conducted in compliance with these standards and to ensure that provisions are in place for subsequent compliance by the water contract agencies. With little exception, virtually all of the potential effects to cultural resources related to water contract renewal arise from subsequent decisions under non-federal jurisdiction.

City and county governments have been granted some regulatory power to list and provide limited protection of cultural resources. This authority is usually exercised in the local permitting process for specific projects and guided by General Plans or similar documents. These water districts are within counties that all have General Plans with provisions for the recognition and protection of cultural resources in future development. The responsibilities of local jurisdictions to address effects to cultural resources through permitting are generally triggered by compliance with the California Environmental Quality Act (CEQA). CEQA guidelines addressing the significance of impacts to cultural resources are outlined in Title 14, Chapter 3, Section 15064.5. The criteria for consideration of resources under CEQA are similar, but somewhat broader than the Federal standard. California maintains a "Register of Historical Resources" which includes all NRHP-listed properties, all California Registered Landmarks, as well as other formally nominated properties. Consideration is also afforded to resources included in local historic registers and to those resources that the CEQA lead agency determines meets the requirement for listing on the California Register (Public Resources Code SS5024.1, Title 14 California Code of Regulations, Section 4852). California also designates Points of Historical Interest, which are markers placed at historic locations to interpret past events to the public. Listing on a state or local register does not imply that a resource would not meet Federal NRHP criteria; only that formal action has only been taken on a local level.

During the preparation of the PEIS, Reclamation investigated the possibility of conducting Section 106 consultation on a programmatic basis. It was determined in consultation with the OHP that Reclamation should address its Section 106 responsibilities on a project-specific basis (Reclamation 1999).

Cultural Setting

Prehistoric Overview

The Sacramento River Division is west of the Sacramento River and includes portions of Tehama, Glenn, Colusa and Yolo Counties. The Sacramento River Division is part of the Sacramento River Valley, an area rich in the evidence of prehistoric and historic use. Before extensive reclamation projects, the valley bottomlands experienced seasonal flooding which produced lush vegetation and attracted abundant wildlife. The waterways provided habitat for fish and mussels. Outside of the river corridors there were grasslands, oak groves and other plants. These resources were extremely attractive to prehistoric inhabitants and there is evidence of regional human use that dates back to around 6,000 B.C. (Reclamation 1999).

Recognition of the archaeological potential of the western Sacramento Valley occurred early. Regional archaeological research began in 1907 with surveys of mounds near Tehama and Red Bluff by Nels Nelson. Other researchers from UC Berkeley excavated sites in Colusa County in the 1930s. In 1951 a burial of probable great antiquity was excavated at a depth of almost 2 meters near Capay in Yolo County. Because of alluvial action, Sacramento Valley archaeological remains are often buried under natural sediments of considerable depth. Reconnaissance and salvage archaeology conducted during the 1950s and 60s for construction of water delivery and storage facilities provided much of the archaeological data used in attempts to synthesize the prehistory of the region. Excavations were conducted of cemeteries, and midden (trash heap) sites at the Red Bluff and Black Butte reservoir sites (Moratto 1985). Many of these sites date to the late prehistoric period; consequently older manifestations remain poorly known. Archaeological work in recent years has been most extensive on public lands. It would be anticipated that numerous undiscovered and deeply buried prehistoric sites are located on agricultural lands in the subject water service areas.

Several cultural chronologies have been proposed to describe the prehistory of the western Sacramento Valley. In recent years, there has been an emphasis on describing local developments and dividing the area into a number of geographic districts and defining a succession of cultural or temporal phases. While this represents a refinement of archaeological study, it often obscures larger trends. Dave Fredrickson has formulated a model for tracing the overall pattern common to the prehistory of Central California. He defined several patterns that indicate a general way of life shared by people without imposing strict temporal implications. Smaller descriptive units called aspects and phases are defined in terms of distinctive features, which are local manifestations. As described below, the patterns relevant to Sacramento Valley prehistory are the Windmiller, Berkeley, and Augustinian Patterns (Moratto 1985).

The Windmiller Pattern is primarily a hunting and fishing economy. The artifact assemblage includes highly developed flaked and groundstone industries, polished charmstones, baked clay artifacts, twined basketry, *Haliotis* and *Olivella* shell ornaments and beads. There was some utilization of seeds and acorns, but it was not as extensive as later. Groups occupying the Sierra foothills (Moratto 1985) may have used the Sacramento Valley in the winter months.

The Berkeley Pattern focuses on acorns as a dietary staple. Relatively more mortars are found indicating a shift to this dependable, but labor intensive food source. Changes in the form of points and shell ornaments are noted and more bone tools and ornaments are found. There are fewer grave goods associated with the Berkeley Pattern internment than with Windmiller burials (Moratto 1985).

The Augustinian Pattern is distinguished by sites with evidence of intensive fishing, hunting, and acorn gathering. There is a shift toward densely populated villages, highly developed exchange systems, ceremonialism, social stratification, cremation, and preinternment burning of grave goods. Artifacts include shaped mortars and pestles, bone awls and the use of the bow and arrows. Augustinian Pattern in the Sacramento

Valley is associated with the migration southward of Wintun peoples, bringing with them new cultural traditions and technologies (Moratto 1985).

An extensive discussion of regional prehistory was prepared in support of the PEIS from which this EA is tiered. The reader is directed to the Cultural Resource Appendix of the Draft PEIS for further information (Reclamation 1997).

Historic Overview

EuroAmericans came later to interior California than they did to the Pacific coast or the Southwest. By 1776 Jose Canizares had explored areas south of present day Sacramento (Wilson and Towne 1978). In the early years of the 19th century, the missions established by the Spanish on the coast were losing populations due to disease and flight. Expeditions were organized to the interior to recapture fugitives and punish groups harboring mission escapees. Though not conclusive, the evidence strongly suggests that these military expeditions did capture native inhabitants of the Sacramento Valley for resettlement at the missions (Jackson 1994). Active native resistance led to a major battle in 1813 between the Spanish under Luis Arguello and Miwok tribelets near the mouth of the Consumnes River to the south (Wilson and Towne 1978). In 1833, a great epidemic swept through the Sacramento Valley wiping out entire villages (Wilson and Towne 1978).

In 1848, the discovery of gold on Sutter's holdings in Coloma caused rapid change to all of California. Literally hundreds of thousands of people immigrated to the gold fields causing widespread destruction of what was left of native culture and resource base. In 1850 the California Indian Indenture Act, permitted, in effect, the enslavement of Native Americans. Kidnapping and selling of Indian women and children was common, as were massacres (Heizer 1974).

The agricultural potential of the west Sacramento Valley was recognized in the second half of the 19th century. Unreliable precipitation and the need for protection from periodic flooding limited further growth of agriculture in the region. A huge private irrigation enterprise was proposed in 1871 to address water shortages and agricultural irrigation in the Central Valley. Enthusiasm and investment for this project evaporated quickly, but in the 1930s the State of California proposed the State Water Project (Pisani 1992). The basic concept and facilities outlined by the State Water Project were approved and built by the Federal government beginning in 1935. The storage, delivery, power generation and flood control facilities of the Central Valley Project were constructed over the next 40 years. Farmers in the irrigation districts are assessed for system construction and water use. Reliable irrigation allowed the development of new crops including rice in the Sacramento Valley.

In contrast to other parts of California, regional growth has been steady throughout the 20th century with no large metropolitan areas developing. Agriculture remains the most important industry.

Ethnographic Overview

At the time of European contact, the area now included in the Sacramento River Division was primarily within the territory of the Wintun-speaking peoples. Linguistic analysis divided the Wintun speakers into the Wintu, Nomlaki and Patwin groups. The Wintu were primarily north of Cottonwood Creek in the northern part of Tehama County. The Nomlaki lived primarily in the Sacramento Valley and the foothills of Tehama and Glenn Counties. The Patwin occupied areas adjacent to the river in Southern Colusa and northern Yolo Counties. The Northwestern Maidu or Konkow, a linguistically unrelated group, also occupied a portion of the river in northern Colusa and southern Glenn County.

These groups shared similar subsistence and settlement patterns in late prehistory and early historic times. The river and valley were rich in resources and allowed the growth of large concentrated populations. Deer, fish and acorns were the main dietary staples, which were supplemented by mussels, small mammals, birds and seasonally available plants. Each village or tribelet of villages controlled its territory, including hunting, fishing and plant gathering locations.

Each of these groups was terribly affected by a devastating epidemic in the Sacramento Valley in 1833, when whole villages were depopulated. The arrival of miners and other settlers brought further reductions in population, followed by the collapse of their economic and social base. Many survivors were removed to reservations or became part of the wage economy.

In recent years there has been a revival of interest in traditional religious practices and arts. Resources likely to be of concern to contemporary groups include village locations and burials, and gathering locations for traditional foods or resources needed for basketry and regalia.

An extensive discussion of regional ethnography was prepared in support of the PEIS from which this EA is tiered. The reader is directed to the Cultural Resource Appendix of the Draft PEIS for further information (Reclamation 1997).

Inventory of Cultural Resources

Inventory information specific to the individual water contractors has not been developed. Limited data are available for each of the counties. Formal surveys for prehistoric and historic archaeological resources in each of the counties are limited to a small percentage of the land area. Typically, an archaeological survey is conducted prior to development projects so it unlikely that much of the potentially affected agricultural land in the service area has been surveyed. The region is rich in prehistoric resources. Because of the low percentage of surveyed land and the relative lack of development, the potential for undiscovered and unrecorded archaeological sites is high (Reclamation 1997). Subsurface archaeological deposits may also occur below shallow disturbances, even in areas that have been inventoried.

Information on historic buildings and structures is generally more available, due to the visibility of these resources and public advocacy. Percentages of buildings and structures of historic age that have been surveyed in each of the counties are not available. Complete recordation of these resources would require archival research to determine historic associations or architectural significance, and field documentation to assess current historical integrity.

As part of their completion of the Section 106 process, Reclamation is required to consult with Indian tribes and other groups to identify any TCPs or traditional use areas (TUAs) that could be affected by the alternatives. Some archival ethnographic research was conducted in support of the PEIS to identify general areas that may be of importance to the Indian tribal groups in the area (Reclamation 1997). In compliance with 36 CFR 800.4(a) (4), Reclamation has sent letters to Indian tribes requesting their input regarding the identification of any properties to which they might attach religious and cultural significance to within the area of potential effect. To date no comments or formal responses have been received from the tribes.

Colusa County

Between two and three percent of Colusa County has been surveyed for archaeological resources. A total of 199 sites have been recorded. Of these, 84 are historic sites or have historic components. Prehistoric site types include habitation sites, temporary camps, artifact scatters, bedrock milling stations, quarries, cemeteries and trails. Prehistoric site densities are highest near the Sacramento River and tributary streams and in the vicinity of Grimes (Colusa County 1989). Historic archaeological resources include the sites of early settlements and agricultural activities, and refuse scatters (Reclamation 1997). The site of the Nowi Rancheria is the only archaeological resource that is formally listed on the NRHP. Many additional sites have been determined eligible for listing or are likely to meet the criteria for NRHP and/or California Register listing (National Park Service [NPS] 2000).

Four buildings are formally listed on the NRHP (NPS 2000). One of these, the Colusa County Courthouse, is also listed as a California State Landmark along with two other properties (OHP 1996). The California Inventory of Historical Resources lists six resources and includes three California Points of Historical Interest. Historic themes illustrated by these resources include aboriginal use, architecture, economic and industrial history, exploration and settlement, government, and religion (Reclamation 1997).

Glenn County

Between one and two percent of Glenn County has been surveyed for archaeological resources. Over 475 sites have been recorded. Of these, 101 are historic sites or have historic components. Prehistoric site types include habitation sites, temporary camps, artifact scatters, bedrock milling stations, quarries, ceremonial sites, cemeteries, and trails. Prehistoric site densities are highest near the Sacramento River and tributary streams. High site densities have also been recorded in higher elevation zones in the western part of the county, outside of the boundaries of the water service areas. Historic archaeological resources include the sites of early settlements, homesteads, ranches and agricultural

activities, and refuse scatters (Glenn County 1993b; Reclamation 1997). No prehistoric or historic archaeological resources are formally listed on the NRHP, but many additional sites have been determined eligible for listing or are likely to meet the criteria for NRHP and/or California Register listing (NPS 2000).

The Gianella Bridge and the Willows Post Office are the only historic buildings or structures formally listed on the NRHP (NPS 2000). Two additional properties, the Swift Adobe and site of the first posted water notice, are listed as California State Landmarks. The first water posting site marks the Sacramento River location where water was diverted for irrigation on the west side of the Sacramento Valley (OHP 1996). The California Inventory of Historical Resources lists 17 resources. The county also includes 17 California Points of Historical Interest. Historic themes in the county include economic and industrial history, exploration and settlement, and government (Reclamation 1997). TCPs and TUAs have been identified in studies conducted in the Mendocino National Forest, which includes part of the county (Glenn County 1993b).

Tehama County

Approximately two percent of Tehama County has been surveyed for archaeological resources. Recorded site density is very high with over 1,615 recorded sites. Historic era sites or sites with historic components number over 200. Prehistoric site types include habitation sites, temporary camps, artifact scatters, milling stations, quarries, ceremonial sites and features, possible celestial alignments, petroglyphs, cemeteries, fishing sites, and trails. Many habitation sites are located on ridges near the numerous streams and creeks which cross the county. Prehistoric site densities are highest near the Sacramento River and other watercourses. Historic archaeological resources include the sites of early settlements and agricultural activities, and refuse scatters (Tehama County 1983; Reclamation 1997). Only one archaeological resource is formally listed on the NRHP, the Sulfur Creek Archaeological District, located near Mill Creek, east of the subject water service areas. Many additional sites have been determined eligible for listing or are likely to meet the criteria for NRHP and/or California Register listing (NPS 2000).

Eight buildings are formally listed on the NRHP (NPS 2000). Four additional properties are listed as a California State Landmark along with two other properties (OHP 1996). The California Inventory of Historical Resources lists 13 resources and the county also has 1 designated California Point of Historical Interest. Historic themes illustrated by these resources include architecture, economic and industrial history, exploration and settlement, government, military, religion, social and education (Reclamation 1997).

3.9.2 Environmental Consequences

Impact Assessment Methodology

Potential impacts to cultural resources, in general, are assessed by applying the criteria of adverse effect as defined in 36 CFR 800.5a. An adverse effect is found when an action may alter the characteristics of a historic property that qualifies it for inclusion on the NRHP in a manner that would diminish the integrity of the property's location, design, setting, workmanship, feeling, or association. Some examples of adverse effect to cultural

resources include: physical destruction or damage; alterations not consistent with the *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*; relocation of a property; isolation and restriction of access; introduction of visible, audible, or atmospheric elements out of character with the resource; neglect resulting in deterioration; or transfer, lease or sale of historic properties without adequate protections. Adverse effects may include reasonably foreseeable effects caused by the action that may occur later in time, be farther removed in distance, or be cumulative. Activities conducted under the alternatives are measured against the criteria of adverse effect to determine the potential for and intensity of impacts to cultural resources. Likewise under CEQA, a significant effect on the environment may result from actions that cause a substantial adverse change in the significance of an historical resource. The assessment of impacts to TCPs, TUAs, and cultural practices also requires a focused consultation effort with the affected community.

In the Section 106 process, Reclamation, as the lead Federal agency, is responsible for applying the criteria of adverse effect and in developing mitigation efforts to avoid or reduce any impacts. This is done in consultation with the SHPO and other consulting parties identified in 36 CFR 800. Prior to implementing individual actions, Reclamation will complete the Section 106 process for the water contract renewal undertakings.

No Action Alternative

The No Action Alternative would continue delivery of project water under terms consistent with the existing contracts. No direct impacts to cultural resources would be expected under the No Action Alternative. Renewal of long-term water service contracts between Reclamation and the Sacramento River Division contractors would not require any new construction or other activities that could directly disturb the integrity of known or unrecorded cultural resources in the service area. Actions by Reclamation under this alternative are within the range of existing conditions.

Indirect impacts to cultural resources could result from the renewal of long-term water service contracts under the terms of the No Action Alternative if it leads to changes in agricultural practices or land use. Certain crops require more ground disturbing activities than others do and changes in land use can cause effects to cultural resources. These effects may be either positive or negative depending on the presence of resources, location, and other factors associated with the changes. Renewal of long-term water contracts is one of many factors that could influence decisions in agricultural practices or land use. The potential for cultural resource impacts related to this alternative is speculative and dependent on future decisions by other parties. Since the No Action Alternative represents a continuation of current quantities of water delivery and pricing terms, it would be expected to have the smallest potential of the alternatives for influencing decisions on future agricultural practices and land use.

Alternative 1

Alternative 1 is assumed to have similar effects to cultural resources as the No Action Alternative. Therefore, no adverse environmental impacts are expected.

Alternative 2

No direct impacts are anticipated to cultural resources as a result of Alternative 2. Alternative 2 does not include any provisions for any new construction or other activities that could directly disturb the integrity of known or unrecorded cultural resources in the districts. Actions by Reclamation under this alternative are within the range of existing conditions.

Indirect impacts to cultural resources could result from the renewal of long-term water service contracts under the terms of Alternative 2. Implementation of Alternative 2 may decrease the quantity of water delivered to the contractors due to the increased cost of water. These changes may contribute to changes in crops grown or patterns of land use in the service areas. Changes in agricultural practices and land use may affect cultural resources either positively or negatively depending on the presence of resources, location, extent of ground disturbance and other factors associated with the changes. Renewal of long-term water contracts is one of many factors that could influence decisions in agricultural practices or land use.

The potential for cultural resource impacts related to this alternative is speculative and dependent on future decisions by other parties. It can be inferred, however, that this alternative would be associated with more potential for change than the others would, because it could affect the economic viability of some current agricultural practices. Anticipated changes could include removing land from agricultural production of water intensive crops such as rice; it is anticipated that in 2030 about 10,683 acres of rice are projected to be fallowed in an average hydrologic year following five dry hydrologic years (see Section 3.2, Agricultural Economics). If land currently planted in rice is left fallow, there may be a beneficial effect to the preservation of archaeological resources present. However, if this land is not managed to prevent erosion, there could be impacts to archaeological resources present. If land taken out of agricultural use is developed for commercial, industrial or housing uses; there could be impacts related to ground disturbing activities.

Specific actions that lead to changes in land use or new construction would require the identification of resources, evaluation of eligibility, and determination of effects to historic properties. Mitigation plans, if required, would be developed in consultation with the SHPO and the Advisory Council.

3.9.3 Cumulative Impacts

Renewal of long-term water contracts under any of the alternatives is one of many factors that could influence decisions in agricultural practices or land use in the water service areas. Demographic, economic, political, and a variety of other issues, independent of the contract renewal, are causing changes with direct and indirect effects to cultural resources. The contribution of the water renewal contracts under the terms of the alternatives would be a minor factor in decisions that could cause impacts to cultural resources in the service areas.

3.10 GEOLOGY AND SOILS

3.10.1 Affected Environment

Geologic Setting

The Sacramento River Division study area is located within the Sacramento Valley physiographic province, with portions of the study area bordering on the Coast Range physiographic province. In terms of landscape features, the northern valley portion (generally north of Stony Creek) is dominated by highly eroded (dissected) uplands, while the southern portion (known as the Colusa Basin) is predominantly low alluvial plains and alluvial fans, with dissected uplands on its western margin (Poland and Evenson 1966). Thus, the Corning Canal water districts, which lie north of Stony Creek, and the TCC water district service areas furthest to the west of the study area lie in areas affected by rapid runoff and soil erosion problems.

The most important economic mineral deposit in the study area is natural gas. Relatively large deposits of natural gas have been identified in the Willows area (Orland-Artois, Glide, and Kanawha water districts), and in the vicinity of Arbuckle (Hart 1966).

Two potentially active faults are present in the study area. The Corning Fault runs adjacent to and parallel to the Corning Canal from Red Bluff to a point south of Artois. Further to the south is the Dunnigan Hills Fault, which runs the length of the Dunnigan Water District, along the west side of Interstate highway 5. Neither fault has been active within the past 200 years (Jennings 1994).

Soils

Soils throughout the study area tend to be clayey (clay and silt loams), with slow infiltration rates and rapid run off (NRCS 2000). This means that precipitation tends to run off rather than infiltrate into the soil, and this can result in erosion problems. Soils on the basin margins tend to have slower infiltration rates than soils on flatter lands toward the center of the basin.

Service areas in which the predominant soils are more permeable and have higher infiltration rates than the average throughout the region, include the Colusa, Dunnigan, and Cortina water districts. Service areas in which the soils have predominantly lower permeability and slower infiltration rates than average include the 4-M, Glenn Valley, La Grande and Holthouse water districts, and the western parts of the Westside, Kanawha, Glide, and Orland-Artois water districts.

3.10.2 Environmental Consequences

No Action Alternative

Soils

Soil characteristics, including slope, permeability, water holding capacity, and other variables, influence and limit irrigation practices and types of crops that can be grown

on the land. Soil and slope are therefore important factors in the economics of farming a given parcel of land. Soil characteristics are taken into account in the water needs assessment used by Reclamation to estimate crop water use (see Section 3.2). Soil characteristics are also taken into account by the CVPM used to estimate future cropping and water use decisions of farmers in response to changes in water rates.

The agricultural economic analysis (Section 3.2) indicates that under the No Action Alternative, in average hydrologic conditions, approximately 95,300 acres would be irrigated in the year 2030. This represents a small reduction in acreage compared to the 106,110 acres irrigated in 1996. By contrast, the CVPM indicates that under dry hydrologic conditions, a total of about 81,700 acres would be irrigated by the year 2030.

Reductions in irrigated acres are likely to be temporary, and would primarily affect deciduous orchards, rice, and row crops, which require frequent and relatively heavy irrigation. Reductions would be greatest in the TCC districts. Within the TCC area, the largest percentage decreases during dry hydrologic conditions would occur in service areas with lands furthest west of the canal and with the poorest soils. These include the 4-M, Glenn Valley, Holthouse, Davis, and La Grande water districts, and also the Kanahwa and Westside water districts.

Under prolonged dry conditions, some of the marginally productive lands might be permanently withdrawn from irrigation. Fallowing and permanent withdrawal of land that has been cultivated could result in increased potential for soil erosion, if the land were not managed to prevent it. Cultivated soils tend to lose stratification and structure, reducing their resistance to natural erosion processes. However, watershed management programs designed to reduce soil erosion have already been initiated within the study area, and it is likely that management practices would be implemented that would reduce the potential for impacts.

Alternative 1

Soils

Water use and cropping patterns under Alternative 1 are not expected to differ substantially from the No Action Alternative. Therefore, additional impacts on soils are expected compared to the No Action Alternative.

Alternative 2

Soils

Results of CVPM modeling presented in Section 3.2 indicate that Alternative 2 would result in a reduction of approximately 65,000 irrigated acres in a scenario in which five dry years are followed by an average year. The reduction is relative to the number of acres expected to be irrigated under the No Action Alternative in dry hydrologic conditions at the end of year 2030. It must be kept in mind that such a comparison is most valid for the case in which average conditions have prevailed until the year 2021, and the dry conditions occurred from 2021 through 2030, with an average water year in

2030. However, if the 5-year dry period occurred early in the study period, then the amount of land irrigated in subsequent years would probably continued to decline, making the impacts of Alternative 2 more severe in the year 2030 than the model suggests.

In any event, the model results show that the amount of land receiving irrigation under Alternative 2 is highly sensitive to antecedent dry conditions. If approximately 65,000 acres were taken out of irrigation, it would likely have a severe effect on soils. As discussed under the No Action Alternative, cultivation tends to remove soil structure, making the soil more vulnerable to both wind and water erosion. If large tracts of land were taken out of irrigation relatively rapidly, it would be difficult to manage the land to prevent erosion. Under dry conditions, vegetation cover would be reduced and natural cover might be slow to re-establish itself. Areas that have been filled and leveled for farming would be particularly susceptible to water erosion during winter rains.

3.10.3 Cumulative Impacts

Reductions in irrigated land might also occur in adjacent, downslope farm areas, most notably in the Glenn-Colusa Irrigation District. Reduced return flows and reduced groundwater recharge could result from the reductions in irrigation of the Sacramento River Division lands, reducing the amount of water available to farmers on downslope lands. Farmers of adjacent lands could be affected by increased water costs similarly to the farmers within the study area. Thus, if soil loss affected the region as a whole, any resources available for addressing soil erosion problems might have to be spread thinly, reducing the chances of successful implementation.

Depending on the timing of dry hydrologic conditions and the sensitivity of declines in water purchases to the price of water, the rate structure of Alternative 2 could result in a cumulative impact on water prices, accelerating reduction in water use as the cost of the water is allocated among fewer and fewer water users over time. As farmland is withdrawn from production, there would be a potential for soil erosion. Therefore, any cumulative impact on water prices would result in a similar cumulative increase in potential for soil erosion.

3.11 AIR QUALITY

3.11.1 Affected Environment

Ambient Air Quality

The EPA has established ambient air quality standards for several different pollutants, which are often referred to as criteria pollutants (ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, inhalable particulate matter [PM_{10}], and lead). Federal ambient air quality standards are based primarily on evidence of acute and chronic health effects. California also has adopted ambient air quality standards, some of which are more stringent than the comparable federal standards.

The federal Clean Air Act requires each state to identify areas that have ambient air quality in violation of federal standards. States are required to develop, adopt, and implement a State Implementation Plan (SIP) to achieve, maintain, and enforce federal ambient air quality standards in these nonattainment areas. Deadlines for achieving the federal air quality standards vary according to air pollutant and the severity of existing air quality problems. The SIP must be submitted to and approved by EPA. SIP elements are developed on a pollutant-by-pollutant basis whenever one or more air quality standards are being violated.

The air pollutants of greatest concern in the Sacramento Valley are ozone and PM_{10}. Ozone concentrations in the middle and northern part of the Sacramento Valley periodically exceed state standards, but seldom exceed the federal ozone standard in the west Sacramento Valley. PM_{10} concentrations throughout the Sacramento Valley periodically exceed state standards but do not exceed federal standards outside of Sacramento County. The Yolo County portion of the study area is considered a nonattainment area for the federal ozone standard, but other portions of the study area are considered attainment areas for both the ozone and PM_{10} standards.

Ozone is not emitted directly into the air but forms through chemical reactions that involve nitrogen oxide emissions and reactive organic compound emissions. Ozone is a strong oxidizing agent that reacts with a wide range of materials and biological tissues. Ozone is a respiratory irritant that can cause acute and chronic effects on the respiratory system. In addition, ozone causes major damage to leaf tissues of crops and natural vegetation and also damages many materials by acting as a chemical oxidizing agent.

Suspended particulate matter represents a diverse mixture of solid and liquid material having size, shape, and density characteristics that allow the material to remain suspended in the air for measurable periods. The physical and chemical composition of suspended particulate matter is highly variable, resulting in a wide range of public health concerns. PM_{10} can be generated as a primary pollutant by abrasion or erosion processes. PM_{10} also can form as a secondary pollutant through chemical reactions or by gaseous pollutants condensing into fine aerosols.

Many components of suspended particulate matter are respiratory irritants. Some components are primarily physical irritants; others are chemical irritants (such as

sulfates, nitrates, and various organic chemicals). Suspended particulate matter also can contain toxic or carcinogenic compounds (such as heavy metals and various organic compounds).

Regulatory Considerations

Section 176(c) of the Clean Air Act requires federal agencies to ensure that actions undertaken in nonattainment or maintenance areas are consistent with the Clean Air Act and with federally enforceable air quality management plans. EPA has promulgated separate rules that establish conformity analysis procedures for highway/mass-transit projects and for other (general) federal agency actions. General conformity requirements are potentially applicable to most other federal agency actions but apply only to those aspects of an action that involve ongoing federal agency responsibility and control over direct or indirect sources of air pollutant emissions.

The EPA conformity rule establishes a process that is intended to demonstrate that the proposed federal action:

- Would not cause or contribute to new violations of federal air quality standards;
- Would not increase the frequency or severity of existing violations of federal air quality standards; and
- Would not delay the timely attainment of federal air quality standards.

The EPA general conformity rule applies to federal actions occurring in nonattainment or maintenance areas when the net increase in total direct and indirect emissions of nonattainment pollutants (or their precursors) exceeds specified thresholds. The emission thresholds that trigger requirements of the conformity rule are called "de minimis" levels. Only the Yolo County portion of the study area is subject to the EPA general conformity rule. The conformity de minimis thresholds for the Yolo County portion of the study area are 50 tons per year of reactive organic compounds and 50 tons per year of nitrogen oxides.

3.11.2 Environmental Consequences

No Action Alternative

The No Action Alternative would continue CVP water deliveries to the contractors under the terms of current contracts. Water delivery systems are not in themselves major sources of air pollution emissions. The only identifiable sources of emissions would be vehicles used for periodically inspecting or maintaining system facilities. Emission quantities from such sources are small, and would continue essentially at past levels. Thus, there would be no net increase in these emissions under the No Action Alternative.

There is no reason to expect that continuing CVP water deliveries to the contractors would result in any major changes in cropping patterns or agricultural management

practices in the service areas. Thus, the No Action Alternative is not expected to have any indirect effects on air pollutant emissions associated with agricultural land use practices (emissions from agricultural equipment or burning or pesticide use or from fugitive dust).

The No Action Alternative would not be subject to the EPA Clean Air Act conformity rule because there would be no net increase in direct or indirect emissions from sources that are under federal agency control.

Alternative 1

Alternative 1 is assumed to have similar air quality effects as the No Action Alternative. Therefore, there are no environmental impacts of this alternative.

Alternative 1 would not be subject to the EPA Clean Air Act conformity rule because there would be no net increase in direct or indirect emissions from sources that are under federal agency control.

Alternative 2

Air quality impacts associated with Alternative 2 would be similar to those under the No Action Alternative. Water delivery systems are not in themselves large sources of air pollution emissions. The only identifiable sources of emissions would be vehicles used for periodically inspecting or maintaining system facilities. Emission quantities from such sources are small and would continue essentially at past levels. Fugitive dust emissions, however, would be expected during cultivation or harvesting.

Under Alternative 2, it is anticipated that about 65,000 acres or approximately 68 percent of the service area is projected to be fallowed in an average hydrologic year following five dry hydrologic years. This change in cropping patterns is anticipated to result in increases in ozone precursor emissions (from fugitive dust). However, the indirect effects of altered crop patterns on air pollutant emissions associated with agricultural land use practices are not expected to have a noticeable impact on overall air quality conditions in the Sacramento Valley.

Alternative 2 would not be subject to the EPA Clean Air Act conformity rule because there would be no net increase in direct or indirect emissions from sources that are under federal agency control.

3.11.3 Cumulative Impacts

Implementation of Alternatives 1 and 2 would not contribute to cumulative air quality impacts.

3.12 VISUAL RESOURCES

3.12.1 Affected Environment

Physical form and visual character are the result of the interaction of natural and engineered elements. Natural elements, including topography, hydrology, vegetation, and climate, create the basic physical context. Engineered elements, including buildings, roads, infrastructure, and settlement patterns, are secondary elements that act on the natural context to establish a particular physical or visual environment.

Landscape Character Types

Landscape character types are described based on State of California Natural Landscape Provinces (USFS 1976) and are represented by seven immense provinces with similar physiographies; that is, combinations of landform, vegetation cover, and surface water bodies. A province's landscape character types are based on its total visual character; no single physical characteristic dictates character type, although landform has a stronger influence than other characteristics (Reclamation 1997).

The west Sacramento Valley is encompassed by the Central Valley Province, which is characterized as predominately lowlands and plains with few hills. This province is mostly agricultural, with areas of wetlands and oaklands, riparian areas along the major watercourses, and numerous small communities throughout the valley.

Wild and Scenic Rivers

Congress created the National Wild and Scenic Rivers System in 1968 (Public Law 90-542; USC 1271 *et seq*.) to preserve rivers and outstanding natural, cultural, or recreational features in a free-flowing condition. High priority is placed on visual resource management of these rivers to preserve or restore their scenic characteristics.

California has its own system of protected rivers. The California Wild and Scenic Rivers System consists of rivers and river segments established by legislative action because of the extraordinary scenic, recreational, fishery, or wildlife values that the rivers or segments possess in their free-flowing condition.

From the viewpoint of visual resources assessment, all rivers designated as wild, scenic, or recreational by the federal government or state of California are regarded as having high scenic quality. None of the streams in the Sacramento River Division are identified under either the national or state wild and scenic river systems.

Scenic Highways

Scenic highways are roads designated as scenic by California or local agencies. Scenic highways are recognized as having exceptional scenic qualities or as affording panoramic vistas. There are no officially designated state or local scenic highways in the Sacramento River Division (Caltrans 2000). However, one roadway—State Route 16 in Yolo County, approximately 10 miles west of the Dunnigan Water District—is eligible for designation in the project area (Caltrans 1992, as cited in Reclamation 1999). The portion of State Route 16 from the Yolo-Colusa county line south to Capay is

considered a Yolo County scenic highway because it affords views of chaparral, woodland, and grassland areas and unusual rock formations (Yolo County 1983).

3.12.2 Environmental Consequences

Impacts to visual resources depend primarily on changes in cropping patterns, which may result in increased fallowed lands and associated modified agricultural viewsheds.

No Action Alternative

Under the No Action Alternative, total irrigated acreage within the service area is projected to be approximately 95,300 acres in 2030 under average hydrologic conditions. Viewsheds in the project area would remain predominately agricultural in nature.

Alternative 1

Alternative 1 is assumed to have similar effects to visual resources as the No Action Alternative. Therefore, there are no environmental impacts of this alternative.

Alternative 2

Under Alternative 2, of the approximately 95,300 acres of irrigated land within the service area directly affected by long-term CVP contract renewal, about 65,000 acres or approximately 68 percent is projected to be fallowed in an average hydrologic year following five dry hydrologic years (see Section 3.2, Agricultural Economics). The largest reduction in acreage for a single crop type (13,838 acres) would be field crops. The magnitude of this type of change in agricultural cropping patterns is expected to change the current viewshed in the service area from one characterized by the varying pattern and texture of various agricultural crops and orchards to one characterized by flat fallow plains.

3.12.3 Cumulative Impacts

Implementation of Alternatives 1 and 2 would not contribute significantly to cumulative impacts to visual resources.

CHAPTER 4
CONSULTATION AND COORDINATION

4.1 INTRODUCTION

Reclamation's compliance with many of the federal statutes, implementing regulations, and executive orders applicable to implementation of CVPIA was documented in the PEIS. Those requirements that were adequately addressed in the PEIS, and for which no further compliance issues have been identified, are briefly summarized below. Requirements for which additional consultation and coordination, or further discussion of compliance issues, are warranted are discussed in greater detail. Also presented are efforts by Reclamation to involve and include interested parties in the site-specific environmental review process.

4.2 PUBLIC INVOLVEMENT

NEPA requires an early and open process for determining issues that should be addressed and analyzed in the environmental document and to assist the decision-maker in making a determination to implement the proposed action or an alternative. This process is designed to involve and inform the public and federal, state, and local agencies as to the environmental consequences of a federal agency's actions. This is to provide the agency with important information and analyses to promote better decision-making by the federal agency.

4.2.1 Public Scoping

The purpose of scoping is to identify potential environmental issues related to the proposed action. Public scoping began on October 15, 1998 with publication of a notice of intent (NOI) in the Federal Register to announce the preparation of environmental documents for renewal of long-term water service contracts. The NOI notified the public of the proposal, solicited written comments on the proposed action, and announced the dates and location of public scoping meetings. The public was also notified of the proposed action through press releases and direct mailings to over 3,000 interested parties. The public scoping period began at the time of publication of the NOI and concluded on January 8, 1999.

Scoping meetings were held at eight locations throughout the CVP service area. In addition, four workshops on Reclamation's water needs assessment process were conducted in conjunction with public scoping meetings. Approximately 560 comments were submitted at public meetings and thirty-two comment letters were received during the scoping period.

Reclamation prepared a scoping report that documented the scoping process (Reclamation 1999b). Comments received during scoping generally addressed the following issues (detailed discussion of scoping comments is presented in the *Central Valley Project Long-term Contract Renewal Scoping Report*):

- Public involvement and information gathering from water service contractors;
- The relationship of the site-specific environmental document to the PEIS;
- The geographic scope of analysis and the level of detail;
- The type of environmental documents to be prepared;
- Purpose and need of long-term contract renewals;
- Alternatives considered in the site-specific environmental documents;
- Impact issues, including water resources, socioeconomic issues, biological resources, including consultation, and impacts of water service contract terms; and
- Coordination with other parties and agencies;

In addition, public comments also addressed contract negotiation and water needs assessment issues. Although these comments were not specific to the environmental review for long-term contract renewal, they were included in the scoping report. Comments and concerns expressed by the public during the scoping period were used by Reclamation in determining the scope of analysis, including the type of environmental document to be prepared for each area of the CVP, geographic variability of concerns, level of detail, resource areas to be evaluated, and development of alternatives.

4.2.2 Public Participation During Contract Negotiations

Public participation has continued throughout the contract negotiation process. Numerous contract negotiations have occurred since the initial contract proposal was presented by Reclamation in November of 1999. These negotiations have afforded the water service contractors the opportunity to comment and discuss the contract provisions with Reclamation. In addition, the negotiation sessions are open to the public and while the public is not able to comment during the negotiations, the public can be kept apprised of the current status of contract negotiations, and can comment at the conclusion of the negotiating session.

4.2.3 Public Comment on the Draft EAs

The Draft EAs were circulated for public and agency review for 30 days each. These public comment periods provided an opportunity for the public to review the issues addressed in the impact analysis and to offer comments on any aspect of the process. Comments on the Draft EAs have been responded to and appropriate revisions were made in the Final EA. The Draft EAs were revised and recirculated for public comment for 30-day periods in September 2003, and again in July 2004 following negotiation of the draft contract and finalization of the Biological Assessment.

4.3 CONSULTATION AND COORDINATION WITH OTHER AGENCIES

4.3.1 National Environmental Policy Act

This EA was prepared pursuant to and in accordance with the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality (CEQ) regulations on implementing NEPA (40 CFR 1500-1508). In accordance with NEPA this document tiers off the PEIS (40 CFR 1508.28) and evaluates the potential site-specific environmental and socioeconomic effects of renewal of the long-term water service contract for the Sacramento River Division contractors.

4.3.2 Endangered Species Act

Reclamation prepared a biological assessment in April of 2004 to determine if the proposed action will affect federally listed threatened and endangered species. The biological assessment addresses all species affected by the CVP operation in the Sacramento River Division. The proposed action includes activities described in the contract negotiated between Reclamation and the Sacramento River Division contractors. Reclamation has completed ESA compliance requirements with NOAA Fisheries and the Service on the proposed action. NOAA Fisheries provided Reclamation a letter dated January 10, 2005, stating that the effects of the LTCR in the Sacramento River Division on listed species were previously analyzed in the OCAP BO, and no additional effects are anticipated. The Service provided Reclamation a memorandum on August 17, 2004 which concluded informal consultation for long term renewal of contracts in the Colusa County WD, County of Colusa, Davis WD, Dunnigan WD, Kanawha WD, La Grande WD, Westside WD, Stony Creek WD, and 4-E WD. On November 12, 2004 the Service provided additional concurrences of "not likely to adversely affect" to Orland-Artois WD, Corning WD, and Thomes Creek WD. A February 14, 2005, memo provided a "not likely to adversely affect" concurrence for the Proberta WD. On February 15, 2005, Reclamation received a memo from the Service concluding consultation on the remaining contractors: Kirkwood WD, Glide WD, Stonyford, Whitney Construction and the U.S. Forest Service. The determination for these districts also included a "not likely to adversely effect listed species or critical habitat" determination. Results of these consultations conclude that contract renewal for the Sacramento River Division contractors is not likely to adversely affect listed species or critical habitat. Reclamation's actions will not result in any changes to the environment that would have the potential for any significant impact on listed species.

4.3.3 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA) requires that Reclamation consult with fish and wildlife agencies (federal and state) on all water development projects that could affect biological resources. The implementation of the CVPIA, of which this action is a part, has been jointly analyzed by Reclamation and the Service and is being jointly implemented. This continuous consultation and consideration of the views of the Service in addition to their review of this document and consideration of their comments satisfies any applicable requirements of the FWCA.

4.3.4 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires that federal agencies evaluate the effects of federal undertakings on historical, archeological, and cultural resources and afford the Advisory Council on Historic Preservation opportunities to comment on the proposed undertaking. The first step in the process is to identify cultural resources included on (or eligible for inclusion on) the National Register of Historic Places that are located in or near the project area. The second step is to identify the possible effects of proposed actions. The lead agency must examine whether feasible alternatives exist that would avoid such effects. If an effect cannot reasonably be avoided, measures must be taken to minimize or mitigate potential adverse effects. Reclamation staff will complete the Section 106 consultation process prior to implementing any actions.

4.3.5 Indian Trust Assets

ITAs are legal interests in property held in trust by the United States for Indian Tribes or individuals. Reclamation, in carrying out its activities, must take reasonable actions to protect and maintain ITAs reserved by or granted to Indian Tribes or individuals by treaty, statue, or Executive Order. Tribes in the Central Valley and Trinity area were notified during the preparation of the PEIS and meetings were held with several Tribes. Based on these coordination and consultation efforts, potential impacts to ITAs were addressed. No federally recognized Indian Tribes or trust assets are found in the affected area of the Sacramento River Division, and no additional impacts to ITAs would occur as a result of the long-term contract renewal under any of the alternatives.

4.3.6 Indian Sacred Sites on Federal Land

Executive Order 13007 provides that federal agencies with statutory or administrative responsibility for management of federal lands shall, to the extent practicable and as permitted by law, accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and avoid adversely affecting the physical integrity of such sacred sites. No federal lands are part of the proposed action evaluated in this EA and therefore sacred sites are not included in the impact assessment of the EA.

4.3.7 Environmental Justice

Executive Order 12898 requires each federal agency to identify and address disproportionately high and adverse human health or environmental effects, including social or economic effects, of programs, policies, and activities on minority and low-income populations. Potential environmental justice impacts have been evaluated in

Section 3.5 of this EA. No disproportionate impacts on minority and low-income populations were identified.

4.3.8 State, Area-wide, and Local Plan and Program Consistency

Executive Order 12372 requires that federal agencies provide for opportunities for state and local officials to provide input on proposed federal assistance or development actions. Consistency of the proposed action with the plans and policies of the Tehama County General Plan (Tehama County 1983), Glenn County General Plan (Glenn County 1993), Colusa County General Plan (Colusa County 1989), and Yolo County General Plan (Yolo County 1983) have been considered and input from state and local officials has been sought in the development of the analysis for this EA. The Draft EAs were circulated to the appropriate state agencies and local agencies to satisfy review and consultation requirements.

4.3.9 Flood Plain Management

Executive Order 11988 requires federal agencies to evaluate the potential effects of any actions they might take in a floodplain and to ensure that planning, programs, and budget requests reflect consideration of flood hazards and floodplain management. The proposed action would not affect instream flows or substantially alter land use patterns, and therefore, would not affect flood hazards or floodplain management.

4.3.10 Wetlands Protection

Executive Order 11990 authorizes federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands when undertaking federal activities and programs. Impacts on wetlands were considered as part of the alternatives evaluated in this EA and no significant impacts were predicted.

4.3.11 Wild and Scenic Rivers Act

Under the Wild and Scenic Rivers Act, a federal agency may not assist in the construction of a water resources project that would have a direct and adverse effect on the free-flowing, scenic, and natural values of a wild or scenic river. None of the EA alternatives would affect flows in wild and scenic portions of rivers.

4.3.12 Farmland Protection Policy Act and Farmland Preservation

The Farmland Protection Policy Act of 1981 and the Memoranda on Farmland Preservation, dated August 30, 1976, and August 11, 1980, respectively, from CEQ require federal agencies to include assessments of the potential of a proposed project to convert designated prime or unique farmland to nonagricultural purposes. If implementing a project would adversely affect farmland preservation, the agencies must consider alternatives to lessen those effects. Federal agencies also must ensure that their programs, to the extent practicable, are compatible with state, local, and private programs to protect farmland. The Natural Resource Conservation Service (NRCS) is the federal agency responsible for ensuring that these laws and polices are followed.

The increased price of CVP water under Alternative 2 in this EA may result in minor changes in cropping patterns or in minor fallowing of land (Section 3.3). Fallowed land can still be used for non-irrigated agricultural practices, may remain in irrigation during wet water years, or may be returned to agricultural production at a later time. Impacts to farmlands as a result of the increased price of CVP water are anticipated to be minimal.

4.3.13 Clean Air Act

The federal Clean Air Act (CAA) was enacted to protect and enhance the nation's air quality in order to promote public health and welfare and the productive capacity of the nation's population. The CAA requires an evaluation of any federal action to determine its potential impact on air quality in the project region. Coordination is required with the appropriate local air quality management district as well as with the Environmental Protection Agency (EPA). This coordination would determine whether the project conforms to the Federal Implementation Plan and the State Implementation Plan (SIP).

Analysis in this EA assumes that minimal changes in land use or agricultural practices would occur under any of the proposed alternatives. Current practices to control dust and soil erosion on lands that are seasonally fallowed would continue. No air quality impacts would occur under any of the alternatives.

4.3.14 Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) (PL 99-339) became law in 1974 and was reauthorized in 1986 and again in August 1996. Through the SDWA, Congress gave the EPA the authority to set standards for contaminants in drinking water supplies. The California Department of Health Services has the primary enforcement responsibility. No changes in compliance would be expected under any of the alternatives evaluated in this EA.

4.3.15 Clean Water Act

The Clean Water Act (CWA) gave the EPA the authority to develop a program to make all waters of the United States "fishable and swimmable." This program has included identifying existing and proposed beneficial uses and methods to protect and/or restore those beneficial uses. Future compliance with CWA requirements for implementation of the CVPIA was evaluated as part of the PEIS. No additional compliance issues have been identified in this EA.

CHAPTER 5
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CHAPTER 6
GLOSSARY AND ACRONYMS

6.1 GLOSSARY

A

Acre-foot—The quantity of water required to cover 1 acre to a depth of 1 foot. Equal to 1,233.5 cubic meters (43,560 cubic feet).

Anadromous—In general, this term is used to refer to fish, such as salmon or steelhead trout that hatch in fresh water, migrate to and mature in the ocean, and return to freshwater as adults to spawn. Section 3403(a) of the CVPIA defines anadromous as "those stocks of salmon (including steelhead), striped bass, sturgeon, and American shad that ascend the Sacramento and San Joaquin rivers and their tributaries and the Sacramento-San Joaquin Delta to reproduce after maturing in San Francisco Bay or the Pacific Ocean".

Aquifer—An underground geologic formation in which water can be stored.

B

Bay-Delta Plan Accord—In December 1994, representatives of the state and federal governments and urban, agricultural and environmental interests agreed to the implementation of a Bay-Delta protection plan through the SWRCB, in order to provide ecosystem protection for the Bay-Delta Estuary. The Draft Bay-Delta Water Control Plan, released in May 1995, superseded D-1485.

Beneficial use—Those uses of water as defined in the State of California Water Code (Chapter 10 of Part 2 of Division 2), including but not limited to agricultural, domestic, municipal, industrial, power generation, fish and wildlife, recreation, and mining.

Biological opinion—Document issued under the authority of the Endangered Species Act stating the Service and/or the National Oceanic and Atmospheric Administration, Fisheries (NOAA Fisheries) finding as to whether a federal action is likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction or adverse modification of critical habitat. This document may include:

Critical habitat—A description of the specific areas with physical or biological features essential to the conservation of a listed species and which may require special management considerations or protection. These areas have been legally designated via Federal Register notices.

Jeopardy opinion—The Service or NOAA Fisheries opinion that an action is likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat. The finding includes reasonable and prudent alternatives, if any.

No jeopardy opinion—The Service or NOAA Fisheries finding that an action is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat.

C

CALFED—Joint federal and state program to address water-related issues in the Sacramento-San Joaquin Rivers Delta.

Candidate species—Plant or animal species not yet officially listed as threatened or endangered, but which is undergoing status review by the Service or the NOAA Fisheries

Central Valley Project (CVP)—As defined by Section 3403(d) of the CVPIA, "all Federal reclamation projects located within or diverting water from or to the watershed of the Sacramento and San Joaquin rivers and their tributaries as authorized by the Act of August 26, 1937 (50 Stat. 850) and all Acts amendatory or supplemental thereto, ..."

Central Valley Project service area—As defined by Section 3403(e) of the CVPIA, "that area of the Central Valley and San Francisco Bay Area where water service has been expressly authorized pursuant to the various feasibility studies and consequent congressional authorizations for the Central Valley Project".

Central Valley Project water—As defined by Section 3403(f) of the CVPIA, "all water that is developed, diverted, stored, or delivered by the Secretary in accordance with the statutes authorizing the Central Valley Project in accordance with the terms and conditions of water rights acquired pursuant to California law".

Central Valley Project water service contractors—Water users that have contracted with the US Bureau of Reclamation for water.

Conjunctive use—The planned use of groundwater in conjunction with surface water in overall management to optimize water resources.

Cost-of-service water rates—The water rate charged to recover all operating and capital costs, and individual contractor operating deficits, associated with the providing of water service. Components of operation and maintenance (O&M) and capital cost vary by contractor depending on services required for water delivery. Differs from full cost in that no charge for interest on capital is included.

Cubic feet per second—A measure of the volume rate of water movement. As a rate of streamflow, a cubic foot of water passing a reference section in 1 second of time. One cubic foot per second equals 0.0283 m /s (7.48 gallons per minute). One cubic foot per 3 second flowing for 24 hours produces approximately 2 acre-feet.

D

Decision -1485 (D-1485)—The SWRCB decision specifying water quality standards for the Sacramento-San Joaquin Delta and Suisun Marsh.

Dedicated Water—Refers to the 800,000 acre feet of CVP yield identified in Section 3406(b)(2) of the CVPIA that the Secretary must dedicate and manage for the primary purpose of implementing the fish and wildlife purposes and measures of the act, to help California protect the Bay-Delta estuary, and to help meet legal obligations imposed on the CVP under state and federal law, including the Federal Endangered Species Act (ESA).

Dry-farmed—Crop production without the use of applied water.

E

Endangered species—Any species or subspecies of bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion of its range. Federally endangered species are officially designated by the Service or the NOAA Fisheries and published in the Federal Register.

Environmental Assessment—A concise public document that a lead agency prepares pursuant to the National Environmental Policy Act when a project is not covered by a categorical exclusion and the lead agency does not know whether the impacts will be significant. The environmental assessment is the primary tool used by an agency to determine whether to prepare an environmental impact statement.

Ephemeral stream—Flows briefly only in direct response to precipitation.

Exotic species—Introduced species not native to the place where they are found.

F

Fallowed land—Cultivated land that lies idle during a growing season.

Full cost water rates—Adds an interest component to the cost-of-service water rates to recover costs of financing the construction of irrigation facilities placed in service. The interest component is calculated in accordance with the Reclamation Reform Act of 1982.

Full cost—As defined by Section 3403(g) of the CVPIA, "the meaning given such term in paragraph (3) of section 202 of the Reclamation Reform Act of 1982". As defined by Section 202(3)(A) of the Reclamation Reform Act of 1982, "an annual rate as determined by the Secretary that shall amortize the expenditures for construction properly allocable to irrigation facilities in service, including all operation and maintenance deficits funded, less payments, over such periods as may by required under Federal Reclamation law or applicable contract provisions, with interest on both accruing from the date of enactment of the Act on costs outstanding at that date, or from the date incurred in the case of costs arising subsequent to the date of enactment of this Act: Provided that operation,

maintenance and replacement charges required under federal reclamation law, including this title, shall be collected in addition to the full cost charge".

G

Groundwater—Water stored underground in pore spaces between rocks and in other alluvial materials and in fractures of hard rock occurring in the saturated zone.

H

Habitat—Area where a plant or animal lives.

I

Intermittent or seasonal stream—Stream on or in contact with the groundwater table that flows only at certain times of the year when the groundwater table is high.

Irrigation water—Water made available from the project which is used primarily in the production of agricultural crops or livestock, including domestic use incidental thereto, and the watering of livestock. Irrigation water does not include water used for human uses such as the watering of landscaping or pasture for animals (e.g., horses) which are kept for personal enjoyment. It generally does not include water delivered to landholdings operated in units of fewer than five acres, unless the contractor establishes to the satisfaction of the contracting officer that the use of the water delivered to any such landholding is a use within this definition.

L

Land classification—An economic classification of variations in land reflecting its ability to sustain long-term agricultural production.

Land retirement—Permanent or long-term removal of land from agricultural production.

Long-term contract—Contracts with terms of more than ten years.

O

Operating Non-Federal Entity—A Non-Federal entity that operates and maintains federal facilities pursuant to an agreement with the United States.

P

Perennial stream—Flows continuously throughout the year.

Place of use—The geographic area specified in a water right permit or license issued by the California SWRCB, wherein the water may be used.

Point of diversion—The point along a river or stream that a water right permit or license specifies water may be diverted to areas away from the river.

Programmatic Environmental Impact Statement—EIS prepared prior to a federal agency's decision regarding a major program, plan, or policy. It is usually broad in scope and followed by subsequent more narrowly focused NEPA compliance documents such as site-specific environmental assessments and environmental impact statements.

R

Range—Geographic region in which a given plant or animal normally lives or grows.

Reclamation laws—As defined by Section 3403(l) of the CVPIA, "the Act of June 17, 1902 (82 Stat. 388) and all Acts amendatory thereof or supplemental thereto".

Repayment contract—As defined by Section 3403(k) of the CVPIA, "the same meaning as provided in sections 9(d) and 9(e) of the Reclamation Project Act of 1939 (53 Stat. 1187, 1195), as amended". See water service contract in Appendix F.

Reservoir—Artificially impounded body of water.

Restoration Fund—As defined in Section 3403(l) of the CVPIA, "the Central Valley Project Restoration Fund established by this title".

Riparian—Areas along or adjacent to a river or stream bank whose waters provide soil moisture significantly in excess of that otherwise available through local precipitation.

S

Scoping—The process of defining the scope of a study, primarily with respect to the issues, geographic area, and alternatives to be considered. The term is typically used in association with environmental documents prepared under the National Environmental Policy Act.

Secretary—As defined by Section 3403(m) of the CVPIA, "the Secretary of the Interior".

Seepage—Water that escapes control through canal lining, stream banks, or other holding or conveyance systems.

Shasta Criteria—Establishes when a water year is considered critical, based on inflow to Shasta Lake. When inflows to Shasta Lake fall below the defined thresholds, the water year is defined as critical, and water deliveries to Sacramento River Settlement and San Joaquin River Exchange Contractors may be reduced up to 25 percent. A year is critical when the full natural inflow to Shasta Lake for the current water year (October 1 of the preceding calendar year through September 30 of the current calendar year) is equal to or less than 3.2 million acre-feet. This is considered a single-deficit. A year is also critical when the accumulated difference (deficiency) between 4 million acre-feet and the full natural inflow to Shasta Lake for successive previous years, plus the forecasted deficiency for the current water year, exceeds 800,000 acre-feet.

Shortages—Reductions in deliveries of contracted firm water. The amount of these reductions is expressed as the percent of full annual supply allocated.

Short-term contract—Contracts with a term of more than five years but less than ten years.

Subsidence—A local mass movement that involves principally the gradual downward settling or sinking of the earth's surface with little or no horizontal motion. It may be due to natural geologic processes or mass activity such as removal of subsurface solids, liquids, or gases, ground water extraction, and wetting of some types of moisture-deficient loose or porous deposits.

T

Threatened species—Legal status afforded to plant or animal species that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range, as determined by the Service or the NOAA Fisheries.

Tiering—Procedure which allows an agency to avoid duplication of paperwork through incorporation by reference of the general discussions and relevant specific discussions from a NEPA document of broader scope into a NEPA document of narrower scope.

Total supply—Total water supply available to area (surface water plus groundwater).

Transfers, sales, and exchanges—A transfer or sale is a one way transaction to another contractor usually on an annual basis, but could be on a long-term basis. An exchange is a two way transaction wherein a contractor transfers a quantity of water to another contractor for a like amount to be returned at a later date. CVP contractors may transfer, sell and exchange to other contractors their contractual water supply only with written consent from the United States.

Tributary—A stream feeding into a larger stream or a lake.

Turn outs—The physical structures along main canal systems for distribution of water.

W

Water acquisition—The purchase of water from willing sellers.

Water rights—California recognizes riparian and appropriative water rights.

> ***Riparian water rights***—Exists for lands which abut a waterway, or which overly an underground stream. Generally, there is no riparian right to diffused surface waters or swamps. The extent of the frontage along a waterway in no way governs the quantity of the water right. Use of water through riparian rights must be on riparian land and within the watershed of the stream. Riparian rights may not be lost as a result of nonuse.
>
> ***Appropriative water rights***—Water rights based upon the principle of prior appropriations, or "first in time, first in right". In order to maintain appropriative water rights, the right to any water must be put to

beneficial use. Nonuse of appropriative water rights may result in the loss of those water rights. In a conflict between a riparian water user and an upstream appropriator, the riparian user has priority, provided that the water is being used in a reasonable and beneficial manner.

Watershed—A region or area bounded peripherally by a water parting and draining ultimately to a particular watercourse or body of water.

Water year—Usually when related to hydrology, the period of time beginning October 1 of one year and ending September 30 of the following year and designated by the calendar year in which it ends.

Wetland—A zone periodically or continuously submerged or having high soil moisture, which has aquatic and/or riparian vegetation components, and is maintained by water supplies significantly in excess of those otherwise available through local precipitation.

Wildlife habitat—An area that provides a water supply and vegetative habitat for wildlife.

6.2 ACRONYMS

Acronym	Full Phrase
ACHP	Advisory Council on Historic Preservation
af	acre-feet
APCD	Air Pollution Control District
APE	area of potential effect
AQMD	Air Quality Management District
ARPA	Archaeological Resources Protection Act
AIRFA	American Indian Religious Freedom Act
B.P.	Before Present
CAA	Clean Air Act
Caltrans	California Department of Transportation
CAP	Clean Air Plan
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CFR	Code of Federal Regulations
CNPS	California Native Plant Society
CNDDB	California Natural Diversity Database
CO	carbon monoxide
COA	coordinated operating agreement
COE	US Army Corps of Engineers
CVGSM	Central Valley Groundwater - Surface Water Simulation Model
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CVPM	Central Valley Production Model
CVP-OCAP	Central Valley Project Operations Criteria and Plan
CWA	Clean Water Act
D-1485	Decision 1485 (State Water Resources Control Board)
DEIS/DEIR	draft environmental impact statement/draft environmental impact report
DPR	California Department of Parks and Recreation
DWR	California Department of Water Resources
EA	environmental assessment
EIS	environmental impact statement
EPA	US Environmental Protection Agency
ESA	Endangered Species Act
ESU	evolutionary significant unit
ET	evapotranspiration
ETAW	evapotranspiration of applied water
FONSI	finding of no significant impact
FWCA	Fish and Wildlife Coordination Act
gpm	gallons per minute

Acronym	Full Phrase
IMPLAN	Impact Analysis for Planning (regional economic input-output model)
Income POW	Income by Place of Work
Interior	US Department of the Interior
ITA	Indian Trust Asset
LTCR	Long Term Contract Renewal
mafy	million acre feet per year
M&I	municipal and industrial
MCL	maximum contaminant level
MOA	memorandum of agreement
NAGPRA	Native American Graves Protection Repatriation Act
NAHC	Native American Heritage Commission
NDDB	Natural Diversity Database
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Services
NOAA Fisheries	National Oceanic and Atmospheric Administration, Fisheries
NOI	notice of intent
NPS	National Park Service
NRCS	National Resources Conservation District
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
O&M	operations and maintenance
OCAP	operations criteria and plan
OHP	Office of Historic Preservation
PEIS	programmatic environmental impact statement
PM_{10}	particulate matter of 10 microns in aerometric diameter or less
POW	place of work
ppb	parts per billion
ppm	parts per million
RBDD	Red Bluff Diversion Dam
Reclamation	US Bureau of Reclamation
ROD	record of decision
ROG	reactive organic gases
ROI	region of influence
RRA	Reclamation Reform Act
SDWA	Safe Drinking Water Act
Secretary	Secretary of the Interior
Service	US Fish and Wildlife Service
SIP	State Implementation Plan
SHPO	California State Historic Preservation Officer
SO_X	oxides of sulfur
SPW	State Project Water
SRA	shaded riverine aquatic
SVAB	Sacramento Valley Air Basin

Acronym	Full Phrase
SWP	State Water Project
SWRCB	State Water Resources Control Board
Taf	thousand acre-feet
TCC	Tehama-Colusa Canal
TCPs	traditional cultural properties
TDS	total dissolved solids
TOC	total organic carbon
TOG	total organic gases
TUAs	traditional use areas
USACE	United States Army Corps of Engineers
USC	United States Code
WD	Water District

APPENDIX A
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Table C-1
Special Status Species Known to Inhabit or Potentially Inhabiting the Project Area

Common Name *Scientific Name*	Status Federal/ State/CNPS	Habitat	agriculture	vernal pool	non-native grassland	native grassland	blue oak	valley oak	foothill pine/oak	freshwater marsh	lacustrine	mixed coniferous	cypress	chamise chaparral	Occurrence in the Sacramento River Division
Plants															
Henderson's Bent Grass *Agrostis Hendersonii*	SC/--/3	Valley and foothill grassland, vernal pool, wetland. Moist places in grassland or vernal pool habitat.		x	x	x									P
Jepson's Milk-vetch *Astragalus rattanii* var *jepsonianus*	--/--/1B	Valley and foothill grassland, ultramafic, cismontane woodland. Commonly on serpentine in grassland or openings in chaparral.			x	x									P
Ferris's Milk-vetch *Astragalus tener* var *ferrisiae*	SC/--/1B	Meadow and seep, valley and foothill grassland, wetland. Found on subalkaline flats on overflow land in the Central Valley. Usually dry, adobe soils.			x	x									P
Heartscale *Atriplex cordulata*	SC/--/1B	Meadow and seep, chenopod scrub, valley and foothill grassland. Alkaline flats and scalds in the Central Valley, sandy soils.			x	x									P
Brittlescale *Atriplex cordulata*	--/--/1B	Vernal pool, meadow and seep, wetland, alkali playa, chenopod scrub, valley and foothill grassland. Usually in alkali scalds or alkaline clay in meadows or annual grassland. Rarely associated with riparian areas, marshes, or vernal pools.		x	x	x									P
San Joaquin Saltbush (Valley Spearscale) *Atriplex joaquiniana*	SC/--/1B	Chenopod scrub, meadow and seep, valley and foothill grassland. In seasonal alkali wetlands or alkali sink scrub with distichlis spicata, frankenia, etc.			x	x									P
Persistent-fruited saltscale *Atriplex persistens*	SC/--/--	Wetland, chenopod scrub, vernal pool. Exact habitat unclear from original publication: wet depressions or vernal ponds within some unnamed habitat.		x											P

Table C-1
Special Status Species Known to Inhabit or Potentially Inhabiting the Project Area *(continued)*

Common Name *Scientific Name*	Status Federal/ State/CNPS	Habitat	agriculture	vernal pool	non-native grassland	native grassland	blue oak	valley oak	foothill pine/oak	freshwater marsh	lacustrine	mixed coniferous	cypress	chamise chaparral	Occurrence in the Sacramento River Division
Indian Valley Brodiaea *Brodiaea coronaria* ssp *rosea*	SC/E/1B	Serpentine gravelly creek bottoms and meadows and swales in cismontane woodland, valley and foothill grassland, meadow and seep, closed-cone coniferous forest, chaparral, and ultramafic.													P
Fox sedge *Carex vulpinoidea*	--/--/2	Wet places.													P
Hoover's Spurge *Chamaesyce hooveri*	SC/--/1B	Valley and foothill grassland, wetland, vernal pool. Vernal pools on volcanic mudflow or clay substrate.		x	x	x									P
Plamate-Bracted Bird's Beak *Cordylanthus palmatus*	E/E/1B	Chenopod scrub, meadow and seep, valley and foothill grassland, wetland. Usually on pescadero silty clay which is alkaline with distichlis, frankenia, etc.			x	x									P
Silky Cryptantha *Cryptantha crinita*	SC/--/1B	Gravelly stream beds of lower montane coniferous forest, cismontane woodland, riparian forest, riparian woodlands, valley and foothill grassland.													P
Recurved Larkspur *Delphinium recurvatum*	SC/--/1B	Alkaline soils in valley saltbush or valley chenopod scrub.													U
Dwarf Downingia *Downingia pusilla*	--/--/2	Valley and foothill grassland, vernal pool, wetland. Vernal lake and pool margins with a variety of associates. In several types of vernal pools. 1-485 m.		x	x	x									P
Four-angled Spikerush *Eleocharis quadrangulata*	--/--/2	Marsh and swamp, freshwater marsh, wetland. Freshwater marshes, lake and pond margins. 20-500 m.								x					P
Brandegee's eriastrum *Eriastrum brandegeae*	SC/--/1B	Chaparral, cismontane woodland. On barren volcanic soils; often in open areas. 345-1000 M.													U
Snow mountain buckwheat *Eriogonum nervulosum*	SC/--/1B	Chaparral, ultramafic. Dry serpentine outcrops, balds, and barrens. 300-2100 M.												x	P
Diamond-petaled California poppy *Eschscholzia rhombipetala*	SC/--/1A	Valley and foothill grassland. Alkaline, clay slopes and flats. 0-975 M.			x	x									P
Adobe-lily *Fritillaria Pluriflora*	SC/--/1B	Ultramafic, chaparral, cismontane woodland, valley and foothill grassland. Usually on clay soils; sometimes serpentine. 55-820 m.			x	x								x	P

Table C-1
Special Status Species Known to Inhabit or Potentially Inhabiting the Project Area *(continued)*

Common Name *Scientific Name*	Status Federal/ State/CNPS	Habitat	agriculture	vernal pool	non-native grassland	native grassland	blue oak	valley oak	foothill pine/oak	freshwater marsh	lacustrine	mixed coniferous	cypress	chamise chaparral	Occurrence in the Sacramento River Division
Boggs Lake Hedge-hyssop *Gratiola heterosepala*	--/E/1B	Freshwater marsh, marsh and swamp, vernal pool, wetland. Clay soils; usually in vernal pools, sometimes on lake margins. 5-2400 m.		x						x					P
Drymaria Dwarf-flax *Hesperolinon drymarioides*	SC/--/1B	Chaparral, cismontane woodland, ultramafic, valley and foothill grassland, closed-cone coniferous forest. Serpentine soils, mostly within chaparral. 390-1000 M.			x	x						x			P
Tehama Dwarf-flax *Hesperolinon tehamense*	SC/--/1B	Chaparral, cismontane woodland, ultramafic. Serpentine barrens in chaparral. 545-1155 M.												x	P
Rose-mallow *Hibiscus lasiocarpus*	--/--/2	Freshwater marsh, marsh and swamp, wetland. Moist, freshwater-soaked river banks and low peat islands in sloughs; in California, known from the delta watershed. 0-150 m.								x					P
Red Bluff Dwarf Rush *Juncus leiospermus* var *leiospermus*	--/--/1B	Chaparral, cismontane woodland, valley and foothill grassland, vernal pool, wetland. Vernally mesic sites. Sometimes on edges of vernal pools. 30-1020 m.		x	x	x									P
Colusa layia *Layia septentrionalis*	--/--/1B	Chaparral, cismontane woodland, ultramafic, valley and foothill grassland. Scattered colonies in fields and grassy slopes in sandy or serpentine soil. 145-1095 m.			x	x									P
Legenere *Legenere limosa*	SC/--/1B	Vernal pool, wetland. In beds of vernal pools. 1-880 m.		x											P
Heckard's Pepper-grass *Lepidium latipes* var *heckardii*	--/--/1B	Valley and foothill grassland, vernal pool, wetland. Grassland, and sometimes vernal pool edges. Alkaline soils. 3-30 m.		x	x	x									P
Wooly Meadowfoam *Limnanthes floccosa* ssp *flocosa*	--/--/2	Chaparral, vernal pool, wetland, cismontane woodland, valley and foothill grassland. Vernally wet areas, ditches, and ponds. 60-1275 m.		x	x	x									P
Red-flowered lotus *Lotus rubriflorus*	SC/--/1B	Valley and foothill grassland, cismontane woodland. Most recent sightings from sterile, red soils-volcanic mudflow deposits. 200-425 M.			x	x									P
Milo Baker's lupine *Lupinus milo-bakeri*	SC/T/1B	Cismontane woodland, valley and foothill grassland. In roadside ditches, dry gravelly areas along roads, and along small streams. 360-440 m.			x	x									P

Table C-1
Special Status Species Known to Inhabit or Potentially Inhabiting the Project Area *(continued)*

Common Name *Scientific Name*	Status Federal/ State/CNPS	Habitat	agriculture	vernal pool	non-native grassland	native grassland	blue oak	valley oak	foothill pine/oak	freshwater marsh	lacustrine	mixed coniferous	cypress	chamise chaparral	Occurrence in the Sacramento River Division
Hall's Madia *Madia hallii*	SC/--/1B	Chaparral, ultramafic. Serpentine hills and ridges. Open, rocky areas within chaparral. 270-910 m.												x	P
Little mousetail *Myosurus minimus* ssp *apus*	SC/--/3	Vernal pool, wetland. Alkaline soils. 20-640 M. Note: Central Valley EO's not mapped.)		x											
Baker's Navarretia *Navarretia leucocephala* ssp *bakeri*	--/--/1B	Cismontane woodland, lower montane coniferous forest, meadow and seep, vernal pool, wetland, valley and foothill grassland. Vernal pools and swales; adobe or alkaline soils. 5-950 m.		x	x	x									P
Colusa Grass *Neostapfia colusana*	T/E/1B	Vernal pool, wetland. Usually in large, or deep vernal pool bottoms; adobe soils. 5-110 m.		x											P
Hairy Orcutt Grass *Orcuttia pilosa*	E/E/1B	Vernal pool, wetland. 25-125 m.		x											P
Ahart's Paronychia *Paronychia ahartii*	SC/--/1B	Cismontane woodland, valley and foothill grassland, vernal pool, wetland. Stony, nearly barren clay of swales and higher ground around vernal pools. 30-150 m.		x	x	x									P
Red mountain catchfly *Silene campanulata* ssp *campanulata*	SC/E/1B	Lower montane coniferous forest, ultramafic, chaparral. Rocky dry shallow serpentine soil. 420-1200 M.										x			P
Wright's Trichocoronis *Trichocoronis wrightii* var *wrightii*	--/--/2	Marsh and swamp, riparian forest, wetland, meadow and seep, vernal pool. Mud flats of vernal lakes, drying river beds, alkali meadows. 5-435 m.		x						x					P
Caper-fruited Tropidocarpum *Tropidocarpum capparideum*	SC/--/1A	Valley and foothill grassland. Alkaline hills. 0-455 m.			x	x									P
Invertebrates															
Antioch Dunes Anthicid Beetle Anthicus antiochensis	SC/--	Interior dunes, inhabit sand slipfaces among bamboo and willow.													U
Sacramento Anthicid Beetle *Anthicus Sacramento*	SC/--	Interior dunes, inhabit sand slipfaces among bamboo and willow.													U
Conservancy Fairy Shrimp *Branchinecta conservatio*	E/--	Found in vernal pool, valley and foothill grassland, and wetland habitats. Inhabit astatic pools located in swales formed by old, braided alluvium, filled by winter and spring rains that last until June.		x	x	x									P

Table C-1
Special Status Species Known to Inhabit or Potentially Inhabiting the Project Area *(continued)*

Common Name *Scientific Name*	Status Federal/ State/CNPS	Habitat	agriculture	vernal pool	non-native grassland	native grassland	blue oak	valley oak	foothill pine/oak	freshwater marsh	lacustrine	mixed coniferous	cypress	chamise chaparral	Occurrence in the Sacramento River Division
Vernal Pool Fairy Shrimp *Branchinecta lynchi*	T/--	Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools. Found in vernal pools, valley and foothill grasslands, and wetlands.													P
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus*	T/--	Lays eggs in elderberries 2-8 inches in diameter in riparian areas. Stressed elderberries may be preferred.													P
Vernal Pool Tadpole Shrimp *Lepidurus packardi*	E/--	Vernal pool, valley and foothill grassland, wetland. Pools commonly found in grass bottomed swales of unplowed grasslands. Some pools are mud-bottomed and highly turbid.		x	x	x									P
California Linderiella Fairy Shrimp Linderiella occidentalis	SC/--	Vernal pool		x											P
California freshwater shrimp *Syncaris pacifica*	E/E	Aquatic, riparian forest, riparian woodlands, Sacramento/San Joaquin flowing waters. Shallow pools away from main streamflow. Winter: undercut banks with exposed roots. Summer: leafy branches touching water.													U
Fish															
Green Sturgeon Acipenser medirostris	SC/SC	Found in large rivers in the Sacramento and San Joaquin System.													U
Delta smelt *Hypomesus transpacificus*	T/T	Seldom found at salinities > 10 ppt most often at salinities < 2 ppt.													U
River Lamprey Lampetra ayresi	SC/SC	Sacramento and San Joaquin System including tributaries.													P
Pacific Lamprey Lampetra tridentata	SC/--	Sacramento and San Joaquin System including tributaries.													P
Central Valley steelhead Oncorhynchus mykiss	T/--	Utilizes freshwater streams for spawning and rearing.													U
Chinook Salmon Winter Run *Oncorhynchus tshawytscha winter run*	E/E	Requires clean, cold water over gravel beds with water temperatures between 6 and 14°C for spawning.													U

Table C-1
Special Status Species Known to Inhabit or Potentially Inhabiting the Project Area *(continued)*

Common Name *Scientific Name*	Status Federal/ State/CNPS	Habitat	agriculture	vernal pool	non-native grassland	native grassland	blue oak	valley oak	foothill pine/oak	freshwater marsh	lacustrine	mixed coniferous	cypress	chamise chaparral	Occurrence in the Sacramento River Division
Central Valley Chinook Salmon Spring Run *Oncorhynchus tshawytscha spring run*	T/T	Requires clean, cold water over gravel beds with water temperatures between 6 and 14°C for spawning.													U
Central Valley Chinook Salmon Spring Run Critical Habitat *Oncorhynchus tshawytscha spring run*	PX/--														U
Central Valley Chinook Salmon Fall/Late Fall Run*Oncorhynchus tshawytscha fall/ late fall run*	C/--	Utilizes freshwater streams for spawning and rearing.													U
Sacramento splittail *Pogonichthys macrolepidotus*	T/SC	Aquatic, Sacramento/San Joaquin flowign waters, freshwater marsh, estuary. Slow moving river sections, dead end sloughs. Require flooded vegetation for spawning and foraging for young.													U
Longfin Smelt *Spirinchus thaleichthys*	SC/SC	Limited to the Delta.													U
Amphibians and Reptiles															
California Tiger Salamander *Ambystoma californiense*	C/SC	Cismontane woodland, meadow and seep, riparian woodlands, valley and foothill grassland, vernal pool, wetland. Need underground refuges, especially ground squirrel burrows and vernal pools or other seasonal water sources for breeding.		x	x	x									P
Northwestern Pond Turtle *Clemmys marmorata marmorata*	SC/SC	Marsh and swamp, Sacramento/San Joaquin flowing and standing waters, wetland, aquatic, artificial flowing and standing waters. Requires basking sites and nest sites may be up to 0.5km from water.								x					P
San Joaquin whipsnake *Masticophil flagellum ruddocki*	SC/SC	Needs mammal burrows for refuge and oviposition sites.													P

Table C-1
Special Status Species Known to Inhabit or Potentially Inhabiting the Project Area *(continued)*

Common Name *Scientific Name*	Status Federal/ State/CNPS	Habitat	agriculture	vernal pool	non-native grassland	native grassland	blue oak	valley oak	foothill pine/oak	freshwater marsh	lacustrine	mixed coniferous	cypress	chamise chaparral	Occurrence in the Sacramento River Division
California red-legged frog *Rana aurora draytonii*	T/SC	Marsh and swamp, wetland, aquatic, Sacramento/San Joaquin flowing waters, south coastal flowing waters, riparian scrubs, south coastal standing waters, artificial standing waters, artificial flowing waters, Sacramento/San Joaquin standing waters, riparian woodlands, riparian forest, freshwater marsh. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.								x					P
Foothill Yellow-legged Frog *Rana boylii*	SC/--	Aquatic, chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, meadow and seep, riparian forest, riparian woodlands, Sacramento/San Joaquin flowing waters, Klamath/North Coast flow waters. Need at least some cobble-sized substrate for egg-laying. Need at least 15 weeks to attain metamorphosis.										x			P
Western Spadefoot *Scaphiopus hammondii*	SC/--	Cismontane woodland, coastal scrub, valley and foothill grassland, vernal pool, wetland. Vernal pools are essential for breeding and egg-laying.		x	x	x									P
Giant Garter Snake *Thamnophis gigas*	T/T	Marsh and swamp, riparian scrubs, wetland. This is the most aquatic of the garter snakes in California.								x					P
Birds															
Northern goshawk *Accipiter gentilis (nesting)*	SC/SC	Subalpine coniferous forest, upper montane coniferous forest, usually nests on north slopes, near water. Red fir, lodgepole pine, Jeffrey pine, and aspens are typical nest trees.										x			P
Tricolored Blackbird *Agelaius Tricolor*	SC/SC	Marsh and swamp Requires open water, protected nesting substrate, & foraging area with insect prey within a few km of the colony.								x					P
Bell's Sage Sparrow Amphispiza belli belli	SC/SC	Foothills of Central Valley. Prefers low, dense stands of shrubs.													P
Golden Eagle (nesting and wintering) *Aquila chrysaetos*	--/SC	Cismontane woodland, coastal prairie, great basin grassland, great basin scrub, valley and foothill grassland. Nesting habitat provided by cliff-walled canyons and large trees in open areas.			x	x									P?

Table C-1
Special Status Species Known to Inhabit or Potentially Inhabiting the Project Area *(continued)*

Common Name *Scientific Name*	Status Federal/ State/CNPS	Habitat	agriculture	vernal pool	non-native grassland	native grassland	blue oak	valley oak	foothill pine/oak	freshwater marsh	lacustrine	mixed coniferous	cypress	chamise chaparral	Occurrence in the Sacramento River Division
Burrowing Owl (Burrow sites) *Athene cunicularia*	SC/SC	Found in coastal prairie and scrub as well as Great Basin and valley and foothill grasslands. As a subterranean nester, dependent upon burrowing mammals such as the California ground squirrel.			x	x									P
Ferruginous Hawk Buteo regalis	SC/SC	Low elevations and open grasslands in Central Valley													P
Swainson's Hawk (Nesting) *Buteo Swainsoni*	--/T	Great Basin grassland, riparian forest, riparian woodlands, valley and foothill grassland with adjacent suitable foraging areas such as grasslands or alfalfa or grain fields supporting rodent populations.	x		x	x									P
Mountain plover *Charadrius montanus (wintering)*	PT/SC	Valley and foothill grassland, chenopod scrub, short vegetation, bare ground and flat topography. Prefer grazed areas and areas with burrowing rodents.	x		x	x									
Western Yellow-billed Cuckoo *Coccyzus americanus occidentalis*	--/E	Dense, humid willow-and cottonwood forests with understory of blackberry, nettles, or wild grape adjacent to sloughs and slow moving rivers													U
Yellow warbler (nesting) *Denfroica petechia brewsteri*	--/SC	Nests in riparian woodlands and montane shrubbery in open coniferous forests.										x			P
White-tailed Kite *Elanus leucurus (nesting)*	--/--	Cismontane woodland, marsh and swamp, riparian woodlands, valley and foothill grassland, wetland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.			x	x				x					P
Greater sandhill crane *Grus canadensis tabida (nesting and wintering)*	--/T	Meadow and seep, marsh and swamp, wetland, prefer grain fields within 4 miles of a shallow body of water used as a communal roost site; irrigated pasture used as loaf sites.	x							x					P
Bald eagle *Haliaeetus leucocephalus (nesting and wintering)*	T/E	Lower montane coniferous forest, old growth, nests in LG, old growth, or dominant live tree with open branches, especially ponderosa pine. Roosts communally in winter.										x			P
Yellow-breated Chat *Icteria virens (nesting)*	--/--	Riparian forest, riparian scrubs, riparian woodlands. Nests in low, dense riparian, consisting of willow, blackberry, wild grape; forage and nest within 10 feet of ground.													P

Table C-1
Special Status Species Known to Inhabit or Potentially Inhabiting the Project Area *(continued)*

Common Name *Scientific Name*	Status Federal/ State/CNPS	Habitat	agriculture	vernal pool	non-native grassland	native grassland	blue oak	valley oak	foothill pine/oak	freshwater marsh	lacustrine	mixed coniferous	cypress	chamise chaparral	Occurrence in the Sacramento River Division
Osprey *Pandion haliaetus (nesting)*	--/--	Riparian forest. Large nests built in treetops within 15 miles of good fish-producing body of water.													U
White-faced Ibis *Plegadis chihi (rookery site)*	SC/--	Marsh and swamp, wetland. Dense tule thickets for nesting interspersed with areas of shallow water for foraging.								x					P
Bank Swallow *Riparia riparia (nesting)*	--/T	Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.													P
Northern spotted owl *Strix occidentalis caurina*	T/SC	North coast coniferous forest, old growth, redwood. High, multistory canopy dominated by big trees, many trees with cavities or broken tops, woody debris and space under canopy.										x			U
Mammals															
Pale Townsend's big-eared bat *Plecotus townsendii pallescens*	SC/SC	Mesic habitats in all but subalpine and alpine areas. Roosts in caves, mines, tunnels, buildings, or other human-made structures. Gleans from brush or trees or feeds along habitat edges.													P
Pacific western big-eared bat *Plecotus townsendii townsendii*	SC/SC	Mesic habitats in all but subalpine and alpine areas. Roosts in caves, mines, tunnels, buildings, or other human-made structures. Gleans from brush or trees or feeds along habitat edges.													P
Marysville Heermann's Kangaroo Rat *Dipodomys californicus eximius*	SC/SC	Annual grassland, coastal scrub, mixed and montane chaparral, and early successional stages (sparse to open canopy) of valley foothill hardwood and valley foothill hardwood-conifer habitats.			x		x	x	x			x		x	P
Spotted Bat *Euderma maculatum*	SC/SC	Lives in desert scrub and open forest areas. Roosts in cliff faces and rock crevices. Eats almost exclusively medium-sized moths, also beetles and caddisflies.													U
Pacific fisher *Martes pennanti pacifica*	SC/SC	North coast coniferous forest, old growth, riparian forest. Use cavities, snags, logs and rocky areas for cover & denning. Need large areas of mature, dense forest.										x			P

Table C-1
Special Status Species Known to Inhabit or Potentially Inhabiting the Project Area *(continued)*

Common Name *Scientific Name*	Status Federal/ State/CNPS	Habitat	agriculture	vernal pool	non-native grassland	native grassland	blue oak	valley oak	foothill pine/oak	freshwater marsh	lacustrine	mixed coniferous	cypress	chamise chaparral	Occurrence in the Sacramento River Division
Small-footed myotis bat *Myotis ciliolabrum*	SC/--	Exists on west and east sides of the Sierra Nevada to about 8,900 feet (2700 meters). Prefer open stands in forests, woodlands and brushy habitats. Roosts in caves, buildings, crevices and sometimes under bark and bridges.					x	x	x			x		x	P
Long-eared myotis bat *Myotis evotis*	SC/--	Lives in coniferous forests in mountain areas. Roosts in small colonies in caves, buildings and under tree bark.										x			P
Fringed myotis bat *Myotis thysanodes*	SC/--	Lives in oak and juniper forests, desert scrub. Roosts in caves, abandoned mines, or buildings.					x	x	x						P
Long-legged myotis bat *Myotis yumanensis*	SC/--	Lives in forested mountainous areas, sometimes desert lowlands. Roosts in tree hollows and under bark, in crevices and buildings.													U
Yuma myotis bat *Myotis yumanensis*	SC/SC	Lives near lakes, creeks or ponds. Roosts by day under building sidings or shingles.													P
San Joaquin Pocket Mouse *Perognathus inornatus inornatus*	SC/--	Coastal scrub, valley and foothill grassland. Needs friable soils.			x	x									P

Sources: California Natural Diversity Database search for the USGS 7.5 minute quadrangle maps for California that encompass the project area, September 2000. US Fish and Wildlife Service letter, September 20, 2000.

Notes:

Federal Status

E = Endangered
T = Threatened
PE = Proposed endangered
PT = Proposed threatened
PX = Proposed critical habitat
C = Candidate
SC = Species of concern
DL = Recently delisted

State Status

E = Endangered
T = Threatened
SC = California species of special concern
R = Rare

California Native Plant Society (CNPS) Status

1A = Plants presumed extinct in California
1B = Rare, threatened, and endangered in California and elsewhere
2 = Rare, threatened, and endangered in California but more common elsewhere
3 = Plants about which more information is needed

Occurrence

C = Confirmed
P = Possible
U = Unlikely

Economic Analysis of November 1999 Tiered Pricing Proposal for PEIS Preferred Alternative

Date: October 2, 2000

This submittal presents the results of an Economic Analysis of the application to the PEIS Preferred Alternative of the November 1999 unit rates for CVP water and Tiered Pricing Proposal.

The PEIS Preferred Alternative included assumptions for the tiered pricing of CVP water that were developed during the preparation of the Draft PEIS. Subsequent to completion of the Final PEIS, a different tiered pricing proposal was developed. In addition, the PEIS assumed 1992 CVP water rates. This analysis includes the 1999 water rates. This submittal applies the new water rates and the November 1999 proposal to the Preferred Alternative and compares the results to the impact analysis of the PEIS Preferred Alternative. The level of detail presented in this submittal is consistent with the level of detail presented in the main PEIS document and the technical appendices. Tables are presented in the same format as used in the PEIS.

The economic analysis includes an evaluation of agricultural economics using Central Valley Production Model (CVPM), municipal and industrial water use economics for CVP water using the spreadsheet presented with the PEIS, and regional economics using IMPLAN. This memorandum discusses the new assumptions in the November 1999 proposal. However, this memorandum does not discuss the basic assumptions used in the PEIS models and analytical tools. This memorandum must be used in conjunction with the Draft PEIS and Final PEIS, including the methodology and modeling technical appendices, to explain the overall assumptions for evaluating the Preferred Alternative in the PEIS.

For the Agricultural Land Use and Economics analysis, the methodology used for applying CVP water rates was modified to allow for the new tiered pricing and the use of blended rates to determine a total water rate for all CVP water applied by an irrigation district or agency. These changes result in changes in water use due to the affordability of CVP water supplies, not a change in reliability.

For the Municipal and Industrial Water Use Economics analysis, blended rates had been used in the PEIS analysis. In addition, this analysis assumes that the municipal and industrial users will be able to afford the calculated water costs, as described in the PEIS. Therefore, CVP water deliveries do not change for the municipal and industrial analysis. The Regional Economics analysis reflects only changes to agricultural and municipal and industrial sectors, but not recreation sectors.

Table of Contents for Technical Memorandum

Section 1 Agricultural Land Use and Economics

SECTION 1

AGRICULTURAL LAND USE AND ECONOMICS

CONTRACT RENEWAL PROPOSAL WITH BLENDED WATER RATES

In the November 1999 proposal, Reclamation has proposed that water sold to CVP water service contractors be sold according to tiered water rates as required by CVPIA section 3404. Reclamation has also proposed that two categories of water be identified. Category 1 water would be calculated as the average delivery of the previous five years, and would be split into three tiers according to the 80-10-10 quantities defined in the CVPIA. Category 2 water would be any water available in excess of the 5-year rolling average, up to the total contract amount as defined by the Needs Analysis.

Tier 1 water rates include the cost-of-service rate and any applicable Restoration charges and surcharges. Both the Restoration Charge and the capital component of the cost-of-service rate are subject to ability-to-pay limits. These limits are in effect for Bella Vista WD and Clear Creek CSD, contractors on the Corning and Tehama-Colusa Canals, and contractors receiving water from New Melones.

Tier 3 water rates include the full-cost rate (as defined in the Reclamation Reform Act) and any applicable Restoration Charges. No ability-to-pay relief is provided in this Tier. The Tier 2 water rate is the average of the applicable Tier 1 and Tier 3 rates. Category 2 water has the same rate as Tier 3.

For this proposal, it is assumed that water conservation guidelines allow contractors to blend the rate of CVP water delivered in any tier or Category, and that they do blend the rates. This is different from the assumption used to assess alternatives in the PEIS, in which contractors were assumed to sell CVP water to growers at tiered rates. Differences between PEIS pricing assumptions and this analysis are:

- This analysis assumes that contractors blend the price of all CVP water received at tiered rates into a single rate. Tiered rates to growers are assumed in the PEIS.

- The project water portion of Sacramento River settlement contracts are not subject to the new pricing policy in this analysis. In the PEIS it was assumed that it was subject to tiered rates.

- Rates are based on the Irrigation Water Rates spreadsheets provided by Reclamation in November 1999. PEIS rates used the 1994 Irrigation Water Rates manual.

- Ability-to-pay relief is incorporated using the current payment capacity studies for Shasta County irrigation contractors, Corning Canal contractors, Tehama-Colusa Canal contractors, and New Melones contractors. In the PEIS, payment capacity was based on a 1992 regional study (PEIS, 1999).

- In this analysis, ability to pay relief is provided in Tier 1, with none in Tier 3 - Tier 2 is the average of Tiers 1 and 3, and so provides 50% relief. In the PEIS, the same dollar amount of ability to pay relief is applied in all pricing tiers.

- A $7.00 per acre-foot Restoration Charge is assumed in this analysis. A $6.50 per acre-foot charge was used in the PEIS. The Friant surcharge was $7.00 per acre-foot in both studies.

- There is no lower bound on the usage of CVP water. In the PEIS each subregion was restricted to using at least the Tier 1 quantity of CVP supplies.

METHODOLOGY

Other than the differences listed above, the modeling approach and underlying data were the same as used for the PEIS. The Central Valley Production Model (CVPM) was used in this analysis, with modifications needed to assess the specific water pricing conditions proposed. Table 1 shows the regions of the CVPM and the corresponding service areas. Groundwater hydrology was not assessed as it was in the PEIS alternatives. Therefore, for purposes of analysis, most regions were assumed to have access to replacement groundwater if needed. Based on groundwater hydrology as described in the PEIS, the following subregions are assumed to be unable to replace any CVP water with groundwater on a long term basis: Shasta County irrigation contractors (subregion 1), Corning Canal contractors (subregion 2), and the Tehama-Colusa service area (subregion 3B).

Water deliveries from the CVPIA Preferred Alternative were used (Reclamation CVPIA PEIS, 1999). These deliveries were allocated on a yearly basis into pricing tiers and categories according to the rules described above. Weighted average (i.e., blended) prices were calculated for each year, with quantities in each tier and category based on the previous five years of delivery. In any given year, the quantity and blended price of water depends on the six-year sequence leading up to and including the current year. Throughout this report the following conventions are use: an Average year represents the average 1922-1990 water delivery from the CVPIA Preferred Alternative (Reclamation CVPIA PEIS, 1999); a Wet year represents the average delivery for the period of 1967-1971 from the CVPIA Preferred Alternative; and a Dry year is the average 1928-1934 delivery from the CVPIA Preferred Alternative.

A total of nine water supply sequences are assessed in this analysis and compared to the CVPIA Preferred Alternative:

Average-Average:	An average water year following a five-year sequence of average years.
Wet-Average:	An average water year following a five-year sequence of wet years.
Dry-Average:	An average water year following a five-year sequence of dry years.
Average-Wet:	A wet water year following a five-year sequence of average years.
Wet-Wet:	A wet water year following a five-year sequence of wet years.
Dry-Wet:	A wet water year following a five-year sequence of dry years.

Average-Dry: A dry water year following a five-year sequence of average years.
Wet-Dry: A dry water year following a five-year sequence of wet years.
Dry-Dry: A dry water year following a five-year sequence of dry years.

The CVP water rates used for each of the nine sequences described above and the CVPIA Preferred Alternative tiered prices are shown in Table 3. Tables 4-12 show the available CVP water service contract supplies by tier and the blended price for each of the 22 subregions under the nine sequences proposed for the Long-Term Contract Renewal analysis.

Results are shown for each of the nine sequences presented as differences compared to the CVPIA Preferred Alternative. When calculating differences from the CVPIA Preferred Alternative, sequences ending in an Average, Wet and Dry years are compared to the Average, Wet and Dry year CVPIA Preferred Alternative results respectively.

IRRIGATED ACRES

Changes in irrigated acres from the Preferred Alternative are summarized by region in Table 13. A complete list of changes by crop and subregion is provided as Table 17.

Both the Average-Average and Wet-Average scenarios show little difference from the Preferred Alternative under the Average hydrology conditions. The Dry-Average sequence shows a larger reduction in irrigated acres almost all of which comes from the Sacramento River region. Compared to the Wet year Preferred Alternative results, there is a similar pattern for the three Long-Term Contract Renewal sequences ending with Wet years. For all three of the Long-Term Contract Renewal Sequences ending in a dry year there are minimal increases in irrigated acreage compared to the Dry year CPVIA Preferred Alternative results. Irrigated acres remain unchanged under all nine sequences in the San Felipe Division.

The reduction in acreage in Average and Wet years preceded by a series of Dry years is a result of higher CVP water costs. Since the quantity of Category 1 water is based on the average deliveries of the preceding five years, the quantity of water eligible for Category 1 classification shrinks when a sustained drought is experienced. When an average or wet year follows a drought period, water becomes available; however a large portion is classified as Category 2 and is priced at the full cost rate. This can be seen in Tables 6 and 9. When this relatively large block of full cost water is incorporated into the blended water price, all CVP supplies become more expensive, and sometimes unaffordable. This result is not seen in the dry-dry sequence because there is not excess water that gets classified as Category 2.

GROSS AND NET REVENUE

Gross revenue (value of production) impacts follow acreage impacts quite closely, and are shown by region in Table 14. Compared to the Average Preferred Alternative, a small reduction of less than $1 million is estimated for the Average-Average and Wet-Average scenarios, and a $39 million reduction is estimated in Dry-Average scenario. Gross revenue also declines compared to the Wet Preferred Alternative with approximately $5 million reductions in Average

and Wet years and a larger reduction of $29 million in the Dry-Wet scenario. In dry years preceded by all three hydrologic conditions, gross revenue is slightly higher when compared to the Preferred Alternative Dry year results. There were no changes in gross revenue for the San Felipe Division since there were no changes in irrigated acres compared to the CVPIA Preferred Alternative. A complete list of changes in gross revenue by crop and subregion is provided as Table 18.

Net revenue impacts are separated into five components; Fallowed land, Groundwater pumping costs, Irrigation Costs, CVP water costs and higher crop prices. The CVP water cost component represents the impact to net revenue from changes in both the quantity of CVP water used and the price of CVP water. Therefore when the blended CVP water price increases, farmers frequently use less water, and the net impact to the CVP water cost component can be positive even when the water price is higher. Table 15 summarizes the net income impacts by component. A negative entry in the table indicates a reduction in net revenue. A complete list of changes in net income by component for each subregion is provided as Table 19.

Relatively small net income impacts are seen in all water supply sequences at the State level. The Average-Average sequence compared to the Average year Preferred Alternative shows a decline of $2 million in net revenue for all of California. The Wet-Average scenario is estimated to have a net increase of approximately $4 million and the Dry-Average sequence a decrease of $12 million.

The net revenue impact in wet years relative to the Preferred Alternative wet results show a pattern similar to the Average year results. Dry years preceded by a series of Average and Wet years both show a net decrease in revenue of about $12 million while the Dry-Dry sequence results in a $15 million decrease in State wide net revenue relative the Preferred Alternative Dry results.
Notice that following a series of dry years, the net revenue component associated with crop prices often results in a positive impact to net revenue. This occurs because some subregions are forced to reduce acreage because of higher blended CVP water prices, resulting in higher crop prices received for acreage that remains in production.

There is a negative impact to net revenue from irrigation costs in the Sacramento and San Joaquin River regions in each of the nine Long-Term Contract Renewal sequences. This impact is derived from the irrigation efficiency improvements induced by higher CVP water prices in the Average year sequences. The change in irrigation efficiency carries through to the Wet and Dry year sequences because they are short run analyses and irrigation technology is fixed in the short run. The increase in irrigation efficiency results in a reduction in the total water used in some subregions while irrigated acreage remains constant.

WATER USE

Table 16 summarizes water use changes by region. A complete list of changes in CVP water use and groundwater use by subregion is provided as Table 20. Water supplies other than CVP project water and groundwater are unaffected and not shown. The San Joaquin River region and most of the sequences for the Sacramento River region show the typical response represented by a shift away from CVP supplies to groundwater as CVP water becomes more expensive under the new pricing schemes. The Tulare Lake region and the Sacramento River region during wet years preceded by a series of Average and Wet years show what would be considered an atypical response.

In the Sacramento River region when five years of Wet and Average conditions are followed by a Wet year, the model predicts that both groundwater and CVP water use will decline relative to the Preferred Alternative Wet condition. The decrease in groundwater use is mostly attributed to subregion 3b. In this subregion in a Wet year coming out of a series of Average or Wet years the blended price is cheaper than the Preferred Alternative Tier 2 water cost as well as the cost of pumping groundwater. Therefore there is a shift away from groundwater to CVP supplies. In Average years preceded by Average or Wet years, the subregion is prevented from shifting to CVP because they are already using their full CVP supply.

In the Tulare Lake region there is a pattern of shifting from groundwater to CVP water that can be attributed to subregions 17. This subregion shifts because under the blended pricing scheme the CVP water becomes cheaper than pumping groundwater; therefore they maximize their CVP water use.

In Average and Wet years preceded by a series of Dry years, there is a large decrease in CVP water use in both the Sacramento and San Joaquin River regions. This is driven by the relatively high cost of CVP supplies under these conditions. Since many subregions receive less water in Dry years or the water falls into the higher tiers and it becomes unaffordable, then the base from which the blended price tier quantities is calculated shrinks. This sets up a condition where an Average or Wet year comes along; the additional water is classified as Category 2 and assessed the full cost price. The CVP blended price is a weighted average of all CVP supplies therefore the cost for all CVP water increases and the supplies often become unaffordable.

LOCALIZED IMPACTS

Certain subregions are substantially affected by the proposed water pricing.

- The Tehama-Colusa Canal service area is the most-affected region. Limited groundwater availability and very high full-cost price relative to the value of water in agricultural production result in almost 60,000 acres out of production in the Dry-Average sequence and substantially higher cost for lands remaining in production. This analysis shows a one-year snapshot. Because water pricing is based on historic delivery, a region (such as the Tehama-Colusa Canal region)

may never be able to “buy its way” back out from a drought. Looked at over a sequence of dry years such as 1928-34 or 1987-92, many or most of the districts in this area could not survive as CVP contractors.

- The analysis predicts that the Delta subregion will make a complete switch to groundwater supplies in all nine hydrologic sequences, assuming groundwater is available in all parts of the service area.

- The analysis estimates that once an extended drought is experienced, the Delta-Mendota service area would switch from its CVP water service supply to groundwater, assuming groundwater is available in all parts of the service area.

- Westlands Water District and many of the Friant Unit contractors would likely continue purchasing CVP water. Since these areas continue to purchase CVP supplies in all years coming out of drought conditions, they would eventually build their base deliveries up or "buy their way" back to pre-drought tier quantities and prices.

TABLE 1
CVPM SUBREGIONS AND DESCRIPTIONS

CVPM Subregion	Description of Major Water Users
1	CVP Users: Anderson-Cottonwood, Clear Creek, Bella Vista, Sacramento River miscellaneous users.
2	CVP Users: Corning Canal, Kirkwood, Tehama, Sacramento River miscellaneous users.
3	CVP Users: Glenn-Colusa ID, Provident, Princeton-Codora, Glenn, Maxwell, and Colusa Basin Drain MWC.
3B	Tehama-Colusa Canal Service Area. CVP Users: Orland-Artois WD, most of County of Colusa, Davis, Dunnigan, Glide, Kanawha, La Grande, Westside WD.
4	CVP Users: Princeton-Codora-Glenn, Meridian Farms WC, Pelger Mutual WC, Recl. Dist. 1004, Recl. Dist. 108, Roberts Ditch, Sartain MWC, Sutter MWC, Swinford Tract IC, Tisdale Irrigation, Sacramento River miscellaneous users.
5	Most Feather River Region riparian and appropriative users.
6	Yolo, Solano Counties. CVP Users: Conaway Ranch, Sacramento River miscellaneous users.
7	Sacramento Co. north of American River. CVP Users: Natomas-Central MWC, Sacramento River miscellaneous users, Pleasant Grove-Verona, San Juan Suburban.
8	Sacramento Co. south of American River, San Joaquin Co.
9	Delta Regions. CVP Users: Banta Carbona, West Side, Plainview.
10	Delta Mendota Canal. CVP Users: Pacheco, Del Puerto, Hospital, Sunflower, West Stanislaus, Mustang, Orestimba, Patterson, Foothill, San Luis WD, Broadview, Eagle Field, Mercy Springs, Pool Exchange Contractors, Schedule II water rights, more.
11	Stanislaus River water rights: Modesto ID, Oakdale ID, South San Joaquin ID.
12	Turlock ID.
13	Merced ID. CVP Users: Madera, Chowchilla, Gravely Ford.
14	CVP Users: Westlands WD.
15	Tulare Lake Bed. CVP Users: Fresno Slough, James, Tranquility, Traction Ranch, Laguna, Real. Dist. 1606.
16	Eastern Fresno Co. CVP Users: Friant-Kern Canal. Fresno ID, Garfield, International.
17	CVP Users: Friant-Kern Canal. Hills Valley, Tri-Valley Orange Cove.
18	CVP Users: Friant-Kern Canal, County of Fresno, Lower Tule River ID, Pixley ID, portion of Rag Gulch, Ducor, County of Tulare, most of Delano Earlimart, Exeter, Ivanhoe, Lewis Cr., Lindmore, Lindsay-Strathmore, Porterville, Sausalito, Stone Corral, Tea Pot Dome, Terra Bella, Tulare.
19	Kern Co. SWP Service Area.
20	CVP Users: Friant-Kern Canal. Shafter-Wasco, S. San Joaquin.
21	CVP Users: Cross Valley Canal, Friant-Kern Canal. Arvin Edison.

TABLE 2

CVP WATER RATES USED FOR LONG TERM CONTRACT RENEWAL ANALYSIS ($)

CVPM Subregion	Tiered Water Rates Used for LTCR analysis			Proposed Blended Water Rates for Water Service Contracts								
				Average	Wet	Dry	Average	Wet	Dry	Average	Wet	Dry
	Tier 1	Tier 2	Tier 3	Followed by Average			Followed by Wet			Followed by Dry		
1	12.01	37.56	63.12	19.67	14.98	14.14	23.91	19.67	18.20	25.19	21.09	19.67
2	10.71	36.40	62.09	18.42	10.71	49.66	29.55	18.42	52.83	10.71	10.71	18.42
3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3B	10.25	40.73	71.21	19.39	10.25	58.15	32.35	19.39	61.42	10.25	10.25	19.39
4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5	20.65	23.01	25.36	21.35	21.18	21.77	21.52	21.35	21.92	20.90	20.81	21.35
6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7	11.77	12.07	12.37	11.86	11.86	11.86	11.86	11.86	11.86	11.86	11.86	11.86
8	10.00	27.46	44.92	15.24	10.00	30.36	25.64	15.24	35.47	10.00	10.00	15.24
9	24.79	55.14	85.50	33.89	24.79	64.53	55.27	33.89	73.22	24.79	24.79	33.89
10	31.15	40.16	49.16	33.85	31.15	42.94	38.01	33.85	44.63	31.15	31.15	33.85
11	0.00	0.00	0.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
12	0.00	0.00	0.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
13	32.16	38.41	44.65	34.04	33.25	37.44	34.77	34.04	37.94	32.16	32.16	34.04
14	32.62	46.48	60.33	36.78	32.62	50.76	43.17	36.78	53.36	32.62	32.62	36.78
15	32.71	41.91	51.10	35.47	34.55	38.10	36.34	35.47	38.82	33.07	32.71	35.47
16	40.48	46.78	53.08	42.37	41.22	45.32	43.40	42.37	46.07	40.48	40.48	42.37
17	34.18	40.49	46.79	36.07	35.15	39.28	36.92	36.07	39.88	34.18	34.18	36.07
18	33.63	40.48	47.33	35.69	34.73	39.16	36.57	35.69	39.78	33.63	33.63	35.69
19	34.58	42.16	49.73	36.86	35.00	41.21	38.84	36.86	42.52	34.58	34.58	36.86
20	34.58	42.16	49.73	36.86	35.70	40.85	37.92	36.86	41.58	34.58	34.58	36.86
21	32.70	39.00	45.31	34.59	32.98	39.01	36.33	34.59	40.03	32.70	32.70	34.59

NOTES:

1. Blended rates used pricing components from the November, 1999 Irrigation Water Rates spreadsheets, Restoration Charge of $7.00
2. PEIS rates used regional estimates of payment capacity and allowed the same ATP relief in all tiers.
3. Blended rates use most recent available payment capacity studies from Reclamation, and allow ATP relief in Tier 1 but not in Tier 3.
4. Only Class 1 rates are shown for Friant Division. Friant surcharge is $7.00 in all rates.

TABLE 3

CVP WATER RATES USED IN PREFERRED ALTERNATIVE ($)

CVPM Subregion	Tiered Water Rates Used in the PEIS Preferred Alternative ($)		
	Tier 1	Tier 2	Tier 3
1	5.91	14.63	23.35
2	11.83	24.7	37.57
3	2.83	5.27	7.71
3B	17.16	36.225	55.29
4	5.32	7.625	9.93
5	4.53	6.965	9.4
6	4.53	6.82	9.11
7	6.63	8.83	11.03
8	4.53	7.095	9.66
9	28.54	35.245	41.95
10	33.46	40.015	46.57
11	0	0	0
12	0	0	0
13	33.65	39.395	45.14
14	39.31	54.385	69.46
15	28.16	34.875	41.59
16	38.25	44.255	50.26
17	35.58	41.905	48.23
18	35.01	41.255	47.5
19	36.68	42.885	49.09
20	36.68	42.885	49.09
21	35.4	42.01	48.62

NOTES:

1. PEIS rates used pricing components from the 1994 Irrigation Water Rates Manual, Restoration Charge of $6.50
2. PEIS rates used regional estimates of payment capacity and allowed the same ATP relief in all tiers.
3. Only Class 1 rates are shown for Friant Division. Friant surcharge is $7.00 in all rates.

TABLE 4

PROJECT WATER APPLIED BY PRICING TIERS
AVERAGE YEAR FOLLOWING AVERAGE 5-YEAR BASE CONDITION

CVPM Subregion	Tier 1	Tier 2	Tier 3	Category 2	Blended Price ($/AF)
	(1000 AF)				
1	9.4	1.2	1.2	-	$ 19.67
2	21.9	2.7	2.7	-	$ 18.42
3	-	-	-	-	NA
3B	159.7	20.0	20.0	-	$ 19.39
4	-	-	-	-	NA
5	16.0	2.0	2.0	-	$ 21.35
6	-	-	-	-	NA
7	12.0	1.5	1.5	-	$ 11.86
8	41.3	5.2	5.2	-	$ 15.24
9	22.5	2.8	2.8	-	$ 33.89
10	231.4	28.9	28.9	-	$ 33.85
11	-	-	-	-	
12	-	-	-	-	
13	153.6	19.2	19.2	-	$ 34.04
14	539.1	67.4	67.4	-	$ 36.78
15	32.3	4.0	4.0	-	$ 35.47
16	18.9	2.4	2.4	-	$ 42.37
17	34.9	4.4	4.4	-	$ 36.07
18	484.2	60.5	60.5	-	$ 35.69
19	13.1	1.6	1.6	-	$ 36.86
20	194.2	24.3	24.3	-	$ 36.86
21	129.7	16.2	16.2	-	$ 34.59

Table 5

PROJECT WATER APPLIED BY PRICING TIERS
AVERAGE YEAR FOLLOWING WET 5-YEAR BASE CONDITION

CVPM Subregion	Tier 1	Tier 2	Tier 3	Category 2	Blended Price ($/AF)
	(1000 AF)				
1	10.4	1.3	0.0	-	$ 14.98
2	27.3	-	-	-	$ 10.71
3	-	-	-	-	NA
3B	199.6	-	-	-	$ 10.25
4	-	-	-	-	NA
5	16.6	2.1	1.2	-	$ 21.18
6	-	-	-	-	NA
7	12.0	1.5	1.5	-	$ 11.86
8	51.6	-	-	-	$ 10.00
9	28.2	-	-	-	$ 24.79
10	289.2	-	-	-	$ 31.15
11	-	-	-	-	NA
12	-	-	-	-	NA
13	165.0	20.6	6.3	-	$ 33.25
14	673.8	-	-	-	$ 32.62
15	34.2	4.3	1.9	-	$ 34.55
16	21.0	2.6	0.1	-	$ 41.22
17	37.9	4.7	1.0	-	$ 35.15
18	523.8	65.5	15.9	-	$ 34.73
19	15.5	0.9	-	-	$ 35.00
20	211.7	26.5	4.6	-	$ 35.70
21	154.9	7.2	-	-	$ 32.98

Table 6

PROJECT WATER APPLIED BY PRICING TIERS
AVERAGE YEAR FOLLOWING DRY 5-YEAR BASE CONDITION

CVPM Subregion	Tier 1	Tier 2	Tier 3	Category 2	Blended Price ($/AF)
	(1000 AF)				
1	10.8	1.0	-	-	$ 14.14
2	6.2	0.8	0.8	19.6	$ 49.66
3	-	-	-	-	NA
3B	40.2	5.0	5.0	149.3	$ 58.15
4	-	-	-	-	NA
5	14.3	1.8	1.8	2.1	$ 21.77
6	-	-	-	-	NA
7	12.0	1.5	1.5	-	$ 11.86
8	20.2	2.5	2.5	26.3	$ 30.36
9	9.2	1.1	1.1	16.7	$ 64.53
10	94.0	11.8	11.8	171.7	$ 42.94
11	-	-	-	-	NA
12	-	-	-	-	NA
13	104.4	13.0	13.0	61.6	$ 37.44
14	219.1	27.4	27.4	400.0	$ 50.76
15	26.8	3.4	3.4	6.8	$ 38.10
16	13.7	1.7	1.7	6.5	$ 45.32
17	24.5	3.1	3.1	13.1	$ 39.28
18	339.7	42.5	42.5	180.6	$ 39.16
19	8.7	1.1	1.1	5.6	$ 41.21
20	133.9	16.7	16.7	75.3	$ 40.85
21	76.2	9.5	9.5	66.8	$ 39.01

Table 7

PROJECT WATER APPLIED BY PRICING TIERS
WET YEAR FOLLOWING AVERAGE 5-YEAR BASE CONDITION

CVPM Subregion	Tier 1	Tier 2	Tier 3	Category 2	Blended Price ($/AF)
	(1000 AF)				
1	9.4	1.2	1.2	1.3	$ 23.91
2	21.9	2.7	2.7	9.4	$ 29.55
3	-	-	-	-	NA
3B	159.7	20.0	20.0	66.6	$ 32.35
4	-	-	-	-	NA
5	16.0	2.0	2.0	0.9	$ 21.52
6	-	-	-	-	NA
7	12.0	1.5	1.5	-	$ 11.86
8	41.3	5.2	5.2	27.8	$ 25.64
9	22.5	2.8	2.8	19.9	$ 55.27
10	231.4	28.9	28.9	107.8	$ 38.01
11	-	-	-	-	NA
12	-	-	-	-	NA
13	153.6	19.2	19.2	14.3	$ 34.77
14	539.1	67.4	67.4	251.2	$ 43.17
15	32.3	4.0	4.0	2.4	$ 36.34
16	18.9	2.4	2.4	2.5	$ 43.40
17	34.9	4.4	4.4	3.8	$ 36.92
18	484.2	60.5	60.5	49.6	$ 36.57
19	13.1	1.6	1.6	3.0	$ 38.84
20	194.2	24.3	24.3	21.9	$ 37.92
21	129.7	16.2	16.2	31.5	$ 36.33

Table 8

PROJECT WATER BY PRICING TIERS
WET YEAR FOLLOWING WET 5-YEAR BASE CONDITION

CVPM Subregion	Tier 1	Tier 2	Tier 3	Category 2	Blended Price ($/AF)
	(1000 AF)				
1	10.4	1.3	1.3	-	$ 19.67
2	29.4	3.7	3.7	-	$ 18.42
3	-	-	-	-	NA
3B	212.9	26.6	26.6	-	$ 19.39
4	-	-	-	-	NA
5	16.6	2.1	2.1	-	$ 21.35
6	-	-	-	-	NA
7	12.0	1.5	1.5	-	$ 11.86
8	63.5	7.9	7.9	-	$ 15.24
9	38.5	4.8	4.8	-	$ 33.89
10	317.6	39.7	39.7	-	$ 33.85
11	-	-	-	-	NA
12	-	-	-	-	NA
13	165.0	20.6	20.6	-	$ 34.04
14	740.0	92.5	92.5	-	$ 36.78
15	34.2	4.3	4.3	-	$ 35.47
16	21.0	2.6	2.6	-	$ 42.37
17	37.9	4.7	4.7	-	$ 36.07
18	523.8	65.5	65.5	-	$ 35.69
19	15.5	1.9	1.9	-	$ 36.86
20	211.7	26.5	26.5	-	$ 36.86
21	154.9	19.4	19.4	-	$ 34.59

Table 9

PROJECT WATER APPLIED BY PRICING TIERS
WET YEAR FOLLOWING DRY 5-YEAR BASE CONDITION

CVPM Subregion	Tier 1	Tier 2	Tier 3	Category 2	Blended Price ($/AF)
	(1000 AF)				
1	10.8	1.3	0.9	-	$ 18.20
2	6.2	0.8	0.8	28.9	$ 52.83
3	-	-	-	-	NA
3B	40.2	5.0	5.0	215.9	$ 61.42
4	-	-	-	-	NA
5	14.3	1.8	1.8	2.9	$ 21.92
6	-	-	-	-	NA
7	12.0	1.5	1.5	-	$ 11.86
8	20.2	2.5	2.5	54.1	$ 35.47
9	9.2	1.1	1.1	36.7	$ 73.22
10	94.0	11.8	11.8	279.5	$ 44.63
11	-	-	-	-	NA
12	-	-	-	-	NA
13	104.4	13.0	13.0	75.9	$ 37.94
14	219.1	27.4	27.4	651.1	$ 53.36
15	26.8	3.4	3.4	9.1	$ 38.82
16	13.7	1.7	1.7	9.1	$ 46.07
17	24.5	3.1	3.1	16.8	$ 39.88
18	339.7	42.5	42.5	230.2	$ 39.78
19	8.7	1.1	1.1	8.5	$ 42.52
20	133.9	16.7	16.7	97.2	$ 41.58
21	76.2	9.5	9.5	98.3	$ 40.03

Table 10

PROJECT WATER APPLIED BY PRICING TIERS
DRY YEAR FOLLOWING AVERAGE 5-YEAR BASE CONDITION

CVPM Subregion	Tier 1	Tier 2	Tier 3	Category 2	Blended Price ($/AF)
	(1000 AF)				
1	9.4	1.2	1.2	1.7	$ 25.19
2	7.8	-	-	-	$ 10.71
3	-	-	-	-	NA
3B	50.3	-	-	-	$ 10.25
4	-	-	-	-	NA
5	16.0	1.9	-	-	$ 20.90
6	-	-	-	-	NA
7	12.0	1.5	1.5	-	$ 11.86
8	25.3	-	-	-	$ 10.00
9	11.5	-	-	-	$ 24.79
10	117.5	-	-	-	$ 31.15
11	-	-	-	-	NA
12	-	-	-	-	NA
13	130.4	-	-	-	$ 32.16
14	273.9	-	-	-	$ 32.62
15	32.3	1.3	-	-	$ 33.07
16	17.1	-	-	-	$ 40.48
17	30.6	-	-	-	$ 34.18
18	424.6	-	-	-	$ 33.63
19	10.9	-	-	-	$ 34.58
20	167.4	-	-	-	$ 34.58
21	95.3	-	-	-	$ 32.70

Table 11

PROJECT WATER APPLIED BY PRICING TIERS
DRY YEAR FOLLOWING WET 5-YEAR BASE CONDITION

CVPM Subregion	Tier 1	Tier 2	Tier 3	Category 2	Blended Price ($/AF)
	(1000 AF)				
1	10.4	1.3	1.3	0.4	$ 21.09
2	7.8	-	-	-	$ 10.71
3	-	-	-	-	NA
3B	50.3	-	-	-	$ 10.25
4	-	-	-	-	NA
5	16.6	1.2	-	-	$ 20.81
6	-	-	-	-	NA
7	12.0	1.5	1.5	-	$ 11.86
8	25.3	-	-	-	$ 10.00
9	11.5	-	-	-	$ 24.79
10	117.5	-	-	-	$ 31.15
11	-	-	-	-	NA
12	-	-	-	-	NA
13	130.4	-	-	-	$ 32.16
14	273.9	-	-	-	$ 32.62
15	33.6	-	-	-	$ 32.71
16	17.1	-	-	-	$ 40.48
17	30.6	-	-	-	$ 34.18
18	424.6	-	-	-	$ 33.63
19	10.9	-	-	-	$ 34.58
20	167.4	-	-	-	$ 34.58
21	95.3	-	-	-	$ 32.70

Table 12

PROJECT WATER BY PRICING TIERS
DRY YEAR FOLLOWING DRY 5-YEAR BASE CONDITION

CVPM Subregion	Tier 1	Tier 2	Tier 3	Category 2	Blended Price ($/AF)
	(1000 AF)				
1	10.8	1.3	1.3	-	$ 19.67
2	6.2	0.8	0.8	-	$ 18.42
3	-	-	-	-	NA
3B	40.2	5.0	5.0	-	$ 19.39
4	-	-	-	-	NA
5	14.3	1.8	1.8	-	$ 21.35
6	-	-	-	-	NA
7	12.0	1.5	1.5	-	$ 11.86
8	20.2	2.5	2.5	-	$ 15.24
9	9.2	1.1	1.1	-	$ 33.89
10	94.0	11.8	11.8	-	$ 33.85
11	-	-	-	-	NA
12	-	-	-	-	NA
13	104.4	13.0	13.0	-	$ 34.04
14	219.1	27.4	27.4	-	$ 36.78
15	26.8	3.4	3.4	-	$ 35.47
16	13.7	1.7	1.7	-	$ 42.37
17	24.5	3.1	3.1	-	$ 36.07
18	339.7	42.5	42.5	-	$ 35.69
19	8.7	1.1	1.1	-	$ 36.86
20	133.9	16.7	16.7	-	$ 36.86
21	76.2	9.5	9.5	-	$ 34.59

TABLE 13

IRRIGATED ACRES BY SUBREGION (1000 ACRES)

CVPM Subregion	Average Preferred Alternative	Change Compared to Average followed by Average			Wet Preferred Alternative	Change Compared to Wet followed by Wet			Dry Preferred Alternative	Change Compared to Dry followed by Dry		
		Average	Wet	Dry		Average	Wet	Dry		Average	Wet	Dry
Sacramento River	2015.5	-1.7	-0.8	-65.3	2020.0	-4.4	-4.4	-53.0	1984.8	0.1	0.1	0.0
San Joaquin River	2526.6	-0.2	-0.2	-1.2	2529.1	-1.7	-1.6	-1.9	2505.9	-0.1	-0.1	-0.1
Tulare Lake	1992.4	0.0	0.0	-0.2	1996.2	-1.2	-1.2	-1.3	1953.7	0.1	0.1	0.1
San Felipe	50.7	0.0	0.0	0.0	69.5	0.0	0.0	0.0	22.2	0.0	0.0	0.0
California Total	6585.2	-1.9	-1.0	-66.7	6614.8	-7.3	-7.3	-56.2	6466.6	0.1	0.1	0.1

TABLE 14

VALUE OF PRODUCTION BY SUBREGION (Million $)

CVPM Subregion	Average Preferred Alternative	Change Compared to Average followed by Average: Average	Wet	Dry	Wet Preferred Alternative	Change Compared to Wet PA followed by Wet: Average	Wet	Dry	Dry Preferred Alternative	Change Compared to Dry PA followed by Dry: Average	Wet	Dry
Sacramento River	1,825.3	-0.4	-0.2	-37.6	1,828.0	-1.6	-1.6	-26.8	1,810.0	0.4	0.4	0.3
San Joaquin River	4,402.3	-0.1	-0.1	-1.0	4,403.8	-0.9	-0.9	-1.1	4,384.2	-0.2	-0.2	-0.2
Tulare Lake	3,876.3	0.0	0.0	-0.3	3,879.4	-1.0	-1.0	-1.1	3,842.7	0.1	0.1	0.1
San Felipe	68.0	0.0	0.0	0.0	70.0	0.0	0.0	0.0	44.0	0.0	0.0	0.0
California Total	10,172.0	-0.5	-0.4	-38.8	10,181.2	-3.6	-3.6	-28.9	10,080.8	0.3	0.3	0.3

TABLE 15

NET REVENUE CHANGES BY REGION (Million $)

Cause of Net Revenue Change	Compared to Average Year PA			Compared to Wet Year PA			Compared to Dry Year PA		
	Average	Wet	Dry	Average	Wet	Dry	Average	Wet	Dry
	followed by Average			followed by Wet			followed by Dry		
Sacramento River									
Fallowed Land	-0.1	0.0	-6.7	-0.3	-0.3	-4.6	0.0	0.0	0.0
Groundwater Pumping Cost	-0.3	-0.3	-0.4	1.0	1.0	-4.5	-0.2	-0.2	-0.2
Irrigation Cost	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
CVP Water Cost	-0.3	1.7	3.6	-5.1	-1.0	4.6	-0.1	-0.1	-0.7
Higher Crop Prices	0.0	0.0	1.9	0.1	0.1	1.0	0.0	0.0	0.0
Net Change	**-1.0**	**1.0**	**-1.9**	**-4.6**	**-0.5**	**-3.8**	**-0.6**	**-0.6**	**-1.2**
San Joaquin River									
Fallowed Land	0.0	0.0	-0.1	-0.2	-0.2	-0.2	0.0	0.0	0.0
Groundwater Pumping Cost	0.0	0.0	-10.3	-7.4	0.2	-14.1	-1.0	-1.0	-1.0
Irrigation Cost	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
CVP Water Cost	1.0	4.0	2.3	7.9	6.1	6.2	-5.9	-5.9	-7.5
Higher Crop Prices	0.1	0.0	2.5	0.2	0.2	1.0	0.0	0.0	0.0
Net Change	**0.9**	**3.9**	**-5.7**	**0.4**	**6.1**	**-7.3**	**-7.0**	**-7.0**	**-8.6**
Tulare Lake									
Fallowed Land	0.0	0.0	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.0
Groundwater Pumping Cost	0.1	0.1	0.1	1.0	1.0	1.0	-3.2	-3.2	-3.2
Irrigation Cost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CVP Water Cost	-2.3	-1.2	-5.7	-3.1	-2.1	-6.4	-0.9	-0.9	-2.3
Higher Crop Prices	0.0	0.0	1.4	0.1	0.1	0.4	0.0	0.0	0.0
Net Change	**-2.1**	**-1.1**	**-4.2**	**-2.1**	**-1.1**	**-5.1**	**-4.1**	**-4.1**	**-5.5**
San Felipe									
Fallowed Land	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Groundwater Pumping Cost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Irrigation Cost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CVP Water Cost	-0.2	0.0	-0.6	-0.5	-0.2	-0.9	0.0	0.0	-0.1
Higher Crop Prices	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change	**-0.2**	**0.0**	**-0.6**	**-0.5**	**-0.2**	**-0.9**	**0.0**	**0.0**	**-0.1**
Total									
Fallowed Land	-0.1	-0.1	-6.9	-0.6	-0.6	-4.9	0.0	0.0	0.0
Groundwater Pumping Cost	-0.2	-0.2	-10.5	-5.3	2.2	-17.6	-4.4	-4.4	-4.4
Irrigation Cost	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
CVP Water Cost	-1.6	4.5	0.2	-0.3	3.1	4.5	-6.9	-6.8	-10.5
Higher Crop Prices	0.1	0.1	5.8	0.4	0.4	2.3	0.0	0.0	0.0
Net Change	**-2.3**	**3.7**	**-11.9**	**-6.3**	**4.6**	**-16.1**	**-11.7**	**-11.7**	**-15.3**

Note: A negative value in a cost category represents an increase in cost that produces a decrease in net revenue

TABLE 16
IRRIGATION WATER APPLIED BY REGION (1000 AF)

Region	Average Preferred Alternative	Change Compared to Average			Wet Preferred Alternative	Change Compared to Wet PA			Dry Preferred Alternative	Change Compared to Dry PA		
		Average	Wet	Dry		Average	Wet	Dry		Average	Wet	Dry
		followed by Average				followed by Wet				followed by Dry		
Sacramento River												
CVP Water*	625.9	-27.6	-23.4	-243.5	694.3	-2.4	-2.6	-305.5	402.1	-20.3	-20.3	-20.4
Groundwater	2,621.3	10.5	10.7	11.2	2,456.9	-24.5	-24.3	114.7	3,261.6	4.1	4.2	4.0
San Joaquin River												
CVP Water*	960.2	-8.7	-9.0	-269.0	1,226.6	-226.3	-21.0	-378.7	506	-17.5	-17.5	-17.5
Groundwater	3,606.2	3.3	3.5	260.0	2,974.2	215.1	10.3	366.8	4723	12.0	12.0	12.0
Tulare Lake												
CVP Water*	919.5	1.9	2.0	2.0	967.3	3.7	3.8	3.6	685.3	0.1	0.1	0.0
Groundwater	3,369.0	-1.8	-2.0	-2.0	2,683.5	-7.7	-7.7	-7.5	4,542.9	0.0400	0.0400	0.0400
San Felipe												
CVP Water*	71.0	0.0	0.0	0.0	71.0	0.0	0.0	0.0	71.0	0.0	0.0	0.0
Groundwater	na	na	na	na	na	na	na	na	na	na	na	na
Total												
CVP Water*	2,505.5	-34.4	-30.4	-510.5	2,888.2	-224.9	-19.9	-680.6	1,593.9	-37.7	-37.8	-37.8
Groundwater	9,596.5	11.9	12.3	269.2	8,114.6	182.8	-21.6	474.0	12,527.1	16.1	16.2	16.1

*CVP water applied is project water only. It excludes exchange contract delivery and the base supply portion of settlement contracts.

TABLE 17 IRRIGATED ACREAGE BY SUBREGION

CVPM Subregion	Crop Category	Preferred Alternative Average	hanges Compared to Average P Average	Wet	Dry	Preferred Alternative Wet	Changes Compared to Wet PA Average	Wet	Dry	Preferred Alternative Dry	Changes Compared to Dry PA Average	Wet	Dry
			Followed by Average				Followed by Wet				Followed by Dry		
1	Pasture	18.3	-1.2	-0.3	-0.1	18.3	-1.5	-1.5	-1.5	18.1	-1.8	-1.8	-1.8
	Alfalfa	0.9	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.9	0.0	0.0	0.0
	Other Field Crops	1.2	0.0	0.0	0.0	1.2	0.0	0.0	0.0	1.2	0.0	0.0	0.0
	Deciduous Orchard	3.8	0.0	0.0	0.0	3.8	0.0	0.0	0.0	3.8	0.0	0.0	0.0
	Small Grain	2.4	0.0	0.0	0.0	2.4	0.0	0.0	0.0	2.4	0.0	0.0	0.0
	Subtotal	**26.6**	**-1.3**	**-0.3**	**-0.1**	**26.5**	**-1.6**	**-1.6**	**-1.6**	**26.3**	**-1.9**	**-1.9**	**-1.9**
2	Pasture	34.1	0.0	0.0	-3.6	33.9	0.0	0.0	-5.9	33.1	0.0	0.0	0.0
	Alfalfa	9.5	0.0	0.0	-0.3	9.5	0.0	0.0	-0.6	9.4	0.0	0.0	0.0
	Sugar Beets	4.0	0.0	0.0	0.0	4.0	0.0	0.0	-0.1	4.0	0.0	0.0	0.0
	Other Field Crops	17.3	0.0	0.0	-0.5	17.2	0.0	0.0	-0.7	17.1	0.0	0.0	0.0
	Rice	4.5	0.0	0.0	-0.2	4.5	0.0	0.0	-0.3	4.5	0.0	0.0	0.0
	Truck Crops	15.5	0.0	0.0	0.0	15.5	0.0	0.0	0.0	15.5	0.0	0.0	0.0
	Deciduous Orchard	86.0	0.0	0.0	-0.1	86.0	0.0	0.0	0.0	86.0	0.0	0.0	0.0
	Small Grain	14.0	0.0	0.0	-0.2	13.9	0.0	0.0	-0.6	13.7	0.0	0.0	0.0
	Subtropical Orchard	10.2	0.0	0.0	0.0	10.2	0.0	0.0	0.0	10.2	0.0	0.0	0.0
	Subtotal	**195.0**	**0.0**	**0.0**	**-4.9**	**194.7**	**0.0**	**0.0**	**-8.2**	**193.5**	**0.0**	**0.0**	**0.0**
3	Pasture	7.8	0.0	0.0	0.0	7.9	0.0	0.0	0.0	7.5	0.0	0.0	0.0
	Alfalfa	18.2	0.0	0.0	0.0	18.3	0.0	0.0	0.0	18.0	0.0	0.0	0.0
	Sugar Beets	9.9	0.0	0.0	0.0	9.9	0.0	0.0	0.0	9.8	0.0	0.0	0.0
	Other Field Crops	15.7	0.0	0.0	0.0	15.8	0.0	0.0	0.0	15.5	0.0	0.0	0.0
	Rice	138.9	0.0	0.0	0.0	139.5	0.0	0.0	0.0	136.7	0.0	0.0	0.0
	Truck Crops	25.2	0.0	0.0	0.0	25.2	0.0	0.0	0.0	25.2	0.0	0.0	0.0
	Tomatoes	25.9	0.0	0.0	0.0	25.9	0.0	0.0	0.0	25.8	0.0	0.0	0.0
	Deciduous Orchard	17.8	0.0	0.0	0.0	17.8	0.0	0.0	0.0	17.8	0.0	0.0	0.0
	Small Grain	30.5	0.0	0.0	0.0	30.6	0.0	0.0	0.0	29.8	0.0	0.0	0.0
	Subtotal	**289.8**	**0.0**	**0.0**	**0.0**	**290.7**	**0.0**	**0.0**	**0.0**	**286.2**	**0.0**	**0.0**	**0.0**
3B	Pasture	5.7	0.0	0.0	-5.7	5.8	0.1	0.1	-1.5	4.3	0.0	0.0	0.0
	Alfalfa	10.1	0.0	0.0	-10.1	10.2	0.1	0.1	-2.6	7.6	0.0	0.0	0.0
	Sugar Beets	5.6	0.0	0.0	-5.3	5.6	0.0	0.0	-2.8	5.1	0.0	0.0	0.0
	Other Field Crops	13.4	0.0	0.0	-13.4	13.5	0.0	0.0	-13.5	10.4	0.0	0.0	0.0
	Rice	9.6	0.0	0.0	-9.6	9.7	0.1	0.1	-9.7	6.2	0.0	0.0	0.0
	Truck Crops	0.6	0.0	0.0	-0.1	0.6	0.0	0.0	0.0	0.6	0.0	0.0	0.0
	Tomatoes	6.1	0.0	0.0	-3.8	6.1	0.0	0.0	-1.8	5.7	0.0	0.0	0.0
	Deciduous Orchard	26.9	0.0	0.0	-3.3	26.9	0.0	0.0	0.0	26.9	0.0	0.0	0.0
	Small Grain	8.5	0.0	0.0	-8.5	8.6	0.0	0.0	-8.6	6.2	0.0	0.0	0.0
	Subtropical Orchard	1.0	0.0	0.0	-0.1	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Subtotal	**87.6**	**0.0**	**0.0**	**-59.9**	**87.9**	**0.3**	**0.3**	**-40.4**	**74.0**	**0.0**	**0.0**	**0.0**

TABLE 17 IRRIGATED ACREAGE BY SUBREGION

CVPM Subregion	Crop Category	Preferred Alternative Average	hanges Compared to Average P Average	Wet	Dry	Preferred Alternative Wet	Changes Compared to Wet PA Average	Wet	Dry	Preferred Alternative Dry	Changes Compared to Dry PA Average	Wet	Dry
			Followed by Average				Followed by Wet				Followed by Dry		
4	Pasture	1.2	0.0	0.0	0.0	1.2	0.0	0.0	0.0	1.1	0.0	0.0	0.0
	Alfalfa	6.8	0.0	0.0	0.0	6.8	0.0	0.0	0.0	6.8	0.0	0.0	0.0
	Sugar Beets	10.3	0.0	0.0	0.0	10.3	0.0	0.0	0.0	10.3	0.0	0.0	0.0
	Other Field Crops	40.1	0.0	0.0	0.0	40.1	0.0	0.0	0.0	39.8	0.0	0.0	0.0
	Rice	87.8	0.0	0.0	0.0	87.9	0.0	0.0	0.0	87.1	0.0	0.0	0.0
	Truck Crops	17.1	0.0	0.0	0.0	17.1	0.0	0.0	0.0	17.1	0.0	0.0	0.0
	Tomatoes	34.1	0.0	0.0	0.0	34.1	0.0	0.0	0.0	34.0	0.0	0.0	0.0
	Deciduous Orchard	30.6	0.0	0.0	0.0	30.6	0.0	0.0	0.0	30.6	0.0	0.0	0.0
	Small Grain	47.5	0.0	0.0	0.0	47.6	0.0	0.0	0.0	46.8	0.0	0.0	0.0
	Subtotal	**275.3**	**0.0**	**0.0**	**0.0**	**275.7**	**0.0**	**0.0**	**-0.1**	**273.6**	**0.0**	**0.0**	**0.0**
5	Pasture	21.4	0.0	0.0	0.0	21.5	0.0	0.0	0.0	21.0	0.0	0.0	0.0
	Alfalfa	4.7	0.0	0.0	0.0	4.7	0.0	0.0	0.0	4.7	0.0	0.0	0.0
	Sugar Beets	2.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0
	Other Field Crops	15.4	0.0	0.0	0.0	15.4	0.0	0.0	0.0	15.4	0.0	0.0	0.0
	Rice	166.0	0.0	0.0	0.0	166.6	-0.1	-0.1	-0.1	165.2	-0.1	-0.1	-0.1
	Truck Crops	6.6	0.0	0.0	0.0	6.6	0.0	0.0	0.0	6.6	0.0	0.0	0.0
	Tomatoes	1.6	0.0	0.0	0.0	1.6	0.0	0.0	0.0	1.6	0.0	0.0	0.0
	Deciduous Orchard	121.6	0.0	0.0	0.0	121.6	0.0	0.0	0.0	121.6	0.0	0.0	0.0
	Small Grain	22.3	0.0	0.0	0.0	22.4	0.0	0.0	0.0	21.9	0.0	0.0	0.0
	Subtropical Orchard	2.5	0.0	0.0	0.0	2.5	0.0	0.0	0.0	2.5	0.0	0.0	0.0
	Subtotal	**364.1**	**0.0**	**0.0**	**0.0**	**364.9**	**-0.2**	**-0.2**	**-0.1**	**362.4**	**-0.2**	**-0.2**	**-0.2**
6	Pasture	12.1	0.0	0.0	0.0	12.5	-0.4	-0.4	-0.4	11.8	0.0	0.0	0.0
	Alfalfa	28.7	0.0	0.0	0.1	29.0	-0.3	-0.3	-0.3	28.6	0.0	0.0	0.0
	Sugar Beets	21.2	0.0	0.0	0.0	21.2	-0.1	-0.1	-0.1	21.1	0.0	0.0	0.0
	Other Field Crops	59.4	0.0	0.0	0.0	59.9	-0.5	-0.5	-0.5	59.1	0.0	0.0	0.0
	Rice	12.9	0.0	0.0	0.0	13.1	-0.2	-0.2	-0.2	12.8	0.0	0.0	0.0
	Truck Crops	3.4	0.0	0.0	0.0	3.4	0.0	0.0	0.0	3.4	0.0	0.0	0.0
	Tomatoes	45.8	0.0	0.0	0.0	45.9	-0.1	-0.1	-0.1	45.7	0.0	0.0	0.0
	Deciduous Orchard	24.6	0.0	0.0	0.0	24.6	0.0	0.0	0.0	24.6	0.0	0.0	0.0
	Small Grain	64.3	0.0	0.0	0.0	64.6	-0.4	-0.4	-0.4	63.3	0.2	0.2	0.2
	Grapes	8.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0
	Subtotal	**280.2**	**0.0**	**0.0**	**0.0**	**282.2**	**-1.9**	**-1.9**	**-1.8**	**278.4**	**0.2**	**0.2**	**0.2**
7	Pasture	14.5	0.0	0.0	0.0	14.5	0.0	0.0	0.0	14.2	0.0	0.0	0.0
	Alfalfa	3.1	0.0	0.0	0.0	3.1	0.0	0.0	0.0	3.1	0.0	0.0	0.0
	Sugar Beets	2.5	0.0	0.0	0.0	2.5	0.0	0.0	0.0	2.5	0.0	0.0	0.0
	Other Field Crops	3.8	0.0	0.0	0.0	3.8	0.0	0.0	0.0	3.8	0.0	0.0	0.0
	Rice	48.3	0.0	0.0	0.0	48.3	0.0	0.0	0.0	47.9	0.0	0.0	0.0
	Truck Crops	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0
	Tomatoes	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0
	Deciduous Orchard	8.9	0.0	0.0	0.0	8.9	0.0	0.0	0.0	8.9	0.0	0.0	0.0
	Small Grain	9.4	0.0	0.0	0.0	9.3	0.0	0.0	0.0	9.2	0.0	0.0	0.0
	Grapes	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0
	Subtotal	**91.4**	**0.0**	**0.0**	**0.0**	**91.5**	**0.0**	**0.0**	**0.0**	**90.5**	**0.0**	**0.0**	**0.0**

TABLE 17 IRRIGATED ACREAGE BY SUBREGION

CVPM Subregion	Crop Category	Preferred Alternative Average	Changes Compared to Average PA: Average	Wet	Dry	Preferred Alternative Wet	Changes Compared to Wet PA: Average	Wet	Dry	Preferred Alternative Dry	Changes Compared to Dry PA: Average	Wet	Dry
			Followed by Average				Followed by Wet				Followed by Dry		
8	Pasture	47.7	0.0	0.0	0.0	47.6	0.0	0.0	0.0	46.9	0.0	0.0	0.0
	Alfalfa	12.3	0.0	0.0	0.0	12.3	0.0	0.0	0.0	12.2	0.0	0.0	0.0
	Sugar Beets	12.8	0.0	0.0	0.0	12.8	0.0	0.0	0.0	12.8	0.0	0.0	0.0
	Other Field Crops	42.7	0.0	0.0	0.0	42.7	0.0	0.0	0.0	42.5	0.0	0.0	0.0
	Rice	4.5	0.0	0.0	0.0	4.5	0.0	0.0	0.0	4.5	0.0	0.0	0.0
	Truck Crops	17.1	0.0	0.0	0.0	17.1	0.0	0.0	0.0	17.1	0.0	0.0	0.0
	Tomatoes	12.9	0.0	0.0	0.0	12.9	0.0	0.0	0.0	12.9	0.0	0.0	0.0
	Deciduous Orchard	46.9	0.0	0.0	0.0	46.9	0.0	0.0	0.0	46.9	0.0	0.0	0.0
	Small Grain	29.0	0.0	0.0	0.0	29.1	0.0	0.0	0.0	28.2	0.0	0.0	0.0
	Grapes	58.9	0.0	0.0	0.0	58.9	0.0	0.0	0.0	58.9	0.0	0.0	0.0
	Subtotal	**284.8**	**0.0**	**0.0**	**0.0**	**284.9**	**0.0**	**0.0**	**0.0**	**282.8**	**0.0**	**0.0**	**0.0**
9	Pasture	24.6	-0.2	-0.2	-0.1	24.6	-0.4	-0.4	-0.4	23.4	0.7	0.7	0.7
	Alfalfa	43.8	-0.1	-0.1	0.0	43.8	-0.2	-0.2	-0.2	43.1	0.4	0.4	0.4
	Sugar Beets	28.6	0.0	0.0	0.0	28.6	-0.1	-0.1	0.0	28.5	0.1	0.1	0.1
	Other Field Crops	114.9	-0.2	-0.2	-0.2	115.0	-0.4	-0.4	-0.4	113.6	0.7	0.7	0.7
	Rice	0.9	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.9	0.0	0.0	0.0
	Truck Crops	46.0	0.0	0.0	0.0	46.0	0.0	0.0	0.0	46.0	0.0	0.0	0.0
	Tomatoes	42.5	0.0	0.0	0.0	42.5	0.0	0.0	0.0	42.3	0.1	0.1	0.1
	Deciduous Orchard	21.3	0.0	0.0	0.0	21.3	0.0	0.0	0.0	21.3	0.0	0.0	0.0
	Small Grain	96.8	-0.1	-0.1	-0.1	97.5	-0.3	-0.3	-0.3	93.7	1.0	1.0	1.0
	Grapes	5.8	0.0	0.0	0.0	5.8	0.0	0.0	0.0	5.8	0.0	0.0	0.0
	Subtotal	**425.0**	**-0.6**	**-0.6**	**-0.4**	**425.9**	**-1.5**	**-1.5**	**-1.4**	**418.4**	**3.0**	**3.0**	**3.0**
10	Pasture	13.3	0.0	0.0	-0.2	13.3	0.0	0.0	0.0	13.3	0.0	0.0	0.0
	Alfalfa	40.8	0.0	0.0	-0.3	40.9	-0.1	0.0	-0.1	40.8	0.0	0.0	0.0
	Sugar Beets	13.9	0.0	0.0	0.0	13.9	0.0	0.0	0.0	13.9	0.0	0.0	0.0
	Other Field Crops	48.2	0.0	0.0	-0.1	48.2	0.1	0.0	0.0	48.3	0.0	0.0	0.0
	Rice	2.9	0.0	0.0	0.0	2.9	0.0	0.0	0.0	2.9	0.0	0.0	0.0
	Truck Crops	112.9	0.0	0.0	0.0	112.9	0.0	0.0	0.0	113.0	0.0	0.0	0.0
	Tomatoes	40.2	0.0	0.0	0.0	40.2	0.0	0.0	0.0	40.2	0.0	0.0	0.0
	Deciduous Orchard	36.6	0.0	0.0	0.0	36.6	0.0	0.0	0.0	36.6	0.0	0.0	0.0
	Small Grain	14.0	0.0	0.0	0.0	14.0	0.1	0.0	0.1	14.0	0.0	0.0	0.0
	Grapes	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Cotton	103.1	0.0	0.0	-0.5	103.1	-0.1	0.0	-0.1	103.1	0.0	0.0	0.0
	Subtropical Orchard	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
	Subtotal	**427.1**	**0.0**	**0.0**	**-1.1**	**427.2**	**-0.1**	**0.0**	**-0.1**	**427.1**	**0.0**	**0.0**	**0.0**
11	Pasture	42.9	0.0	0.0	0.0	43.0	0.0	0.0	0.0	42.7	0.0	0.0	0.0
	Alfalfa	8.4	0.0	0.0	0.0	8.4	0.0	0.0	0.0	8.3	0.0	0.0	0.0
	Sugar Beets	0.4	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.4	0.0	0.0	0.0
	Other Field Crops	17.8	0.0	0.0	0.0	17.9	0.0	0.0	0.0	17.8	0.0	0.0	0.0
	Rice	4.4	0.0	0.0	0.0	4.4	0.0	0.0	0.0	4.4	0.0	0.0	0.0
	Truck Crops	6.3	0.0	0.0	0.0	6.3	0.0	0.0	0.0	6.3	0.0	0.0	0.0
	Tomatoes	0.8	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.8	0.0	0.0	0.0
	Deciduous Orchard	80.8	0.0	0.0	0.0	80.8	0.0	0.0	0.0	80.8	0.0	0.0	0.0
	Small Grain	1.8	0.0	0.0	0.0	1.8	0.0	0.0	0.0	1.8	0.0	0.0	0.0
	Grapes	10.4	0.0	0.0	0.0	10.4	0.0	0.0	0.0	10.4	0.0	0.0	0.0
	Subtotal	**174.0**	**0.0**	**0.0**	**0.0**	**174.2**	**0.0**	**0.0**	**0.0**	**173.7**	**0.0**	**0.0**	**0.0**

TABLE 17 IRRIGATED ACREAGE BY SUBREGION

CVPM Subregion	Crop Category	Preferred Alternative Average	Changes Compared to Average PA: Average	Wet	Dry	Preferred Alternative Wet	Changes Compared to Wet PA: Average	Wet	Dry	Preferred Alternative Dry	Changes Compared to Dry PA: Average	Wet	Dry
			Followed by Average				Followed by Wet				Followed by Dry		
12	Pasture	18.3	0.0	0.0	0.0	18.0	0.0	0.0	0.0	18.0	0.0	0.0	0.0
	Alfalfa	18.2	0.0	0.0	0.0	18.1	0.0	0.0	0.0	18.1	0.0	0.0	0.0
	Sugar Beets	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
	Other Field Crops	41.2	0.0	0.0	0.0	41.0	0.0	0.0	0.0	41.0	0.0	0.0	0.0
	Truck Crops	3.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
	Deciduous Orchard	94.0	0.0	0.0	0.0	94.0	0.0	0.0	0.0	94.0	0.0	0.0	0.0
	Small Grain	10.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	9.9	0.0	0.0	0.0
	Grapes	14.0	0.0	0.0	0.0	14.0	0.0	0.0	0.0	14.0	0.0	0.0	0.0
	Cotton	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Subtropical Orchard	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Subtotal	**200.8**	**0.0**	**0.0**	**0.0**	**200.2**	**0.0**	**0.0**	**0.0**	**200.1**	**0.0**	**0.0**	**0.0**
13	Pasture	39.6	0.0	0.0	0.0	39.9	-0.2	-0.2	-0.3	39.5	-0.3	-0.3	-0.3
	Alfalfa	41.8	0.0	0.0	0.1	42.1	-0.2	-0.2	-0.2	41.8	-0.2	-0.2	-0.2
	Sugar Beets	5.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0
	Other Field Crops	54.8	0.0	0.0	0.0	55.0	-0.1	-0.1	-0.2	54.6	-0.1	-0.1	-0.1
	Rice	3.9	0.0	0.0	0.0	3.9	0.0	0.0	0.0	3.9	0.0	0.0	0.0
	Truck Crops	18.0	0.0	0.0	0.0	18.0	0.0	0.0	0.0	18.0	0.0	0.0	0.0
	Tomatoes	7.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0
	Deciduous Orchard	135.0	0.0	0.0	0.0	135.0	0.0	0.0	0.0	135.0	0.0	0.0	0.0
	Small Grain	46.9	0.0	0.0	0.0	47.2	-0.1	-0.1	-0.1	46.4	-0.1	-0.1	-0.1
	Grapes	99.0	0.0	0.0	0.0	99.0	0.0	0.0	0.0	99.0	0.0	0.0	0.0
	Cotton	71.8	0.0	0.0	0.0	72.1	-0.2	-0.2	-0.3	71.6	-0.2	-0.2	-0.2
	Subtropical Orchard	9.9	0.0	0.0	0.0	9.9	0.0	0.0	0.0	9.9	0.0	0.0	0.0
	Subtotal	**532.5**	**0.0**	**0.0**	**0.0**	**534.1**	**-0.9**	**-0.9**	**-1.1**	**531.6**	**-0.9**	**-0.9**	**-0.9**
14	Pasture	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
	Alfalfa	14.0	0.0	0.0	0.0	14.0	0.0	0.0	0.0	13.4	0.0	0.0	0.0
	Sugar Beets	4.8	0.0	0.0	0.0	4.8	0.0	0.0	0.0	4.8	0.0	0.0	0.0
	Other Field Crops	18.4	0.0	0.0	0.0	18.3	0.0	0.0	0.0	17.9	0.0	0.0	0.0
	Truck Crops	136.4	0.0	0.0	0.0	136.4	0.0	0.0	0.0	136.2	0.0	0.0	0.0
	Tomatoes	77.0	0.0	0.0	0.1	77.0	0.0	0.0	0.0	76.2	0.0	0.0	0.0
	Deciduous Orchard	24.9	0.0	0.0	0.0	24.9	0.0	0.0	0.0	24.9	0.0	0.0	0.0
	Small Grain	10.4	0.0	0.0	0.0	10.4	0.0	0.0	0.0	9.7	0.0	0.0	0.0
	Grapes	7.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0
	Cotton	206.5	0.0	0.0	-0.1	206.6	0.0	0.0	0.0	198.8	0.0	0.0	0.0
	Subtropical Orchard	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Subtotal	**500.4**	**0.0**	**0.0**	**0.0**	**500.5**	**0.0**	**0.0**	**0.0**	**489.9**	**0.0**	**0.0**	**0.0**
15	Pasture	3.9	0.0	0.0	0.0	3.9	0.0	0.0	0.0	3.7	0.0	0.0	0.0
	Alfalfa	83.1	0.0	0.0	0.2	83.4	0.0	0.0	0.1	80.6	0.0	0.0	0.0
	Sugar Beets	5.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0
	Other Field Crops	86.0	0.0	0.0	0.0	86.1	0.0	0.0	0.0	84.2	0.0	0.0	0.0
	Rice	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
	Truck Crops	12.0	0.0	0.0	0.0	12.0	0.0	0.0	0.0	12.0	0.0	0.0	0.0
	Tomatoes	2.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0
	Deciduous Orchard	38.0	0.0	0.0	0.0	38.0	0.0	0.0	0.0	38.0	0.0	0.0	0.0
	Small Grain	71.0	0.0	0.0	0.0	71.6	0.0	0.0	0.0	67.9	0.0	0.0	0.0
	Grapes	56.0	0.0	0.0	0.0	56.0	0.0	0.0	0.0	56.0	0.0	0.0	0.0
	Cotton	242.1	0.0	0.0	-0.2	242.7	0.0	0.0	-0.1	235.5	0.0	0.0	0.0
	Subtropical Orchard	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Subtotal	**600.1**	**0.0**	**0.0**	**-0.1**	**601.7**	**0.0**	**0.0**	**0.0**	**585.9**	**0.0**	**0.0**	**0.0**

TABLE 17 IRRIGATED ACREAGE BY SUBREGION

CVPM Subregion	Crop Category	Preferred Alternative Average	Changes Compared to Average PA: Average	Wet	Dry	Preferred Alternative Wet	Changes Compared to Wet PA: Average	Wet	Dry	Preferred Alternative Dry	Changes Compared to Dry PA: Average	Wet	Dry
			Followed by Average				Followed by Wet				Followed by Dry		
16	Pasture	6.2	0.0	0.0	0.0	6.3	-0.2	-0.2	-0.1	6.1	0.0	0.0	0.0
	Alfalfa	5.1	0.0	0.0	0.0	5.2	-0.1	-0.1	-0.1	5.1	0.0	0.0	0.0
	Other Field Crops	6.1	0.0	0.0	0.0	6.1	-0.1	-0.1	-0.1	6.0	0.0	0.0	0.0
	Truck Crops	5.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0
	Deciduous Orchard	16.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0
	Small Grain	4.0	0.0	0.0	0.0	4.1	0.0	0.0	0.0	4.0	0.0	0.0	0.0
	Grapes	55.0	0.0	0.0	0.0	55.0	0.0	0.0	0.0	55.0	0.0	0.0	0.0
	Cotton	5.0	0.0	0.0	0.0	5.1	0.0	0.0	0.0	5.0	0.0	0.0	0.0
	Subtropical Orchard	9.0	0.0	0.0	0.0	9.0	0.0	0.0	0.0	9.0	0.0	0.0	0.0
	Subtotal	**111.4**	**-0.1**	**-0.1**	**0.0**	**111.8**	**-0.4**	**-0.4**	**-0.4**	**111.3**	**-0.1**	**-0.1**	**-0.1**
17	Pasture	3.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0
	Alfalfa	5.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0
	Sugar Beets	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
	Other Field Crops	8.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0	7.1	0.0	0.0	0.0
	Truck Crops	10.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0
	Tomatoes	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Deciduous Orchard	73.0	0.0	0.0	0.0	73.0	0.0	0.0	0.0	73.0	0.0	0.0	0.0
	Small Grain	6.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	5.3	0.0	0.0	0.0
	Grapes	109.0	0.0	0.0	0.0	109.0	0.0	0.0	0.0	109.0	0.0	0.0	0.0
	Cotton	10.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	8.7	0.0	0.0	0.0
	Subtropical Orchard	35.0	0.0	0.0	0.0	35.0	0.0	0.0	0.0	35.0	0.0	0.0	0.0
	Subtotal	**260.1**	**0.0**	**0.0**	**0.0**	**260.3**	**0.0**	**0.0**	**0.0**	**255.3**	**0.0**	**0.0**	**0.0**
18	Pasture	4.0	0.0	0.0	0.0	4.1	0.0	0.0	0.0	3.7	0.0	0.0	0.0
	Alfalfa	62.2	0.0	0.0	0.1	62.8	-0.3	-0.3	-0.2	59.0	0.0	0.0	0.0
	Sugar Beets	1.9	0.0	0.0	0.0	1.9	0.0	0.0	0.0	1.9	0.0	0.0	0.0
	Other Field Crops	78.1	0.0	0.0	-0.1	78.5	-0.2	-0.2	-0.2	75.3	0.0	0.0	0.0
	Truck Crops	13.0	0.0	0.0	0.0	13.0	0.0	0.0	0.0	13.0	0.0	0.0	0.0
	Tomatoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Deciduous Orchard	69.0	0.0	0.0	0.0	69.0	0.0	0.0	0.0	69.0	0.0	0.0	0.0
	Small Grain	41.0	0.0	0.0	0.0	41.4	-0.1	-0.1	-0.1	38.8	0.1	0.1	0.1
	Grapes	56.0	0.0	0.0	0.0	56.0	0.0	0.0	0.0	56.0	0.0	0.0	0.0
	Cotton	170.3	0.0	0.0	-0.1	171.2	-0.5	-0.5	-0.5	163.7	0.0	0.0	0.1
	Subtropical Orchard	97.0	0.0	0.0	0.0	97.0	0.0	0.0	0.0	97.0	0.0	0.0	0.0
	Subtotal	**592.5**	**0.0**	**0.0**	**-0.1**	**594.9**	**-1.2**	**-1.2**	**-1.2**	**577.2**	**0.1**	**0.1**	**0.1**
19	Pasture	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Alfalfa	25.8	0.0	0.0	0.0	25.9	0.0	0.0	0.0	25.2	0.0	0.0	0.0
	Sugar Beets	4.9	0.0	0.0	0.0	5.0	0.0	0.0	0.0	4.9	0.0	0.0	0.0
	Other Field Crops	6.7	0.0	0.0	0.0	6.7	0.0	0.0	0.0	6.7	0.0	0.0	0.0
	Truck Crops	24.0	0.0	0.0	0.0	24.0	0.0	0.0	0.0	24.0	0.0	0.0	0.0
	Tomatoes	1.7	0.0	0.0	0.0	1.7	0.0	0.0	0.0	1.7	0.0	0.0	0.0
	Deciduous Orchard	50.9	0.0	0.0	0.0	50.9	0.0	0.0	0.0	50.9	0.0	0.0	0.0
	Small Grain	7.6	0.0	0.0	0.0	7.6	0.0	0.0	0.0	7.2	0.0	0.0	0.0
	Grapes	10.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0
	Cotton	117.9	0.0	0.0	-0.1	117.8	0.0	0.0	0.0	115.1	0.0	0.0	0.0
	Subtropical Orchard	4.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0
	Subtotal	**253.6**	**0.0**	**0.0**	**0.0**	**253.6**	**0.0**	**0.0**	**0.0**	**249.7**	**0.0**	**0.0**	**0.0**

TABLE 17 IRRIGATED ACREAGE BY SUBREGION

CVPM Subregion	Crop Category	Preferred Alternative Average	hanges Compared to Average P Average	Wet	Dry	Preferred Alternative Wet	Changes Compared to Wet PA Average	Wet	Dry	Preferred Alternative Dry	Changes Compared to Dry PA Average	Wet	Dry
			Followed by Average				Followed by Wet				Followed by Dry		
20	Pasture	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Alfalfa	12.0	0.0	0.0	0.0	12.1	0.0	0.0	0.0	11.0	0.0	0.0	0.0
	Sugar Beets	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0
	Other Field Crops	3.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0
	Truck Crops	41.0	0.0	0.0	0.0	41.0	0.0	0.0	0.0	40.9	0.0	0.0	0.0
	Tomatoes	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0
	Deciduous Orchard	52.0	0.0	0.0	0.0	52.0	0.0	0.0	0.0	52.0	0.0	0.0	0.0
	Small Grain	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0
	Grapes	33.0	0.0	0.0	0.0	33.0	0.0	0.0	0.0	33.0	0.0	0.0	0.0
	Cotton	33.0	0.0	0.0	0.0	33.1	0.0	0.0	0.0	30.8	0.0	0.0	0.0
	Subtropical Orchard	27.0	0.0	0.0	0.0	27.0	0.0	0.0	0.0	27.0	0.0	0.0	0.0
	Subtotal	**202.8**	**0.0**	**0.0**	**0.0**	**203.0**	**0.0**	**0.0**	**0.0**	**199.3**	**0.0**	**0.0**	**0.0**
21	Pasture	0.8	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.8	0.0	0.0	0.0
	Alfalfa	27.6	0.0	0.0	0.0	27.7	0.0	0.0	0.0	27.3	0.0	0.0	0.0
	Sugar Beets	7.4	0.0	0.0	0.0	7.4	0.0	0.0	0.0	7.4	0.0	0.0	0.0
	Other Field Crops	16.1	0.0	0.0	0.0	16.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0
	Rice	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Truck Crops	107.8	0.0	0.0	0.0	107.8	0.0	0.0	0.0	107.8	0.0	0.0	0.0
	Tomatoes	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Deciduous Orchard	25.0	0.0	0.0	0.0	25.0	0.0	0.0	0.0	25.0	0.0	0.0	0.0
	Small Grain	1.8	0.0	0.0	0.0	1.9	0.0	0.0	0.0	1.8	0.0	0.0	0.0
	Grapes	36.9	0.0	0.0	0.0	36.9	0.0	0.0	0.0	36.9	0.0	0.0	0.0
	Cotton	120.8	0.0	0.0	-0.1	120.8	0.0	0.0	0.0	119.3	0.0	0.0	0.0
	Subtropical Orchard	14.0	0.0	0.0	0.0	14.0	0.0	0.0	0.0	14.0	0.0	0.0	0.0
	Subtotal	**359.2**	**0.0**	**0.0**	**0.0**	**359.2**	**0.0**	**0.0**	**0.0**	**357.2**	**0.0**	**0.0**	**0.0**

NOTES:
1. All acreage values in thousands.
2. A negative value represents a lower acreage in an alternative than in the Preferred Alternative.
3. Not all 12 crops are grown in all subregions.
4. Subregions 3 and 3B should be added together to get the complete subregion 3. 3B represents the area within this subregion served by the Tehama Colusa Canal.

TABLE 18 VALUE OF PRODUCTION BY SUBREGION (Million $)

CVPM Subregion	Crop Category	Preferred Alternative Average	Changes Compared to Average PA: Average	Wet	Dry	Preferred Alternative Wet	Changes Compared to Wet PA: Average	Wet	Dry	Preferred Alternative Dry	Changes Compared to Dry PA: Average	Wet	Dry
			Followed by Average				Followed by Wet				Followed by Dry		
1	Pasture	2.7	-0.2	0.0	0.0	2.6	-0.2	-0.2	-0.2	2.6	-0.3	-0.3	-0.3
	Alfalfa	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0
	Other Field Crops	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0
	Deciduous Orchard	4.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0
	Small Grain	0.7	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.7	0.0	0.0	0.0
	Subtotal	**8.4**	**-0.2**	**-0.1**	**0.0**	**8.3**	**-0.3**	**-0.3**	**-0.3**	**8.3**	**-0.3**	**-0.3**	**-0.3**
2	Pasture	4.9	0.0	0.0	-0.5	4.9	0.0	0.0	-0.8	4.8	0.0	0.0	0.0
	Alfalfa	5.1	0.0	0.0	-0.2	5.1	0.0	0.0	-0.3	5.0	0.0	0.0	0.0
	Sugar Beets	2.9	0.0	0.0	0.0	2.9	0.0	0.0	0.0	2.9	0.0	0.0	0.0
	Other Field Crops	7.8	0.0	0.0	-0.2	7.8	0.0	0.0	-0.3	7.7	0.0	0.0	0.0
	Rice	3.8	0.0	0.0	-0.1	3.8	0.0	0.0	-0.3	3.8	0.0	0.0	0.0
	Truck Crops	55.1	0.0	0.0	-0.1	55.1	0.0	0.0	-0.1	55.1	0.0	0.0	0.0
	Deciduous Orchard	91.3	0.0	0.0	-0.1	91.3	0.0	0.0	0.0	91.3	0.0	0.0	0.0
	Small Grain	4.0	0.0	0.0	-0.1	3.9	0.0	0.0	-0.2	3.9	0.0	0.0	0.0
	Subtropical Orchard	14.6	0.0	0.0	0.0	14.6	0.0	0.0	0.0	14.6	0.0	0.0	0.0
	Subtotal	**189.5**	**0.0**	**0.0**	**-1.3**	**189.4**	**0.0**	**0.0**	**-2.1**	**189.1**	**0.0**	**0.0**	**0.0**
3	Pasture	1.1	0.0	0.0	0.0	1.1	0.0	0.0	0.0	1.1	0.0	0.0	0.0
	Alfalfa	9.7	0.0	0.0	0.0	9.7	0.0	0.0	0.0	9.6	0.0	0.0	0.0
	Sugar Beets	7.3	0.0	0.0	0.0	7.3	0.0	0.0	0.0	7.2	0.0	0.0	0.0
	Other Field Crops	7.1	0.0	0.0	0.0	7.1	0.0	0.0	0.0	7.0	0.0	0.0	0.0
	Rice	118.1	0.0	0.0	0.0	118.6	0.0	0.0	0.0	116.2	0.0	0.0	0.0
	Truck Crops	89.6	0.0	0.0	0.0	89.6	0.0	0.0	0.0	89.6	0.0	0.0	0.0
	Tomatoes	37.9	0.0	0.0	0.0	38.0	0.0	0.0	0.0	37.9	0.0	0.0	0.0
	Deciduous Orchard	18.9	0.0	0.0	0.0	18.9	0.0	0.0	0.0	18.9	0.0	0.0	0.0
	Small Grain	8.7	0.0	0.0	0.0	8.7	0.0	0.0	0.0	8.5	0.0	0.0	0.0
	Subtotal	**298.4**	**0.0**	**0.0**	**0.0**	**299.0**	**0.0**	**0.0**	**0.0**	**295.9**	**0.0**	**0.0**	**0.0**
3B	Pasture	0.8	0.0	0.0	-0.8	0.8	0.0	0.0	-0.2	0.6	0.0	0.0	0.0
	Alfalfa	5.4	0.0	0.0	-5.4	5.4	0.0	0.0	-1.4	4.1	0.0	0.0	0.0
	Sugar Beets	4.1	0.0	0.0	-3.9	4.1	0.0	0.0	-2.0	3.8	0.0	0.0	0.0
	Other Field Crops	6.1	0.0	0.0	-6.0	6.1	0.0	0.0	-6.1	4.7	0.0	0.0	0.0
	Rice	8.2	0.0	0.0	-8.2	8.2	0.0	0.0	-8.2	5.2	0.0	0.0	0.0
	Truck Crops	2.0	0.0	0.0	-0.2	2.0	0.0	0.0	-0.1	2.0	0.0	0.0	0.0
	Tomatoes	8.9	0.0	0.0	-5.6	8.9	0.0	0.0	-2.7	8.4	0.0	0.0	0.0
	Deciduous Orchard	28.6	0.0	0.0	-3.5	28.6	0.0	0.0	0.0	28.6	0.0	0.0	0.0
	Small Grain	2.4	0.0	0.0	-2.4	2.4	0.0	0.0	-2.4	1.8	0.0	0.0	0.0
	Subtropical Orchard	1.4	0.0	0.0	-0.1	1.4	0.0	0.0	0.0	1.4	0.0	0.0	0.0
	Subtotal	**67.9**	**0.0**	**0.0**	**-36.2**	**68.1**	**0.1**	**0.1**	**-23.1**	**60.5**	**0.0**	**0.0**	**0.0**

TABLE 18 VALUE OF PRODUCTION BY SUBREGION (Million $)

CVPM Subregion	Crop Category	Preferred Alternative Average	Changes Compared to Average PA: Average	Wet	Dry	Preferred Alternative Wet	Changes Compared to Wet PA: Average	Wet	Dry	Preferred Alternative Dry	Changes Compared to Dry PA: Average	Wet	Dry
			Followed by Average				Followed by Wet				Followed by Dry		
4	Pasture	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0
	Alfalfa	3.6	0.0	0.0	0.0	3.7	0.0	0.0	0.0	3.6	0.0	0.0	0.0
	Sugar Beets	7.5	0.0	0.0	0.0	7.5	0.0	0.0	0.0	7.5	0.0	0.0	0.0
	Other Field Crops	18.0	0.0	0.0	0.0	18.1	0.0	0.0	0.0	17.9	0.0	0.0	0.0
	Rice	74.6	0.0	0.0	0.0	74.8	0.0	0.0	0.0	74.1	0.0	0.0	0.0
	Truck Crops	60.8	0.0	0.0	0.0	60.8	0.0	0.0	0.0	60.8	0.0	0.0	0.0
	Tomatoes	49.9	0.0	0.0	0.0	49.9	0.0	0.0	0.0	49.9	0.0	0.0	0.0
	Deciduous Orchard	32.5	0.0	0.0	0.0	32.5	0.0	0.0	0.0	32.5	0.0	0.0	0.0
	Small Grain	13.5	0.0	0.0	0.0	13.5	0.0	0.0	0.0	13.3	0.0	0.0	0.0
	Subtotal	**260.7**	**0.0**	**0.0**	**0.0**	**260.9**	**0.0**	**0.0**	**0.0**	**259.7**	**0.0**	**0.0**	**0.0**
5	Pasture	3.1	0.0	0.0	0.0	3.1	0.0	0.0	0.0	3.0	0.0	0.0	0.0
	Alfalfa	2.5	0.0	0.0	0.0	2.5	0.0	0.0	0.0	2.5	0.0	0.0	0.0
	Sugar Beets	1.5	0.0	0.0	0.0	1.5	0.0	0.0	0.0	1.5	0.0	0.0	0.0
	Other Field Crops	6.9	0.0	0.0	0.0	6.9	0.0	0.0	0.0	6.9	0.0	0.0	0.0
	Rice	141.2	0.0	0.0	0.0	141.7	-0.1	-0.1	-0.1	140.5	-0.1	-0.1	-0.1
	Truck Crops	23.5	0.0	0.0	0.0	23.5	0.0	0.0	0.0	23.5	0.0	0.0	0.0
	Tomatoes	2.3	0.0	0.0	0.0	2.3	0.0	0.0	0.0	2.3	0.0	0.0	0.0
	Deciduous Orchard	129.1	0.0	0.0	0.0	129.1	0.0	0.0	0.0	129.1	0.0	0.0	0.0
	Small Grain	6.3	0.0	0.0	0.0	6.3	0.0	0.0	0.0	6.2	0.0	0.0	0.0
	Subtropical Orchard	3.6	0.0	0.0	0.0	3.6	0.0	0.0	0.0	3.6	0.0	0.0	0.0
	Subtotal	**320.0**	**0.0**	**0.0**	**0.0**	**320.5**	**-0.1**	**-0.1**	**-0.1**	**319.1**	**-0.1**	**-0.1**	**-0.1**
6	Pasture	1.7	0.0	0.0	0.0	1.8	-0.1	-0.1	-0.1	1.7	0.0	0.0	0.0
	Alfalfa	16.8	0.0	0.0	0.0	17.0	-0.2	-0.2	-0.2	16.8	0.0	0.0	0.0
	Sugar Beets	16.2	0.0	0.0	0.0	16.3	-0.1	-0.1	0.0	16.2	0.0	0.0	0.0
	Other Field Crops	28.9	0.0	0.0	0.0	29.2	-0.2	-0.2	-0.2	28.8	0.0	0.0	0.0
	Rice	10.6	0.0	0.0	0.0	10.8	-0.2	-0.2	-0.2	10.5	0.0	0.0	0.0
	Truck Crops	14.1	0.0	0.0	0.0	14.1	0.0	0.0	0.0	14.1	0.0	0.0	0.0
	Tomatoes	70.0	0.0	0.0	0.0	70.2	-0.1	-0.1	-0.1	70.0	0.0	0.0	0.0
	Deciduous Orchard	26.2	0.0	0.0	0.0	26.2	0.0	0.0	0.0	26.2	0.0	0.0	0.0
	Small Grain	21.9	0.0	0.0	0.0	22.0	-0.1	-0.1	-0.1	21.5	0.1	0.1	0.1
	Grapes	13.8	0.0	0.0	0.0	13.8	0.0	0.0	0.0	13.8	0.0	0.0	0.0
	Subtotal	**220.3**	**0.0**	**0.0**	**0.0**	**221.2**	**-0.9**	**-0.9**	**-0.9**	**219.6**	**0.0**	**0.0**	**0.0**
7	Pasture	2.1	0.0	0.0	0.0	2.1	0.0	0.0	0.0	2.1	0.0	0.0	0.0
	Alfalfa	1.8	0.0	0.0	0.0	1.8	0.0	0.0	0.0	1.8	0.0	0.0	0.0
	Sugar Beets	1.9	0.0	0.0	0.0	1.9	0.0	0.0	0.0	1.9	0.0	0.0	0.0
	Other Field Crops	1.8	0.0	0.0	0.0	1.8	0.0	0.0	0.0	1.8	0.0	0.0	0.0
	Rice	39.6	0.0	0.0	0.0	39.7	0.0	0.0	0.0	39.3	0.0	0.0	0.0
	Truck Crops	1.2	0.0	0.0	0.0	1.2	0.0	0.0	0.0	1.2	0.0	0.0	0.0
	Tomatoes	0.8	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.8	0.0	0.0	0.0
	Deciduous Orchard	9.5	0.0	0.0	0.0	9.5	0.0	0.0	0.0	9.5	0.0	0.0	0.0
	Small Grain	3.2	0.0	0.0	0.0	3.2	0.0	0.0	0.0	3.1	0.0	0.0	0.0
	Grapes	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0
	Subtotal	**62.3**	**0.0**	**0.0**	**0.0**	**62.4**	**0.0**	**0.0**	**0.0**	**61.9**	**0.0**	**0.0**	**0.0**

TABLE 18 VALUE OF PRODUCTION BY SUBREGION (Million $)

CVPM Subregion	Crop Category	Preferred Alternative Average	Changes Compared to Average PA: Average	Wet	Dry	Preferred Alternative Wet	Changes Compared to Wet PA: Average	Wet	Dry	Preferred Alternative Dry	Changes Compared to Dry PA: Average	Wet	Dry
			Followed by Average				Followed by Wet				Followed by Dry		
8	Pasture	6.9	0.0	0.0	0.0	6.9	0.0	0.0	0.0	6.8	0.0	0.0	0.0
	Alfalfa	7.2	0.0	0.0	0.0	7.2	0.0	0.0	0.0	7.2	0.0	0.0	0.0
	Sugar Beets	9.8	0.0	0.0	0.0	9.8	0.0	0.0	0.0	9.8	0.0	0.0	0.0
	Other Field Crops	20.8	0.0	0.0	0.0	20.8	0.0	0.0	0.0	20.7	0.0	0.0	0.0
	Rice	3.7	0.0	0.0	0.0	3.7	0.0	0.0	0.0	3.7	0.0	0.0	0.0
	Truck Crops	70.9	0.0	0.0	0.0	70.9	0.0	0.0	0.0	70.9	0.0	0.0	0.0
	Tomatoes	19.8	0.0	0.0	0.0	19.8	0.0	0.0	0.0	19.7	0.0	0.0	0.0
	Deciduous Orchard	49.9	0.0	0.0	0.0	49.9	0.0	0.0	0.0	49.9	0.0	0.0	0.0
	Small Grain	9.2	0.0	0.0	0.0	9.2	0.0	0.0	0.0	8.9	0.0	0.0	0.0
	Grapes	101.7	0.0	0.0	0.0	101.7	0.0	0.0	0.0	101.7	0.0	0.0	0.0
	Subtotal	**299.9**	**0.0**	**0.0**	**0.0**	**300.0**	**0.0**	**0.0**	**0.0**	**299.3**	**0.0**	**0.0**	**0.0**
9	Pasture	3.6	0.0	0.0	0.0	3.6	-0.1	-0.1	-0.1	3.4	0.1	0.1	0.1
	Alfalfa	25.6	-0.1	-0.1	0.0	25.7	-0.1	-0.1	-0.1	25.2	0.2	0.2	0.2
	Sugar Beets	22.0	0.0	0.0	0.0	22.0	0.0	0.0	0.0	21.9	0.1	0.1	0.1
	Other Field Crops	55.9	-0.1	-0.1	-0.1	56.0	-0.2	-0.2	-0.2	55.3	0.3	0.3	0.3
	Rice	0.7	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.7	0.0	0.0	0.0
	Truck Crops	190.8	0.0	0.0	0.0	190.8	0.0	0.0	0.0	190.6	0.1	0.1	0.1
	Tomatoes	64.9	0.0	0.0	0.0	65.0	-0.1	-0.1	0.0	64.8	0.1	0.1	0.1
	Deciduous Orchard	22.7	0.0	0.0	0.0	22.7	0.0	0.0	0.0	22.7	0.0	0.0	0.0
	Small Grain	30.7	0.0	0.0	0.0	30.9	-0.1	-0.1	-0.1	29.7	0.3	0.3	0.3
	Grapes	10.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0
	Subtotal	**426.8**	**-0.3**	**-0.3**	**-0.1**	**427.2**	**-0.6**	**-0.6**	**-0.6**	**424.2**	**1.2**	**1.2**	**1.2**
10	Pasture	3.1	0.0	0.0	0.0	3.1	0.0	0.0	0.0	3.1	0.0	0.0	0.0
	Alfalfa	23.6	0.0	0.0	-0.2	23.6	-0.1	0.0	-0.1	23.6	0.0	0.0	0.0
	Sugar Beets	12.2	0.0	0.0	0.0	12.2	0.0	0.0	0.0	12.2	0.0	0.0	0.0
	Other Field Crops	31.0	0.0	0.0	-0.1	31.0	0.0	0.0	0.0	31.0	0.0	0.0	0.0
	Rice	2.3	0.0	0.0	0.0	2.3	0.0	0.0	0.0	2.3	0.0	0.0	0.0
	Truck Crops	718.0	0.0	0.0	0.0	717.9	0.1	0.0	0.1	718.1	0.0	0.0	0.0
	Tomatoes	60.1	0.0	0.0	0.0	60.1	0.0	0.0	0.0	60.1	0.0	0.0	0.0
	Deciduous Orchard	52.4	0.0	0.0	0.0	52.4	0.0	0.0	0.0	52.4	0.0	0.0	0.0
	Small Grain	7.6	0.0	0.0	0.0	7.5	0.1	0.0	0.1	7.6	0.0	0.0	0.0
	Grapes	1.9	0.0	0.0	0.0	1.9	0.0	0.0	0.0	1.9	0.0	0.0	0.0
	Cotton	102.6	0.0	0.0	-0.5	102.7	-0.1	0.0	-0.1	102.6	0.0	0.0	0.0
	Subtropical Orchard	0.4	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.4	0.0	0.0	0.0
	Subtotal	**1015.1**	**0.0**	**0.0**	**-0.8**	**1015.1**	**0.0**	**0.0**	**0.0**	**1015.2**	**0.0**	**0.0**	**0.0**
11	Pasture	10.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	9.9	0.0	0.0	0.0
	Alfalfa	4.8	0.0	0.0	0.0	4.8	0.0	0.0	0.0	4.8	0.0	0.0	0.0
	Sugar Beets	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0
	Other Field Crops	11.5	0.0	0.0	0.0	11.5	0.0	0.0	0.0	11.4	0.0	0.0	0.0
	Rice	3.5	0.0	0.0	0.0	3.6	0.0	0.0	0.0	3.5	0.0	0.0	0.0
	Truck Crops	40.1	0.0	0.0	0.0	40.1	0.0	0.0	0.0	40.0	0.0	0.0	0.0
	Tomatoes	1.2	0.0	0.0	0.0	1.2	0.0	0.0	0.0	1.2	0.0	0.0	0.0
	Deciduous Orchard	115.8	0.0	0.0	0.0	115.8	0.0	0.0	0.0	115.8	0.0	0.0	0.0
	Small Grain	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Grapes	19.4	0.0	0.0	0.0	19.4	0.0	0.0	0.0	19.4	0.0	0.0	0.0
	Subtotal	**207.6**	**0.0**	**0.0**	**0.0**	**207.6**	**0.0**	**0.0**	**0.0**	**207.5**	**0.0**	**0.0**	**0.0**

TABLE 18 VALUE OF PRODUCTION BY SUBREGION (Million $)

CVPM Subregion	Crop Category	Preferred Alternative Average	Changes Compared to Average PA: Average	Wet	Dry	Preferred Alternative Wet	Changes Compared to Wet PA: Average	Wet	Dry	Preferred Alternative Dry	Changes Compared to Dry PA: Average	Wet	Dry
			Followed by Average				Followed by Wet				Followed by Dry		
12	Pasture	4.2	0.0	0.0	0.0	4.2	0.0	0.0	0.0	4.2	0.0	0.0	0.0
	Alfalfa	10.5	0.0	0.0	0.0	10.4	0.0	0.0	0.0	10.5	0.0	0.0	0.0
	Sugar Beets	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
	Other Field Crops	26.5	0.0	0.0	0.0	26.4	0.0	0.0	0.0	26.3	0.0	0.0	0.0
	Truck Crops	19.1	0.0	0.0	0.0	19.1	0.0	0.0	0.0	19.1	0.0	0.0	0.0
	Deciduous Orchard	134.7	0.0	0.0	0.0	134.7	0.0	0.0	0.0	134.7	0.0	0.0	0.0
	Small Grain	5.4	0.0	0.0	0.0	5.4	0.0	0.0	0.0	5.3	0.0	0.0	0.0
	Grapes	26.2	0.0	0.0	0.0	26.2	0.0	0.0	0.0	26.2	0.0	0.0	0.0
	Cotton	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Subtropical Orchard	3.5	0.0	0.0	0.0	3.5	0.0	0.0	0.0	3.5	0.0	0.0	0.0
	Subtotal	**231.2**	**0.0**	**0.0**	**0.0**	**230.9**	**0.0**	**0.0**	**0.0**	**230.8**	**0.0**	**0.0**	**0.0**
13	Pasture	9.2	0.0	0.0	0.0	9.3	-0.1	-0.1	-0.1	9.2	-0.1	-0.1	-0.1
	Alfalfa	24.2	0.0	0.0	0.0	24.3	-0.1	-0.1	-0.1	24.2	-0.1	-0.1	-0.1
	Sugar Beets	4.4	0.0	0.0	0.0	4.4	0.0	0.0	0.0	4.4	0.0	0.0	0.0
	Other Field Crops	35.2	0.0	0.0	0.0	35.4	-0.1	-0.1	-0.1	35.1	-0.1	-0.1	-0.1
	Rice	3.1	0.0	0.0	0.0	3.1	0.0	0.0	0.0	3.1	0.0	0.0	0.0
	Truck Crops	114.4	0.0	0.0	0.0	114.4	0.0	0.0	0.0	114.4	0.0	0.0	0.0
	Tomatoes	10.5	0.0	0.0	0.0	10.5	0.0	0.0	0.0	10.5	0.0	0.0	0.0
	Deciduous Orchard	193.4	0.0	0.0	0.0	193.4	0.0	0.0	0.0	193.4	0.0	0.0	0.0
	Small Grain	25.3	0.0	0.0	0.0	25.4	0.0	0.0	-0.1	25.0	0.0	0.0	0.0
	Grapes	184.9	0.0	0.0	0.0	184.9	0.0	0.0	0.0	184.9	0.0	0.0	0.0
	Cotton	71.4	0.0	0.0	-0.1	71.8	-0.2	-0.2	-0.3	71.2	-0.2	-0.2	-0.2
	Subtropical Orchard	34.7	0.0	0.0	0.0	34.7	0.0	0.0	0.0	34.7	0.0	0.0	0.0
	Subtotal	**710.6**	**0.0**	**0.0**	**0.0**	**711.5**	**-0.5**	**-0.5**	**-0.7**	**709.9**	**-0.6**	**-0.6**	**-0.6**
14	Pasture	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Alfalfa	8.6	0.0	0.0	0.0	8.6	0.0	0.0	0.0	8.2	0.0	0.0	0.0
	Sugar Beets	3.9	0.0	0.0	0.0	4.0	0.0	0.0	0.0	3.9	0.0	0.0	0.0
	Other Field Crops	11.0	0.0	0.0	0.0	10.9	0.0	0.0	0.0	10.7	0.0	0.0	0.0
	Truck Crops	817.9	0.0	0.0	0.0	817.8	0.0	0.0	0.0	816.9	0.0	0.0	0.0
	Tomatoes	114.6	0.0	0.0	0.1	114.6	0.0	0.0	0.0	113.3	0.0	0.0	0.0
	Deciduous Orchard	38.5	0.0	0.0	0.0	38.5	0.0	0.0	0.0	38.5	0.0	0.0	0.0
	Small Grain	5.2	0.0	0.0	0.0	5.2	0.0	0.0	0.0	4.9	0.0	0.0	0.0
	Grapes	15.1	0.0	0.0	0.0	15.1	0.0	0.0	0.0	15.1	0.0	0.0	0.0
	Cotton	234.6	0.0	0.0	-0.1	234.7	0.0	0.0	0.0	225.8	0.0	0.0	0.0
	Subtropical Orchard	3.7	0.0	0.0	0.0	3.7	0.0	0.0	0.0	3.7	0.0	0.0	0.0
	Subtotal	**1253.1**	**0.0**	**0.0**	**0.0**	**1253.1**	**0.0**	**0.0**	**0.0**	**1241.1**	**0.0**	**0.0**	**0.0**
15	Pasture	0.9	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.9	0.0	0.0	0.0
	Alfalfa	51.3	0.0	0.0	0.1	51.4	0.0	0.0	0.0	49.7	0.0	0.0	0.0
	Sugar Beets	4.1	0.0	0.0	0.0	4.1	0.0	0.0	0.0	4.0	0.0	0.0	0.0
	Other Field Crops	51.2	0.0	0.0	0.0	51.3	0.0	0.0	0.0	50.2	0.0	0.0	0.0
	Rice	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
	Truck Crops	72.0	0.0	0.0	0.0	72.0	0.0	0.0	0.0	71.9	0.0	0.0	0.0
	Tomatoes	3.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
	Deciduous Orchard	58.7	0.0	0.0	0.0	58.7	0.0	0.0	0.0	58.7	0.0	0.0	0.0
	Small Grain	41.6	0.0	0.0	0.0	41.9	0.0	0.0	0.0	39.7	0.0	0.0	0.0
	Grapes	121.7	0.0	0.0	0.0	121.7	0.0	0.0	0.0	121.7	0.0	0.0	0.0
	Cotton	275.0	0.0	0.0	-0.2	275.7	0.0	0.0	-0.1	267.5	0.0	0.0	0.0
	Subtropical Orchard	3.7	0.0	0.0	0.0	3.7	0.0	0.0	0.0	3.7	0.0	0.0	0.0
	Subtotal	**683.2**	**0.0**	**0.0**	**-0.1**	**684.5**	**0.0**	**0.0**	**0.0**	**671.1**	**0.0**	**0.0**	**0.0**

TABLE 18 VALUE OF PRODUCTION BY SUBREGION (Million $)

CVPM Subregion	Crop Category	Preferred Alternative Average	Changes Compared to Average PA: Average	Wet	Dry	Preferred Alternative Wet	Changes Compared to Wet PA: Average	Wet	Dry	Preferred Alternative Dry	Changes Compared to Dry PA: Average	Wet	Dry
			Followed by Average				Followed by Wet				Followed by Dry		
16	Pasture	1.4	0.0	0.0	0.0	1.5	0.0	0.0	0.0	1.4	0.0	0.0	0.0
	Alfalfa	3.1	0.0	0.0	0.0	3.2	0.0	0.0	0.0	3.1	0.0	0.0	0.0
	Other Field Crops	3.6	0.0	0.0	0.0	3.6	0.0	0.0	0.0	3.6	0.0	0.0	0.0
	Truck Crops	30.0	0.0	0.0	0.0	30.0	0.0	0.0	0.0	30.0	0.0	0.0	0.0
	Deciduous Orchard	24.7	0.0	0.0	0.0	24.7	0.0	0.0	0.0	24.7	0.0	0.0	0.0
	Small Grain	2.4	0.0	0.0	0.0	2.4	0.0	0.0	0.0	2.3	0.0	0.0	0.0
	Grapes	119.6	0.0	0.0	0.0	119.6	0.0	0.0	0.0	119.6	0.0	0.0	0.0
	Cotton	5.7	0.0	0.0	0.0	5.8	-0.1	-0.1	-0.1	5.7	0.0	0.0	0.0
	Subtropical Orchard	33.7	0.0	0.0	0.0	33.7	0.0	0.0	0.0	33.7	0.0	0.0	0.0
	Subtotal	**224.3**	**0.0**	**0.0**	**0.0**	**224.5**	**-0.2**	**-0.2**	**-0.2**	**224.2**	**0.0**	**0.0**	**0.0**
17	Pasture	0.7	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.5	0.0	0.0	0.0
	Alfalfa	3.1	0.0	0.0	0.0	3.1	0.0	0.0	0.0	2.5	0.0	0.0	0.0
	Sugar Beets	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
	Other Field Crops	4.8	0.0	0.0	0.0	4.8	0.0	0.0	0.0	4.2	0.0	0.0	0.0
	Truck Crops	60.0	0.0	0.0	0.0	60.0	0.0	0.0	0.0	59.7	0.0	0.0	0.0
	Tomatoes	1.5	0.0	0.0	0.0	1.5	0.0	0.0	0.0	1.4	0.0	0.0	0.0
	Deciduous Orchard	112.8	0.0	0.0	0.0	112.8	0.0	0.0	0.0	112.8	0.0	0.0	0.0
	Small Grain	3.5	0.0	0.0	0.0	3.5	0.0	0.0	0.0	3.1	0.0	0.0	0.0
	Grapes	236.9	0.0	0.0	0.0	236.9	0.0	0.0	0.0	236.9	0.0	0.0	0.0
	Cotton	11.4	0.0	0.0	0.0	11.4	0.0	0.0	0.0	9.9	0.0	0.0	0.0
	Subtropical Orchard	131.0	0.0	0.0	0.0	131.0	0.0	0.0	0.0	131.0	0.0	0.0	0.0
	Subtotal	**565.7**	**0.0**	**0.0**	**0.0**	**565.7**	**0.0**	**0.0**	**0.0**	**562.0**	**0.0**	**0.0**	**0.0**
18	Pasture	0.9	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.8	0.0	0.0	0.0
	Alfalfa	38.4	0.0	0.0	0.1	38.7	-0.2	-0.2	-0.2	36.4	0.0	0.0	0.0
	Sugar Beets	1.6	0.0	0.0	0.0	1.6	0.0	0.0	0.0	1.5	0.0	0.0	0.0
	Other Field Crops	46.5	0.0	0.0	0.0	46.7	-0.1	-0.1	-0.1	44.8	0.0	0.0	0.0
	Truck Crops	78.0	0.0	0.0	0.0	78.0	0.0	0.0	0.0	77.9	0.0	0.0	0.0
	Tomatoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Deciduous Orchard	106.6	0.0	0.0	0.0	106.6	0.0	0.0	0.0	106.6	0.0	0.0	0.0
	Small Grain	24.0	0.0	0.0	0.0	24.3	-0.1	-0.1	-0.1	22.7	0.1	0.1	0.1
	Grapes	121.7	0.0	0.0	0.0	121.7	0.0	0.0	0.0	121.7	0.0	0.0	0.0
	Cotton	193.5	0.0	0.0	-0.1	194.6	-0.6	-0.6	-0.6	186.0	0.0	0.0	0.0
	Subtropical Orchard	363.1	0.0	0.0	0.0	363.1	0.0	0.0	0.0	363.1	0.0	0.0	0.0
	Subtotal	**974.2**	**0.0**	**0.0**	**-0.1**	**976.1**	**-1.0**	**-1.0**	**-1.0**	**961.5**	**0.1**	**0.1**	**0.1**
19	Pasture	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Alfalfa	15.7	0.0	0.0	0.0	15.7	0.0	0.0	0.0	15.3	0.0	0.0	0.0
	Sugar Beets	4.3	0.0	0.0	0.0	4.3	0.0	0.0	0.0	4.2	0.0	0.0	0.0
	Other Field Crops	4.5	0.0	0.0	0.0	4.5	0.0	0.0	0.0	4.5	0.0	0.0	0.0
	Truck Crops	147.1	0.0	0.0	0.0	147.0	0.0	0.0	0.0	147.0	0.0	0.0	0.0
	Tomatoes	2.7	0.0	0.0	0.0	2.7	0.0	0.0	0.0	2.7	0.0	0.0	0.0
	Deciduous Orchard	80.2	0.0	0.0	0.0	80.2	0.0	0.0	0.0	80.2	0.0	0.0	0.0
	Small Grain	3.6	0.0	0.0	0.0	3.6	0.0	0.0	0.0	3.5	0.0	0.0	0.0
	Grapes	33.0	0.0	0.0	0.0	33.0	0.0	0.0	0.0	33.0	0.0	0.0	0.0
	Cotton	125.2	0.0	0.0	-0.1	125.1	0.0	0.0	0.0	122.2	0.0	0.0	0.0
	Subtropical Orchard	17.1	0.0	0.0	0.0	17.1	0.0	0.0	0.0	17.1	0.0	0.0	0.0
	Subtotal	**433.3**	**0.0**	**0.0**	**0.0**	**433.3**	**0.0**	**0.0**	**0.0**	**429.7**	**0.0**	**0.0**	**0.0**

TABLE 18 VALUE OF PRODUCTION BY SUBREGION (Million $)

CVPM Subregion	Crop Category	Preferred Alternative Average	Changes Compared to Average PA: Average	Wet	Dry	Preferred Alternative Wet	Changes Compared to Wet PA: Average	Wet	Dry	Preferred Alternative Dry	Changes Compared to Dry PA: Average	Wet	Dry
			Followed by Average				Followed by Wet				Followed by Dry		
20	Pasture	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Alfalfa	7.3	0.0	0.0	0.0	7.3	0.0	0.0	0.0	6.7	0.0	0.0	0.0
	Sugar Beets	0.4	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.4	0.0	0.0	0.0
	Other Field Crops	2.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0
	Truck Crops	251.6	0.0	0.0	0.0	251.6	0.0	0.0	0.0	251.2	0.0	0.0	0.0
	Tomatoes	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0
	Deciduous Orchard	81.8	0.0	0.0	0.0	81.8	0.0	0.0	0.0	81.8	0.0	0.0	0.0
	Small Grain	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.4	0.0	0.0	0.0
	Grapes	109.1	0.0	0.0	0.0	109.1	0.0	0.0	0.0	109.1	0.0	0.0	0.0
	Cotton	35.0	0.0	0.0	0.0	35.2	0.0	0.0	0.0	32.7	0.0	0.0	0.0
	Subtropical Orchard	115.6	0.0	0.0	0.0	115.6	0.0	0.0	0.0	115.6	0.0	0.0	0.0
	Subtotal	**603.9**	**0.0**	**0.0**	**0.0**	**604.1**	**0.0**	**0.0**	**0.0**	**600.4**	**0.0**	**0.0**	**0.0**
21	Pasture	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0
	Alfalfa	16.8	0.0	0.0	0.0	16.8	0.0	0.0	0.0	16.6	0.0	0.0	0.0
	Sugar Beets	6.4	0.0	0.0	0.0	6.4	0.0	0.0	0.0	6.3	0.0	0.0	0.0
	Other Field Crops	10.8	0.0	0.0	0.0	10.8	0.0	0.0	0.0	10.8	0.0	0.0	0.0
	Rice	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Truck Crops	661.4	0.0	0.0	0.0	661.3	0.0	0.0	0.1	661.3	0.0	0.0	0.0
	Tomatoes	1.6	0.0	0.0	0.0	1.6	0.0	0.0	0.0	1.6	0.0	0.0	0.0
	Deciduous Orchard	39.3	0.0	0.0	0.0	39.3	0.0	0.0	0.0	39.3	0.0	0.0	0.0
	Small Grain	0.9	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.9	0.0	0.0	0.0
	Grapes	122.1	0.0	0.0	0.0	122.1	0.0	0.0	0.0	122.1	0.0	0.0	0.0
	Cotton	128.3	0.0	0.0	-0.1	128.3	0.0	0.0	0.0	126.7	0.0	0.0	0.0
	Subtropical Orchard	59.9	0.0	0.0	0.0	59.9	0.0	0.0	0.0	59.9	0.0	0.0	0.0
	Subtotal	**1047.6**	**0.0**	**0.0**	**0.0**	**1047.6**	**0.0**	**0.0**	**0.0**	**1045.7**	**0.0**	**0.0**	**0.0**

NOTES:
1. All values in millions of 1992 dollars.
2. A negative value represents a lower gross revenue in an alternative than in the Preferred Alternative.
3. Not all 12 crops are grown in all subregions.
4. Subregions 3 and 3B should be added together to get the complete subregion 3. 3B represents the area within this subregion served by the Tehama Colusa Canal.

TABLE 19 CHANGES IN NET REVENUE BY SUBREGION (Million $)

CVPM Subregion	Cause of Net Revenue Change		Change Compared to Average PA				Change Compared to Wet PA				Change Compared to Dry PA		
			Average	Wet	Dry		Average	Wet	Dry		Average	Wet	Dry
			Followed By Average				Followed By Wet				Followed By Dry		
1	Fallowed Land	1.8	-0.1	0.0	0.0	1.8	-0.1	-0.1	-0.1	1.7	-0.1	-0.1	-0.1
	Groundwater Pumping Cost	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	0.1	0.1
	Irrigation Cost	2.3	-0.2	-0.2	-0.2	-2.3	-0.2	-0.2	-0.2	-2.3	-0.2	-0.2	-0.2
	CVP Water Cost	0.6	0.3	0.2	0.1	-0.7	0.4	0.4	0.4	-0.7	0.4	0.4	0.4
	Higher Crop Prices	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Net Change		**0.1**	**0.0**	**0.0**	**-1.2**	**0.2**	**0.2**	**0.2**	**-1.2**	**0.2**	**0.2**	**0.2**
2	Fallowed Land	30.1	0.0	0.0	-0.3	30.1	0.0	0.0	-0.4	30.0	0.0	0.0	0.0
	Groundwater Pumping Cost	20.4	0.0	0.0	0.0	-19.9	0.0	0.0	0.0	-24.6	0.0	0.0	0.0
	Irrigation Cost	22.1	0.0	0.0	0.0	-22.1	0.0	0.0	0.0	-21.9	0.0	0.0	0.0
	CVP Water Cost	0.4	-0.2	0.0	0.1	-0.6	-0.6	-0.2	0.5	-0.1	0.0	0.0	-0.1
	Higher Crop Prices	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0
	Net Change		**-0.2**	**0.0**	**0.0**	**-12.4**	**-0.6**	**-0.2**	**0.1**	**-16.5**	**0.0**	**0.0**	**-0.1**
3	Fallowed Land	39.3	0.0	0.0	0.0	39.4	0.0	0.0	0.0	38.9	0.0	0.0	0.0
	Groundwater Pumping Cost	9.0	0.0	0.0	0.0	-7.9	0.0	0.0	0.0	-14.5	0.0	0.0	0.0
	Irrigation Cost	21.2	0.0	0.0	0.0	-21.3	0.0	0.0	0.0	-21.0	0.0	0.0	0.0
	CVP Water Cost	1.6	0.0	0.0	0.0	-1.6	-0.2	-0.2	-0.2	-1.4	-0.3	-0.3	-0.3
	Higher Crop Prices	0.2	0.0	0.0	0.3	0.1	0.0	0.0	0.2	0.4	0.0	0.0	0.0
	Net Change		**0.0**	**0.0**	**0.3**	**8.7**	**-0.2**	**-0.2**	**0.0**	**2.4**	**-0.3**	**-0.3**	**-0.3**
3B	Fallowed Land	11.9	0.0	0.0	-6.4	11.9	0.0	0.0	-3.8	10.6	0.0	0.0	0.0
	Groundwater Pumping Cost	3.0	0.0	0.0	0.0	-1.8	1.4	1.4	-4.1	-8.3	0.0	0.0	0.0
	Irrigation Cost	9.0	0.0	0.0	0.0	-9.1	0.0	0.0	0.0	-7.7	0.0	0.0	0.0
	CVP Water Cost	3.7	-0.4	1.4	3.7	-4.2	-4.7	-1.2	4.2	-0.9	0.2	0.2	-0.3
	Higher Crop Prices	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
	Net Change		**-0.4**	**1.4**	**-2.8**	**-3.1**	**-3.3**	**0.2**	**-3.7**	**-6.3**	**0.2**	**0.2**	**-0.3**
4	Fallowed Land	34.3	0.0	0.0	0.0	34.3	0.0	0.0	0.0	34.1	0.0	0.0	0.0
	Groundwater Pumping Cost	9.3	0.0	0.0	0.0	-8.5	0.0	0.0	0.0	-13.5	0.0	0.0	0.0
	Irrigation Cost	20.2	0.0	0.0	0.0	-20.3	0.0	0.0	0.0	-20.1	0.0	0.0	0.0
	CVP Water Cost	1.3	0.0	0.0	0.0	-1.3	-0.1	-0.1	-0.1	-1.1	-0.2	-0.2	-0.2
	Higher Crop Prices	0.2	0.0	0.0	0.3	0.1	0.0	0.0	0.1	0.3	0.0	0.0	0.0
	Net Change		**0.0**	**0.0**	**0.3**	**4.4**	**-0.1**	**-0.1**	**0.0**	**-0.3**	**-0.2**	**-0.2**	**-0.2**
5	Fallowed Land	53.4	0.0	0.0	0.0	53.5	0.0	0.0	0.0	53.2	0.0	0.0	0.0
	Groundwater Pumping Cost	14.9	0.0	0.0	0.0	-13.0	0.0	0.0	0.0	-18.7	0.0	0.0	0.0
	Irrigation Cost	22.5	0.0	0.0	0.0	-22.6	0.0	0.0	0.0	-22.4	0.0	0.0	0.0
	CVP Water Cost	0.2	-0.3	-0.3	-0.3	-0.2	-0.3	-0.3	-0.3	-0.2	-0.3	-0.3	-0.3
	Higher Crop Prices	0.1	0.0	0.0	0.3	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0
	Net Change		**-0.3**	**-0.3**	**0.0**	**17.7**	**-0.3**	**-0.3**	**-0.2**	**12.1**	**-0.3**	**-0.3**	**-0.3**

TABLE 19 CHANGES IN NET REVENUE BY SUBREGION (Million $)

CVPM Subregion	Cause of Net Revenue Change		Change Compared to Average PA				Change Compared to Wet PA				Change Compared to Dry PA		
			Average	Wet	Dry		Average	Wet	Dry		Average	Wet	Dry
			Followed By Average				Followed By Wet				Followed By Dry		
6	Fallowed Land	32.3	0.0	0.0	0.0	32.5	-0.2	-0.2	-0.2	32.2	0.0	0.0	0.0
	Groundwater Pumping Cost	14.9	0.0	0.0	0.0	-14.4	0.3	0.3	0.3	-17.6	-0.1	-0.1	-0.1
	Irrigation Cost	21.6	0.0	0.0	0.0	-21.8	0.0	0.0	0.0	-21.5	0.0	0.0	0.0
	CVP Water Cost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Higher Crop Prices	0.3	0.0	0.0	0.4	0.2	0.0	0.0	0.2	0.5	0.0	0.0	0.0
	Net Change		**0.0**	**0.0**	**0.4**	**-3.6**	**0.1**	**0.1**	**0.3**	**-6.4**	**-0.1**	**-0.1**	**-0.1**
7	Fallowed Land	10.5	0.0	0.0	0.0	10.5	0.0	0.0	0.0	10.4	0.0	0.0	0.0
	Groundwater Pumping Cost	7.6	0.0	0.0	0.0	-6.9	0.0	0.0	0.0	-9.1	0.0	0.0	0.0
	Irrigation Cost	4.4	0.0	0.0	0.0	-4.4	0.0	0.0	0.0	-4.3	0.0	0.0	0.0
	CVP Water Cost	0.3	-0.1	-0.1	-0.1	-0.3	-0.1	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1
	Higher Crop Prices	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
	Net Change		**-0.1**	**-0.1**	**0.0**	**-1.0**	**-0.1**	**-0.1**	**0.0**	**-3.1**	**-0.1**	**-0.1**	**-0.1**
8	Fallowed Land	46.4	0.0	0.0	0.0	46.5	0.0	0.0	0.0	46.4	0.0	0.0	0.0
	Groundwater Pumping Cost	30.8	0.0	0.0	0.0	-29.1	0.1	0.1	0.1	-35.4	-0.1	-0.1	-0.1
	Irrigation Cost	21.1	0.0	0.0	0.0	-21.1	0.0	0.0	0.0	-21.0	0.0	0.0	0.0
	CVP Water Cost	0.3	-0.8	-0.5	-1.6	-0.5	-2.0	-1.2	-2.8	-0.1	-0.3	-0.3	-0.4
	Higher Crop Prices	0.2	0.0	0.0	0.2	0.2	0.0	0.0	0.1	0.3	0.0	0.0	0.0
	Net Change		**-0.8**	**-0.5**	**-1.3**	**-4.1**	**-1.9**	**-1.0**	**-2.5**	**-9.8**	**-0.3**	**-0.3**	**-0.5**
9	Fallowed Land	52.9	-0.1	-0.1	0.0	52.9	-0.1	-0.1	-0.1	52.4	0.2	0.2	0.2
	Groundwater Pumping Cost	2.5	-0.6	-0.6	-0.6	-2.1	-1.2	-1.2	-1.2	-3.2	-0.4	-0.4	-0.4
	Irrigation Cost	34.4	-0.3	-0.3	-0.3	-34.4	-0.3	-0.3	-0.3	-33.9	-0.3	-0.3	-0.3
	CVP Water Cost	1.2	1.2	1.2	1.2	-2.0	2.0	2.0	2.0	-0.5	0.5	0.5	0.5
	Higher Crop Prices	0.3	0.0	0.0	0.5	0.3	0.0	0.0	0.2	0.6	0.0	0.0	0.0
	Net Change		**0.3**	**0.3**	**0.7**	**14.5**	**0.5**	**0.5**	**0.7**	**15.5**	**0.0**	**0.0**	**0.0**
10	Fallowed Land	97.8	0.0	0.0	-0.1	97.8	0.0	0.0	0.0	97.8	0.0	0.0	0.0
	Groundwater Pumping Cost	15.4	0.0	0.0	-6.8	-12.5	-8.3	-0.8	-8.6	-20.6	0.0	0.0	0.0
	Irrigation Cost	38.9	0.0	0.0	0.0	-38.9	0.0	0.0	0.0	-38.9	0.0	0.0	0.0
	CVP Water Cost	6.3	-0.1	0.4	6.3	-8.1	7.9	0.7	8.1	-3.2	0.2	0.2	-0.1
	Higher Crop Prices	0.5	0.0	0.0	0.4	0.4	0.0	0.0	0.2	0.9	0.0	0.0	0.0
	Net Change		**-0.1**	**0.4**	**-0.1**	**38.7**	**-0.5**	**0.0**	**-0.3**	**36.0**	**0.2**	**0.2**	**-0.1**
11	Fallowed Land	35.5	0.0	0.0	0.0	35.5	0.0	0.0	0.0	35.4	0.0	0.0	0.0
	Groundwater Pumping Cost	1.0	0.0	0.0	0.0	-0.8	0.0	0.0	0.0	-1.1	0.0	0.0	0.0
	Irrigation Cost	16.0	0.0	0.0	0.0	-16.0	0.0	0.0	0.0	-16.0	0.0	0.0	0.0
	CVP Water Cost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Higher Crop Prices	0.1	0.0	0.0	0.3	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0
	Net Change		**0.0**	**0.0**	**0.3**	**18.7**	**0.0**	**0.0**	**0.1**	**18.6**	**0.0**	**0.0**	**0.0**

TABLE 19 CHANGES IN NET REVENUE BY SUBREGION (Million $)

CVPM Subregion	Cause of Net Revenue Change		Change Compared to Average PA				Change Compared to Wet PA				Change Compared to Dry PA		
			Average	Wet	Dry		Average	Wet	Dry		Average	Wet	Dry
			Followed By Average				Followed By Wet				Followed By Dry		
12	Fallowed Land	41.8	0.0	0.0	0.0	41.7	0.0	0.0	0.0	41.7	0.0	0.0	0.0
	Groundwater Pumping Cost	6.1	0.0	0.0	0.0	-4.8	0.0	0.0	0.0	-8.4	0.0	0.0	0.0
	Irrigation Cost	19.9	0.0	0.0	0.0	-19.8	0.0	0.0	0.0	-19.8	0.0	0.0	0.0
	CVP Water Cost	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Higher Crop Prices	0.1	0.0	0.0	0.3	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0
	Net Change		**0.0**	**0.0**	**0.3**	**17.2**	**0.0**	**0.0**	**0.1**	**13.7**	**0.0**	**0.0**	**0.0**
13	Fallowed Land	112.2	0.0	0.0	0.0	112.3	-0.1	-0.1	-0.1	112.1	-0.1	-0.1	-0.1
	Groundwater Pumping Cost	38.4	0.8	0.7	-2.7	-33.9	1.6	1.6	-4.9	-50.7	0.2	0.2	0.2
	Irrigation Cost	53.6	0.0	0.0	0.0	-53.8	0.0	0.0	0.0	-53.6	0.0	0.0	0.0
	CVP Water Cost	6.8	-0.8	-0.6	2.1	-6.4	-1.7	-1.5	4.3	-5.4	-0.2	-0.2	-0.4
	Higher Crop Prices	0.4	0.0	0.0	0.5	0.4	0.0	0.0	0.2	0.8	0.0	0.0	0.0
	Net Change		**0.0**	**0.1**	**-0.1**	**18.7**	**-0.1**	**0.0**	**-0.5**	**3.3**	**-0.1**	**-0.1**	**-0.3**
14	Fallowed Land	111.5	0.0	0.0	0.0	111.5	0.0	0.0	0.0	110.3	0.0	0.0	0.0
	Groundwater Pumping Cost	81.1	0.0	0.0	0.0	-58.3	0.0	0.0	0.0	-118.6	0.0	0.0	0.0
	Irrigation Cost	62.8	0.0	0.0	0.0	-62.8	0.0	0.0	0.0	-61.1	0.0	0.0	0.0
	CVP Water Cost	32.8	1.3	3.5	-6.0	-45.1	1.8	6.4	-5.5	-14.4	-6.3	-6.3	-7.3
	Higher Crop Prices	0.7	0.0	0.0	0.5	0.6	0.0	0.0	0.2	1.2	0.0	0.0	0.0
	Net Change		**1.3**	**3.5**	**-5.6**	**-53.9**	**1.8**	**6.4**	**-5.3**	**-82.6**	**-6.3**	**-6.3**	**-7.3**
15	Fallowed Land	94.1	0.0	0.0	0.0	94.2	0.0	0.0	0.0	92.6	0.0	0.0	0.0
	Groundwater Pumping Cost	81.0	0.0	0.0	0.0	-69.3	0.3	0.3	0.3	-102.9	-1.5	-1.5	-1.5
	Irrigation Cost	61.8	0.0	0.0	0.0	-61.9	0.0	0.0	0.0	-60.3	0.0	0.0	0.0
	CVP Water Cost	1.8	-0.3	-0.2	-0.4	-1.9	-0.2	-0.2	-0.3	-1.5	-0.4	-0.4	-0.5
	Higher Crop Prices	0.7	0.0	0.0	0.4	0.6	0.1	0.0	0.2	1.5	0.0	0.0	0.0
	Net Change		**-0.3**	**-0.2**	**0.1**	**-38.3**	**0.2**	**0.2**	**0.2**	**-70.7**	**-1.9**	**-1.9**	**-1.9**
16	Fallowed Land	37.3	0.0	0.0	0.0	37.3	0.0	0.0	0.0	37.3	0.0	0.0	0.0
	Groundwater Pumping Cost	1.9	-0.6	-0.6	-0.6	0.0	-0.5	-0.5	-0.5	-4.3	-0.5	-0.5	-0.5
	Irrigation Cost	11.0	0.0	0.0	0.0	-11.1	0.0	0.0	0.0	-11.0	0.0	0.0	0.0
	CVP Water Cost	0.7	0.7	0.7	0.7	-0.7	0.7	0.7	0.7	-0.5	0.5	0.5	0.5
	Higher Crop Prices	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0
	Net Change		**0.0**	**0.0**	**0.1**	**25.7**	**0.1**	**0.1**	**0.1**	**21.6**	**0.0**	**0.0**	**0.0**
17	Fallowed Land	95.8	0.0	0.0	0.0	95.8	0.0	0.0	0.0	95.2	0.0	0.0	0.0
	Groundwater Pumping Cost	17.7	0.2	0.2	0.2	-12.7	0.3	0.3	0.3	-25.5	0.0	0.0	0.0
	Irrigation Cost	27.8	0.0	0.0	0.0	-27.8	0.0	0.0	0.0	-27.4	0.0	0.0	0.0
	CVP Water Cost	1.4	-0.1	-0.1	-0.3	-1.2	-0.4	-0.3	-0.5	-1.1	0.0	0.0	-0.1
	Higher Crop Prices	0.2	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0
	Net Change		**0.0**	**0.1**	**0.1**	**54.2**	**0.0**	**0.0**	**-0.1**	**41.5**	**0.0**	**0.0**	**-0.1**

TABLE 19 CHANGES IN NET REVENUE BY SUBREGION (Million $)

CVPM Subregion	Cause of Net Revenue Change		Change Compared to Average PA: Average Followed By Average	Wet Followed By Average	Dry Followed By Average		Change Compared to Wet PA: Average Followed By Wet	Wet Followed By Wet	Dry Followed By Wet		Change Compared to Dry PA: Average Followed By Dry	Wet Followed By Dry	Dry Followed By Dry
18	Fallowed Land	153.6	0.0	0.0	0.0	153.9	-0.1	-0.1	-0.1	151.9	0.0	0.0	0.0
	Groundwater Pumping Cost	57.9	0.0	0.0	0.0	-46.2	0.2	0.2	0.2	-78.0	0.0	0.0	0.0
	Irrigation Cost	64.9	0.0	0.0	0.0	-65.1	0.0	0.0	0.0	-63.2	0.0	0.0	0.0
	CVP Water Cost	17.7	-1.5	-1.0	-3.3	-17.7	-2.2	-1.7	-3.9	-15.2	0.8	0.8	0.0
	Higher Crop Prices	0.6	0.0	0.0	0.4	0.5	0.0	0.0	0.1	1.1	0.0	0.0	0.0
	Net Change		**-1.5**	**-1.0**	**-2.9**	**25.3**	**-2.1**	**-1.6**	**-3.7**	**-3.4**	**0.8**	**0.8**	**0.0**
19	Fallowed Land	54.3	0.0	0.0	0.0	54.3	0.0	0.0	0.0	53.9	0.0	0.0	0.0
	Groundwater Pumping Cost	31.6	0.0	0.0	0.0	-21.3	0.2	0.2	0.2	-51.5	-1.2	-1.2	-1.2
	Irrigation Cost	28.8	0.0	0.0	0.0	-28.8	0.0	0.0	0.0	-28.3	0.0	0.0	0.0
	CVP Water Cost	0.5	-0.5	-0.5	-0.6	-0.6	-0.5	-0.5	-0.5	-0.4	-0.5	-0.5	-0.5
	Higher Crop Prices	0.3	0.0	0.0	0.2	0.3	0.0	0.0	0.1	0.6	0.0	0.0	0.0
	Net Change		**-0.5**	**-0.5**	**-0.3**	**3.9**	**-0.3**	**-0.3**	**-0.3**	**-25.7**	**-1.8**	**-1.8**	**-1.8**
20	Fallowed Land	81.5	0.0	0.0	0.0	81.5	0.0	0.0	0.0	81.0	0.0	0.0	0.0
	Groundwater Pumping Cost	24.7	0.0	0.0	0.0	-19.7	0.0	0.0	0.0	-36.6	-0.2	-0.2	-0.2
	Irrigation Cost	20.9	0.0	0.0	0.0	-20.9	0.0	0.0	0.0	-20.5	0.0	0.0	0.0
	CVP Water Cost	9.2	-0.1	0.2	-0.9	-9.5	-0.3	-0.1	-1.1	-7.0	-0.2	-0.2	-0.5
	Higher Crop Prices	0.2	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0
	Net Change		**-0.1**	**0.2**	**-0.8**	**31.5**	**-0.3**	**0.0**	**-1.1**	**17.2**	**-0.3**	**-0.3**	**-0.7**
21	Fallowed Land	112.4	0.0	0.0	0.0	112.4	0.0	0.0	0.0	112.1	0.0	0.0	0.0
	Groundwater Pumping Cost	49.3	0.0	0.0	0.0	-37.6	0.2	0.2	0.2	-68.4	-0.8	-0.8	-0.8
	Irrigation Cost	37.1	0.0	0.0	0.0	-37.1	0.0	0.0	0.0	-36.8	0.0	0.0	0.0
	CVP Water Cost	8.4	0.1	0.3	-0.5	-9.6	0.2	0.5	-0.4	-5.5	-0.7	-0.7	-0.9
	Higher Crop Prices	0.4	0.0	0.0	0.2	0.4	0.0	0.0	0.1	0.7	0.0	0.0	0.0
	Net Change		**0.1**	**0.3**	**-0.3**	**28.5**	**0.4**	**0.7**	**-0.1**	**2.1**	**-1.5**	**-1.5**	**-1.7**
Total	Fallowed Land		-0.1	0.0	-6.8	1100.4	-0.4	-0.3	-4.6	1093.0	-0.2	-0.2	-0.2
	Groundwater Pumping		0.4	0.4	-9.9	-364.0	-4.4	3.1	-16.6	-616.9	-4.0	-4.0	-4.0
	Irrigation Cost		-0.3	-0.3	-0.3	-503.5	-0.3	-0.3	-0.3	-496.0	-0.3	-0.3	-0.3
	CVP Water Cost		-1.3	4.3	2.3	-91.1	0.0	2.9	6.5	-42.5	-8.0	-7.9	-10.7
	Higher Crop Prices		0.1	0.0	4.7	4.1	0.4	0.4	1.9	8.6	0.0	0.0	0.0
	Net Change		**-1.1**	**4.4**	**-10.0**	**146.0**	**-4.6**	**5.8**	**-13.2**	**-53.9**	**-12.4**	**-12.4**	**-15.1**

Notes:
1. All values in millions of 1992 dollars
2. A negative value represents a reduction in net revenue compared to the Preferred Alternative
3. Subregions 3 and 3B should be added together to get the complete subregion 3. 3B represents the area within this subregion served by the Tehama Colusa Canal
4. PA is the Preferred Alternative

TABLE 20 IRRIGATION WATER APPLIED BY SUBREGION

CVPM Subregion	Water Source	Preferred Alternative Average	Changes Compared to Average PA			Preferred Alternative Wet	Changes Compared to Wet PA			Preferred Alternative Dry	Changes Compared to Dry PA		
			Average	Wet	Dry		Average	Wet	Dry		Average	Wet	Dry
			Followed by Average				Followed by Wet				Followed by Dry		
1	CVP Water	19.3	-10.8	-6.4	-5.4	20.5	-13.0	-13.0	-13.0	21.0	-13.5	-13.5	-13.5
	Groundwater	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	-1.5	-1.5	-1.5
2	CVP Water	27.7	0.0	0.0	-21.6	37.1	0.0	0.1	-36.7	8.2	0.0	0.0	0.0
	Groundwater	512.1	0.0	0.0	0.0	506.4	0.0	-0.1	0.0	584.7	0.0	0.0	0.0
3	CVP Water	170.4	0.0	0.0	0.0	174.2	0.0	0.0	0.0	154.3	0.0	0.0	0.0
	Groundwater	248.9	0.0	0.0	0.0	227.0	0.0	0.0	0.0	355.3	0.0	0.0	0.0
3B	CVP Water	199.6	0.1	0.0	-199.6	227.0	39.3	39.1	-227.0	50.3	0.0	0.0	-0.1
	Groundwater	78.7	-0.1	0.0	0.0	50.4	-38.4	-38.2	99.6	191.9	0.0	0.0	0.0
4	CVP Water	129.8	0.0	0.0	0.0	133.1	0.0	0.0	0.0	113.9	0.0	0.0	0.0
	Groundwater	326.6	0.0	0.0	0.0	305.1	0.0	0.0	0.0	442.8	0.0	0.0	0.0
5	CVP Water	19.9	0.1	0.0	0.1	20.8	0.1	0.0	0.0	17.9	0.0	-0.1	0.0
	Groundwater	492.6	-0.1	0.0	-0.1	449.3	-1.1	-1.0	-0.4	588.7	-1.1	-1.0	-1.1
6	CVP Water	2.2	0.0	0.0	0.0	2.4	0.0	0.0	0.0	1.8	0.0	0.0	0.0
	Groundwater	452.8	0.0	0.0	0.0	447.6	-6.4	-6.4	-6.0	521.0	0.0	0.0	0.0
7	CVP Water	22.0	0.0	0.0	0.0	22.6	0.0	0.0	0.0	19.1	0.0	0.0	0.0
	Groundwater	193.2	0.0	0.0	0.0	177.9	0.0	0.0	0.0	217.5	0.0	0.0	0.0
8	CVP Water	51.6	0.1	0.0	-0.1	79.4	0.1	-0.1	-0.1	25.3	0.0	0.0	-0.1
	Groundwater	756.4	-0.1	0.0	0.1	717.3	0.0	0.0	0.0	851.3	-0.2	-0.2	-0.1
9	CVP Water	28.2	-28.2	-28.2	-28.2	48.1	-48.1	-48.1	-48.1	11.5	-11.5	-11.5	-11.5
	Groundwater	80.3	17.9	17.9	18.7	70.2	35.6	35.6	36.0	100.1	11.5	11.5	11.4
10	CVP Water	183.4	0.0	0.0	-183.4	234.4	-228.4	-22.8	-234.4	92.1	0.0	0.0	0.0
	Groundwater	496.2	0.0	0.0	179.4	414.4	227.7	22.7	233.7	632.4	0.0	0.0	-0.1
11	CVP Water	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Groundwater	34.1	0.0	0.0	0.0	26.8	0.0	0.0	0.0	34.5	0.0	0.0	0.0
12	CVP Water	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Groundwater	173.1	0.0	0.0	0.0	141.8	0.0	0.0	0.0	228.2	0.0	0.0	0.0
13	CVP Water	163.6	16.7	16.6	-60.2	159.0	33.2	33.1	-113.1	128.2	0.0	0.0	0.0
	Groundwater	912.5	-16.7	-16.6	60.2	812.0	-36.2	-36.2	109.1	1,181.4	-3.8	-3.8	-3.8
14	CVP Water	524.4	0.1	0.0	0.1	719.0	0.1	0.0	0.0	230.2	0.0	0.0	0.0
	Groundwater	826.3	-0.1	0.0	-0.1	603.6	-0.1	0.0	0.0	1,176.4	0.0	0.0	0.0
15	CVP Water	35.1	0.0	0.1	0.1	38.1	0.0	0.1	0.0	28.6	0.0	0.0	0.0
	Groundwater	1,276.6	0.0	-0.1	-0.1	1,099.1	0.0	0.0	0.0	1,600.7	0.0	0.0	0.0
16	CVP Water	16.2	-16.2	-16.2	-16.2	15.7	-15.7	-15.7	-15.7	12.9	-12.9	-12.9	-12.9
	Groundwater	49.6	14.9	14.8	15.0	0.0	13.2	13.2	13.2	107.3	11.5	11.5	11.5
17	CVP Water	34.6	3.9	3.8	4.0	32.5	7.4	7.3	7.4	27.1	0.0	0.0	0.1
	Groundwater	415.1	-3.8	-3.8	-3.9	303.2	-7.4	-7.2	-7.4	577.4	0.0	0.0	0.0
18	CVP Water	517.3	0.0	0.0	0.1	526.3	0.0	0.0	0.1	399.0	0.0	0.0	0.1
	Groundwater	1,018.0	0.0	0.0	-0.1	821.8	-4.0	-4.0	-3.8	1,334.9	0.0	0.0	0.0

TABLE 20 IRRIGATION WATER APPLIED BY SUBREGION

CVPM Subregion	Water Source	Preferred Alternative Average	Changes Compared to Average PA			Preferred Alternative Wet	Changes Compared to Wet PA			Preferred Alternative Dry	Changes Compared to Dry PA		
			Average	Wet	Dry		Average	Wet	Dry		Average	Wet	Dry
			Followed by Average				Followed by Wet				Followed by Dry		
19	CVP Water	13.3	-0.1	0.0	0.1	15.4	-0.1	-0.1	0.0	9.4	0.0	0.0	0.0
	Groundwater	366.8	0.1	0.0	-0.1	250.7	0.0	0.0	0.0	578.4	0.0	0.0	0.0
20	CVP Water	208.7	0.1	0.1	-0.2	219.8	0.1	0.1	-0.1	154.1	0.0	0.0	-0.1
	Groundwater	303.6	-0.1	-0.1	0.1	244.8	0.0	0.0	0.0	437.3	0.0	0.0	0.0
21	CVP Water	138.3	0.0	0.0	-0.1	163.0	0.0	0.1	-0.1	89.3	0.0	0.0	-0.1
	Groundwater	579.4	0.0	0.0	0.1	445.2	0.0	-0.1	0.0	783.1	0.0	0.0	0.0
Total	CVP Water	2,505.5	-34.4	-30.4	-510.5	2,888.2	-224.9	-19.8	-680.6	1,593.9	-37.7	-37.8	-37.8
	Groundwater	9,596.5	11.9	12.3	269.2	8,114.6	182.8	-21.6	474.0	12,527.1	16.1	16.2	16.1

Notes:
1. All quantities in thousands of acre-feet
2. A negative value represents a lower quantitity than in the Preferred Alternative
3. Subregions 3 and 3B should be added together to get the complete subregion 3. 3B represents the area within this subregion served by the Tehama Colusa Canal
4. PA is the Preferred Alternative

TABLE 21 SUBREGION ANALYSIS OF SIGNIFICANT CHANGES IN WATER USE

Subregion	Outcome	Explanation
1	Decrease in CVP use and no GW substitution in all sequences	Less CVP water is used than in the Preferred Alternative because the blended price is 140% to 330% higher than the Preferred Alternative Tier 1 (the only tier of water that was used for this scenario). For hydrologic reasons, subregion 1 is restricted from switching to groundwater.
2	Decrease in CVP use and no GW substitution in Dry to Average and Dry to Wet sequences	Less CVP water is used than in the Preferred Alternative because the blended prices for the Dry to Average and Dry to Wet sequences are 320% and 345% higher than the Preferred Alternative Tier 1 price (the only water tier that was used for this scenario). For hydrologic reasons, subregion 2 is restricted from switching to groundwater.
3B	Decrease CVP and no GW substitution in Dry to Average sequence	Less CVP water is used than in the Preferred Alternative because the blended price is 240% higher than the Tier 1 price from the Preferred Alternative, which is the only tier of water that was used. For hydrologic reasons the region is restricted from switching to groundwater in this long-run scenario.
3B	Decrease in CVP use and GW substitution in Dry to Wet sequence	CVP water use decreases because the blended price is 260% higher than the Preferred Alternative Tier 1 price. The model allowed a shift to groundwater on a short run basis to provide water to permanent crops during the wet year when groundwater would have been recharged.
3B	Shift from Groundwater to CVP water in Average to Wet and Wet to Wet sequences	In the Preferred Alternative wet year analysis subregion 3B has 39 TAF of water that falls in Tiers 2 or 3. Under the LTCR blended pricing mechanism all of the subregions CVP water is priced at a level that is lower than the Preferred Alternative Tier 2. This additional affordable CVP water is used resulting in a less groundwater being pumped.
9	Shift from CVP to Groundwater in all sequences	The blended price of CVP water in subregion 9 is greater than the groundwater pumping cost resulting in the shift from CVP to groundwater.
10	Shift from CVP to Groundwater in Dry to Average and Average, Wet and Dry to Wet sequences	Due to an increase in the CVP price relative to the Preferred Alternative, the depth to which groundwater can be affordably pumped increases resulting in the shift from CVP supplies to groundwater.
13	Shift from groundwater to CVP in Average to Average, Wet to Average, Average to Wet and Wet to Wet sequences	In the Preferred Alternative Average and Wet conditions subregion 13 had water classified as Tier 2 or Tier 3 which was not affordable, and pumped groundwater to supplement it's Tier 1 supply down to a depth at which it was no longer affordable. In the LTCR sequences, the blended price is less expensive than the Preferred Alternative upper Tier price, therefor a shift is made from the deepest groundwater to the now affordable CVP supply.

TABLE 21 SUBREGION ANALYSIS OF SIGNIFICANT CHANGES IN WATER USE

Subregion	Outcome	Explanation
13	Shift from CVP to Groundwater in Dry to Average and Dry to Wet sequences	Under the LTCR blended price mechanism, when coming out of a drought into a Average or Wet year the blended price increases. In these situations, shallow groundwater is less expensive than the CVP blended price. As more groundwater is pumped the cost increases as the pump lift increases and the cost eventually becomes greater than the CVP blended price. When this happens the remainder of the subregions water supply is taken from the CVP supplies.
16	Shift from CVP to Groundwater in all sequences	The blended price of CVP water in subregion 16 is greater than the groundwater pumping cost resulting in the shift from CVP to groundwater.
17	Shift from groundwater to CVP	In the Preferred Alternative Average and Wet conditions this subregion had water classified as Tier 2 or Tier 3 which was not affordable. The subregion pumped groundwater down to a depth at which it was no longer affordable to supplement the CVP water is was able to afford. In the LTCR sequences, the blended price is less expensive than the least expensive CVP tier that was not used, therefor a shift is made from the deepest groundwater to the now affordable CVP supply.
19	Shift from CVP to Groundwater in Dry to Dry sequence	The blended pricing causes the Dry to Dry CVP water cost to rise higher than the groundwater pumping cost resulting in the shift from CVP to groundwater.

SECTION 2
REGIONAL ECONOMICS

REGIONAL ECONOMICS

This analysis identifies the regional economic impacts of two out of the nine total Long-Term Contract Renewal sequences; an Average year following an Average five-year base condition, and an Average year following a Dry five-year base condition. The regional economic analysis is restricted to these sequences because they are the only sequences that represent long-run conditions. The Input-Output model used in the regional economic analysis assumes a long run equilibrium is reached, therefore it is inappropriate to model short run responses represented by the Wet and Dry year conditions. While the Average year following the Dry five-year base condition is not strictly a long-run scenario, as described in the Agricultural and Land Use and Economics section, there are some regions that will be permanently impacted by a five year series of drought years. Because of this, the results can be considered long run.

The assumptions and baseline data used in this analysis are the same as what was used in the Preferred Alternative. Tables 23 and 24 show the results of the Average year following an Average five-year base condition, Tables 25 and 26 the Average year following a Wet five-year base condition, and Tables 27 and 28 the Average year following a Dry five-year base condition. Tables 23, 25, and 27 present the impacts by economic sectors that are aggregations of Standard Industrial Classification (SIC)industries. Tables 24, 26, and 28 present the regional economic impacts broken out by the source of the impact including reduced agricultural output, changes in net farm income, and changes in M&I water costs. Note that regional economic impacts are not reported for the North Coast or the Central and South Coast regions because the rolling five year average tiered pricing mechanism has no impact on these regions.

AVERAGE YEAR FOLLOWING AVERAGE FIVE-YEAR BASE CONDITION

Table 23 shows the employment, output and income effects on all sectors in each regional economy of the long-term contract renewals. Most of the impacts are felt in the Manufacturing, Trade and Services sectors. These impacts are derived from the impact to net income. The economic impacts by region from each source can be seen in Table 24. Reduction in net income resulting from changes in CVP water cost, groundwater pumping, irrigation costs and changes in crop prices have the greatest impact at the statewide level.

AVERAGE YEAR FOLLOWING DRY FIVE-YEAR BASE CONDITION

Table 27 shows the employment, output and income effects for each regional economy and the State as a whole broken out by the impacted sectors. Table 28 shows how each of the impact sources contribute to the total impact. The reduction in agricultural output in the Sacramento River region relative to the Preferred Alternative dominates the statewide impact.

TABLE 22

REGIONAL ECONOMIC IMPACTS ON ALL SECTORS: AVERAGE YEAR FOLLOWING AVERAGE 5-YEAR BASE CONDITION COMPARED TO THE PREFERRED ALTERNATIVE AVERAGE YEAR CONDITION

	Impacts on all Sectors					
	Employment (# of jobs)		Output ($MM)		PoW Income ($MM)	
Region Directly Impacted	Direct	Total	Direct	Total	Direct	Total
Sacramento River						
Agriculture						
Reduced Output	-10	-20	-0.5	-1.2	-0.2	-0.6
Reduced Net Income	-20	-50	-0.9	-2.3	-0.5	-1.3
Total Agriculture	-30	-60	-1.4	-3.5	-0.7	-1.9
M&I Water Costs	-60	-130	-3.9	-8.5	-2.0	-4.7
TOTAL 1/	**-90**	**-190**	-5.3	-12.0	-2.8	-6.6
San Joaquin River						
Agriculture						
Reduced Output	0	0	-0.2	-0.3	-0.1	-0.2
Reduced Net Income	20	40	0.8	1.8	0.5	1.0
Total Agriculture	20	30	0.7	1.5	0.4	0.9
M&I Water Costs	-80	-150	-5.0	-9.4	-2.6	-5.1
TOTAL 1/	**-60**	**-120**	-4.3	-7.9	-2.2	-4.2
Tulare Lake						
Agriculture						
Reduced Output	0	0	0.0	0.0	0.0	0.0
Reduced Net Income	-50	-80	-2.1	-4.1	-1.1	-2.2
Total Agriculture	-50	-80	-2.1	-4.1	-1.1	-2.2
M&I Water Costs	0	0	0.0	0.0	0.0	0.0
TOTAL 1/	**-50**	**-80**	-2.1	-4.1	-1.1	-2.2
Bay Area						
Agriculture						
Reduced Output	0	0	0.0	0.0	0.0	0.0
Reduced Net Income	0	-10	-0.2	-0.4	-0.1	-0.2
Total Agriculture	0	-10	-0.2	-0.4	-0.1	-0.2
M&I Water Costs	-60	-130	-4.4	-9.4	-2.4	-5.4
TOTAL 1/	**-60**	**-130**	-4.6	-9.8	-2.5	-5.6
California Total						
Agriculture						
Reduced Output	-10	-20	-0.7	-1.5	-0.3	-0.8
Reduced Net Income	-50	-100	-2.3	-5.0	-1.2	-2.7
Total Agriculture	-60	-120	-3.0	-6.5	-1.6	-3.5
M&I Water Costs	-200	-410	-13.3	-27.4	-7.0	-15.1
TOTAL 1/	**-260**	**-530**	**-16.3**	**-33.9**	**-8.6**	**-18.6**

Note: (1) May differ from sum of elements due to rounding.

TABLE 23

REGIONAL ECONOMIC IMPACT: AVERAGE YEAR FOLLOWING AVERAGE 5-YEAR BASE CONDITION COMPARED TO THE PREFERRED ALTERNATIVE AVERAGE YEAR CONDITION

	Employment (# of jobs)		Output ($MM)		PoW Income ($MM)	
Region and Affected Sector	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**
Sacramento River						
Agric., Frst., Fish.	-10	-10	-0.4	-0.5	-0.2	-0.3
Mining	0	0	0.0	0.0	0.0	0.0
Construction	0	0	0.0	-0.2	0.0	-0.1
Manufacturing	-10	-20	-1.6	-2.2	-0.6	-0.8
TCU	0	-10	-0.2	-0.9	-0.1	-0.5
Trade	-40	-70	-1.1	-2.1	-0.7	-1.3
FIRE	-10	-20	-0.8	-2.6	-0.5	-1.7
Services	-20	-60	-0.9	-2.8	-0.6	-1.7
Government	0	-10	-0.2	-0.7	-0.1	-0.3
Misc	0	0	0.0	0.0	0.0	0.0
TOTAL/1	**-90**	**-190**	**-5.3**	**-12.0**	**-2.8**	**-6.6**
San Joaquin River						
Agric., Frst., Fish.	0	-10	-0.2	-0.3	-0.1	-0.1
Mining	0	0	-0.1	-0.1	0.0	0.0
Construction	0	0	0.0	-0.1	0.0	-0.1
Manufacturing	-10	-10	-0.8	-1.1	-0.2	-0.3
TCU	0	-10	-0.3	-0.6	-0.2	-0.3
Trade	-10	-30	-0.4	-1.1	-0.2	-0.6
FIRE	-10	-20	-1.1	-2.1	-0.7	-1.3
Services	-30	-50	-1.2	-2.2	-0.7	-1.3
Government	0	0	-0.2	-0.3	-0.1	-0.1
Misc	0	0	0.0	0.0	0.0	0.0
TOTAL/1	**-60**	**-120**	**-4.3**	**-7.9**	**-2.2**	**-4.2**
Tulare Lake						
Agric., Frst., Fish.	0	0	0.0	0.0	0.0	0.0
Mining	0	0	0.0	0.0	0.0	0.0
Construction	0	0	0.0	0.0	0.0	0.0
Manufacturing	-10	-10	-1.0	-1.3	-0.4	-1.3
TCU	0	0	0.0	-0.2	0.0	-0.2
Trade	-40	-50	-1.0	-1.4	-0.7	-1.4
FIRE	0	0	0.0	-0.4	0.0	-0.4
Services	0	-10	0.0	-0.6	0.0	-0.6
Government	0	0	0.0	-0.1	0.0	-0.1
Misc	0	0	0.0	0.0	0.0	0.0
TOTAL/1	**-50**	**-80**	**-2.1**	**-4.1**	**-1.1**	**-4.1**

TABLE 23

REGIONAL ECONOMIC IMPACT: AVERAGE YEAR FOLLOWING AVERAGE 5-YEAR BASE CONDITION COMPARED TO THE PREFERRED ALTERNATIVE AVERAGE YEAR CONDITION

	Employment (# of jobs)		Output ($MM)		PoW Income ($MM)	
Region and Affected Sector	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**
Bay Area						
Agric., Frst., Fish.	0	0	0.0	-0.1	0.0	0.0
Mining	0	0	0.0	0.0	0.0	0.0
Construction	0	0	0.0	-0.1	0.0	-0.1
Manufacturing	-10	-10	-1.2	-1.9	-0.4	-0.7
TCU	0	-10	-0.3	-0.8	-0.2	-0.4
Trade	-20	-40	-0.9	-1.7	-0.5	-1.0
FIRE	-10	-20	-1.0	-2.3	-0.6	-1.5
Services	-20	-50	-1.1	-2.6	-0.7	-1.6
Government	0	0	-0.2	-0.3	-0.1	-0.1
Misc	0	0	0.0	0.0	0.0	0.0
TOTAL/1	**-60**	**-130**	**-4.6**	**-9.8**	**-2.5**	**-5.6**
California Total						
Agric., Frst., Fish.	-10	-20	-0.6	-0.9	-0.3	-0.5
Mining	0	0	-0.1	-0.1	0.0	0.0
Construction	0	-10	0.0	-0.5	0.0	-0.3
Manufacturing	-30	-50	-4.7	-6.5	-1.6	-3.1
TCU	-10	-20	-0.8	-2.5	-0.4	-1.4
Trade	-110	-190	-3.4	-6.3	-2.2	-4.4
FIRE	-20	-60	-2.9	-7.4	-1.8	-4.9
Services	-70	-180	-3.2	-8.1	-1.9	-5.2
Government	0	-10	-0.6	-1.4	-0.3	-0.7
Misc	0	0	-0.1	-0.1	-0.1	-0.1
TOTAL/1	**-260**	**-530**	**-16.3**	**-33.9**	**-8.6**	**-20.5**

Note:(1) May differ from sum of elements due to rounding.

Table 24

REGIONAL ECONOMIC IMPACTS ON ALL SECTORS: AVERAGE YEAR FOLLOWING WET 5-YEAR BASE CONDITION COMPARED TO THE PREFERRED ALTERNATIVE AVERAGE YEAR CONDITION

	Impacts on all Sectors					
	Employment (# of jobs)		Output ($MM)		PoW Income ($MM)	
Region Directly Impacted	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**
Sacramento River						
Agriculture						
Reduced Output	0	-10	-0.4	-0.8	-0.2	-0.4
Reduced Net Income	30	50	1.0	2.6	0.5	1.4
Total Agriculture	20	40	0.6	1.8	0.4	1.0
M&I Water Costs	-60	-130	-3.9	-8.5	-2.0	-4.7
TOTAL 1/	**-40**	**-90**	**-3.3**	**-6.7**	**-1.6**	**-3.6**
San Joaquin River						
Agriculture						
Reduced Output	0	0	-0.2	-0.3	-0.1	-0.2
Reduced Net Income	100	170	3.7	8.1	2.1	4.5
Total Agriculture	90	160	3.6	7.8	2.0	4.4
M&I Water Costs	-80	-150	-5.0	-9.4	-2.6	-5.1
TOTAL 1/	**20**	**10**	**-1.4**	**-1.6**	**-0.6**	**-0.7**
Tulare Lake						
Agriculture						
Reduced Output	0	0	0.0	0.0	0.0	0.0
Reduced Net Income	-30	-40	-1.1	-2.1	-0.6	-1.1
Total Agriculture	-30	-40	-1.1	-2.1	-0.6	-1.1
M&I Water Costs	0	0	0.0	0.0	0.0	0.0
TOTAL 1/	**-30**	**-40**	**-1.1**	**-2.1**	**-0.6**	**-1.1**
Bay Area						
Agriculture						
Reduced Output	0	0	0.0	0.0	0.0	0.0
Reduced Net Income	0	0	-0.1	-0.2	0.0	-0.1
Total Agriculture	0	0	-0.1	-0.2	0.0	-0.1
M&I Water Costs	-60	-130	-4.4	-9.4	-2.4	-5.4
TOTAL 1/	**-60**	**-130**	**-4.5**	**-9.6**	**-2.5**	**-5.5**
California Total						
Agriculture						
Reduced Output	0	-10	-0.5	-1.1	-0.2	-0.6
Reduced Net Income	100	180	3.6	8.4	2.0	4.7
Total Agriculture	100	170	3.0	7.3	1.7	4.2
M&I Water Costs	-200	-410	-13.3	-27.4	-7.0	-15.1
TOTAL 1/	**-100**	**-240**	**-10.3**	**-20.1**	**-5.3**	**-11.0**

Note: (1) May differ from sum of elements due to rounding.

TABLE 25

REGIONAL ECONOMIC IMPACT: AVERAGE YEAR FOLLOWING WET 5-YEAR BASE CONDITION COMPARED TO THE PREFERRED ALTERNATIVE AVERAGE YEAR CONDITION

	Employment (# of jobs)		Output ($MM)		PoW Income ($MM)	
Region and Affected Sect	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**
Sacramento River						
Agric., Frst., Fish.	0	-10	-0.2	-0.3	-0.1	-0.2
Mining	0	0	0.0	0.0	0.0	0.0
Construction	0	0	0.0	-0.1	0.0	-0.1
Manufacturing	0	-10	-0.7	-0.9	-0.2	-0.3
TCU	0	0	-0.2	-0.6	-0.1	-0.3
Trade	0	-10	-0.2	-0.7	0.0	-0.3
FIRE	-10	-20	-0.8	-1.8	-0.5	-1.1
Services	-20	-40	-0.9	-1.9	-0.6	-1.1
Government	0	0	-0.2	-0.5	-0.1	-0.2
Misc	0	0	0.0	0.0	0.0	0.0
TOTAL/1	**-40**	**-90**	**-3.3**	**-6.7**	**-1.6**	**-3.6**
San Joaquin River						
Agric., Frst., Fish.	0	0	-0.1	-0.2	-0.1	-0.1
Mining	0	0	-0.1	-0.1	0.0	0.0
Construction	0	0	0.0	-0.1	0.0	0.0
Manufacturing	10	10	0.6	0.8	0.3	0.4
TCU	0	0	-0.3	-0.4	-0.2	-0.2
Trade	60	60	1.0	1.1	0.8	0.9
FIRE	-10	-10	-1.1	-1.2	-0.7	-0.8
Services	-30	-30	-1.2	-1.2	-0.7	-0.7
Government	0	0	-0.2	-0.2	-0.1	-0.1
Misc	0	0	0.0	0.0	0.0	0.0
TOTAL/1	**20**	**10**	**-1.4**	**-1.6**	**-0.6**	**-0.7**
Tulare Lake						
Agric., Frst., Fish.	0	0	0.0	0.0	0.0	0.0
Mining	0	0	0.0	0.0	0.0	0.0
Construction	0	0	0.0	0.0	0.0	0.0
Manufacturing	0	-10	-0.5	-0.7	-0.2	-0.7
TCU	0	0	0.0	-0.1	0.0	-0.1
Trade	-20	-30	-0.5	-0.7	-0.4	-0.7
FIRE	0	0	0.0	-0.2	0.0	-0.2
Services	0	-10	0.0	-0.3	0.0	-0.3
Government	0	0	0.0	0.0	0.0	0.0
Misc	0	0	0.0	0.0	0.0	0.0
TOTAL/1	**-30**	**-40**	**-1.1**	**-2.1**	**-0.6**	**-2.1**

TABLE 25

REGIONAL ECONOMIC IMPACT: AVERAGE YEAR FOLLOWING WET 5-YEAR BASE CONDITION COMPARED TO THE PREFERRED ALTERNATIVE AVERAGE YEAR CONDITION

	Employment (# of jobs)		Output ($MM)		PoW Income ($MM)	
Region and Affected Sect	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**
Bay Area						
Agric., Frst., Fish.	0	0	0.0	-0.1	0.0	0.0
Mining	0	0	0.0	0.0	0.0	0.0
Construction	0	0	0.0	-0.1	0.0	-0.1
Manufacturing	-10	-10	-1.2	-1.9	-0.4	-0.7
TCU	0	-10	-0.3	-0.8	-0.2	-0.4
Trade	-20	-40	-0.8	-1.6	-0.5	-1.0
FIRE	-10	-10	-1.0	-2.2	-0.6	-1.5
Services	-20	-50	-1.1	-2.6	-0.7	-1.6
Government	0	0	-0.2	-0.3	-0.1	-0.1
Misc	0	0	0.0	0.0	0.0	0.0
TOTAL/1	**-60**	**-130**	**-4.5**	**-9.6**	**-2.5**	**-5.5**
California Total						
Agric., Frst., Fish.	-10	-10	-0.4	-0.7	-0.2	-0.3
Mining	0	0	-0.1	-0.1	0.0	0.0
Construction	0	0	0.0	-0.3	0.0	-0.2
Manufacturing	-10	-10	-1.7	-2.7	-0.5	-1.2
TCU	-10	-10	-0.8	-1.8	-0.4	-1.0
Trade	20	-20	-0.5	-1.9	-0.1	-1.2
FIRE	-20	-40	-2.9	-5.5	-1.8	-3.6
Services	-70	-130	-3.2	-5.9	-1.9	-3.8
Government	0	-10	-0.6	-1.0	-0.3	-0.5
Misc	0	0	-0.1	-0.1	-0.1	-0.1
TOTAL/1	**-100**	**-250**	**-10.3**	**-20.1**	**-5.3**	**-12.0**

Note:(1) May differ from sum of elements due to rounding.

TABLE 26

REGIONAL ECONOMIC IMPACTS ON ALL SECTORS: AVERAGE YEAR FOLLOWING DRY 5-YEAR BASE CONDITION COMPARED TO THE PREFERRED ALTERNATIVE AVERAGE YEAR CONDITION

	Impacts on all Sectors					
	Employment (# of jobs)		Output ($MM)		PoW Income ($MM)	
Region Directly Impacted	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**
Sacramento River						
Agriculture						
Reduced Output	-700	-2240	-92.1	-194.5	-30.8	-86.9
Reduced Net Income	130	240	4.7	12.4	2.6	6.9
Total Agriculture	-570	-2000	-87.4	-182.1	-28.2	-80.0
M&I Water Costs	-60	-140	0.4	-0.9	-0.2	-0.5
TOTAL 1/	**-630**	**-2140**	**-91.8**	**-191.6**	**-30.5**	**-85.2**
San Joaquin River						
Agriculture						
Reduced Output	-10	-20	-0.7	-1.5	-0.3	-0.7
Reduced Net Income	-140	-240	-5.4	-11.7	-3.0	-6.5
Total Agriculture	-150	-270	-6.1	-13.2	-3.3	-7.3
M&I Water Costs	-80	-150	0.0	0.0	0.0	0.0
TOTAL 1/	**-230**	**-420**	**-11.0**	**-22.7**	**-5.9**	**-12.4**
Tulare Lake						
Agriculture						
Reduced Output	0	-10	-0.2	-0.5	-0.1	-0.2
Reduced Net Income	-100	-170	-3.6	-7.1	-1.9	-3.8
Total Agriculture	-100	-170	-3.8	-7.6	-2.0	-4.0
M&I Water Costs	0	0	0.0	0.0	0.0	0.0
TOTAL 1/	**-100**	**-170**	**-4.4**	**-8.8**	**-2.3**	**-4.6**
Bay Area						
Agriculture						
Reduced Output	0	0	0.0	0.0	0.0	0.0
Reduced Net Income	-10	-20	-0.6	-1.4	-0.3	-0.8
Total Agriculture	-10	-20	-0.6	-1.4	-0.3	-0.8
M&I Water Costs	-60	-130	-0.5	-1.1	-0.3	-0.6
TOTAL 1/	**-70**	**-150**	**-5.0**	**-10.8**	**-2.8**	**-6.2**
California Total						
Agriculture						
Reduced Output	-710	-2270	-93.0	-196.5	-31.2	-87.9
Reduced Net Income	-120	-190	-4.8	-7.8	-2.6	-4.1
Total Agriculture	-830	-2460	-97.8	-204.3	-33.8	-92.0
M&I Water Costs	-200	-420	-0.1	-1.9	-0.5	-1.1
TOTAL 1/	**-1030**	**-2880**	**-112.2**	**-233.8**	**-41.4**	**-108.3**

Note: (1) May differ from sum of elements due to rounding.

TABLE 27

REGIONAL ECONOMIC IMPACT: AVERAGE YEAR FOLLOWING DRY 5-YEAR BASE CONDITION COMPARED TO THE PREFERRED ALTERNATIVE AVERAGE YEAR CONDITION

	Employment (# of jobs)		Output ($MM)		PoW Income ($MM)	
Region and Affected Sector	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**
Region and Affected Sector	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**
Sacramento River						
Agric., Frst., Fish.	-450	-630	-26.1	-33.0	-13.4	-16.6
Mining	0	0	0.0	-0.1	0.0	0.0
Construction	0	-30	0.0	-2.1	0.0	-1.2
Manufacturing	-230	-290	-64.9	-73.1	-16.9	-19.8
TCU	0	-120	-0.2	-16.8	-0.1	-7.5
Trade	90	-310	1.6	-13.8	1.2	-8.1
FIRE	-10	-200	-0.9	-22.7	-0.5	-14.6
Services	-20	-500	-1.0	-22.8	-0.6	-13.8
Government	0	-50	-0.2	-7.2	-0.1	-3.5
Misc	0	0	0.0	0.0	0.0	0.0
TOTAL/1	**-630**	**-2130**	**-91.8**	**-191.6**	**-30.5**	**-85.2**
San Joaquin River						
Agric., Frst., Fish.	-10	-20	-0.8	-1.2	-0.4	-0.5
Mining	0	0	-0.1	-0.1	0.0	0.0
Construction	0	0	0.0	-0.3	0.0	-0.1
Manufacturing	-30	-40	-3.8	-5.1	-1.4	-1.9
TCU	0	-10	-0.3	-1.2	-0.2	-0.6
Trade	-140	-210	-3.6	-5.8	-2.4	-3.7
FIRE	-10	-30	-1.1	-4.2	-0.7	-2.7
Services	-30	-100	-1.2	-4.3	-0.7	-2.6
Government	0	-10	-0.2	-0.5	-0.1	-0.2
Misc	0	0	0.0	0.0	0.0	0.0
TOTAL/1	**-230**	**-420**	**-11.0**	**-22.7**	**-5.9**	**-12.4**
Tulare Lake						
Agric., Frst., Fish.	0	-10	-0.3	-0.4	-0.1	-0.4
Mining	0	0	0.0	0.0	0.0	0.0
Construction	0	0	0.0	-0.1	0.0	-0.1
Manufacturing	-20	-20	-2.1	-2.7	-0.7	-2.7
TCU	0	0	0.0	-0.4	0.0	-0.4
Trade	-80	-110	-2.1	-2.9	-1.5	-2.9
FIRE	0	-10	0.0	-0.9	0.0	-0.9
Services	0	-30	0.0	-1.2	0.0	-1.2
Government	0	0	0.0	-0.2	0.0	-0.2
Misc	0	0	0.0	0.0	0.0	0.0
TOTAL/1	**-100**	**-170**	**-4.4**	**-8.8**	**-2.3**	**-8.8**

TABLE 27

REGIONAL ECONOMIC IMPACT: AVERAGE YEAR FOLLOWING DRY 5-YEAR BASE CONDITION COMPARED TO THE PREFERRED ALTERNATIVE AVERAGE YEAR CONDITION

Region and Affected Sector	Employment (# of jobs)		Output ($MM)		PoW Income ($MM)	
	Direct	Total	Direct	Total	Direct	Total
Region and Affected Sector	**Direct**	**Total**	**Direct**	**Total**	**Direct**	**Total**
Bay Area						
Agric., Frst., Fish.	0	0	0.0	-0.1	0.0	0.0
Mining	0	0	0.0	0.0	0.0	0.0
Construction	0	0	0.0	-0.1	0.0	-0.1
Manufacturing	-10	-10	-1.4	-2.2	-0.5	-0.8
TCU	0	-10	-0.3	-0.8	-0.2	-0.4
Trade	-30	-50	-1.1	-2.0	-0.7	-1.3
FIRE	-10	-20	-1.0	-2.4	-0.6	-1.6
Services	-20	-60	-1.1	-2.8	-0.7	-1.8
Government	0	0	-0.2	-0.3	-0.1	-0.2
Misc	0	0	0.0	0.0	0.0	0.0
TOTAL/1	-70	-150	-5.0	-10.8	-2.8	-6.2
California Total						
Agric., Frst., Fish.	-470	-660	-27.2	-34.6	-13.9	-17.5
Mining	0	0	-0.1	-0.2	0.0	-0.1
Construction	0	-40	0.0	-2.6	0.0	-1.5
Manufacturing	-290	-370	-72.2	-83.1	-19.6	-25.2
TCU	-10	-140	-0.8	-19.3	-0.4	-8.9
Trade	-170	-680	-5.0	-24.5	-3.3	-16.0
FIRE	-20	-260	-2.9	-30.2	-1.8	-19.8
Services	-70	-680	-3.3	-31.1	-2.0	-19.3
Government	0	-60	-0.6	-8.2	-0.3	-4.1
Misc	0	0	-0.1	-0.1	-0.1	-0.1
TOTAL/1	-1030	-2880	-112.2	-233.8	-41.4	-112.5

Note:(1) May differ from sum of elements due to rounding.

SECTION 3

MUNICIPAL AND INDUSTRIAL WATER USE ECONOMICS

MUNICIPAL AND INDUSTRIAL ECONOMICS

The municipal and industrial economics analysis is based upon the Average-Average tiered pricing scenario. This analysis is based upon the impacts to CVP contractors. This is different than the municipal and industrial economic analysis that was included in the PEIS.

The PEIS municipal and industrial water cost analysis primarily evaluated the impacts on the need and cost to transfer water to non-CVP municipalities. Therefore, the analysis included water costs for many non-CVP water users. For example, the municipality in the San Joaquin River Basin was based upon the Cities of Stockton and Fresno water costs which are not based on CVP water, as described in the Municipal Water Costs Methodology and Modeling Technical Appendix to the PEIS.

The analysis included in the following table is based only on CVP contractors in order to define the cost of CVP water under the Tiered Water Pricing proposal.

TABLE 28

SUMMARY OF M&I ECONOMICS ANALYSIS FOR AVERAGE YEAR CONDITIONS FOR REGIONAL ECONOMICS

Result	Preferred Alternative Average	Change from the Preferred Alternative Average		
		Average-Average	Dry-Average	Wet-Average
Average Condition				
Supplies, 1,000 acre-feet (1)				
Sacramento Valley	929.0	0.0	0.0	0.0
Bay Area	1024.0	0.0	0.0	0.0
San Joaquin Valley	704.0	0.0	0.0	0.0
Central and South Coast	5921.0	0.0	0.0	0.0
Average Condition				
Economic Costs, Million $ (2)				
Sacramento Valley	1.1	4.1	4.3	4.1
Bay Area	3.5	4.6	4.6	4.6
San Joaquin Valley	0.3	5.2	5.2	5.2
Central and South Coast	649.0	0.0	0.0	0.0

NOTES:

Water transfers not considered as replacement supplies in this comparison.

(1) After purchase or development of non-transfer replacement supplies to make supply equal demand.

(2) Total costs include replacement supplies, restoration payments and metering. A negative cost means a net gain is estimated.

APPENDIX E
PUBLIC COMMENTS AND RESPONSES

E.1 INTRODUCTION

This Appendix includes a list of agencies, organizations, and individuals commenting on the previously-circulated Revised Draft EA, copies of their comments, and responses to the substantive environmental issues raised in the comments. The following pages show all the comments received which relate to the project and the Bureau's responses to those comments. The Bureau reviewed and considered all comments and determined whether or not the comments warranted further analysis and documentation. The Bureau noted in the individual responses when further analysis or changes were made.

E.2 INDEX

Comments

Taxpayers for Common Sense

August 18, 2004

VIA FAX and EMAIL

Mr. Kirk Rodgers
Mr. Richard Stevenson
Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Ms. Basia Trout
Red Bluff Division Office
Bureau of Reclamation
P.O. Box 159
Red Bluff, CA 96080

Re: Renewal of the Central Valley Project long-term water service contracts with The Sacramento River Division Contractors

Dear Mr. Rodgers, Mr. Stevenson, and Ms. Trout:

TCS-1

Taxpayers for Common Sense (TCS), a nonpartisan budget watchdog group, is extremely concerned about the long-term implications of proposed Central Valley Project (CVP) water service contracts for the Shasta, Trinity River, and Sacramento River Divisions. Specifically, TCS believes these contracts do not fairly represent the interests of federal taxpayers. We strongly urge the Bureau of Reclamation to extend the comment periods on both the environmental documents regarding the renewal of the Sacramento River Division CVP Long-Term Water Service Contracts and also the proposed renewal of 36 long term water service contracts in the Shasta, Trinity River, and Sacramento River Divisions by at least 60 days.

Given the impact these water contracts will have on both California water issues and federal taxpayers for years to come, it is vitally important that all stakeholders have ample opportunity to review these proposals and to be able to give comprehensive input. Although the regular public comment period is generally sufficient, the long-term nature of these contracts combined with the scheduling of the comment period during a traditional time for families to take vacation and for congressional recess makes it necessary for the Bureau to extend the comment period to allow appropriate public input into the process. The Bureau is supposed to be negotiating on behalf of federal taxpayers. As a result, the Bureau owes it to taxpayers to give them every chance to ask questions and understand the impacts of these major 25-year water commitments. The Bureau proposes to renew Sacramento River Division contracts for up to 322,000 acre-feet of CVP water before the public has reviewed the potential impact of these contracts.

Long-term CVP contracts are not permanent entitlements. Instead, these contracts must receive full review in order to consider the constantly evolving needs of California's

Responses

TCS-1

Thank you for your comment. Reclamation has considered requests for extensions of the comment period, and feels adequate time was given for review. The BA for the Sacramento River Division long-term water service contract renewals was completed in August of 2003. The Draft EA was first released on August 19, 2003 and was revised in March of 2004. On July 2, 2004, a 60-day public review and comment period was initiated for the associated long-term CVP water service contracts for the Black Butte Unit, Tehama-Colusa Canal Unit, and the Corning Canal Unit of the Sacramento River Division. The revised draft EA and FONSI were released on July 30, 2004 for an additional 30-day public review.

Taxpayers for Common Sense (cont'd)

Mr. Kirk Rodgers
Mr. Richard Stevenson
Ms. Basia Trout
August 18, 2004

diverse set of water users. California's water needs are constantly in flux and full review of these contracts renewals is the only responsible policy. Contract pricing should also charge markets rates for water.

Again, we urge the Bureau of Reclamation to extend the comment period on these contracts by an additional 60 days to give federal taxpayers the fullest possible opportunity to comment on these long-term contracts. Please feel free to contact me at (202) 546-8500 x126 or aileen@taxpayer.net with any questions.

Sincerely,

Aileen D. Roder
Program Director

Comments

Valley Water Protection Association

From: "Colefarm" <colefarm@shocking.com>
To: <btrout@mp.usbr.gov>
Date: 8/26/04 6:23PM
Subject: Sacramento River and Feather Water Contracts

TO: Ms. Basia Trout, Federal Bureau of Reclamation

FROM: Linda Cole, Valley Water Protection Association

RE: Sacramento River Division contracts, Feather Water District

VWPA-1

These contracts have not been given adequate time for the public to review the reports and to weigh potentials for cumulative impacts within the Sacramento watershed. We respectfully request that an extension be given for review and comment. That extension should include adequate time for the public to consider studies and reports not yet available, and for consideration of proposed actions listed in other contracts within the same water basin. We need to look at cumulative impacts within the total proposed actions from all contracts potentially tapping the same water resources within the valley.

Contract decisions need to responsive to the people's right to know and to comment. These contracts have the potential to drive water management for up to 40 years. At the same time we have political assumptions that shortfalls in water south of the Delta will be made up by water from Northern California... for growth, for drought, for water quality, for fish, for economic stimulus. All these parallel efforts need to be considered once the full scientific studies have been completed. The comment period should reflect the comolexity of these issues. Anything less is not following the intent of the law providing for public input.
Thank you,

Linda Cole

Responses

VWPA-1

Reclamation has considered requests for extensions of the comment period and feels adequate time was given for review. The BA for the Sacramento River Division long-term water service contract renewals was completed in August of 2003. The Draft EA was first released on August 19, 2003 and was revised in March of 2004. On July 2, 2004, a 60-day public review and comment period was initiated for the associated long-term CVP water service contracts for the Black Butte Unit, Tehama-Colusa Canal Unit, and the Corning Canal Unit of the Sacramento River Division. The revised draft EA and FONSI were released on July 30, 2004 for an additional 30-day public review.

The cumulative impacts of the CVP were addressed in the PEIS for implementation of the CVPIA. The analysis in the EA finds the renewals of the contract to be a continuation of previous contracts with minor financial and administrative changes, with no changes in either the volumes of water under contract or the places of use. Moreover, most do not involve any change in the type of use, such as the addition of M&I uses. The analysis in the EA addresses the proposed changes to the contract and the potential environmental effects of those changes. As indicated in the EA, these contract changes would not result in significant effects to the environment.

Comments

The Bay Institute

The Bay Institute
Natural Resources Defense Council
Planning and Conservation League

Via Federal Express

August 27, 2004

Ms. Basia Trout
U.S. Bureau of Reclamation
22500 Altube Avenue
P. O. Box 159
Red Bluff, CA 96080

Re: Comments on Revised Draft EA on Sacramento River Division Renewal Contracts

Dear Ms. Trout,

This letter provides comments of The Bay Institute, the Natural Resources Defense Council (NRDC) and the Planning and Conservation League on the Revised Draft Environmental Assessment (EA) for Renewal of the Long-term Contracts for the Sacramento River Division Contractors (U.S. Bureau of Reclamation, Mid-Pacific Region, Sacramento, CA; July 2004). Additional supplemental comments from our organizations are also being submitted by NRDC under separate cover.

Bay-1

The EA states that it has been prepared to determine whether renewal of long-term water service contracts will result in any significant impacts to the natural and human environment (EA, pg. 1-1). In its current form, the document describes alternatives with few meaningful differences and offers an incomplete, inadequate and contradictory environmental impacts analysis. Much of the information provided in the EA is an incomplete review of analyses conducted by the U.S. Bureau of Reclamation (Reclamation) for its Operation Criteria and Plan Biological Assessment (OCAP BA), which evaluates proposed Reclamation operations in the Sacramento River Division as well as the greater Sacramento-San Joaquin watershed and which identifies numerous instances in which proposed operations will negatively impact the natural environment and valuable biological resources.[1]

[1] The EA states that renewal of Sacramento River Division water service contracts is related to the current update of the Operations Criteria and Plan (OCAP) (EA, pg. 1-5, 6). The project description for the Sacramento River Division contained in the OCAP and accompanying Biological Assessment is essentially the same as that described in the three alternatives in the EA.

Responses

Bay-1

Given legal and regulatory constraints, the two action alternatives in the EA provide a reasonable range of alternatives that meet the stated purpose and need. The EA summarizes key points addressed in the OCAP BA while referring to the more comprehensive and in-depth review of these issues in the BA, where it is discussed at length. The tiered documents used the PEIS by reference as a foundation to avoid duplication and focus more narrowly on the new alternatives or more detailed site-specific effects. Therefore, only changes from the alternatives considered in the PEIS would be addressed in detail in the tiered EA. The No Action Alternative is defined as renewal of existing contracts as modified by non-discretionary CVPIA provisions addressed in the PEIS. The analysis displays the increment of change between that of the No Action Alternative and the other alternatives. The diversion of water is an on-going action and the current condition. Hence, the significant impacts alluded to in this comment are not a result of the proposed action but are the existing/no action conditions.

Comments

The Bay Institute (cont'd)

Bay-2

Other important analyses, including the Draft EIS/EIR for the Fish Passage Improvement Project at the Red Bluff Diversion Dam (TCCA and USBR, 2002), are not even cited. The EA itself, although incomplete, identifies a number of substantial negative impacts. Yet, despite overwhelming evidence to the contrary (including the listing of several fish species dependent on environmental conditions in the Sacramento River Division under state and federal Endangered Species Acts (ESA) in just the last decade), the EA contends that these impacts have no significant or cumulative effects. This conclusion and the Finding of No Significant Impact (FONSI, July 2004) are wholly unsupported by both the readily available scientific evidence and analytical results reported by Reclamation in the EA, OCAP BA, and a number of other documents and reports.

Water project operations on the Sacramento River affect many terrestrial and aquatic plant and animals species that inhabit the river corridor, the Sacramento-San Joaquin Delta and the San Francisco Bay. Our comments focus on the effects of proposed Sacramento River Division operations on native anadromous fish species that rely on the Sacramento River and its tributaries. Several of these species, including winter-run and spring-run Chinook salmon and steelhead, have declined to such low levels that they are now listed under both state and federal Endangered Species Acts. For each of these species, dams and water management operations on the Sacramento River and its tributaries are identified as key factors for the species' declines.

Bay-3

Three components of Reclamation's proposed Sacramento River Division operations have substantial continuing and new negative impacts on the environment and pose significant threats to native anadromous fish species that rely on this river. Only one of these impacts is even identified in the EA, despite other Reclamation analyses that have previously identified the others.

Bay-4

1. Operation of Red Bluff Diversion Dam (RBDD). According to the EA (as well as the Project Description in the OCAP BA), Reclamation proposes to continue closing the RBDD during the May 15-September 15 period. RBDD blocks and/or delays migration of adult anadromous fishes, harms emigrating juvenile anadromous fishes, and degrades habitat and water quality in the Sacramento River upstream and downstream of the facility. Compared to the alternatives analyzed in the Draft EIS/EIR for the Fish Passage Improvement Project at Red Bluff Diversion Dam (August 2002), an effort led by Reclamation and one of its major Sacramento River Division water contractors (Tehama-Colusa Canal Authority), the RBDD operation proposed in the EA, the No Action "4-month gates in" alternative, was determined to have the greatest negative impacts on fishery resources in the Sacramento River. Reclamation's selection of this operational protocol for RBDD as the preferred alternative conflicts with the preferred alternative identified in the Draft EIS/EIR and, in fact, appears to abrogate the EIS/EIR process for

Responses

Bay-2

Impacts resulting from the proposed alternatives would neither be significant, nor would they differ substantially from the No Action Alternative. The diversion and use of water is an on-going action. Dam maintenance and operations are discussed in the CVPIA PEIS and OCAP BA/BO. These impact analyses, although incorporated by reference in the EA, are not applied to the proposed action impact level. The PEIS analyzed cumulative impacts of long-term contract renewals on a regional basis. Because the contract renewals maintain the status quo of water deliveries under ongoing CVP operations, and in essence only change the legal and financial arrangements of a continuing action, they do not contribute to cumulative impacts in any demonstrable manner.

Bay-3

These impacts do not result from the proposed action. As stated earlier, the impacts of continuing the operations of the CVP and the implementation of CVPIA have been discussed in the CVPIA PEIS and OCAP BA/BO.

Bay-4

Any impacts related to the RBDD do not result from the proposed action of water service contract renewal. Future conditions of the RBDD are being addressed in a separate project-specific process.

Comments

The Bay Institute (cont'd)

the Fish Passage Improvement Project, the finalization of which has been "delayed" pending completion of the OCAP process.[2]

Bay-5

2. Elevated water temperature in the Sacramento River below Keswick Dam. According to the OCAP Project Description, Reclamation proposes to change Sacramento River temperature control objectives, relocating the temperature compliance point upstream in the river (OCAP BA, pg. 2-36).[3] Compared to current operations, this will increase mortality of incubating winter-run Chinook salmon eggs and emergent fry and substantially reduce the area of habitat for all salmonid species that use the mainstem Sacramento River. The proposed action violates protections required by the State Water Resources Control Board (Water Rights Orders 90-05 and 91-01) and the Endangered Species Act (Biological Opinion for winter-run Chinook salmon; NOAA Fisheries, 1993). This impact is not discussed in the EA, nor has it been addressed in any NEPA document analyzing Reclamation's new OCAP.

Bay-6

3. Eliminate minimum carryover storage requirements in Shasta Reservoir. According to the OCAP BA (pg. 2-36), Reclamation proposes to no longer operate to maintain a minimum carryover storage in Shasta Reservoir of 1.9 million acre-feet (MAF). This requirement, contained in the winter-run Chinook salmon BO (NOAA Fisheries, 1993), is intended to maintain an adequate cold-water pool in the reservoir to provide for releases of cold water to the river for protection of winter-run Chinook salmon during multi-year dry periods. This impact is not discussed in the EA, nor has it been addressed in any NEPA document analyzing Reclamation's new OCAP.

Bay-7

These operations described in the EA and related OCAP BA also threaten and devalue several large-scale and costly habitat improvement projects that have been already initiated in the Sacramento River and its tributaries upstream of RBDD.[4] In addition, it is noteworthy that none of the three alternatives described in the EA reflect any effort by Reclamation to craft operational protocols that would minimize these (and other) well-documented negative impacts of current operations on the Sacramento River environment and its biota. Indeed, Alternative 2 of the EA is assessed as having greater negative impacts on the wetland and riparian environments than current operations.

The following sections discuss some of the negative impacts of the proposed actions related to renewal of long-term water service contracts in the Sacramento River Division on several native anadromous fish species.

[2] In response to questions from NOAA Fisheries, Reclamation stated that the preferred alternative for RBDD operations was the "No Action Alternative" described in the 2002 Draft EIS/EIR. Reclamation responses to NOAA Fisheries questions are available at www.usbr.gov/mp/cvo/ocapBA.html.

[3] The temperature compliance point is the location at which specific cool water temperature conditions must be maintained for the protection of winter-run Chinook salmon by Reclamation using reservoir releases and the Shasta Temperature Control Device.

[4] Habitat improvement actions upstream of RBDD include: Battle Creek Restoration Plan; Clear Creek Restoration Plan; ACID fish passage improvements; ongoing improvement of Iron Mountain Mine water quality discharges; and the Temperature Control Device at Shasta Dam.

Responses

Bay-5

The EA alternatives do not include the actions mentioned above. That action is outside of the scope of this document. The proposed action addressed in the EA is renewal of water service contracts, not operations of the CVP.

Bay-6

The proposal of a change in the storage level at Shasta Reservoir is outside the scope of this EA. The hydrologic operation of the CVP is a separate action with its own environmental compliance requirements.

Bay-7

The EA does not assess the continued use of RBDD, as this is a separate action which is assessed in depth in the OCAP BA, and is the subject of its own environmental compliance procedures. Therefore this comment is outside the scope of this document.

The EA does not address operational aspects of water conveyance. This EA tiers off the PEIS to evaluate potential site-specific environmental impacts of renewing the long-term water service contract for the Sacramento River Division contractors. The purpose of this project is to renew the Sacramento River Division water service contracts, consistent with the provisions of CVPIA. The project alternatives include the terms and conditions of the contracts and tiered water pricing.

Operational protocols are not associated with the stated purpose and need, and are therefore not included in either of the proposed actions.

Comments

The Bay Institute (cont'd)

Bay-8

Spring-run Chinook salmon
Historically, the spring run of Chinook salmon was the second largest run in the Central Valley watershed and supported the bulk of the commercial fishery (Yoshiyama et al., 1998; copy enclosed). Based on population declines during the past several decades (and extirpation of spring-run Chinook salmon in the San Joaquin basin), Sacramento basin spring-run Chinook salmon are now listed as threatened under both state and federal ESAs. During the past decade, the run has been the target of a number of protection and recovery efforts, including those focused on tributary streams upstream of RBDD.

The EA states that the majority of spring-run Chinook salmon spawn in three Sacramento River tributaries, Mill, Deer, and Butte Creeks (EA, pg. 3-75), all of which enter the Sacramento River below RBDD. The EA further states that since only a small percentage of spring-run Chinook salmon spawn in the mainstem Sacramento River above (or below) RBDD, no population level impacts are expected. While the description of current spring-run Chinook salmon distribution may be accurate, this explanation inexplicably ignores the fact that as recently as 15 years ago the mainstem Sacramento River supported a substantial population of spring-run Chinook salmon that spawned above RBDD, averaging more than 10,000 fish per year from 1969-1986 (Figure 1, data from California Department of Fish and Game [CDFG]), more than five times as many fish as returned to Mill, Deer and Butte Creeks combined during the same period (Figure 2, data from CDFG). Since the early 1990s, only a few hundred fish have successfully returned to the upper mainstem Sacramento River and, in 2003, preliminary analysis of escapement surveys indicated that no spring-run returned to spawn in this reach of the river. The decline of the Sacramento River population coincided with the 1987-1992 drought and poor water quality conditions in the upper river, particularly below RBDD (use of spawning habitat below RBDD by fish prevented from reaching the upper reach of the river declined during this period as well). Similar low numbers of spring-run Chinook salmon were counted on the three tributary streams downstream of RBDD during the drought. However, since the mid-1990s, although populations recovered somewhat in the downstream tributaries, the mainstem Sacramento River population remained critically low and, based on the 2003 survey, may now be approaching extinction.

Given the current restricted geographic distribution and only two remaining independent natural spring-run Chinook salmon populations (one in Mill and Deer Creeks and the other in Butte Creek), the species is perilously close to extirpation in the Sacramento basin (McElhany et al., 2000; Lindley et al., 2004; copies enclosed). A major focus of protection and recovery efforts is to reestablish the run in other suitable streams. The mainstem Sacramento River below Keswick Dam, which has large amounts of holding and spawning habitat and cool water temperatures, and two tributary streams, Battle and Clear Creeks (both located upstream of RBDD) offer some of the best opportunities for restoring a broader geographic distribution for the spring-run Chinook salmon, increasing its population size, and reducing its vulnerability to extinction. In addition, the

Responses

Bay-8
The suggested timeframe is outside of the EA's baseline conditions. The historical distribution of Chinook, however, is discussed. The EA acknowledges that the placement of dams and water diversions are a major cause of this species decline. It should also be noted that the numbers may be misleading. The NOAA OCAP Supplemental BO 2004-2006 (February 27th 2004) states:

> "[e]valuating the abundance of the ESUs as a whole, however, complicates trend detection. For example, although the mainstem Sacramento River population appears to have undergone a significant decline, the data are not necessarily comparable because coded wire tag information gathered from Central Valley fall-run Chinook salmon (CV fall-run Chinook salmon; *O. tshawytscha*) returns since the early 1990s has resulted in adjustments to ladder counts at Red Bluff Diversion Dam (RBDD) that have reduced the overall number of fish that are categorized as spring-run Chinook salmon."

The EA does not assess the continued use of RBDD, as this is a separate action which is assessed in depth in the OCAP BA, and is the subject of its own environmental compliance procedures.

Comments

The Bay Institute (cont'd)

anadromous fish doubling requirement of the Central Valley Project Improvement Act (CVPIA) includes a doubling goal for spring-run Chinook salmon on the Sacramento River (USFWS, 1995).

Past and current RBDD operations have had significant negative impacts on spring-run Chinook salmon. Continuation of the current RBDD operations, the action proposed in the EA, will likely result in the extirpation of the run from the Sacramento River, failure to meet CVPIA-mandated doubling goal for the run in the Sacramento River, and prevent establishment of the run in newly restored streams upstream of RBDD.

- RBDD prevents or delays upstream migration of 70% of adult fish (OCAP BA, pg. 6-19; Draft EIS/EIR Fish Passage Improvement Project for RBDD, pg. B-6). Fish ladders incorporated into the dam are inefficient at passing spring-run Chinook salmon (CDFG, 1998; copy enclosed).
- Reduced flows and elevated temperatures below RBDD when the gates are closed reduce survival of fish restricted to areas below RBDD.
- Migration delays at RBDD prevent fish that do pass the facility from successfully reaching suitable holding habitat in tributary streams before seasonal decreases in flow and increases in temperature in the lower reaches of these tributaries block their passage (TCCA and USBR, 2002).
- The biological consequences of blocked or delayed passage at RBDD include changes in spawning distribution (Hallock, 1987; copy enclosed), hybridization with fall-run Chinook salmon (CDFG, 1998), increased adult pre-spawning mortality (USBR, 1995), and decreased egg viability (Vogel et al., 1988), all of which contribute to reduced reproductive success.

Bay-9

Winter-run Chinook salmon

Winter-run Chinook salmon historically spawned in several Sacramento River tributaries located far upstream of Shasta Dam (Moyle, 2002). Closure of Shasta and Keswick Dams restricted this unique run to a single location, the Sacramento River below Keswick Dam.[5] Environmental conditions (largely water temperature) in the river further restrict the fish, which return to the river as immature adults during the winter and hold during the spring and summer before spawning in the late summer, to the short reach of the river from immediately below Keswick Dam to approximately Red Bluff Diversion Dam (depending on water temperature and flow conditions). In the mid-1970s, drought and extreme water management operations on the Sacramento River nearly wiped out the run, killing most adult fish holding in the river and most incubating eggs during two consecutive years and resulting in extremely low returns of adult fish three years later

[5] The Sacramento River basin is the only watershed that supports a winter run of Chinook salmon (Moyle, 2002).

Responses

Bay-9

These are not consequences of the proposed action. The EA does not address shifting the compliance point, the removal of the minimum carryover storage, nor the impacts of RBDD. Operations of the CVP are a separate action. Please refer to the CVPIA PEIS and OCAP BA. Cumulative CVP impacts were addressed in the CVPIA PEIS and are incorporated in this EA by reference. Beyond those cumulative impacts discussed in the CVPIA PEIS and BO, there are no additional cumulative impacts that would result from long-term water service contract renewals in the Sacramento River Division.

Comments

The Bay Institute (cont'd)

Bay-9 (cont'd)

(i.e., in 1979 and 1980, Figure 3, data from CDFG, 2004 datum is a preliminary estimate reported to the California Bay-Delta Authority Operations Group). By 1989, after the species had remained at critically low levels for a decade, it was listed by both the state and federal ESAs as threatened. In 1994, the federal ESA listing was changed to endangered.

Given the current extremely restricted geographic distribution of winter-run Chinook salmon and the concentration of the entire Evolutionarily Significant Unit (ESU) into a single population, this species is also highly vulnerable to extinction (Lindley et al., 2004). A major focus of protection and recovery efforts is to protect remaining habitat below Keswick Dam by using the Shasta Temperature Control Device[6] and controlled reservoir releases to maintain suitably cool temperatures for adult holding, spawning, egg incubation and early rearing, improve passage of immigrating adults to the upper Sacramento River by opening RBDD gates during September 15-May 15 period, improve survival of emigrating juveniles, and reestablish the run in other suitable streams, with the greatest emphasis on Battle Creek. And as existing state bond funding for CALFED restoration activity dries up and federal funding for and authorization of CALFED languish, it is at best uncertain whether, let alone when, winter-run Chinook salmon will be successfully restored to Battle Creek.

The EA states that, in some years, water temperatures "may reach levels that are detrimental to survivorship" (pg. 3-75) for winter-run Chinook salmon but implies that the run will respond by spawning closer to the dam. The effects of reduced summer flow (predicted by the OCAP BA analyses) and the effects of elevated water temperature resulting from this and Reclamation's proposed upstream shift in the temperature compliance point on this run (or on spring-run Chinook salmon and steelhead), and the resultant reduction in critical habitat area are not described in the EA or included in the summary table of potential impacts (EA Table 2-2, pg. 2-15, 16). The OCAP BA provides more analysis of the multiple potential impacts of planned operations for the delivery of water by Reclamation to its Sacramento River Division contractors as well as downstream contractors and the Delta.

- Reclamation's plan to shift the temperature compliance point to a location 18 miles upstream of that presently required under the winter-run Chinook salmon BO (NOAA Fisheries, 1993) is likely to undo some or all of the progress towards recovery of the species made during the past decade (see Figure 3). Even during the past decade Reclamation has failed to meet current temperature compliance requirements, with the largest exceedences occurring during the past four to seven years (OCAP BA, pg. 9-29). These exceedences are the likely explanation of Reclamation's observation in the OCAP BA that winter-run Chinook salmon now spawn in areas closer to Keswick Dam than in the past and, rather than justifying

[6] Before the Temperature Control Device was completed, cool water from deep in Shasta Reservoir was released from lower outlets by bypassing the power generation turbines.

Responses

The Bay Institute (cont'd)

Bay-9 (cont'd)

a harmful change in the temperature compliance point proposed by Reclamation, may in fact be contributing to the slowed rate of population increase observed in the past three to four years. In addition, Reclamation predicts that Sacramento River flows during the critical late summer and early fall period will be lower, exacerbating water temperature problems (OCAP BA, pg. 9-27).

- Results of analyses reported in the OCAP BA (pg. 9-32, Figure 9-32) indicate that future operations will increase egg mortality (above current levels) by an average of 5-10% and by as much as 20-25% in critically dry years.

- The upstream shift in the temperature compliance point reduces winter-run Chinook salmon habitat by 40% (as linear river miles), effectively eliminating access to 18 miles of river channel in many years.

Reclamation's plan to no longer operate to meet the minimum 1.9 MAF of carryover storage threatens the survival of winter-run Chinook salmon during multi-year droughts. The potential impacts of this action were not reported in the EA.

- Maintenance of a minimum of 1.9 MAF is intended to preserve enough water in Shasta Reservoir's cold-water pool to support flow releases for temperature control in the upper Sacramento River in years following dry and critically dry years. Failure to maintain sufficient reserves and resultant inability to threatens the survival of entire cohorts of the winter-run Chinook salmon ESU.

- Based on this proposed less conservative storage management plan, Reclamation's OCAP BA (pg. 9-28-32) predicted that, on average during dry and critically dry years, 45% of incubating eggs would be killed each year. This mortality rate is approximately two to ten times higher than that predicted for wetter years.

While current operations of RBDD improve passage for adult fish, the RBDD gates remain closed during the period when a large percentage of juvenile winter-run Chinook salmon migrate downstream. These fish must pass under the gates or through the ladders and their auxiliary water systems, or they are entrained and impinged into the Tehama-Colusa Canal headworks or the Research Pumping Plant screens and bypasses. The well-documented negative impacts of RBDD on survival of emigrating juvenile salmon, which were likely part of the basis for the Draft EIS/EIR for the RBDD Fish Passage Improvement Project to recommend as a preferred alternative that RBDD gates be raised year-round (Executive Summary, pg. V), were not reported in the EA.

- More than one third (39%) of emigrating juvenile winter-run try to pass RBDD when the gates are closed (TCCA and USBR, 2002, pg. B-8). Compared to fish that pass the RBDD when the gates are open, these fish are subjected to increased stress, physical injury and mortality.

Comments

The Bay Institute (cont'd)

- Vondracek and Moyle (1983) reported that the predominant cause of mortality of juvenile salmonids passing through the RBDD was a dysfunctional predator-prey created by the RBDD. USFWS (1981) reported that greater than 50% of juvenile Chinook salmon passing through RBDD when the gates were down died.

Steelhead

Steelhead, which spawn in the Sacramento River above RBDD and in upstream tributaries, will be negatively affected by Reclamation's proposed renewal of long-term water service contracts and associated operations in a variety of ways.

Bay-10

- RBDD blocks passage of at least 17% of immigrating adult steelhead (TCCA and USBR, 2002).
- More than a third (36%) of juvenile emigrants are negatively affected by RBDD. Mortality rates of juvenile steelhead passing through the dam are 42% (TCCA and USBR, 2002).
- Increases in water temperature resulting from the upstream shift in the temperature compliance point and reduced flows during the summer will increase mortality (above current rates) of both adult and juvenile steelhead.

Green sturgeon

Green sturgeon populations have been reduced throughout their range and today only three known spawning populations still exist, including one on the Sacramento River (Moyle et al, 1995). Among the causes for the species' decline are loss of access to spawning habitat by dam construction and degradation of spawning habitat quality (OCAP BA, pg. B-12).

Bay-11

- As much as 35% of the immigrating adult green sturgeon are blocked by RBDD. Green sturgeon do not readily ascend fish ladders designed for passage of salmonid fishes, therefore any green sturgeon that reach RBDD when the gates are closed are completely prevented from ascending the river beyond that point (OCAP BA, pg. B-16). Emigrating adult fish are also blocked by RBDD.
- During the May 15-September 15 period when the RBDD gates are closed, nearly 100% of emigrating larval and juvenile green sturgeon must pass under the gates, through the fish ladders, or become entrained at the two diversion facilities where, like juvenile salmonids they are subject to stress, injury, mortality, and high rates of predation

Bay-12

During the past few decades, the effects of water management operations on the Sacramento River, its environment, and its valuable biological resources have been observed, investigated and extensively documented. For many specific impacts, the mechanisms underlying their effects have been identified and alternative infrastructure

Responses

Bay-10

See response to Bay-9, above.

Bay-11

See response to Bay-9, above.

Bay-12

The alternatives assessed in the EA represent a range of water service agreement provisions that meet the project purpose and need. The No Action Alternative consists of renewing existing water service contracts as described by the Preferred Alternative of the PEIS. In November 1999, Reclamation published a proposed long-term water service

Comments

The Bay Institute (cont'd)

Bay-12 (cont'd) design, operation and/or management approaches that minimize their adverse impacts have been devised. The three alternatives evaluated by Reclamation in the draft EA to support renewal of long-term water service contracts in the Sacramento River Division fail to consider or implement any such improvements, despite compelling evidence that continued operations threaten the continued existence of several priority fish species and despite federal laws such as the CVPIA that mandate such reforms. Further, the impacts analysis reported in the EA ignores a large body of evidence, much published by Reclamation itself, of adverse impacts of current and planned actions and draws a false and unsupported conclusion of no significant impact.

Bay-13 For all of the above reasons, and for the reasons set out in our supplemental comments being submitted under separate cover, as well as based on the materials attached with both sets of our comments and/or incorporated or referenced therein, the revised draft EA and the draft FONSI are technically and legally inadequate and contrary to law. We strongly urge Reclamation to prepare new environmental documentation for the proposed action, including an EIS/EIR, that includes among other things a more robust range of alternatives, including at least one that, at a minimum, is designed to address the negative impacts discussed in these comments, and that provides a much more comprehensive and rigorous evaluation of negative impacts to the River's environment and biological resources.

Sincerely,

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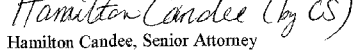

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Responses

Bay 12 (cont'd)

contract. In April 2000, the CVP Contractors presented an alternative long-term water service contract. Reclamation and the CVP Contractors continued to negotiate the CVP-wide terms and conditions with these proposals serving as "bookends." This EA considers these proposals as bookends in the environmental documentation to evaluate the impacts and benefits of renewing the long-term water service contracts.

Reduction of contract amounts was considered in certain cases but rejected from analysis. The reason for this was twofold. First, water needs analyses have been completed for all contractors and in almost all cases the needs exceed or equal the current total contract amount. Second, in order to implement good water management, the contractors must be able to store or immediately use water available in years when more water is available. By quantifying contract amounts in terms of the needs analyses and the CVP delivery capability, the contractors can make their own economic decisions. Allowing the contractors to retain the full water quantity gives the contractors assurance that the water will be available to them for storage investments. In addition the CVPIA, in and of itself, achieves a balance through its dedication of significant amounts of CVP water and actions to acquire water for environmental purposes.

Non-renewal of existing contracts is considered infeasible based on Section 3404(c) of the CVPIA. This alternative was considered but eliminated from analysis in this EA because Reclamation has no discretion not to renew the contracts.

Bay-13

Reclamation has analyzed the Proposed Action in accordance with NEPA. The range of alternatives is based on the proposed contracts under negotiation when the NEPA process was initiated, and provides an adequate range of contract provisions consistent with the purpose and need of the contract renewal. The EA, tiered to the CVPIA PEIS, deals with the local effects of water pricing and how that may affect the Sacramento River Division's water purchases. The determination of no significant impact is based on the absence of changes to the infrastructure, physical disturbances, or water delivery, because few changes are expected in water quantities purchased by the contractors or in acreage cultivated as a result of the proposed action.

In addition, as stated in an earlier response, the CVPIA, through its numerous environmental actions, is addressing fish and wildlife that have been impacted by the CVP. The contracts need to be considered in the context of the CVPIA as a whole.

The Bay Institute (cont'd)

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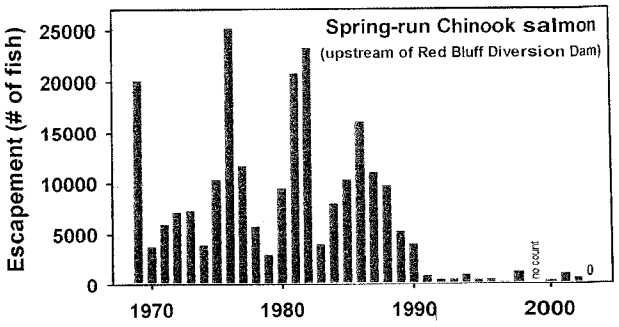

Figure 1. Escapement (number of adult fish) of spring-run Chinook salmon to the mainstem Sacramento River upstream of Red Bluff Diversion Dame, Data from CDFG.

The Bay Institute (cont'd)

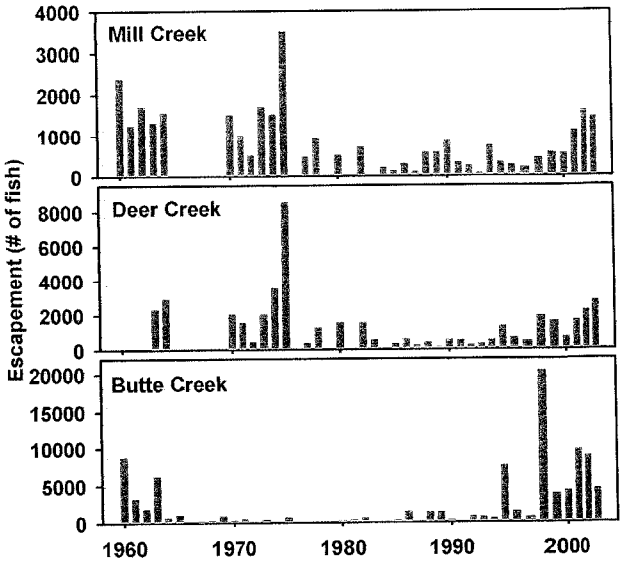

Figure 2. Escapement (number of adult fish) of spring-run Chinook salmon to Mill, Deer, and Butte Creeks. Data from CDFG.

The Bay Institute (cont'd)

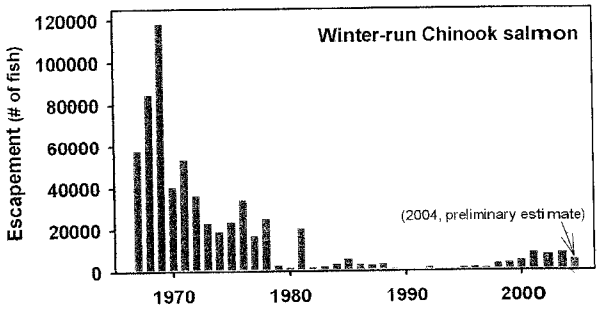

Figure 3. Escapement (number of adult fish) of winter-run Chinook salmon to the mainstem Sacramento River. Datum for 2004 is a preliminary estimate. Data from CDFG.

Comments

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RE: Supplemental Comments on Revised EA for Sacramento River Division Contracts

Dear Ms. Trout:

These are the supplemental comments of the Natural Resources Defense Council (NRDC), The Bay Institute, and the Planning & Conservation League (PCL) on the Revised Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for Renewal of the Long-term Contracts for the Sacramento River Division Contractors (proposed contracts), U.S. Bureau of Reclamation, Mid-Pacific Region, Sacramento, CA; July 2004. Separately, our three organizations are submitting detailed technical comments on the revised draft EA/FONSI, along with extensive attachments, under separate cover. (A copy of those separate August 27, 2004 comments, without the attachments, is also enclosed herein for your convenience.) In addition, we are enclosing with these supplemental comments numerous materials that are relevant to the proposed renewal contracts and the revised draft EA/FONSI. We request full consideration of both sets of comments, along with all materials attached to or submitted with each of our comment letters or incorporated or referenced therein.

1. Request for Extension of Comment Deadline

NRDC-1

The Bureau has not provided adequate time for the public to review the EA and FONSI or the proposed contracts. For all of the reasons stated in the attached letters from the Pacific Coast Federation of Fishermen's Associations (PCFFA), Taxpayers for Common Sense, Northern California/Nevada Council-Federation of Fly Fishers, and Rep. George Miller and five other Members of Congress, we urge you to reopen or extend (or both) the public comment periods for the contracts and the EA/FONSI so that there will be at least 60 days of public comment allowed after the completion and public distribution of the final Biological Opinion of NOAA Fishers (NMFS) on the new OCAP for the Central Valley Project (CVP) and the State Water Project (SWP).

2. The Revised Draft EA and the proposed FONSI are Legally Inadequate.

NRDC-2

The Bureau has failed to correct the numerous deficiencies in its prior environmental review documents pertaining to CVP long-term renewal contracts and interim renewal

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Responses

NRDC-1

Reclamation has considered requests for extensions of the comment period but feels adequate time was given for review. The draft OCAP BO has been reviewed and the final OCAP BOs did not alter the analysis presented in the EA.

NRDC-2

The EA and the scope of the analysis were developed consistent with NEPA regulations and guidance from the Council on Environmental Quality (CEQ), and in conformance with the direction provided by NRDC vs Patterson, Civ. No. S-88-1658 (Patterson), which specifically addressed the application of NEPA relative to contract renewals. In Patterson the court found that "…ongoing projects and activities require NEPA procedures only when they undergo changes amounting in themselves to further "major action." The court went further to state that the NEPA

Comments

Natural Resource Defense Council (cont'd)

NRDC-2 (cont'd)

contracts. Numerous comments criticizing these earlier documents have been submitted to the Bureau and are contained in the administrative records on those contracts and their associated NEPA review processes, including NRDC's own extensive comments dated December 7, 2000, which are attached and incorporated herein, and the comments of the Hoopa Valley Tribe (letter of Thomas Schlosser to Frank Michny), which are also attached. Among other things, the Bureau has failed to meet its legal obligation to prepare a full Environmental Impact Statement (EIS) on these proposed contracts, failed to consider a reasonable range of alternatives, and failed to disclose and analyze adequately the environmental impacts of the proposed action, including cumulative impacts. Associated CEQA review is likewise insufficient. Some of these defects are more fully addressed below.

NRDC-3

3. The Bureau has failed to address the concerns previously identified by EPA and failed to comply with the Findings of the Council on Environmental Quality.

In a series of letters, the US EPA has expressed repeated concern over the adequacy of the Bureau's environmental review process for its contract renewal program, including but not limited to the attached letters dated December 8, 2000, August 30, 2001, January 4, 2002, and January 23, 2004. Yet the Bureau has failed to adequately address those concerns in its new EA/FONSI. Similarly, back in 1989, EPA challenged the Bureau's failure to complete a full EIS on each group of CVP renewal contracts and the Council on Environmental Quality (CEQ) upheld EPA's critique. See 54 Fed. Reg. 28477 (July 6, 1989). The Bureau has numerous copies of the complete record of that proceeding, including in its copies of the court record in *NRDC v. Patterson*, Civ. No. S-88-1658-LKK, and should review and reconsider that record, including EPA's numerous submissions, and the CEQ findings.

NRDC-4

4. The Bureau has failed to adequately consider the effects of its operations and proposed contracts.

Among many other defects, the Bureau has failed to adequately consider the impacts to fish species and fish habitat from its operations on the Sacramento River, including but not limited to the operation of Red Bluff Diversion Dam and the Tehama-Colusa Canal and the Bureau's new overall OCAP. In addition to the information provided in and referenced in our separate technical comments on this EA/FONSI, we also attach and direct your attention to the following relevant documents, and incorporate each of them by reference:

a. July 11, 2003 letter from NRDC and The Bay Institute to Ms. Ann Lubas-Williams on the Draft OCAP and Draft OCAP Biological Assessment.
b. July 28, 2004 letter from NRDC to Mr. Wayne White of US FWS re ESA Consultation on OCAP.

Responses

NRCD-2 (cont'd)

statutory requirement applies only to those changes. The analysis in the EA finds the renewals of the contract to be a continuation of previous contracts with minor financial and administrative changes with no changes in either the volumes of water under contract or the places of use. Moreover, most contracts do not involve any change in the type of use, such as the addition of M&I uses. The analysis in the EA addresses the proposed changes to the contract and the potential environmental effects of those changes. As indicated in the EA, these contract changes would not result in significant effects to the environment.

NRDC-3

Please see response to NRDC-2, above.

NRDC-4

The analysis in the EA addresses the proposed changes to the contract and the potential environmental effects of those changes. As indicated in the EA, these contract changes would not result in significant effects to the environment. The proposed action that is being analyzed in this EA is water service contract renewal and the delivery of water to the contractors. The impacts to fish species as a result of contractor's water use and Reclamation's operations and maintenance activities are discussed in the documents you mentioned. This EA does not disregard the findings of other reports, but is focusing on the proposed action of incorporating administrative conditions into renewed contracts to ensure CVPIA compliance.

In regard to the Fish Passage Improvement Project, Reclamation is continuously working with NOAA Fisheries to minimize impacts to salmonids at the RBDD and decisions about the next steps will be made after the OCAP BA consultation is completed. This is a separate action subject to its own environmental compliance requirements. Permanent, structural fixes at the RBDD would cost on the order of 100 million dollars, so decisions as to what to do are not easily reached. It may be that lower costs, seasonal fixes can be designed, but that remains to be seen.

Natural Resource Defense Council (cont'd)

NRDC-4 (cont'd)

Similarly, the EA/FONSI disregards the concerns, findings and analysis previously provided on these Sacramento River environmental issues by the Bureau itself or other federal agencies, including but not limited to the attached letter of July 23, 2004 from NMFS to Mr. Thomas Stokely and the attached February 1998 Supplemental Fish & Wildlife Coordination Act Report by the US FWS on the Red Bluff Diversion Dam and the Tehama-Colusa Canal, as well as the August 2002 Draft EIS/EIR for the Fish Passage Improvement Project at Red Bluff Diversion Dam, available at www.tccafishpassage.org.

NRDC-5

5. The Bureau fails to analyze meaningful alternatives on the key terms of the contracts including price and water quantity.

Numerous members of the public have written to the Bureau in past years urging the Bureau to evaluate a broader range of alternatives to its current policy of rolling over most water quantity terms in its long term renewal contracts and keeping water prices significantly below cost and below market without any adjustment for conservation incentives or environmental repayment. The EA/FONSI has utterly failed to evaluate such alternatives, including those discussed in the attached May 3, 2004 letter of National Taxpayers Union & Taxpayers for Common Sense, the attached letter of January 9, 2001 of NRDC, and the attached March 2, 1994 brief on ratesetting filed by plaintiffs in *NRDC v. Patterson*, Civ. No. S-88-1658-LKK.

NRDC-6

6. The Bureau is acting in an arbitrary and capricious manner in its NEPA process on contract renewals.

This EA/FONSI is part of a larger pattern of arbitrary NEPA compliance by the CVP in addressing its OCAP and contract-renewal program. For example, the Bureau is proposing significant changes in its operations in its OCAP, yet failing to do any NEPA or CEQA review. The Bureau is conducting an EIS on the Sacramento River Settlement Contracts, the American River Division renewal contracts and the San Luis Unit renewal contracts, yet relying on a mere EA/FONSI for its Sacramento River Division contracts. The current proposed FONSI refers to a project description in OCAP, yet the 3 different versions of the OCAP BA, the final OCAP itself, the final FWS Biological Opinion on OCAP, and the ongoing ESA consultation with NMFS on OCAP involve different project descriptions. In sum, the approach is irrational and arbitrary and contrary to NEPA and its implementing regulations. We urge you to withdraw the revised draft EA and FONSI and proceed with a more adequate analysis in a full draft EIS on the proposed contracts.

Sincerely,

Hamilton Candee
Senior Attorney

NRDC-5

A needs analysis was conducted for each contractor within the various units of the CVP to determine the historic and projected water demands and supplies, and historic and projected cropping patterns. Comprehensive information on each contractor's surface and groundwater supplies was collected together with information in the contractor's Water Management Plans. In regards to groundwater supplies, the initial calculation of CVP water needs was limited by the assumption that groundwater pumping would not exceed the safe yield of the aquifer. The average of 19 years of historical water deliveries was compared to a calculated average past beneficial use. Because the CVP was initially established as a supplemental water supply for areas without adequate supplies, the needs for most contractors are at least equal to the CVP water service contract and frequently exceeded the previous contract amount.

The water pricing contract rates are defined by the CVP rate-setting policies, P.L. 99-546 and the Reclamation Reform Act (RRA). The prices of CVP water used in the No Action Alternative are based upon 1994 irrigation and municipal/industrial CVP water rates.

The No Action alternative together with negotiated proposals for CVP-wide terms and conditions are the basis for the action alternatives. The preferred alternative essentially maintains the status quo apart from changes mandated by the CVPIA. The analysis displays the increment of change between the No Action Alternative and the other alternatives.

NRDC-6

Project operations as described in the OCAP BA are a separate action from contract renewal. The OCAP BA/BO process is subject to its own environmental compliance requirements which are being addressed as may be required. A consistent project description was utilized in both Biological Opinions received on the CVP operations.

Comments

Defenders of Wildlife

Butte Environmental Council

August 30, 2004

Basra Trout
P.O. Box 159
Red Bluff CA 96080.

Mr. Richard Stevenson
Bureau of Reclamation
2800 Cottage Way, MP-440,
Sacramento CA 95825.

Re: Sacramento River Division Environmental Assessment and Contracts

Dear Ms. Trout and Mr. Stevenson:

On behalf of Butte Environmental Council, Defenders of Wildlife, and the Lassen Forest Preservation Group, we would like to thank you and your staff for the opportunity to comment on and pose questions about the Sacramento River Division Environmental Assessment and Contracts.

Process

We request that the Bureau of Reclamation (BR) extend the comment period on the Sacramento River Division Environmental Assessment (EA) and the Sacramento River Division Contracts. We have been unable to download the sizable documents from your web site. In addition, we need access to the Biological Opinions (BOs) by the U.S. Fish and Wildlife Service and NOAA Fisheries to adequately comment and these documents have not been completed.

We request a hard copy of this EA, and when available, the BOs, the Sacramento River Settlement Contractors Environmental Impact Statement, and the Feather Water District Environmental Assessment.

Substantive Issues

DOW-1 1) Are there operational conservation plans for each of the contractors as required by the Central Valley Project Improvement Act (CVPIA)? If so, will you please send us copies?

DOW-2 2) There are severe water quality issues in the Colusa drain, which fails both state and federal standards. When and how will you address these violations of the Clean Water Act and Porter Cologne?

Responses

DOW-1

All M&I contractors with more than 2000 af of Project Water or Irrigation contractors with more than 2000 irrigable acres are required to have water conservation plans. All available Water District (contractor) Water Conservation or Water Management Plans are on file at the Regional office and can be made available for review there. The contact point for those plans would be Lucille Billingsley in the Mid-Pacific's Regional Office, who can be reached at (916) 978-5215.

Sacramento River Settlement contractors, as holders of water rights, are distinct from water service contractors and are still developing their plans as part of a 'Regional' plan. The City of Redding, which has both a settlement contract and a water service contract, and the contractors which hold only water service contracts, such as the TCCA districts, Bella Vista, Clear Creek, and the City of Shasta Lake have prepared plans.

DOW-2

Reclamation is unaware of any specific violations of the Clean Water Act or Porter Cologne Act in the Colusa Drain resulting from its actions of renewing water service contracts. We have received no notices of any such violations. Reclamation does not own these facilities and cannot address violations which do not directly result from the proposed action of contract renewal. Please see comment FOR-16.

Comments

Defenders of Wildlife (cont'd)

DOW-3 3) The model used for benchmark studies for this process, CalSIM II, is highly flawed (Sjovold 2004). How will the BR correct these significant failings?

DOW-4 4) The operation of the Red Bluff diversion violates the CVPIA. It currently prevents migration of 70% of threatened spring run Chinook salmon and 17% of steelhead adults. There has been no quantification of impacts to all juvenile fish species. What does the BR plan to do to rectify this violation?

DOW-5 5) The Tehama Colusa Canal and the Corning Canal pose serious problems for fish migration on all the westside tributaries. As you are aware, Stoney Creek is so impacted that it runs unnaturally dry a significant part of the year. What does the BR propose to do to restore flows to these tributaries?

DOW-6 6) What analysis has been conducted to determine the impacts to ground water, the local economy, and the environment if surface waters are sold and ground water is used to replace the surface water for existing operations? What analysis has been done to determine the impacts to the local economy and the environment if surface waters are sold and agricultural land is fallowed?

DOW-7 7) The Sacramento River has minimum flow standards for salmonids and no ecosystem flow standards for riparian restoration, a significant CalFed goal.

DOW-8 8) What analysis has been conducted to determine the possible impacts from proposed water storage projects like Sites Reservoir and raising Shasta dam?

DOW-9 9) Where is the cumulative impact analysis for all the contracts, possible ground water substitution, and proposed storage projects?

DOW-10 10) The contract renewals are an opportunity to quantify the value of water flowing from upper watersheds. How will the BR fund the studies to provide this watershed information? The contractors should assist with the funding.

Thank you for the opportunity to comment.

Sincerely,

Barbara Vlamis, Executive Director
Butte Environmental Council
116 W. Second Street, Suite 3
Chico, CA 95928

Kelly McDonald, California Program Associate
Defenders of Wildlife
926 J Street, Suite 522
Sacramento, CA 95814

James Brobeck, Forestry Policy Analyst
Lassen Forest Preservation Group
1605 Manzanita
Chico, CA 95926

Responses

DOW-3
In conducting studies for this process, we used the best available information at our disposal. New information will be taken into account as it is provided.

DOW-4
Only about 7% of the total spring run population currently migrates into the upper Sacramento Valley and is either delayed or blocked at the RBDD. Conversely, 93% of spring-run experience no delays or they spawn downstream of the RBDD. The earliest arriving fish have the best chance of making it to the upper reaches of tributary streams where they hold over the summer before spawning, encountering no obstacles. Permanent, structural fixes would cost in the order of 100 million dollars, so decisions as to what to do are not easily reached. It may seasonal fixes can be designed at lower costs, but that remains to be seen. Reclamation is continuously working with NOAA Fisheries to minimize impacts to salmonids at the RBDD and decisions about the next steps will be made after the OCAP BA consultation is completed.

DOW-5
The TC and Corning Canals do not impact fish migration in most west side streams. These canals pass under these streams by means of siphons, leaving them unobstructed with the exception of Funks Creek and, seasonally, Stony Creek. However, all west side streams south of Stony Creek, including Funks, terminate in the Colusa Basin Drain. The Drain is a privately constructed feature that predates the canals by decades, which blocks or impedes access from the Sacramento River. All streams north of Stony Creek connect to the Sacramento River, but most, except Cottonwood Creek were seasonal before the onset of agricultural diversions. While these diversions surely shorten the period of flow, they are all private, not CVP diversions. The only water removed from tributaries to the Sacramento by the TC and Corning Canals is a portion of the water stored in Black Butte Reservoir at the end of the flood season. Part of that stored water, as noted above, is devoted to in-stream flows that tend to extend the period of potential passage.

Comments

Defenders of Wildlife (cont'd)

Responses

DOW-5 (cont'd)

Historically, flows in Stony Creek occurred intermittently in the late fall, winter, and spring months. With the installation of Black Butte Dam, flows in Stony Creek have been regulated by the COE for the purpose of flood control primarily from November through March. After the threat of floods has passed, Reclamation controls releases of stored water for the purpose of irrigation. When water is being diverted for irrigation using a temporary diversion dam, a minimum of 40 cfs is being released downstream for fishery benefits. Reclamation and the COE are currently consulting with NOAA Fisheries on the effects of water operations in lower Stony creek to anadromous fish. A short-term BO was issued in 2002 and a long-term BO is expected by March of 2005. The terms and conditions of the BO suggest increased releases to benefit salmonids.

DOW-6

This EA does not evaluate exchanges or transfers. Water transfers are considered actions separate from contract renewal that require their own action-specific environmental compliance. The CVPIA has allowed water transfers upon approval by Reclamation; transfers were evaluated in the Programmatic Environmental Impact Statement for the Preferred Alternative. Reclamation will continue to require separate environmental review of proposed transfer requests. At this time, however, some sense of the potential effects can be obtained from, or soon will be obtainable, from the reports of the Sacramento Valley Water Management Program, the EIS for the renewal of the Sacramento River Settlement Contracts (SRSC), and the Sacramento River Basinwide Water Management Plan. The effects predicted by modeling for the SRSC EIS were surprisingly small in the context of the basin as a whole.

The CVP was initially established as a supplemental water supply for areas without adequate supplies. A needs analysis was conducted for each contractor within the various units of the CVP. In regards to groundwater supplies, the initial calculation of CVP water needs was limited by the assumption that groundwater pumping would not exceed the safe yield of the aquifer.

Comments

Defenders of Wildlife (cont'd)

Responses

DOW-6 (cont'd)
The Agricultural Economics and Regional Economy sections under each of the alternatives in the EA analyzes which scenario would result in the greatest economic effects when applied to the gross value of production, the fallowing of land, and the increased cost of CVP water.

DOW-7
Comment noted. The subject of this EA is the renewal of existing contracts with minor financial and administrative changes with no changes in either the volumes of water under contract or the places of use. The analysis in the EA concerns Reclamation's delivery of CVP water to CVP contract areas. The comments regarding minimum flow standards are outside the scope of this document.

DOW-8
The subject of this EA is the renewal of existing contracts with minor financial and administrative changes with no changes in either the volumes of water under contract or the places of use. The analysis in the EA concerns Reclamation's delivery of CVP water to CVP contract areas. The comments regarding water storage projects are outside the scope of this document.

DOW-9
The cumulative impacts of the CVP were addressed in the PEIS for implementation of the CVPIA. Analysis of potential impacts on agricultural land use and economics of the Sacramento River Division CVP contract renewal is conducted at the level of the specific CVP contractors that would be affected. The analysis of potential regional level water projects is beyond the scope of the action analyzed in this EA.

DOW-10
The subject of this EA is the renewal of existing contracts with minor financial and administrative changes with no changes in either the volumes of water under contract or the places of use. The analysis in the EA concerns Reclamation's delivery of CVP water, not its use. The comments regarding watershed studies are outside the scope of this document.

Taxpayers for Common Sense

Comments

August 30, 2004

VIA FAX AND EMAIL

Mr. Kirk Rodgers
Mr. Richard Stevenson
Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Ms. Basia Trout
Red Bluff Division Office
Bureau of Reclamation
P.O. Box 159
Red Bluff, CA 96080

RE: Sacramento River Division Contractors Draft Revised Environmental Assessment (EA) and Finding of No Significant Impact (FONSI)

Dear Mr. Rodgers, Mr. Stevenson, and Ms. Trout:

With this letter, Taxpayers for Common Sense (TCS), a nonpartisan budget watchdog, submits our comments regarding the Bureau of Reclamation's draft EA and FONSI for the Sacramento River Division contracts. TCS is extremely concerned about the way in which the Bureau of Reclamation is renewing Central Valley Project (CVP) water service contracts. According to the Bureau of Reclamation's July 30, 2004 press release, the Sacramento River Division contracts include the Tehama-Colusa Canal Unit, the Corning Canal Unit, and the Black Butte Unit. These proposed contracts will restrict up to 322,000 acre feet of CVP water for 25 to 40 years.

TCS-2-1

It is vital that the Bureau of Reclamation recognize that it is representing the interests of federal taxpayers when it is negotiating CVP water service contracts. The Bureau owes it to taxpayers to give them every chance to ask questions and understand the impacts of these major 25- to 40-year water commitments. It is disturbing that the Bureau has basically ignored numerous letters asking it to extend the comment period on the Sacramento River Division EA and FONSI. Instead, the Bureau proposes to renew Sacramento River Division contracts for up to 322,000 acre-feet of CVP water before the public has had a full opportunity to review the potential impact of these contracts or the proposed environmental documentation. To add insult to injury, the internet link to these important documents is down on the day that public comments are due, making it almost impossible for the public to comment on this vital documentation.

A non-partisan budget watchdog
651 Pennsylvania Avenue, SE • Washington, DC 20003 • Tel: (202) 546-8500 • Fax: (202) 546 8511 • staff@taxpayer.net • www.taxpayer.net

Responses

TCS-2-1

Reclamation has considered requests for extension of the comment period and feels adequate time was given for review. The analysis in the EA finds the renewals of the contract to be a continuation of previous contracts with minor financial and administrative changes with no changes in either the volumes of water under contract or the places of use. Moreover most do not involve any change in the type of use, such as the addition of M&I uses. The analysis in the EA addresses the proposed changes to the contract and the potential environmental effects of those changes. As indicated in the EA, these contract changes would not result in significant effects to the environment.

A needs analysis was conducted for each contractor within the various units of the CVP to determine the historic and projected water demands and supplies, and historic and projected cropping patterns. Comprehensive information on each contractor's surface and groundwater supplies was collected together with the contractor's Water Management Plans. In regards to groundwater supplies, the initial calculation of CVP water needs was limited by the assumption that groundwater pumping would not exceed the safe yield of the aquifer. The average of 19 years of historical water deliveries was compared to a calculated average past beneficial use. Because the CVP was initially established as a supplemental water supply for areas without adequate supplies, the needs for most contractors are at least equal to the CVP water service contract and have frequently exceeded the previous contract amount.

Comments

Taxpayers for Common Sense (cont'd)

Ms. Basia Trout
August 30, 2004

Public involvement must be the cornerstone of the water contract process. Without it, taxpayers face the negative fiscal ramifications of federal water service contracts that they had little part in shaping. The public should be given every chance to comment on the draft EA and FONSI for the Sacramento River Division contracts. Protecting taxpayers' interests requires that full opportunity be given for them to comment on all facets of water contract negotiations. The impact of these contracts on federal taxpayers as well as their potential consequences for water quality, wildlife and wildlife habitat, the fishing industry, urban and rural water users throughout California, and other important community concerns require that the public be fully engaged before decisions are made.

TCS believes these contracts do not represent the interests of federal taxpayers. Instead, they provide extremely favorable conditions to water service contractors while failing to ensure essential taxpayer protections, promised in the Central Valley Project Improvement Act (CVPIA) of 1992, are included. CVPIA and CALFED signified a commitment to ending the age of big subsidies and waste in California water policy. The Bureau of Reclamation needs to renew CVP contracts in a way that represents a responsible vision of future water needs in California. All proposed CVP contracts should reflect realistic water delivery amounts at far less subsidized prices.

Unfortunately, the Bureau of Reclamation is poised to enter into 25- to 40-year contracts with Sacramento River Division contractors which will not implement the important contract reforms envisioned by the CVPIA. The Bureau owes it to taxpayers to reduce promised quantities in the proposed contracts to reflect realistic water delivery levels. Inflated promises of water and large subsidies will increase pressure for new dam projects and threaten the delicate balance negotiated in the CALFED Record of Decision (ROD). Such promises will continue a vicious cycle of the federal government promising unreachable amounts of water at cheap prices to CVP contractors and then federal taxpayers being forced to fund massive new water projects to try to meet these demands.

TCS-2-2

Long-term CVP contracts are not permanent entitlements. Instead, contracts must receive full review in order to consider the constantly evolving needs of California's diverse set of water users. Contract pricing should also charge markets rates for water. The Bureau of Reclamation must also enforce tiered water pricing when drafting Sacramento River Division contract renewals. Under CVPIA, CVP contracts should be written to apply tiered water pricing when water consumption exceeds 80% of the annual contract maximum. Tiered pricing encourages wise use of water, therefore reducing the federal taxpayer's responsibility for providing highly subsidized water that will be wasted by contractors. We ask the Bureau of Reclamation to set annual contract maximums at more realistic levels that the CVP will be able to achieve.

A non-partisan budget watchdog
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Responses

TCS-2-2

The water pricing contract rates are defined by the CVP rate-setting policies, P.L. 99-546, and the Reclamation Reform Act (RRA). The prices of CVP water used in the No Action Alternative are based upon 1994 irrigation and municipal/industrial CVP water rates. The contracts will use tiered water pricing and in the No Action Alternative it is based upon use of a "80/10/10" Tiered Water Pricing from Contract Rate to Full Cost Rate" including appropriate Ability-To-Pay limitations. Under this approach the first 80% of the maximum contract total would be priced at a rate equal to the average of the contract Rate and Full Cost rate. The final 10% of the contract total would be priced at the Full Cost rate.

The No Action Alternative, together with negotiated proposals for CVP-wide terms and conditions, are the basis for the action alternatives. The preferred alternative essentially maintains the status quo apart from changes mandated by the CVPIA. The analysis displays the increment of change between the No Action Alternative and the other alternatives.

Taxpayers for Common Sense (cont'd)

Mr. Kirk Rodgers
Mr. Richard Stevenson
Ms. Basia Trout
August 30, 2004

TCS strongly urges the Bureau of Reclamation to redraft Sacramento River Division contract renewals to ensure that federal taxpayers are protected and the Central Valley Project Improvement Act of 1992 is accurately and legally implemented. We also urge the Bureau to give the public every possible opportunity to participate in the contract negotiation process. Please contact me at (202) 546-8500 x130 or aileen@taxpayer.net with any questions.

Sincerely,

Aileen D. Roder
Program Director

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Comments

Taxpayers for Common Sense

August 30, 2004

VIA FAX AND EMAIL

Ms. Basia Trout
Red Bluff Division Office
Bureau of Reclamation
P.O. Box 159
Red Bluff, CA 96080

RE: Sacramento River Division Contractors Draft Revised Environmental Assessment (EA) and Finding of No Significant Impact (FONSI)

Dear Ms. Trout:

Taxpayers for Common Sense (TCS), a nonpartisan budget watchdog group, would like to reiterate our concerns regarding the comment period for the Sacramento River Division draft EA and FONSI. On August 30, 2004, while finishing TCS' comments regarding these important documents, I noted that the link provided in the Bureau of Reclamation's July 30, 2004 press release entitled "Environmental Documents Available for the Renewal of the Sacramento River Division CVP Long-Term Water Service Contracts," was down. Given that August 30 is the deadline for the public to comment on these important documents, it is especially critical that these documents be readily available to the public at this time. Instead, as of 2:00 PM (EDT), the link continues to be down.

TCS-3-1

As you know, I alerted you to the problem associated with the Bureau of Reclamation's website link via email. TCS finds this development very disturbing. Despite numerous requests, the Bureau has refused to extend the comment period for these documents, yet the very documents that the public is being asked to review are unavailable on the final day of the comment period. In fact, there is no telling how long the link to these documents has been inactive. The scheduling of the comment period during a traditional time of family vacations and congressional recess combined with the documents being unavailable to the public on the last day of the comment period makes it necessary for the Bureau to extend the comment period to allow appropriate public input into the process.

A non-partisan budget watchdog
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Responses

TCS-3-1

Reclamation has considered requests for extensions of the comment period and feels adequate time was given for public review. The BA for the Sacramento River Division long-term water service contract renewals was completed on August of 2003. The Draft EA was first released on August 19, 2003 and was revised in March of 2004. On July 2, 2004, a 60-day public review and comment period was initiated for the associated long-term CVP water service contracts for the Black Butte Unit, Tehama-Colusa Canal Unit, and the Corning Canal Unit of the Sacramento River Division. The revised draft EA and FONSI were released on July 30, 2004 for an additional 30-day public review.

Taxpayers for Common Sense (cont'd)

I appreciate your attention on this matter. Please contact me if you have any questions at (202) 546-8500 x130 or aileen@taxpayer.net.

Sincerely,

Aileen D. Roder
Program Director

Cc: Mr. Kirk Rodgers

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Comments

Friends of the River

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FRIENDS OF THE RIVER

~~September~~ 30, 2004
aus

Ms. Basia Trout
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P.O. Box 159
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Mr. Richard Stevenson
U.S. Bureau of Reclamation
2800 Cottage Way, MP-440
Sacramento, CA 95825

Re: **Sacramento River Division CVP Long-Term Contracts**
Joint Comments on Contracts and Environmental Assessment

Dear Ms. Trout and Mr. Stevenson:

These are the comments of Friends of the River in combined response to the Sacramento River Division CVP Long-Term Contracts and Environmental Assessment (EA). Friends of the River is California's statewide river conservation organization, with more than 5,000 members dedicated to the protection and restoration of the state's free flowing rivers and watersheds.

Extension of Comment Period

The public comment period deadlines for the Sacramento River Division Contracts and its EA are August 30 and 31 respectively. But commenting effectively on these key documents within the short time period allotted has proven difficult.

FOR-1

The Bureau of Reclamation's Operations Criteria and Plan (OCAP) for the re-operation of the Central Valley Project (CVP) in cooperation with State Water Project facilities is intended to meet all future Bureau water obligations, including renewed CVP contracts. OCAP must therefore be considered a crucial component of the Sacramento River Division contracts. The National Marine Fisheries Service's (NMFS) biological opinion for threatened and endangered salmon and steelhead in response to OCAP is not yet available to the public. This makes it virtually impossible to submit relevant comments in regard the contracts' potential impacts on threatened and endangered salmonids.

The U.S. Fish and Wildlife Service's Biological Opinion for the endangered Delta Smelt in response to OCAP (dated 7/30/04) was not available to the public until the first week of

Responses

FOR-1

Reclamation has considered requests to extend the comment period and feels adequate time was given for public review. The BA for the Sacramento River Division long-term water service contract renewals was completed on August of 2003. The Draft EA was first released on August 19, 2003 and was revised in March of 2004. On July 2, 2004, a 60-day public review and comment period was initiated for the associated long-term CVP water service contracts for the Black Butte Unit, Tehama-Colusa Canal Unit, and the Corning Canal Unit of the Sacramento River Division. The revised draft EA and FONSI were released on July 30, 2004 for an additional 30-day public review. Reclamation considered extensions of the comment period but feels adequate time was given for review. The OCAP BO and the NOAA Fisheries BO is not expected to significantly change the analysis of this draft EA. The analysis in the EA addresses the proposed changes to the contract and the potential environmental effects of those changes. As indicated in the EA, these contract changes would not result in significant effects to the environment.

Comments

Friends of the River (cont'd)

August. Friends of the River is still reviewing this detailed 231 page document in regard to its relevancy with Sacramento River Division contracts.

Copies of the contracts and the EA are difficult for the public to access. General public access to the documents were primarily via the internet. Perhaps due to technical interface problems, Friends of the River has found it impossible to download the relevant documents from the Bureau's web site. The Bureau's web site was inaccessible to us and appeared to be over-loaded by public queries on Sept. 30. The lack of easily accessible documents made it quite difficult to develop comprehensive comments.

Friends of the River respectfully requests a 90-day extension of time to review all pertinent background information and comment on these complex and lengthy documents.

FOR-2

Shasta Reservoir Carry-Over Storage

Proposed changes in CVP operations outlined in OCAP indicate that the Bureau intends to eliminate the 1.9 million acre feet of Shasta reservoir carry-over storage used to maintain adequate cold water flows for the endangered Sacramento River winter run chinook salmon. To the extent that the elimination of cold water carry-over storage is needed to meet CVP contract renewals and other Bureau obligations, this could eliminate or reduce critical habitat in the Sacramento River for the endangered winter run chinook and other listed species.

FOR-3

Sacramento River Temperature Standard

In conjunction with the elimination of cold water carry-over storage, OCAP proposes to eliminate up to 20 miles of critical habitat for the endangered winter run chinook by moving the Sacramento River temperature standard for salmonids from Red Bluff upstream to Ball's Ferry. To the extent that the temperature standard change is needed to meet CVP contract renewals and other Bureau obligations, this could eliminate critical habitat for the endangered winter run chinook and other listed species.

FOR-4

Red Bluff Diversion Dam

The Red Bluff Diversion Dam (RBDD) diverts most of the water used by the Sacramento River Division contractors. The Contract EA and OCAP indicate that the Bureau intends to continue the current operation of the RBDD. The RBDD is a well-known fish killer. The current operation of the RBDD creates migration problems for up to 70% of the threatened spring run chinook salmon that spawn upstream of Red Bluff. It also blocks passage for at least 17% of threatened steelhead adults and negatively impacts juvenile steelhead migrants. The RBDD also blocks as much as 35% of migrating green sturgeon, which are now found only in the Sacramento and Klamath rivers.

Ironically, the Tehama-Colusa Canal Authority and several state and federal agencies proposed in 2003 a solution to the RBDD fish passage problems which called for the permanent raise of the RBDD gates to provide 100% effective passage for all fish species. The dam's diversion function would be replaced with new water pumps and

Responses

FOR-2

Operations of the CVP as addressed in the OCAP BA/BO process is a separate action subject to its own environmental compliance requirements. Management of the cold water pool at Shasta Reservoir is being addressed in the OCAP consultation process and BO.

FOR-3

A change in the cold water management is not related to several of these contracts. The changes being addressed are necessitated by physical changes to water availability and other environmental requirements that have occurred since 1992. See response to FOR-2.

FOR-4

Only about 7% of the total spring run population currently migrates into the upper Sacramento Valley and is either delayed or blocked at the RBDD. Conversely, 93% of spring-run experience no delays or they spawn downstream of the RBDD. The earliest arriving fish have the best chance of making it to the upper reaches of tributary streams where they hold over the summer before spawning, encountering no obstacles. Permanent, structural fixes would cost in the order of 100 million dollars, so decisions as to what to do are not easily reached. It may be that seasonal fixes can be designed at lower costs, but that remains to be seen. Reclamation is continuously working with NOAA Fisheries to minimize impacts to salmonids at the RBDD and decisions about the next steps will be made after the BA consultation is completed. This is a separate action subject to its own environmental compliance requirements.

Comments

Friends of the River (cont'd)

fish screens. The Bureau was instrumental in shelving this proposal in favor of continuing the current fish-killing operation.

FOR-5

Continued operation of the RBDD is not acceptable. It fails to provide the salmon mitigation and enhancement originally promised in the federal authorizing legislation for the RBDD. It violates the mandates of the Central Valley Project Improvement Act (CVPIA) and the California Bay-Delta Restoration Program to resolve fish passage problems, as well as the Anadromous Fish Restoration Plan (AFRP) to double the Central Valley's salmonid population. It fails to comply with section 5931 of the California Fish and Game Code requiring the free passage of fish over or around dams. Even worse, it ignores the million of taxpayer dollars spent to study and resolve fish passage problems at RBDD and will negate millions more that have been or will be spent to improve salmon and steelhead habitat on Battle Creek, Clear Creek, and other upstream tributaries.

Fish passage problems at the RBDD must be resolved before the CVP contracts are renewed, or the contract renewals will violate state and federal law and contribute to unacceptable adverse impacts on threatened and endangered fish species.

Tehama-Colusa Canal and Corning Canal

FOR-6

The Tehama-Colusa Canal and Corning Canal distribute Sacramento River Division contract water diverted by the RBDD. The canals cross several west-side tributaries of the Sacramento River that formerly provided habitat for salmon and steelhead. The canal crossings have played a key role in the reduction or elimination of salmonid habitat on these tributaries.

The Corning Canal siphon creates a barrier to migrating salmon and steelhead in Elder Creek during low to moderate flow conditions. The Tehama-Colusa Canal siphon is a partial barrier to salmon and steelhead migration in Thomes Creek due to stream degradation associated with downstream gravel mining. The Tehama-Colusa Canal turn-out structure on Stony Creek not only acts as a partial barrier to salmon and steelhead migration, it actually diverts water from the creek into the canal. The diversion virtually dewaters for much of the year the lower portion of Stony Creek.

Ironically, both Thomes Creek and Stony Creek were targeted for salmon enhancement in the original RBDD authorizing legislation. But CVP operations have actually negatively impacted salmon and steelhead on these streams and other west-side tributaries. The canal siphons and diversion structures on Elder, Thomes, and Stony creeks and other tributary streams violate sections 5931 and 5937 of the California Fish and Game Code requiring fish passage and adequate flows downstream of dams to maintain fish in good condition. This situation is contrary to the intent of the California Bay-Delta Restoration Program to restore salmonid habitat in the Sacramento watershed and the AFRP fish-doubling mandate.

Fish migration and downstream flow problems created by the Tehama-Colusa Canal and Corning Canal must be resolved before the Sacramento River Division Contracts are renewed, or the contract renewals will violate existing restoration policies and both state and federal law.

Friends of the River's Sacramento River Division Contracts & EA Comments *Page 3*

Responses

FOR-5

Reclamation is continuously working with NOAA Fisheries to minimize impacts to salmonids at the RBDD and decisions about the next steps will be made after the OCAP BA consultation is completed. This is a separate action with its own planning and environmental compliance requirements.

FOR-6

The TC and Corning Canals do not impact fish migration in most west side streams. These canals pass under these streams by means of siphons, leaving them unobstructed with the exception of Funks Creek and, seasonally, Stony Creek. However, all west side streams south of Stony Creek, including Funks, terminate in the Colusa Basin Drain, a privately constructed feature that predates the canals by decades, which blocks or impedes access from the Sacramento River. All streams north of Stony Creek connect to the Sacramento River, but most, except Cottonwood Creek, were seasonal before the onset of agricultural diversions. While these diversions surely shorten the period of flow, they are all private, non-CVP diversions. The only water removed from tributaries to the Sacramento by the TC and Corning Canals is a portion of the water stored in Black Butte Reservoir at the end of the flood season. Part of that stored water, as noted above, is devoted to in-stream flows that tend to extend the period of potential passage.

Historically, flows in Stony Creek occurred intermittently in the late fall, winter, and spring months. With the installation of Black Butte Dam, flows in Stony Creek have been regulated by the COE for the purpose of flood control primarily from November through March. After the threat of floods has passed, Reclamation controls releases of stored water for the purpose of irrigation. When water is being diverted for irrigation, using a temporary diversion dam, a minimum of 40 cfs is being released downstream for fishery benefits. Reclamation and the COE are currently consulting with NOAA Fisheries on the effects of water operations in lower Stony creek to anadramous fish. A short-term BO was issued in 2002 and a long-term BO is expected by March of 2005. The terms and conditions of the BO suggest increased releases to benefit salmonids.

Comments

Friends of the River (cont'd)

Sacramento River Flow Standard

A key ecosystem restoration goal of the California Bay-Delta Restoration Program is to restore the natural stream meander and its associated aquatic and riparian habitats in the Sacramento River. These habitats support a wide range of sensitive, threatened, and endangered fish and wildlife species.

FOR-7

Although studies are still on-going, it is generally accepted that a comprehensive Sacramento River flow standard will require flows beyond the minimum levels needed for anadromous fish. Restoration of the river's natural meander and associated habitat will require bed-mobilization and streambank erosion flows to re-establish gravel bars. It will also require a naturally declining late spring flow to renew riparian habitat.

Renewal of the Sacramento River Division contracts could perpetuate flow conditions in the Sacramento River that are detrimental to the restoration of its natural meander ecosystem. Contracts should not be renewed until studies are completed identifying the flow standard needed to restore the river ecosystem. The flow standard should then be incorporated into the contracts when they are renewed. Adoption of this flow standard as part of the contracts is required by section 5937 of the California Fish and Game Codes, which mandates flows sufficient to maintain fish in good condition below dams.

Delta Smelt Biological Opinion

The U.S. Fish and Wildlife Service issued a no-jeopardy opinion for the endangered Delta smelt in regard to the Bureau's changes in CVP operations proposed in OCAP. Since these operational changes include CVP contract renewals, the Delta Smelt Biological Opinion (BO) is directly pertinent to the renewal of the Sacramento River Division contracts.

FOR-8

The Service's no-jeopardy decision is based on a confluence of actions and standards that have yet to be achieved, including full funding and implementation of the Environmental Water Account, providing 100% of the CVPIA's water mandate to the environment, and meeting water quality standards in the Delta and at Vernalis. Given the long and sad history of these unmet standards, it is likely that in most years, the Delta smelt will indeed be in jeopardy.

Upstream contract renewals will likely contribute to the further decline of this endangered species. The contracts should be modified to ensure that all standards needed to keep the Delta smelt out of jeopardy are met.

Threatened & Endangered Species

FOR-9

The renewal of the Sacramento River Division contracts effect the entire river and its adjacent terrestrial habitat, as well as the Bay-Delta ecosystem downstream. Unfortunately, the EA focuses primarily on fish species and gives short-shrift to terrestrial species dependent on river-associated wetlands, riparian forests, and adjacent grasslands. Contract renewals could modify flows needed to renew gravel bars and

Friends of the River's Sacramento River Division Contracts & EA Comments *Page 4*

Responses

FOR-7

General ecosystem goals for the Sacramento River are beyond the scope of the proposed action. The water service contracts contain provisions that call for reductions in deliveries to meet applicable environmental requirements. Contracts can adjust to such a flow standard, should one be adopted in the future.

FOR-8

The subject of this EA is the renewal of existing contracts with minor financial and administrative changes with no changes in either the volumes of water under contract or the places of use. The analysis in the EA concerns Reclamation's delivery of CVP water to CVP service areas. In addition, contracts contain provisions to reduce deliveries to meet environmental requirements, including relevant biological opinions. Delta smelt issues are being analyzed in the OCAP BA/BO.

FOR-9

The EA has discussed effects to plants, invertebrates, amphibians and reptiles, birds, mammals, as well as fish. But since the subject of this EA is the renewal of existing contracts with minor financial and administrative changes with no changes in either the volumes of water under contract or the places of use, effects to terrestrial species are minimal, and have been analyzed in the OCAP BA/BO and/or the PEIS.

Comments

Friends of the River (cont'd)

FOR-9 (cont'd)

eroded banks, reducing habitat for riparian species such as the bank swallow, yellow-billed cuckoo, and valley elderberry longhorn beetle. The contract renewals could reduce overflow into adjacent wetlands and vernal grasslands, which provide habitat for the giant garter snake and Swainson's hawk. The EA should fully disclose the potential impacts to these listed species and their habitat.

New Surface Storage Projects

The Bureau of Reclamation is involved in two surface storage project investigations that directly pertain to the Sacramento River Division contract renewals. These include the Shasta Dam Storage Investigation and the North of Delta Offstream Storage Investigation.

The Shasta Dam Storage Investigation is focusing on increasing storage by raising Shasta dam anywhere from 6 to 200 feet. This project could significantly modify flows in the Sacramento River and the operation of downstream diversion facilities used by the Sacramento River Division contractors.

FOR-10

The North of Delta Offstream Storage Investigation is focusing on developing offstream storage in the western portion of the Sacramento Valley. The potential offstream storage sites would be fed by the existing or expanded RBDD and Tehama-Colusa Canal. There would also be considerable water wheeling between the Tehama-Colusa Canal and Glen-Colusa Irrigation District Canal, the diversion facility for which would also be used to supply water for offstream storage. In addition, a new third diversion facility from the Sacramento River is contemplated.

The environmental impacts on the Sacramento River and its tributaries, and their threatened and endangered fish and wildlife species and habitat that could be caused by these new storage facilities in conjunction with the contract renewals must be fully considered.

Water Conservation

The CVPIA requires effective water conservation plans to be in place and implemented before contracts are renewed. It is not clear that the required plans are in place for the contract renewals.

FOR-11

In reviewing the proposed long-term contracts for Sacramento Valley water users, Friends of the River questions why the Bureau is relying on the ineffectual water conservation guidelines of the Reclamation Reform Act rather than the Mid-Pacific Region's own Criteria for Evaluating Water Conservation Plans. The Mid-Pacific Region's Criteria, written to comply with the CVPIA, are far superior in helping water districts manage their water more efficiently for beneficial uses.

FOR-12

The current draft of the Sacramento Valley long-term contracts seems to leave it to the complete discretion of the Contracting Officer to determine if the water conservation plan meets Federal Law. This is far too anemic oversight. At a minimum, Reclamation should insert the following language into the contracts:

Friends of the River's Sacramento River Division Contracts & EA Comments *Page 5*

Responses

FOR-10

The subject of this EA is the renewal of existing contracts with minor financial and administrative changes with no changes in either the volumes of water under contract or the places of use. The analysis in the EA concerns Reclamation's delivery of CVP water within the CVP service area. The comments regarding future water storage projects are outside the scope of this document.

FOR-11

All M&I contractors with more than 2000 af of Project Water, or Irrigation contractors with more than 2000 irrigable acres, are required to have water conservation plans. All available Water District (contractor) Water Conservation or Water Management Plans are on file at the Regional office and can be made available for review there. Contact point for those would be Lucille Billingsley, MP-402.

Sacramento River Settlement contractors, as holders of water rights, are distinct from water service contractors and are still developing their plans as part of a 'Regional' plan. The City of Redding, which has both a settlement contract and a water service contract, and the contractors which hold only water service contracts, such as the TCCA districts, Bella Vista, Clear Creek, and the City of Shasta Lake have prepared plans.

Reclamation believes that Regional Criteria can be as effective as the existing Standard Criteria. Reclamation has agreed to consider Regional Criteria as a pilot program and these criteria must be found as effective as the Standard Criteria to continue after the first 5 years.

As you may recall, the Regional Criteria started back in 1997. At that time public meetings were held, and the "objectives driven" approach was the preferred alternative. The current Regional Criteria "piggy-back" off of these previous meetings.

Comments

Friends of the River (cont'd)

"Water delivery pursuant to this Contract shall be contingent upon Contractor's continued implementation of such revised water conservation program, as documented in an annual update report on the conservation plan implementation. This plan must be made available to the public."

FOR-13

Friends of the River reiterates the objections it made during the draft phase of the Basin-Wide Water Management Plans. The Basin-Wide Plan is an exercise in paperwork, not an effort to implement effective, proven water management practices. The basin-wide plan, created by and for the exclusive benefit of Sacramento Valley contractors, has no requirements, no standards, no oversight by federal agencies or the public, and is completely pointless. The Mid-Pacific Region's existing Criteria for Evaluating Water Conservation Plans provide sufficient flexibility to the contractors and accountability to the U.S. taxpayers, making a Basin-Wide Plan absolutely unnecessary.

Water Transfers and Groundwater Measurement

FOR-14

Contract water should not be transferred unless both the willing seller and buyer can demonstrate they are already using existing water supplies as efficiently as possible. Friends of the River recommends the following language:

"Any transfer of Federal water between a willing seller Contractor and a willing buyer will only be allowed if the contracting officer determines that the Contractor is implementing an effective water conservation program, as detailed in the Criteria for Evaluating Water Conservation Plans, based on 3405 (e) of the CVPIA. If the willing buyer is a Federal Water Contractor, the contractor will will only be allowed to receive transferred Federal Water if the contracting officer determines that the Contractor is implementing an effective water conservation plan, as detailed in the same Criteria."

FOR-15

Contract language regarding the measurement of water within the contractor boundaries must be expanded to include the following:

"...the Contractor has established a measuring program satisfactory to the Contracting Officer. The Contractor shall ensure that all surface water *and groundwater that results from a recharge program using, at least in part, Federal Water...*"

Colusa Drain Water Quality Problems

FOR-16

Much of the irrigation water provided to the Sacramento River Division Contractors drains into the Colusa drain. Water in the Colusa drain fails to meet state water quality and federal Clean Water Act standards.

In addition to state and federal water quality laws, the CVPIA also requires resolution of the Colusa drain's chronic water pollution problems. Contracts must not be renewed until the water quality problems are resolved. Resolution of this problem should not include diverting the polluted water elsewhere, such as the Yolo bypass.

Friends of the River's Sacramento River Division Contracts & EA Comments *Page 6*

Responses

FOR-12

The contracts connected to the Standard Criteria do not contain the suggested language that would condition water deliveries on plan implementation. The Criteria do state that the Regional plans will be noticed in the federal register, which provides the public with the opportunity to review the plans prior to being deemed adequate by Reclamation.

FOR-13

The Regional plan is only a part of the Basin Wide Management Plan. See response to comments regarding Regional Criteria being developed in response to administrative proposal.

FOR-14

Reclamation utilizes the water transfer guidelines developed under CVPIA to determine whether transfers should be approved or not. To be approved, the transfers must be consistent with state law including provisions concerning reasonable and beneficial use of water.

FOR-15

Reclamation considers it inappropriate to use the contracts to establish Regional criteria; rather, the approach that keeps the criteria timely and appropriate is to reference the required (and updated) criteria in the contracts.

FOR-16

Comment noted. Reclamation provides water to our customers and, although we are not responsible for how our customers use and dispose of the water, we support the need to improve the water quality in the Colusa Basin Drain. Currently, there are many ongoing efforts to improve the water quality in the Drain. The impacts of pesticides on water quality in the Colusa Drain are being addressed in the Colusa Basin Drainage District's Coordinated Resource Management Plan project. The project uses Integrated Resource Management to bring together representatives from diverse groups to resolve the identified issues, including improving water quality caused by pesticide use. U.C. Davis together with the CALFED Ecosystem Restoration Program are implementing the Alternative Pesticide Use Phase II (B211)(97-C12) to identify, promote,

Comments

Friends of the River (cont'd)

Thank you for soliciting our comments in response to the Sacramento River Division CVP Long-Term Contracts and EA.

Sincerely,

Steven L. Evans
Conservation Director

Friends of the River's Sacramento River Division Contracts & EA Comments *Page 7*

Responses

FOR-16 (cont'd)

and monitor alternative practices to reduce biological impacts of pesticides, as well as impacts from agricultural and urban sources on the water quality of all priority aquatic habitats identified by CalFed. The Colusa Basin Drain Sub-Watershed Project: Sand and Salt Creek Watershed (5-081-255-0), in affiliation with the Colusa County Resource Conservation District, State Water Resources Control Board and the Regional Water Quality Control Board is expected to yield survey results, water quality plan results, and water quality monitoring results, which will all be made available to all interested parties making recommendations on how landowners will comply with the Clean Water Act.

Reclamation supports these activities to improve water quality while it meets its obligation to renew water service contracts and provide water for irrigation.

Comments

Hoopa Valley Tribe

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August 27, 2004

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Re: Comments on Revised Draft Environmental Assessment and Draft FONSI for Sacramento River Division Long Term Contract Renewals (July 2004).

Dear Ms. Trout:

On behalf of the Hoopa Valley Indian Tribe, we have reviewed and now submit the following comments on the above referenced Draft Revised Environmental Assessment (REA) and Draft Finding of No Significant Impact (FONSI). These comments reflect the Tribe's ongoing concern with management of the Central Valley Project ("CVP"), which includes the Trinity River Division. Because of the CVP's effect on fisheries reserved for the Tribe, we are committed to ensuring that Reclamation actions subject to the National Environmental Policy Act (NEPA) reflect and comply with court decisions requiring, for example, that mitigation measures imposed as a result of consultation under Section 7 of the Endangered Species Act be addressed in draft environmental review documentation prepared pursuant to NEPA. *See e.g. Westlands v. United States*, 275 F.Supp.2d 1157 (E.D. Cal. 2002*), rev'd on other grounds*, No. 03-15194 (9th Cir. July 13, 2004) (discussed below). This approach ensures that the public is fully informed and has the opportunity to comment and participate in the decision-making process on all aspects of projects affecting the human environment.

Hoopa-1

Reclamation has tentatively concluded that the proposed project, the renewal of eighteen (18) water service contracts for the delivery of up to 322,000 acre feet of CVP water for a term of up to 40 years in some cases, will have no significant impact requiring an Environmental Impact Statement. Draft FONSI at 2. That conclusion, however, is unsupported in a number of particulars described below. It also relies in part on deferral of consideration of impacts to threatened and endangered species pending completion of consultation with NOAA-Fisheries and the Fish and Wildlife Service. *Id.* at 3. Such an approach is legally impermissible.

Responses

Hoopa-1

The No Action Alternative consists of renewing existing water service contracts as described by the Preferred Alternative of the PEIS. The No Action Alternative together with negotiated proposals for CVP-wide terms and conditions are the basis for the action alternatives. The preferred alternative essentially maintains the status quo apart from changes mandated by the CVPIA. The analysis displays the increment of change between the No Action Alternative and the other alternatives.

Hoopa Valley Tribe (cont'd)

1. Scope of Analysis

The REA states that it is limited in its scope to determining whether renewal of Sacramento River Division long-term water service contracts will have "site specific" impacts. Draft EA at 1-1. This focus on site-specific impacts is reflected in the document's "area of analysis" as the land within the district and counties of the Sacramento River Division project area and vicinity that may be affected by renewal of these 18 contracts. Draft EA at ES-3. Accordingly, there is no analysis of how the associated diversions will affect other portions of the CVP service area, such as the Trinity River basin or the Bay/Delta region. For example, it is likely that an alternative requiring lower volumes of diversions would make more water from the upper Sacramento River and Shasta Reservoir available for temperature control in the upper Sacramento River, thus reducing the need to rely on diversion from the Trinity River for those purposes. Lower level diversions from the Sacramento River to contractors may also provide higher Sacramento River flow into the Delta, thus improving water quality in the Delta and the availability of Delta resources for fishery, agricultural, municipal and industrial uses in southern California. The EA presents only the most cursory analysis of the interrelationship between these diversions and other portions of the CVP. *E.g.* Draft EA at 3-75 (noting that diversions have effect on amount and timing of freshwater flow in the Sacramento River and Delta). However, such considerations receive relatively short-shrift in this EA, as a result both of the site-specific focus of the document and the improvident omission of lower-diversion alternatives from the range of alternatives considered.

The EA states that its site-specific focus is warranted by the fact that the document is "tiered" off a Programmatic Environmental Impact Statement (PEIS) prepared in October 1999, which evaluated the impacts of implementing the CVPIA, including the renewal of existing long-term contracts. However, the EA also acknowledges that the PEIS preferred alternative included a set of contract terms and conditions represented by the No Action alternative of this EA, and that the final Sacramento River renewal contracts will not incorporate that particular set of terms and conditions. Draft EA at ES-3 through ES-4 (stating that final contracts will include terms negotiated between Alternatives 1 and 2). It is therefore possible that the actual contract terms will have CVP-wide impacts that were not analyzed in the CVPIA PEIS.

For example, the PEIS preferred alternative assumed that tiered pricing would be a component of any renewal contracts. The lack of tiered pricing in the proposed contracts may have significant effects on volumes of water actually requested for delivery under the contracts, which in turn will affect CVP-wide availability and reliability of supplies, carryover storage, and the finances resources available to the Bureau to fund fishery and wildlife measures required by the CVPIA. The set of impacts addressed on a programmatic and CVP- wide level in the PEIS therefore may be very different from the impacts that will actually result from implementation of the proposed action as presented in this EA.

Comments

Hoopa Valley Tribe (cont'd)

Bureau of Reclamation
ATTN: Basia Trout
August 27, 2004
Page 3

2. **Failure to Include an Alternative that Includes Contract Language Reflecting CVPIA Mandated Fishery Restoration Flows.**

Hoopa-2

The proposed action is the renewal of Sacramento River Division contracts for 25 or 40 years, depending on the type of contract, under terms and conditions that are substantially similar to the existing interim renewal contracts, which expire February 28, 2006. The language of the proposed contracts states generally that deliveries (and by implication the diversions necessary to accomplish those deliveries) will comply with the requirements of federal law. The contract language does not specifically reference the requirements of federal law that require priority be given to providing sufficient flows to protect and restore specified anadromous fisheries, including those of the Trinity River, *e.g.* Trinity River Act of 1955, Pub. L. 84-386, 69 Stat. 710 (1955); CVPIA § 3406(b)(23); *see also* Solicitor's Opinion, "Proposed Contract with Grasslands Water District," U.S. Dept. of Interior (Dec. 7, 1979). The EA should have considered an alternative that incorporates language specifically referencing those obligations.

On December of 2003, the Hoopa Valley Tribe ("Tribe") filed an administrative appeal of the Bureau Regional Director's denial of the Tribe's request that language referencing the instream fishery flow requirements of the Trinity River be incorporated into the terms of long term renewal contracts between the Bureau of Reclamation ("Bureau") and Central Valley Project ("CVP") water service contractors. This language is authorized by section 3404 of the Central Valley Project Improvement Act, Pub. L. 102-575, 106 Stat. 4600 (1992) ("CVPIA"), which subjects new and renewal CVP water service contracts to the fishery restoration provisions of the CVPIA, which includes the Bureau's obligation to meet the fishery restoration requirements of the Trinity River as established by the Trinity River Flow Evaluation-Final Report ("Flow Study"). *See* CVPIA § 3406(b)(23).

Contract language acknowledging Trinity River restoration requirements also reflects long-standing congressional directives that prioritize Trinity fishery releases over transbasin diversions to Central Valley contractors and is consistent with the federal government's trust responsibility to protect and preserve the Hoopa Valley Tribe's federally reserved fishing right. The Tribe's request was narrowly tailored to require compliance with scientifically based fishery flow requirements set forth in the Flow Study. Those requirements must be implemented pursuant to CVPIA § 3406(b)(23), and should be included as conditions on supply made available for delivery to Central Valley Project contractors.

The decisions of the federal courts since the enactment of the CVPIA make clear that the Bureau can and should reduce quantities of water delivered when fishery needs demand greater allocations. *See O'Neill v. United States*, 50 F.3d 677, 686 (9th Cir. 1998) (holding that the CVPIA modified priority of water users and thus changed contractual obligations under pre-existing long-term water delivery contracts); *NRDC v. Houston*, 146 F.3d 1118, 1126 (9th Cir. 1998) (invalidating CVP renewal contracts for failure to comply with environmental requirements); *Klamath Water Users Protective Ass'n v. Patterson*, 204 F.3d 1206, 1213 (9th Cir. 1999) (recognizing Bureau's responsibility to manage project operations to "meet the requirements of the ESA, requirements that override the water rights of the Irrigators"). The

Responses

Hoopa-2

Fishery restoration flows are issues related to the operation of facilities to store and deliver water to the contractors, and were addressed in the PEIS and again in the OCAP BA/BO consultation; whereas the contracts that are the subject of this EA concern the delivery of water and the class of use (ag, M&I). In addition, the CVPIA has separate programs dealing specifically with fishery restoration flows.

Your comments concern issues affecting availability of stored water, whereas the EA addresses the delivery of water when it is available.

Comments

Hoopa Valley Tribe (cont'd)

Ninth Circuit has expressly recognized the Bureau's obligation to operate to meet the water needs of vested tribal fishing rights. *Klamath Water Users*, 204 F.3d at 1214 (holding that the Bureau has "a responsibility to divert the water and resources needed to fulfill the Tribes' rights, rights that take precedence over any alleged rights of the Irrigators"). Accordingly, the terms of interim renewal contracts should expressly acknowledge those requirements, and the impacts of incorporating those requirements into the contracts should be assessed in an EIS.

Express subordination of water service delivery obligations to fishery restoration needs is hardly unprecedented. *E.g., id.* The Bureau has historically included fishery restoration requirements as among the conditions on supply available to satisfy interim renewal contracts. For example, in *California Trout v. Schaefer*, 58 F.3d 469 (9th Cir. 1995), the court noted that an interim renewal contract for allocations from the New Melones Reservoir provided "a maximum of 75,000 acre-feet of water annually, subject to availability after the Bureau satisfied the water needs of in-basin users and higher priority out-of-basin users." *Id.* at 471 (emphasis added). The "in-basin" needs given priority under that contract included those of "fish and wildlife resources" in the Stanislaus River Basin established under CVPIA § 3406(c)(2). *Id.* Given that precedent, the Bureau should consider an alternative heeding the command of CVPIA § 3404(c) in the terms of interim renewal contracts.

Improper Deferral of Mitigation.

Hoopa-3

The EA improperly defers consideration of impacts to threatened and endangered species pending completion of ESA § 7 consultation with NOAA-Fisheries and the Fish and Wildlife Service. Draft FONSI at 3; Draft EA at 4-3. Such an approach is impermissible under NEPA, as illustrated by the ruling in *Westlands*, 275 F.Supp. 2d at 1182 -1185, *rev'd in part on other grounds*, No. 03-15194 (9th Cir. July 13, 2004). In that case, the court found that a Draft Environmental Impact Statement (DEIS) did not adequately analyze the impact of the proposed action on certain ESA-listed species. *Id.* at 1183. Further, the court found that the DEIS "did not consider or identify mitigation measures" for those impacts, other than to "specify that mitigation for impacts…would consist of consulting with the Service on impacts and implementing any required conservation measures." *Id.* The court concluded that Reclamation violated NEPA.

That is precisely the approach adopted in this document, which acknowledges that ESA § 7 consultation both on the CVP-OCAP and on the localized impacts of the particular contracts at issue here has yet to be completed. It is likely that significant mitigation requirements will be imposed because of that consultation, as the EA acknowledges that diversions required to supply these contracts will "negatively affect[]" winter-run, spring-run and fall/late fall-run Chinook and Central Valley Steelhead. Draft EA at ES-6 through ES-7, Table ES-2. In the words of the *Westlands* court, this approach "defers consideration of mitigation efforts" and "precludes the parties from meaningful analysis." *Id.* at 1184. See also *id.* at 1188 ("The omission of discussion of mitigation measures foreclosed any public input on the issues of whether and what CVP operations management alternatives existed and were feasible; and whether alternate water sources existed or if reduced flows could reduce the impact on species and other CVP users.").

Responses

Hoopa-3

The Draft NEPA document reflects Reclamation's assessment of impacts on listed species based on our Biological Assessment. The NEPA document will be amended, if necessary, in the Final EA to reflect any findings of the Biological Opinions that differ. The decision of what action, if any, to take will be based on the Final EA, not the Draft.

Comments

Hoopa Valley Tribe (cont'd)

Moreover, to the extent that mitigation measures are imposed as a result of deferred ESA § 7 consultation, either in the form of Reasonable and Prudent Measures (RPMs) or other terms and conditions that may have significant impacts beyond those of the proposed action, the *Westlands* case requires that the environmental impacts of those mitigation measures be discussed "with reasonable thoroughness." *Id.* at 1192. These measures and their environmental impacts must be disclosed to the public in a process that "included public participation", *i.e.* they must be disclosed in a manner that allows meaningful public scrutiny, comment, and participation. *Id.* at 1198. By deferring discussion of species impacts pending completion of consultation with the fisheries agencies, the Draft EA/FONSI for interim contract renewals fails to meet these requirements.

We are particularly concerned about the potential effects that may arise from RPMs under consideration by NOAA Fisheries in their review of the CVP-OCAP. As you know, NOAA is considering including in their Biological Opinion certain RPMs regarding temperature requirements in the upper Sacramento River and operation of the Red Bluff diversion dam. Both of these may have discrete as well as cumulative impacts on water supplies available for diversion to meet the contractual obligations proposed here, as well as impacts to fishery and power resources that are not fully disclosed and addressed in this draft EA. The public has thus been deprived of the opportunity to meaningfully review the cumulative impacts of diverting up to 322,000 acre feet of water from the natural course of the Sacramento River and the associated actions that will be required under the ESA to mitigate the effect of those diversions.

3. Inadequate Discussion of Alternatives.

Hoopa-4

The Draft EA is also insufficient because it lacks an adequate discussion of the "environmental impacts of the proposed action and alternatives" 40 C.F.R. § 1508.9. Council on Environmental Quality (CEQ) regulations require that an environmental assessment "shall include" a discussion of the environmental impacts "of the proposed action and alternatives…." *Id.* The Draft EA/FONSI, however, discusses only three alternatives: no action, the Bureau's proposed contract terms, and the Contractor's proposed contract terms. The EA does not identify the actual proposed terms of the renewed contracts, but states that, as a result of ongoing negotiations between contractors and the Bureau, the actual terms of contracts to be executed will fall somewhere in between the "bookends" represented by the three alternatives. Draft EA at ES-4; *Id.* at 2-8. The EA thus fails to identify a preferred alternative that accurately describes the actual action and associated impacts that will likely result. This approach is somewhat disingenuous in light of the fact that on July 30, 2004 the Bureau announced that it had concluded negotiation on contract terms and at that time released the negotiated terms for a 60 day public review. *See* Bureau of Reclamation Press Release No. MP-04-054 (available at << http://www.usbr.gov/mp/ Mp140/news/2004/MP-04-054.html>>).

Responses

Hoopa-4

The EA and the scope of the analysis were developed consistent with NEPA regulations and guidance from the Council on Environmental Quality (CEQ), and in conformance with the direction provided by NRDC vs Patterson, Civ. No. S-88-1658 (Patterson) which specifically addressed the application of NEPA relative to contract renewals. In Patterson the court found that "…ongoing projects and activities require NEPA procedures only when they undergo changes amounting in themselves to further "major action." The court went further to state that the NEPA statutory requirement applies only to those changes. The analysis in the EA finds the renewals of the contract to be a continuation of previous contracts with minor financial and administrative changes with no changes in either the volumes of water under contract or the places of use. Moreover, most do not involve any change in the type of use, such as the addition of M&I uses. The analysis in the EA addresses the proposed changes to the contract and the potential environmental effects of those changes. As indicated in the EA, these contract changes would not result in significant effects to the environment.

The two action alternatives represent the terms of the final contract, and a copy of a representative contract is provided in Appendix F of the final EA.

Comments

Hoopa Valley Tribe (cont'd)

Bureau of Reclamation
ATTN: Basia Trout
August 27, 2004
Page 6

Hoopa-5

The analysis also expressly excludes from consideration a number of reasonable alternatives, including non-renewal, and renewal at reduced delivery amounts that would more accurately reflect current delivery constraints. *See* Draft EA at 2-8. These alternatives warrant further consideration. A comparative analysis of differential environmental impacts of a wide range of alternatives to the proposed action must be undertaken in order to allow the public a meaningful opportunity to assess the proposed action.

5. M&I Shortage Policy

Hoopa-6

The terms of the contracts at issue, as disclosed on July 30, 3004, do not specifically reference Reclamation's proposed revised M&I Shortage Policy, which has been under development for a number of years and has yet to be completed or subjected to necessary review under NEPA or the ESA. According to the Project Description for the Biological Assessment on the CVP-OCAP, any contract that does not specifically refer to the revised policy will not be subject to its provisions. Long Term CVP and SWP OCAP Biological Assessment (June 30, 2004) at p. 2-20. The Draft EA does not discuss the revised policy, its impacts or implications. In the event that the revised M&I Shortage Policy is completed prior to execution of these contracts, and the final contracts as released for public comment on July 30, 2004 are further revised to reflect that policy, recirculation of this EA will be necessary in order to assess the impacts of incorporating those revised shortage provisions into these contracts.

6. Indian Trust Assets

Hoopa-7

The draft FONSI states that "continued delivery of project water to the existing contracts will not affect any Indian Trust Assets because existing rights will not be affected." That statement fails to acknowledge the nature of water rights associated with tribal fishing rights. For example, the Hoopa Valley Tribe's federally protected fishing right guarantees to the Tribe the right to a fishery that is supportive of a moderate standard of living. As has been repeatedly acknowledged by the federal courts, tribes are entitled to sufficient water in rivers flowing through their lands to support a fishery that will meet those needs. Accordingly, as the needs of the Tribe and the fishery change, so do the water rights associated with the need to sustain that fishery. We accordingly remain very concerned that contractually dedicating the vast amounts of water that are specified in the CVP long term contracts will make it increasingly difficult for the CVP to adequately protect tribal fishery resources, as the limited supply that is available for these purposes is subject to increasingly greater demands as a result of foreseeable drought, global warming, population growth, and urban development. The EA fails to adequately address the cumulative impacts of these various factors on Bureau's ability to provide for and protect the fishery resources within its charge. *See e.g.* CVPIA § 3406 (b)(23) (identifying trust responsibility to protect the fishery resources of the Hoopa Valley Tribe as constraint on operation of CVP facilities).

Responses

Hoopa-5
The alternatives present a range of water service agreement provisions that could be implemented for long term contract renewals. The No Action Alternative consists of renewing existing water service contracts as described by the Preferred Alternative of the PEIS. The No Action alternative together with negotiated proposals for CVP-wide terms and conditions are the basis for the alternatives. Reduction of contract amounts were considered in certain cases but rejected from analysis. The needs analyses performed resulted in a need for water which equals or exceeds the current total contract amount. The existing and proposed renewal contracts both include provisions for reductions in deliveries in those years in which insufficient water is available.

Non-renewal of existing contracts is considered infeasible based on Section 3404(c) of the CVPIA. Reclamation is mandated by law to renew the contracts and thus lacks discretion to not renew the contracts.

Hoopa-6
Those impacts are being discussed in a separate EA specific to the revised M&I policy.

Hoopa-7
Those issues were the subject of the Trinity River EIS and the PEIS. They do not need to be reanalyzed in documents focused upon the maximum quantities under contract. As noted in a prior response the requirements for flows in the Trinity Basin affect how much water is available to fulfill contracts, whereas this document addresses the maximum amount that would be delivered. This EA addresses how much may be delivered if available, whereas the comment addresses factors affecting how much will be available.

Hoopa Valley Tribe (cont'd)

August 27, 2004
Page 7

Thank you for allowing us the opportunity to comment on the Draft EA/FONSI. We trust that our comments will be appropriately considered and addressed in any final NEPA documentation for this proposed action.

Sincerely yours,

MORISSET, SCHLOSSER, JOZWIAK & McGAW

Thomas P. Schlosser
Regina M. Cutler
Attorneys for the Hoopa Valley Tribe

cc: Bennett Raley
Kirk Rodgers
Steve Thompson

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amc:8/27/04

River Partners Organization

Page 1

From: "Daniel Efseaff" <defseaff@riverpartners.org>
To: <btrout@mp.usbr.gov>
Date: 9/1/04 11:42AM
Subject: Request for extension

RPO-1

Please extend the period for comments on the Reclamation Board Water contracts that are coming up.

I would like copies of the documents and a list of the contracts that are coming up.

Sincerely,

Dan Efseaff
Restoration Ecologist
River Partners
539 Flume Street, Chico, California 95928
(530)894-5401, ext 21
defseaff@riverpartners.org
www.riverpartners.org

RPO-1

Reclamation considered extensions of the comment period but feels adequate time was given for review. The BA for the Sacramento River Division long-term water service contract renewals was completed on August of 2003. The Draft EA was first released on August 19, 2003 and was revised in March of 2004. On July 2, 2004, a 60-day public review and comment period was initiated for the associated long-term CVP water service contracts for the Black Butte Unit, Tehama-Colusa Canal Unit, and the Corning Canal Unit of the Sacramento River Division. The revised draft EA and FONSI were released on July 30, 2004 for an additional 30 day public review.

Documents have been available onsite at www.usbr.gov/mp/cvpia/3404c/index.html.

Comments

Sacramento River Preservation Trust

From: "John Merz" <jmerz@inreach.com>
To: "Basia Trout" <btrout@mp.usbr.gov>
Date: 9/3/04 3:31PM
Subject: Sacramento River Division,CVP Contracts& EA/FONSI

Dear Basia,

SRPT-1

I have reviewed the comments submitted to the Bureau concerning the proposed Sacramento River Division, CVP Contracts and related EA/FONSI by both the NRDC,TBI&PCL and FOR and am in complete agreement with every point made. Please add the Sacramento River Preservation Trust (Trust) and the Sacramento Valley Environmental Water Caucus (SVEWC) to the list of groups and individuals requesting an extension of the comment period for both the contracts and the supporting environmental documents. Please note that we are incorporating by reference the comments submitted by NRDC, et al as mentioned above and hereby request to be kept informed of any and all activities associated with this project.

Sincerely,

John Merz
President
Sacramento River Preservation Trust
PO Box 5366
Chico, CA 95927
530-345-1865 (Phone)
530-899-5105 (Fax)
jmerz@sacrivertrust.org

Co-chair,SVEWC

Responses

SRPT-1

Comment noted. Reclamation considered extensions of the comment period but feels adequate time was given for review. The BA for the Sacramento River Division long-term water service contract renewals was completed in August of 2003. The Draft EA was first released on August 19, 2003 and was revised in March of 2004. On July 2, 2004, a 60-day public review and comment period was initiated for the associated long-term CVP water service contracts for the Black Butte Unit, Tehama-Colusa Canal Unit, and the Corning Canal Unit of the Sacramento River Division. The revised draft EA and FONSI were released on July 30, 2004 for an additional 30-day public review.

State Clearinghouse and Planning Unit

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit

Arnold
Schwarzenegger
Governor

Jan Boel
Acting Director

September 3, 2004

Basia Trout
U.S. Bureau of Reclamation, Red Bluff Field Office
22500 Altube Avenue
Red Bluff, CA 96080

Subject: Renewal of Long-term Contracts for the Sacramento River Division
SCH#: 2004082017

Dear Basia Trout:

The State Clearinghouse submitted the above named Environmental Assessment to selected state agencies for review. The review period closed on September 2, 2004, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the ten-digit State Clearinghouse number when contacting this office.

Sincerely,

Terry Roberts

Terry Roberts
Director, State Clearinghouse

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
TEL (916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

State Clearinghouse and Planning Unit

State Clearinghouse Data Base

SCH#	2004082017
Project Title	Renewal of Long-term Contracts for the Sacramento River Division
Lead Agency	U.S. Bureau of Reclamation
Type	EA Environmental Assessment
Description	Renewal of long-term water service contracts for water contractors in the Western Sacramento Valley for a period of 25 years or 40 years, depending on water use.

Lead Agency Contact

Name	Basia Trout
Agency	U.S. Bureau of Reclamation, Red Bluff Field Office
Phone	530-528-0512 **Fax**
email	
Address	22500 Altube Avenue
City	Red Bluff **State** CA **Zip** 96080

Project Location

County	Glenn, Tehama, Colusa
City	Willows
Region	
Cross Streets	
Parcel No.	
Township	**Range** **Section** **Base**

Proximity to:

Highways	
Airports	
Railways	
Waterways	
Schools	
Land Use	

Project Issues	Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Cumulative Effects; Economics/Jobs; Geologic/Seismic; Landuse; Recreation/Parks; Soil Erosion/Compaction/Grading; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Wildlife
Reviewing Agencies	Resources Agency; Regional Water Quality Control Bd., Region 5 (Sacramento); Regional Water Quality Control Bd., Region 5 (Redding); Department of Parks and Recreation; Native American Heritage Commission; Reclamation Board; Department of Fish and Game, Region 2; Department of Fish and Game, Region 1; Department of Water Resources; Caltrans, Division of Transportation Planning; State Water Resources Control Board, Division of Water Rights; State Water Resources Control Board, Division of Water Quality; State Water Resources Control Board, Clean Water Program; State Lands Commission
Date Received	08/04/2004 **Start of Review** 08/04/2004 **End of Review** 09/02/2004

Note: Blanks in data fields result from insufficient information provided by lead agency.

Comments

Department of Fish & Game

State of California - The Resources Agency — ARNOLD SCHWARZENEGGER, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
Street
A 96001
S-2300

September 9, 2004

Ms. Basia Trout
US Bureau of Reclamation
22500 Altube Avenue – Hwy 99W
Red Bluff CA 96080

Dear Ms. Trout:

The Department of Fish and Game has reviewed the "Revised Draft Environmental Assessment for Renewal of Long-Term Contracts for Sacramento Canals Unit of the Central Valley Project (CVP)." According to the document, the purpose of the project is to renew the "Canals Unit" water service contracts consistent with the provisions of the Central Valley Project Improvement Act (CVPIA) as developed in the programmatic environmental impact statement for the CVPIA. The stated need for long-term contract renewal includes achieving a reasonable balance among competing demands including irrigation; fish and wildlife protection, restoration and mitigation and enhancement; and ensures CVP compliance with applicable laws including the Federal Endangered Species Act. While we did not see an explicit statement of need to achieve compliance with relevant State laws such as the California Endangered Species Act, we do recommend the US Bureau of Reclamation (Reclamation) support the State's efforts to protect fish and wildlife.

At this time, the Department of Fish and Game believes it is appropriate to delay proceeding with the environmental decision making process for the Long-Term Contract for the Sacramento Canals Unit until finalization of the Federal Endangered Species Act Biological Opinion which is due to be released by National Oceanic and Atmospheric Administration Fisheries in the near future

DFG-1

The Environmental Analysis (EA) relies on inappropriate and outdated assessments and omits relevant analyses for determining protection of Federal- and State-listed species including:

- Biological Opinion of 1993 for the CVP which only addresses effects to winter-run Chinook salmon. This document, which is being updated and replaced, cannot be used for assessing effects on the two other listed anadromous salmonid species, Central Valley spring-run Chinook salmon and Central Valley steelhead.

Conserving California's Wildlife Since 1870

Responses

DFG-1

Information and assessment of affects on all listed anadramous fish is taken from the referenced March 22, 2004 CVP and State Water Project OCAP BA, which is the best information available. Updated versions did not significantly change the outcome of the assessments. The action being addressed in the EA is the delivery of water within CVP service areas. Updated ESA consultations have addressed all listed species affected by CVP operations.

Comments

Department of Fish & Game (cont'd)

Ms. Basia Trout
September 9, 2004
Page Two

DFG-2

- The referenced March 22, 2004, Long-term Central Valley Project and State Water Project Operations Criteria and Plan (OCAP) Biological Assessment is out of date. The document has been updated with different versions several times since March. The current version in our opinion still contains some conclusions on the habitat and passage needs of some of the State listed anadromous species that we do not agree with; however, we understand there may be another version forthcoming.

DFG-3

- The determination of the effects Red Bluff Diversion Dam (RBDD) has on winter-run, spring-run and fall/late fall-run Chinook salmon and Central Valley steelhead is referenced to the 1993 Biological Opinion for winter-run Chinook which is not usable for spring-run Chinook salmon, fall-run Chinook salmon and steelhead. CVPIA Section 3406 b (10) requires the development and implementation of measures to minimize fish passage problems experienced by juvenile and adult anadromous fish at RBDD. In 2002 Reclamation lead the preparation and public review of a draft EIS/EIR addressing CVPIA requirement to minimize fish passage problems at RBDD. Reclamation has suspended the decision making process started by the document without responding to comments and we have not been notified when the suspension may end.

DFG-4

- The preferred alternative is overly vague in that it is a "negotiated position between Alternative 1 and Alternative 2." The formal project description for Alternative 1 does not clearly state what types of protections would be in place for endangered species; therefore, it is possible that the preferred alternative may not comply with the Endangered Species Act. The document should clearly describe what is included in the preferred alternative that is applicable and relevant to Federal and State endangered species acts and CVPIA anadromous fish restoration requirements.

The existing operation of the Sacramento Canal's Unit RBDD with its undersized fish ladders currently impairs passage of anadromous fish when the gates are installed and river flows are elevated due to runoff events. The species that endures the most impairment under existing conditions is spring-run Chinook which include adult migrants traveling to Battle Creek and Clear Creek. In addition, existing conditions can impair passage of the very last portion of the adult winter-run migration and juvenile anadromous fish traveling downstream under certain conditions. The fish ladders at the dam are over 40 years old and do not perform to currently accepted standards. The Draft Environmental Impact Statement/Environmental Impact Report for Fish Passage Improvement Project for RBBD describes the existing conditions explained above for both ladder performance and impaired passage of spring-run and winter-run Chinook.

Responses

DFG-2
The draft OCAP BA/BO documents have been reviewed and the final OCAP BA/BO documents did not change the information or determination of effects in the EAs. Also see response to comment DFG-1.

DFG-3
The RBDD EIS/EIR passage process is postponed until the final OCAP BO is issued. Reclamation is continuously working with NOAA Fisheries to minimize impacts to salmonids at the RBDD and decisions about the next steps will be made after the OCAP BA consultation is completed and implemented. This is a separate action subject to its own environmental compliance requirements. Please see earlier comments regarding the RBDD EIS/EIR process.

DFG-4
The No Action Aternative together with negotiated proposals for CVP-wide terms and conditions are the basis for the action alternatives. The preferred alternative, essentially maintains the status quo apart from changes mandated by the CVPIA. The analysis displays the increment of change between the No Action Alternative and the other alternatives. The contracts will comply with all relevant environmental requirements.

Comments

Department of Fish & Game (cont'd)

Ms. Basia Trout
September 9, 2004
Page Three

In addition to our general concerns with the EA, the Department has the following specific comments:

DFG-5 Page 3-67, Paragraph 1, Last sentence: This sentence is unclear as to what type of Chinook salmon is being analyzed for negative effects at RBDD and when the negative effects occur with respect to existing conditions or historical conditions. The sentence is in past tense implying negative effects are no longer occurring. This sentence and the one before it should be revised to clearly indicate that: (1) spring-run, winter-run and fall-run Chinook occur at RBDD; and (2) spring-run and winter-run Chinook are still affected negatively by RBDD to differing degrees.

DFG-6 Page 3-67, Paragraph 2, Section Title and Contents: Coho do not occur in the Sacramento River. Remove all references to coho from the document.

DFG-7 Page 3-75, Paragraph 2: The document states 98 percent of the spawning winter-run are protected. This conclusion is based upon an incomplete data set. The winter-run Chinook spawning distribution in the analysis was limited to an upstream area based on data for a few select years. Since it is known winter-run spawn as far downstream as RBDD and since the EA covers up to 40 years into the future, the complete data set should be used to characterize spawning winter-run distribution.

DFG-8 Page 3-74, Paragraph 3, last two sentences: These sentences need further explanation.

The Department recommends the "Long-Term Water Supply Contracting Environmental" document be retracted and reissued with appropriate modifications upon completion of the Biological Opinion for the CVP OCAP. Reclamation should also complete the environmental document for RBDD by responding to comments and issuing a "Record of Decision." Thank you for your considerations of our comments. If there are any questions regarding this matter, please contact Staff Environmental Scientist Harry Rectenwald at (530) 225-2368.

Sincerely,

DONALD B. KOCH
Regional Manager

cc: Messrs. Harry Rectenwald, Steve Turek,
and Randal C. Benthin and Ms. Alice Low
Department of Fish and Game
601 Locust Street
Redding, CA 96001

Responses

DFG-5
Comment noted. Text was changed to reflect the current status.

DFG-6
The EA will be modified to more clearly state that coho salmon are unlikely to occur within the project-affected waterways.

DFG-7
Par 2. states that incubation conditions for winter-run Chinook salmon are estimated to cover 98% of winter-run spawning even with increased temperatures due to lowered water levels in the Sacramento River. The information was based on the best information available, as referenced in the Long-term CVP and State Water project OCAP BA.

DFG-8
Reclamation provides CVP water to contractors to the point of diversion. Most adverse impacts occur to fish as a result of taking and using the water, which is not a Reclamation action.

AG & M&I
R. O. Final CVP-Wide Draft 4/19-2004
Corning WD Draft 7/22-2003
Corning WD Draft 6/26-2003
Corning WD Draft 6/25-2003
R.O. Final CVP-Wide 6/10-2003
Sac.Valley Division Draft 5/28-2003
CVP-Wide Draft 5/23-2003
Contract No.
14-06-200-6575-LTR1

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
Central Valley Project, California

LONG-TERM RENEWAL CONTRACT BETWEEN THE UNITED STATES AND CORNING WATER DISTRICT PROVIDING FOR PROJECT WATER SERVICE FROM THE SACRAMENTO RIVER DIVISION

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
Central Valley Project, California

LONG-TERM RENEWAL CONTRACT BETWEEN THE UNITED STATES AND CORNING WATER DISTRICT PROVIDING FOR PROJECT WATER SERVICE FROM THE SACRAMENTO RIVER DIVISION

THIS CONTRACT, made this _____ day of _____, 20___, in pursuance generally of the Act of June 17, 1902 (32 Stat. 388), and acts amendatory or supplementary thereto, including, but not limited to, the Acts of August 26, 1937 (50 Stat. 844), as amended and supplemented, August 4, 1939 (53 Stat. 1187), as amended and supplemented, July 2, 1956 (70 Stat. 483), June 21, 1963 (77 Stat. 68), October 12, 1982 (96 Stat. 1263), October 27, 1986 (100 Stat. 3050), as amended, and Title XXXIV of the Act of October 30, 1992 (106 Stat. 4706), all collectively hereinafter referred to as Federal Reclamation law, between THE UNITED STATES OF AMERICA, hereinafter referred to as the United States, and CORNING WATER DISTRICT, hereinafter referred to as the Contractor, a public agency of the State of California, duly organized, existing, and acting pursuant to the laws thereof;

WITNESSETH, That:

EXPLANATORY RECITALS

[1st] WHEREAS, the United States has constructed and is operating the Central Valley Project (Project), California, for diversion, storage, carriage, distribution and beneficial use, for flood control, irrigation, municipal, domestic, industrial, fish and wildlife mitigation, protection and restoration, generation and distribution of electric energy, salinity control, navigation and other beneficial uses, of waters of the Sacramento River, the American River, the Trinity River, and the San Joaquin River and their tributaries; and

[2nd] WHEREAS, the United States constructed the Red Bluff Diversion Dam, and the Corning Canal and related delivery facilities including pumping plants, hereinafter collectively referred to as the Canal Facilities, which will be used in part for the furnishing of water to the Contractor pursuant to the terms of this Contract; and

[3rd] WHEREAS, the rights to Project Water were acquired by the United States pursuant to California law for operation of the Project; and

[4th] WHEREAS, the Contractor and the United States entered into Contract No. 14-06-200-6575, as amended on March 9, 1962, and August 4, 1971, which established terms for the delivery to the Contractor of Central Valley Project Water from the Canal Facilities from August 1, 1957, through February 28, 1995, and under which the initial date of water delivery to the Contractor was April 15, 1961; and

[5th] WHEREAS, the Contractor and the United States have pursuant to subsection 3404(c)(1) of the Central Valley Project Improvement Act (CVPIA), subsequently entered into interim renewal contract(s) identified as Contract No(s). 14-06-200-6575-IR1, 14-06-200-6575-IR2, 14-06-200-6575-IR3, 14-06-200-6575-IR4, 14-06-200-6575-IR5, 14-06-200-6575-IR6,

14-06-200-6575-IR7, and 14-06-200-6575-IR8, the current of which is hereinafter referred to as the Existing Contract, which provided for the continued water service to the Contractor from March 1, 2004, through February 28, 2006; and

[6th] WHEREAS, Section 3404(c) of the CVPIA provides for long-term renewal of the Existing Contract following completion of appropriate environmental documentation, including a programmatic environmental impact statement (PEIS) pursuant to the National Environmental Policy Act (NEPA), analyzing the direct and indirect impacts and benefits of implementing the CVPIA and the potential renewal of all existing contracts for Project Water; and

[7th] WHEREAS, the United States has completed the PEIS and all other appropriate environmental review necessary to provide for long-term renewal of the Existing Contract; and

[8th] WHEREAS, the Contractor has requested the long-term renewal of the Existing Contract, pursuant to the terms of the Existing Contract, Federal Reclamation law, and the laws of the State of California, for water service from the Project; and

[9th] WHEREAS, the United States has determined that the Contractor has fulfilled all of its obligations under the Existing Contract; and

[10th] WHEREAS, the Contractor has demonstrated to the satisfaction of the Contracting Officer that the Contractor has utilized the Project Water supplies available to it for reasonable and beneficial use and, based upon a needs analysis cooperatively prepared by the Contracting Officer and the Contractor, has demonstrated projected future demand for water use that exceeds the Contract Total to be made available to it pursuant to this Contract; and

[11th] WHEREAS, water obtained from the Project has been relied upon by urban and agricultural areas within California for more than 50 years, and is considered by the Contractor as an essential portion of its water supply; and

[12th] WHEREAS, the economies of regions within the Project, including the Contractor's, depend upon the continued availability of water, including water service from the Central Valley Project; and

[13th] WHEREAS, the Secretary intends through coordination, cooperation, and partnerships to pursue measures to improve water supply, water quality, and reliability of the Project for all Project purposes; and

[14th] WHEREAS, the mutual goals of the United States and the Contractor include: to provide for reliable Project Water supplies; to control costs of those supplies; to achieve repayment of the Project as required by law; to guard reasonably against Project Water shortages; to achieve a reasonable balance among competing demands for use of Project Water; and to comply with all applicable environmental statutes, all consistent with the legal obligations of the United States relative to the Project; and

[15th] WHEREAS, the parties intend by this Contract to develop a more cooperative relationship in order to achieve their mutual goals; and

[16th] WHEREAS, the United States and the Contractor are willing to enter into this Contract pursuant to Federal Reclamation law on the terms and conditions set forth below;

NOW, THEREFORE, in consideration of the mutual and dependent covenants herein contained, it is hereby mutually agreed by the parties hereto as follows:

DEFINITIONS

1. When used herein unless otherwise distinctly expressed, or manifestly incompatible with the intent of the parties as expressed in this Contract, the term:

(a) "Calendar Year" shall mean the period January 1 through December 31, both dates inclusive;

(b) "Charges" shall mean the payments required by Federal Reclamation law in addition to the Rates and Tiered Pricing Component specified in this Contract as determined annually by the Contracting Officer pursuant to this Contract;

(c) "Condition of Shortage" shall mean a condition respecting the Project during any Year such that the Contracting Officer is unable to deliver sufficient water to meet the Contract Total;

(d) "Contracting Officer" shall mean the Secretary of the Interior's duly authorized representative acting pursuant to this Contract or applicable Federal Reclamation law or regulation;

(e) "Contract Total" shall mean the maximum amount of water to which the Contractor is entitled under subdivision (a) of Article 3 of this Contract;

(f) "Contractor's Boundaries" shall mean the area to which the Contractor is permitted to provide Project Water under this Contract as described in Exhibit "A" attached hereto, which may be modified from time to time in accordance with Article 35 of this Contract without amendment of this Contract;

(g) "CVPIA" shall mean the Central Valley Project Improvement Act, Title XXXIV of the Act of October 30, 1992 (106 Stat. 4706);

(h) "Eligible Lands" shall mean all lands to which Irrigation Water may be delivered in accordance with Section 204 of the Reclamation Reform Act of October 12, 1982 (96 Stat. 1263), as amended, hereinafter referred to as RRA;

(i) "Excess Lands" shall mean all lands in excess of the limitations contained in Section 204 of the RRA, other than those lands exempt from acreage limitation under Federal Reclamation law;

(j) "Full Cost Rate" shall mean an annual rate as determined by the Contracting Officer that shall amortize the expenditures for construction properly allocable to the Project Irrigation or M&I functions, as appropriate, of facilities in service including all O&M deficits funded, less payments, over such periods as may be required under Federal Reclamation law, or applicable contract provisions. Interest will accrue on both the construction expenditures and funded O&M deficits from October 12, 1982, on costs outstanding at that date, or from the date incurred in the case of costs arising subsequent to October 12, 1982, and shall be calculated in accordance with subsections 202(3)(B) and (3)(C) of the RRA. The Full Cost Rate includes actual operation, maintenance, and replacement costs consistent with Section 426.2 of the Rules and Regulations for the RRA. The Full Cost Rate used to compute the Tiered Pricing Component defined in subdivision (y) of this Article does not include the costs associated with the Contractor's Irrigation Water distribution works constructed by the United States. However, the Irrigation Full Cost Water Rate defined in subdivision (l) of this Article does include such costs;

(k) "Ineligible Lands" shall mean all lands to which Irrigation Water may not be delivered in accordance with Section 204 of the RRA;

(l) "Irrigation Full Cost Water Rate" shall mean the Full Cost Rate applicable to the delivery of Irrigation Water;

(m) "Irrigation Water" shall mean water made available from the Project that is used primarily in the production of agricultural crops or livestock, including domestic use incidental thereto, and watering of livestock;

(n) "Landholder" shall mean a party that directly or indirectly owns or leases nonexempt land, as provided in 43 CFR 426.2;

(o) "Municipal and Industrial (M&I) Water" shall mean Project Water, other than Irrigation Water, made available to the Contractor. M&I Water shall include water used for human use and purposes such as the watering of landscaping or pasture for animals (e.g., horses) which are kept for personal enjoyment or water delivered to land holdings operated in units of less than five acres unless the Contractor establishes to the satisfaction of the Contracting Officer that the use of water delivered to any such landholding is a use described in subdivision (m) of this Article;

(p) "M&I Full Cost Water Rate" shall mean the Full Cost Rate applicable to the delivery of M&I Water;

(q) "Operation and Maintenance" or "O&M" shall mean normal and reasonable care, control, operation, repair, replacement (other than capital replacement), and maintenance of Project facilities;

(r) "Operating Non-Federal Entity" shall mean the Tehama-Colusa Canal Authority, its successors or assigns, a non-Federal entity which has the obligation to operate and maintain all or a portion of the Canal Facilities pursuant to an agreement with the United States, and which may have funding obligations with respect thereto;

(s) "Project" shall mean the Central Valley Project owned by the United States and managed by the Department of the Interior, Bureau of Reclamation;

(t) "Project Contractors" shall mean all parties who have water service contracts for Project Water from the Project with the United States pursuant to Federal Reclamation law;

(u) "Project Water" shall mean all water that is developed, diverted, stored, or delivered by the Secretary in accordance with the statutes authorizing the Project and in accordance with the terms and conditions of water rights acquired pursuant to California law;

(v) "Rates" shall mean the payments determined annually by the Contracting Officer in accordance with the then-current applicable water ratesetting policies for the Project, as described in subdivision (a) of Article 7 of this Contract;

(w) "Recent Historic Average" shall mean the most recent five-year average of the final forecast of Water Made Available to the Contractor pursuant to this Contract or its preceding contract(s);

(x) "Secretary" shall mean the Secretary of the Interior, a duly appointed successor, or an authorized representative acting pursuant to any authority of the Secretary and through any agency of the Department of the Interior;

(y) "Tiered Pricing Component" shall be the incremental amount to be paid for each acre-foot of Water Delivered as described in subdivision (j) of Article 7 of this Contract;

(z) "Water Delivered" or "Delivered Water" shall mean Project Water diverted for use by the Contractor at the point(s) of delivery approved by the Contracting Officer;

(aa) "Water Made Available" shall mean the estimated amount of Project Water that can be delivered to the Contractor for the upcoming Year as declared by the Contracting Officer, pursuant to subdivision (a) of Article 4 of this Contract;

(bb) "Water Scheduled" shall mean Project Water made available to the Contractor for which times and quantities for delivery have been established by the Contractor and Contracting Officer, pursuant to subdivision (b) of Article 4 of this Contract; and

(cc) "Year" shall mean the period from and including March 1 of each Calendar Year through the last day of February of the following Calendar Year.

TERM OF CONTRACT

2. (a) This Contract shall be effective March 1, 20___, through February 28, 20___, and supercedes the Existing Contract. In the event the Contractor wishes to renew this Contract beyond February 28, 20___, the Contractor shall submit a request for renewal in writing to the Contracting Officer no later than two years prior to the date this Contract expires. The renewal of this Contract insofar as it pertains to the furnishing of Irrigation Water to the Contractor shall be governed by subdivision (b) of this Article, and the renewal of this Contract insofar as it pertains to the furnishing of M&I Water to the Contractor shall be governed by subdivision (c) of this Article.

(b) (1) Under terms and conditions of a renewal contract that are mutually agreeable to the parties hereto, and upon a determination by the Contracting Officer that at the time of contract renewal the conditions set forth in subdivision (b)(2) of this Article are met, and subject to Federal and State law, this Contract, insofar as it pertains to the furnishing of Irrigation Water to the Contractor, shall be renewed for a period of 25 years.

(2) The conditions which must be met for this Contract to be renewed are: (i) the Contractor has prepared a water conservation plan that has been determined by the Contracting Officer in accordance with Article 26 of this Contract to meet the conservation and efficiency criteria for evaluating such plans established under Federal law; (ii) the Contractor is implementing an effective water conservation and efficiency program based on the Contractor's water conservation plan as required by Article 26 of this Contract; (iii) the Contractor is maintaining all water measuring devices and implementing all water measurement methods as

approved by the Contracting Officer pursuant to Article 6 of this Contract; (iv) the Contractor has reasonably and beneficially used the Project Water supplies made available to it and, based on projected demands, is reasonably anticipated and expects to fully utilize for reasonable and beneficial use the quantity of Project Water to be made available to it pursuant to such renewal; (v) the Contractor is complying with all terms and conditions of this Contract; and (vi) the Contractor has the physical and legal ability to deliver Project Water.

(3) The terms and conditions of the renewal contract described in subdivision (b)(1) of this Article and any subsequent renewal contracts shall be developed consistent with the parties' respective legal rights and obligations, and in consideration of all relevant facts and circumstances, as those circumstances exist at the time of renewal, including, without limitation, the Contractor's need for continued delivery of Project Water; environmental conditions affected by implementation of the Contract to be renewed, and specifically changes in those conditions that occurred during the life of the Contract to be renewed; the Secretary's progress toward achieving the purposes of the CVPIA as set out in Section 3402 and in implementing the specific provisions of the CVPIA; and current and anticipated economic circumstances of the region served by the Contractor.

(c) This Contract, insofar as it pertains to the furnishing of M&I Water to the Contractor, shall be renewed for successive periods of up to 40 years each, which periods shall be consistent with then-existing Reclamation-wide policy, under terms and conditions mutually agreeable to the parties and consistent with Federal and State law. The Contractor shall be afforded the opportunity to comment to the Contracting Officer on the proposed adoption and application of any revised policy applicable to the delivery of M&I Water that would limit the

term of any subsequent renewal contract with the Contractor for the furnishing of M&I Water to less than 40 years.

(d) The Contracting Officer shall make a determination ten years after the date of execution of this Contract, and every five years thereafter during the term of this Contract, of whether a conversion of the relevant portion of this Contract to a contract under said subsection 9(d) of the Reclamation Project Act of 1939 can be accomplished pursuant to the Act of July 2, 1956 (70 Stat. 483). The Contracting Officer shall also make a determination ten years after the date of execution of this Contract and every five years thereafter during the term of this Contract of whether a conversion of the relevant portion of this Contract to a contract under subsection 9(c)(1) of the Reclamation Project Act of 1939 can be accomplished. Notwithstanding any provision of this Contract, the Contractor reserves and shall have all rights and benefits under the Act of July 2, 1956 (70 Stat. 483). The Contracting Officer anticipates that during the term of this Contract, all authorized Project construction expected to occur will have occurred, and on that basis the Contracting Officer agrees upon such completion to allocate all costs that are properly assignable to the Contractor, and agrees further that, at any time after such allocation is made, and subject to satisfaction of the condition set out in this subdivision, this Contract shall, at the request of the Contractor, be converted to a contract under subsection 9(d) or 9(c)(1), whichever is applicable, of the Reclamation Project Act of 1939, subject to applicable Federal law and under stated terms and conditions mutually agreeable to the Contractor and the Contracting Officer. A condition for such conversion to occur shall be a determination by the Contracting Officer that, account being taken of the amount credited to return by the Contractor as provided for under Federal Reclamation law, the remaining amount of construction costs assignable for ultimate return by the Contractor can probably be repaid to

the United States within the term of a contract under said subsection 9(d) or 9(c)(1), whichever is applicable. If the remaining amount of costs that are properly assignable to the Contractor cannot be determined during the term of this Contract, the Contracting Officer shall notify the Contractor, and provide the reason(s) why such a determination could not be made. Further, the Contracting Officer shall make such a determination as soon thereafter as possible so as to permit, upon request of the Contractor and satisfaction of the condition set out above, conversion to a contract under subsection 9(d) or 9(c)(1), whichever is applicable. In the event such determination of costs has not been made at a time which allows conversion of this Contract during the term of this Contract or the Contractor has not requested conversion of this Contract within such term, the parties shall incorporate in any subsequent renewal contract as described in subdivision (b) of this Article a provision that carries forth in substantially identical terms the provisions of this subdivision.

WATER TO BE MADE AVAILABLE AND DELIVERED TO THE CONTRACTOR

3. (a) During each Year, consistent with all applicable State water rights, permits, and licenses, Federal law, and subject to the provisions set forth in Articles 11 and 12 of this Contract, the Contracting Officer shall make available for delivery to the Contractor 23,000 acre-feet of Project Water for irrigation and M&I purposes. Water Delivered to the Contractor in accordance with this subdivision shall be scheduled and paid for pursuant to the provisions of Articles 4 and 7 of this Contract.

(b) Because the capacity of the Project to deliver Project Water has been constrained in recent years and may be constrained in the future due to many factors including hydrologic conditions and implementation of Federal and State laws, the likelihood of the Contractor actually receiving the amount of Project Water set out in subdivision (a) of this

Article in any given Year is uncertain. The Contracting Officer's modeling referenced in the PEIS projected that the Contract Total set forth in this Contract will not be available to the Contractor in many years. During the most recent five years, the Recent Historic Average of water made available to the Contractor was 21,160 acre-feet. Nothing in subdivision (b) of this Article shall affect the rights and obligations of the parties under any provision of this Contract.

(c) The Contractor shall utilize the Project Water in accordance with all applicable legal requirements.

(d) The Contractor shall make reasonable and beneficial use of all water furnished pursuant to this Contract. Ground-water recharge programs (direct, indirect, or in lieu), ground-water banking programs, surface water storage programs, and other similar programs utilizing Project Water or other water furnished pursuant to this Contract conducted within the Contractor's Boundaries which are consistent with applicable State law and result in use consistent with Federal Reclamation law will be allowed; Provided, That any direct recharge program(s) is (are) described in the Contractor's water conservation plan submitted pursuant to Article 26 of this Contract; Provided, further, That such water conservation plan demonstrates sufficient lawful uses exist in the Contractor's Boundaries so that using a long-term average, the quantity of Delivered Water is demonstrated to be reasonable for such uses and in compliance with Federal Reclamation law. Ground-water recharge programs, ground-water banking programs, surface water storage programs, and other similar programs utilizing Project Water or other water furnished pursuant to this Contract conducted outside the Contractor's Boundaries may be permitted upon written approval of the Contracting Officer, which approval will be based upon environmental documentation, Project Water rights, and Project operational concerns. The Contracting Officer will address such concerns in regulations, policies, or guidelines.

(e) The Contractor shall comply with requirements applicable to the Contractor in biological opinion(s) prepared as a result of a consultation regarding the execution of this Contract undertaken pursuant to Section 7 of the Endangered Species Act of 1973 (ESA), as amended, that are within the Contractor's legal authority to implement. The Existing Contract, which evidences in excess of 42 years of diversions for irrigation and/or M&I purposes of the quantities of water provided in subdivision (a) of Article 3 of this Contract, will be considered in developing an appropriate baseline for biological assessment(s) prepared pursuant to the ESA, and any other needed environmental review. Nothing herein shall be construed to prevent the Contractor from challenging or seeking judicial relief in a court of competent jurisdiction with respect to any biological opinion or other environmental documentation referred to in this Article.

(f) As soon as possible following each declaration of Water Made Available under Article 4 of this Contract, the Contracting Officer will make a determination whether Project Water, or other water available to the Project, can be made available to the Contractor in addition to the Contract Total under Article 3 of this Contract during the Year without adversely impacting other Project Contractors. At the request of the Contractor, the Contracting Officer will consult with the Contractor prior to making such a determination. If the Contracting Officer determines that Project Water, or other water available to the Project, can be made available to the Contractor, the Contracting Officer will announce the availability of such water and shall so notify the Contractor as soon as practical. The Contracting Officer will thereafter meet with the Contractor and other Project Contractors capable of taking such water to determine the most equitable and efficient allocation of such water. If the Contractor requests the delivery of any

quantity of such water, the Contracting Officer shall make such water available to the Contractor in accordance with applicable statutes, regulations, guidelines, and policies.

(g) The Contractor may request permission to reschedule for use during the subsequent Year some or all of the Water Made Available to the Contractor during the current Year referred to as "carryover." The Contractor may request permission to use during the current Year a quantity of Project Water which may be made available by the United States to the Contractor during the subsequent Year referred to as "preuse." The Contracting Officer's written approval may permit such uses in accordance with applicable statutes, regulations, guidelines, and policies.

(h) The Contractor's right pursuant to Federal Reclamation law and applicable State law to the reasonable and beneficial use of Water Delivered pursuant to this Contract during the term thereof and any subsequent renewal contracts, as described in Article 2 of this Contract, during the terms thereof shall not be disturbed so long as the Contractor shall fulfill all of its obligations under this Contract and any renewals thereof. Nothing in the preceding sentence shall affect the Contracting Officer's ability to impose shortages under Article 11 or subdivision (b) of Article 12 of this Contract or applicable provisions of any subsequent renewal contracts.

(i) Project Water furnished to the Contractor pursuant to this Contract may be delivered for other than irrigation or M&I purposes upon written approval by the Contracting Officer in accordance with the terms and conditions of such approval.

(j) The Contracting Officer shall make reasonable efforts to protect the water rights necessary for the Project and to provide the water available under this Contract. The Contracting Officer shall not object to participation by the Contractor, in the capacity and to the

extent permitted by law, in administrative proceedings related to the Project Water rights; Provided, That the Contracting Officer retains the right to object to the substance of the Contractor's position in such a proceeding; Provided further, That in such proceedings the Contracting Officer shall recognize the Contractor has a legal right under the terms of this Contract to use Project Water.

TIME FOR DELIVERY OF WATER

4. (a) On or about February 20 of each Calendar Year, the Contracting Officer shall announce the Contracting Officer's expected declaration of the Water Made Available. Such declaration will be expressed in terms of both Water Made Available and the Recent Historic Average and will be updated monthly, and more frequently if necessary, based on then-current operational and hydrologic conditions and a new declaration with changes, if any, to the Water Made Available will be made. The Contracting Officer shall provide forecasts of Project operations and the basis of the estimate, with relevant supporting information, upon the written request of the Contractor. Concurrently with the declaration of the Water Made Available, the Contracting Officer shall provide the Contractor with the updated Recent Historic Average.

(b) On or before each March 1 and at such other times as necessary, the Contractor shall submit to the Contracting Officer a written schedule, satisfactory to the Contracting Officer, showing the monthly quantities of Project Water to be delivered by the United States to the Contractor pursuant to this Contract for the Year commencing on such March 1. The Contracting Officer shall use all reasonable means to deliver Project Water according to the approved schedule for the Year commencing on such March 1.

(c) The Contractor shall not schedule Project Water in excess of the quantity of Project Water the Contractor intends to put to reasonable and beneficial use within the

Contractor's Boundaries or to sell, transfer, or exchange pursuant to Article 9 of this Contract during any Year.

(d) Subject to the conditions set forth in subdivision (a) of Article 3 of this Contract, the United States shall deliver Project Water to the Contractor in accordance with the initial schedule submitted by the Contractor pursuant to subdivision (b) of this Article, or any written revision(s), satisfactory to the Contracting Officer, thereto submitted within a reasonable time prior to the date(s) on which the requested change(s) is/are to be implemented.

POINT OF DIVERSION AND RESPONSIBILITY FOR DISTRIBUTION OF WATER

5. (a) Project Water scheduled pursuant to subdivision (b) of Article 4 of this Contract shall be delivered to the Contractor at approved turnouts on the Canal Facilities and any additional point or points of delivery either on Project facilities or another location or locations mutually agreed to in writing by the Contracting Officer and the Contractor. The United States shall furnish such power as may be necessary to pump Project Water at the existing Corning Canal side pumping plants and at existing relift stations at heads and elevations sufficient to irrigate by gravity all areas within the Contractor's Boundaries below elevation 380 (MSL).

(b) The Contracting Officer, either directly or through its written agreement(s) with the Operating Non-Federal Entity/Entities shall make all reasonable efforts to maintain sufficient flows and levels of water in Project facilities to deliver Project Water to the Contractor at specific turnouts established pursuant to subdivision (a) of this Article. The parties acknowledge that it may be necessary from time to time to shut down some or all of Project facilities for maintenance or emergencies. Except in the case of emergency, the Contracting Officer shall consult with the Contractor to schedule the shut down at such times and for such duration as will allow for the work to be accomplished completely and efficiently, and with a

minimum of disruption of water service to the Contractor. In this regard, shut downs will, to the extent reasonably possible, be limited to the months of December and January.

(c) The Contractor shall deliver Irrigation Water in accordance with any applicable land classification provisions of Federal Reclamation law and the associated regulations. The Contractor shall not deliver Project Water to land outside the Contractor's Boundaries unless approved in advance by the Contracting Officer.

(d) All Water Delivered to the Contractor pursuant to this Contract shall be measured and recorded with equipment furnished, installed, operated, and maintained by the United States, or the Operating Non-Federal Entity/Entities at the point or points of delivery established pursuant to subdivision (a) of this Article. Upon the request of either party to this Contract, the Contracting Officer shall investigate, or cause to be investigated by the responsible Operating Non-Federal Entity/Entities, the accuracy of such measurements and shall take any necessary steps to adjust any errors appearing therein. For any period of time when accurate measurements have not been made, the Contracting Officer shall consult with the Contractor and the responsible Operating Non-Federal Entity/Entities prior to making a final determination of the quantity delivered for that period of time.

(e) Neither the Contracting Officer nor any Operating Non-Federal Entity/Entities shall be responsible for the control, carriage, handling, use, disposal, or distribution of Water Delivered to the Contractor pursuant to this Contract beyond the delivery points specified in subdivision (a) of this Article. The Contractor shall indemnify the United States, its officers, employees, agents, and assigns on account of damage or claim of damage of any nature whatsoever for which there is legal responsibility, including property damage, personal injury, or death arising out of or connected with the control, carriage, handling, use,

disposal, or distribution of such Water Delivered beyond such delivery points, except for any damage or claim arising out of (i) acts or omissions of the Contracting Officer or any of its officers, employees, agents, or assigns, including Operating Non-Federal Entity/Entities, with the intent of creating the situation resulting in any damage or claim, (ii) willful misconduct of the Contracting Officer or any of its officers, employees, agents, or assigns, including Operating Non-Federal Entity/Entities, (iii) negligence of the Contracting Officer or any of its officers, employees, agents, or assigns including the Operating Non-Federal Entity/Entities, or (iv) damage or claims resulting from a malfunction of facilities owned and/or operated by the United States or responsible Operating Non-Federal Entity/Entities; Provided, That the Contractor is not the Operating Non-Federal Entity/Entities that owned or operated the malfunctioning facility (ies) from which the damage claim arose.

MEASUREMENT OF WATER WITHIN THE CONTRACTOR'S BOUNDARIES

6. (a) The Contractor has established a measuring program satisfactory to the Contracting Officer. The Contractor shall ensure that all surface water delivered for irrigation purposes within the Contractor's Boundaries is measured at each agricultural turnout and such water delivered for M&I purposes is measured at each M&I service connection. The water measuring devices or water measuring methods of comparable effectiveness must be acceptable to the Contracting Officer. The Contractor shall be responsible for installing, operating, and maintaining and repairing all such measuring devices and implementing all such water measuring methods at no cost to the United States. The Contractor shall use the information obtained from such water measuring devices or water measuring methods to ensure its proper management of the water, to bill water users for water delivered by the Contractor; and, if applicable, to record water delivered for M&I purposes by customer class as defined in the

Contractor's water conservation plan provided for in Article 26 of this Contract. Nothing herein contained, however, shall preclude the Contractor from establishing and collecting any charges, assessments, or other revenues authorized by California law. The Contractor shall include a summary of all its annual surface water deliveries in the annual report described in subdivision (c) of Article 26.

(b) To the extent the information has not otherwise been provided, upon execution of this Contract, the Contractor shall provide to the Contracting Officer a written report describing the measurement devices or water measuring methods being used or to be used to implement subdivision (a) of this Article and identifying the agricultural turnouts and the M&I service connections or alternative measurement programs approved by the Contracting Officer, at which such measurement devices or water measuring methods are being used, and, if applicable, identifying the locations at which such devices and/or methods are not yet being used including a time schedule for implementation at such locations. The Contracting Officer shall advise the Contractor in writing within 60 days as to the adequacy and necessary modifications, if any, of the measuring devices or water measuring methods identified in the Contractor's report and if the Contracting Officer does not respond in such time, they shall be deemed adequate. If the Contracting Officer notifies the Contractor that the measuring devices or methods are inadequate, the parties shall within 60 days following the Contracting Officer's response, negotiate in good faith the earliest practicable date by which the Contractor shall modify said measuring devices and/or measuring methods as required by the Contracting Officer to ensure compliance with subdivision (a) of this Article.

(c) All new surface water delivery systems installed within the Contractor's Boundaries after the effective date of this Contract shall also comply with the measurement provisions described in subdivision (a) of this Article.

(d) The Contractor shall inform the Contracting Officer and the State of California in writing by April 30 of each Year of the monthly volume of surface water delivered within the Contractor's Boundaries during the previous Year.

(e) The Contractor shall inform the Contracting Officer and the Operating Non-Federal Entity on or before the 20th calendar day of each month of the quantity of Irrigation and M&I Water taken during the preceding month.

RATES AND METHOD OF PAYMENT FOR WATER

7. (a) The Contractor shall pay the United States as provided in this Article for all Delivered Water at Rates, Charges, and the Tiered Pricing Component established in accordance with (i) the Secretary's ratesetting policy for Irrigation Water adopted in 1988 and the Secretary's then-existing ratesetting policy for M&I Water. Such ratesetting policies shall be amended, modified, or superceded only through a public notice and comment procedure; (ii) applicable Federal Reclamation law and associated rules and regulations, or policies; and (iii) other applicable provisions of this Contract. Payments shall be made by cash transaction, electronic funds transfer, or any other mechanism as may be agreed to in writing by the Contractor and the Contracting Officer. The Rates, Charges, and Tiered Pricing Component applicable to the Contractor upon execution of this Contract are set forth in Exhibit "B," as may be revised annually.

(b) The Contracting Officer shall notify the Contractor of the Rates, Charges, and Tiered Pricing Component as follows:

(1) Prior to July 1 of each Calendar Year, the Contracting Officer shall provide the Contractor an estimate of the Charges for Project Water that will be applied to the period October 1, of the current Calendar Year, through September 30, of the following Calendar Year, and the basis for such estimate. The Contractor shall be allowed not less than two months to review and comment on such estimates. On or before September 15 of each Calendar Year, the Contracting Officer shall notify the Contractor in writing of the Charges to be in effect during the period October 1 of the current Calendar Year, through September 30, of the following Calendar Year, and such notification shall revise Exhibit "B."

(2) Prior to October 1 of each Calendar Year, the Contracting Officer shall make available to the Contractor an estimate of the Rates and Tiered Pricing Component for Project Water for the following Year and the computations and cost allocations upon which those Rates are based. The Contractor shall be allowed not less than two months to review and comment on such computations and cost allocations. By December 31 of each Calendar Year, the Contracting Officer shall provide the Contractor with the final Rates and Tiered Pricing Component to be in effect for the upcoming Year, and such notification shall revise Exhibit "B."

(c) At the time the Contractor submits the initial schedule for the delivery of Project Water for each Year pursuant to subdivision (b) of Article 4 of this Contract, the Contractor shall make an advance payment to the United States equal to the total amount payable pursuant to the applicable Rate(s) set under subdivision (a) of this Article, for the Project Water scheduled to be delivered pursuant to this Contract during the first two calendar months of the Year. Before the end of the first month and before the end of each calendar month thereafter, the Contractor shall make an advance payment to the United States, at the Rate(s) set under subdivision (a) of this Article, for the Water Scheduled to be delivered pursuant to this Contract

during the second month immediately following. Adjustments between advance payments for Water Scheduled and payments at Rates due for Water Delivered shall be made before the end of the following month; Provided, That any revised schedule submitted by the Contractor pursuant to Article 4 of this Contract which increases the amount of Water Delivered pursuant to this Contract during any month shall be accompanied with appropriate advance payment, at the Rates then in effect, to assure that Project Water is not delivered to the Contractor in advance of such payment. In any month in which the quantity of Water Delivered to the Contractor pursuant to this Contract equals the quantity of Water Scheduled and paid for by the Contractor, no additional Project Water shall be delivered to the Contractor unless and until an advance payment at the Rates then in effect for such additional Project Water is made. Final adjustment between the advance payments for the Water Scheduled and payments for the quantities of Water Delivered during each Year pursuant to this Contract shall be made as soon as practicable but no later than April 30th of the following Year, or 60 days after the delivery of Project Water carried over under subdivision (g) of Article 3 of this Contract if such water is not delivered by the last day of February.

(d) The Contractor shall also make a payment in addition to the Rate(s) in subdivision (c) of this Article to the United States for Water Delivered, at the Charges and the appropriate Tiered Pricing Component then in effect, before the end of the month following the month of delivery; Provided, That the Contractor may be granted an exception from the Tiered Pricing Component pursuant to subdivision (j)(2) of this Article. The payments shall be consistent with the quantities of Irrigation Water and M&I Water Delivered as shown in the water delivery report for the subject month prepared by the Operating Non-Federal Entity/Entities or, if there is no Operating Non-Federal Entity/Entities, by the Contracting

Officer. The water delivery report shall be deemed a bill for the payment of Charges and the applicable Tiered Pricing Component for Water Delivered. Adjustment for overpayment or underpayment of Charges shall be made through the adjustment of payments due to the United States for Charges for the next month. Any amount to be paid for past due payment of Charges and the Tiered Pricing Component shall be computed pursuant to Article 20 of this Contract.

(e) The Contractor shall pay for any Water Delivered under subdivision (a), (f), or (g) of Article 3 of this Contract as determined by the Contracting Officer pursuant to applicable statutes, associated regulations, any applicable provisions of guidelines or ratesetting policies; Provided, That the Rate for Water Delivered under subdivision (f) of Article 3 of this Contract shall be no more than the otherwise applicable Rate for Irrigation Water or M&I Water under subdivision (a) of this Article.

(f) Payments to be made by the Contractor to the United States under this Contract may be paid from any revenues available to the Contractor.

(g) All revenues received by the United States from the Contractor relating to the delivery of Project Water or the delivery of non-Project water through Project facilities shall be allocated and applied in accordance with Federal Reclamation law and the associated rules or regulations, and the then current Project ratesetting policies for M&I Water or Irrigation Water.

(h) The Contracting Officer shall keep its accounts pertaining to the administration of the financial terms and conditions of its long-term contracts, in accordance with applicable Federal standards, so as to reflect the application of Project costs and revenues. The Contracting Officer shall, each Year upon request of the Contractor, provide to the Contractor a detailed accounting of all Project and Contractor expense allocations, the disposition of all Project and Contractor revenues, and a summary of all water delivery

information. The Contracting Officer and the Contractor shall enter into good faith negotiations to resolve any discrepancies or disputes relating to accountings, reports, or information.

(i) The parties acknowledge and agree that the efficient administration of this Contract is their mutual goal. Recognizing that experience has demonstrated that mechanisms, policies, and procedures used for establishing Rates, Charges, and Tiered Pricing Components, and/or for making and allocating payments, other than those set forth in this Article may be in the mutual best interest of the parties, it is expressly agreed that the parties may enter into agreements to modify the mechanisms, policies, and procedures for any of those purposes while this Contract is in effect without amending this Contract.

(j) (1) Beginning at such time as deliveries of Project Water in a Year exceed 80 percent of the Contract Total, then before the end of the month following the month of delivery the Contractor shall make an additional payment to the United States equal to the applicable Tiered Pricing Component. The Tiered Pricing Component for the amount of Water Delivered in excess of 80 percent of the Contract Total, but less than or equal to 90 percent of the Contract total, shall equal one-half of the difference between the Rate established under subdivision (a) of this Article and the Irrigation Full Cost Water Rate or M&I Full Cost Water Rate, whichever is applicable. The Tiered Pricing Component for the amount of Water delivered which exceeds 90 percent of the Contract Total shall equal the difference between (i) the Rate established under subdivision (a) of this Article and (ii) the Irrigation Full Cost Water Rate or M&I Full Cost Water Rate, whichever is applicable. For all Water Delivered pursuant to subdivision (a) of Article 3 of this Contract which is in excess of 80 percent of the Contract Total, this increment shall be deemed to be divided between Irrigation Water and M&I Water in the same proportion as actual deliveries of each bear to the cumulative total Water Delivered.

Solely for the purpose of calculating the Tiered Pricing Component, the Full Cost Rate shall not include the interest component of the Contractor's water distribution system constructed by the United States and covered by Repayment Contract No. 14-06-200-516-A entered into pursuant to 43 USC 485h(d).

(2) Subject to the Contracting Officer's written approval, the Contractor may request and receive an exemption from such Tiered Pricing Components for Project Water delivered to produce a crop which the Contracting Officer determines will provide significant and quantifiable habitat values for waterfowl in fields where the water is used and the crops are produced; Provided, That the exemption from the Tiered Pricing Components for Irrigation Water shall apply only if such habitat values can be assured consistent with the purposes of the CVPIA through binding agreements executed with or approved by the Contracting Officer prior to use of such water.

(3) For purposes of determining the applicability of the Tiered Pricing Component pursuant to this Article, Water Delivered shall include Project Water that the Contractor transfers to others but shall not include Project Water transferred to the Contractor, nor shall it include the additional water provided to the Contractor under the provisions of subdivision (f) of Article 3 of this Contract.

(k) For the term of this Contract, Rates under the respective ratesetting policies will be established to recover only reimbursable O&M (including any deficits) and capital costs of the Project, as those terms are used in then-current Project ratesetting policies, and interest, where appropriate, except in instances where a minimum Rate is applicable in accordance with the relevant Project ratesetting policy. Changes of significance in practices which implement the Contracting Officer's ratesetting policies will not be implemented until the

Contracting Officer has provided the Contractor an opportunity to discuss the nature, need, and impact of the proposed change.

(l) Except as provided in subsections 3405(a)(1)(B) and 3405(f) of the CVPIA, the Rates for Project Water transferred by the Contractor shall be the Contractor's Rates adjusted upward or downward to reflect the changed costs, if any, incurred by the Contracting Officer in the delivery of the transferred Project Water to the transferee's point of delivery in accordance with the then applicable Project ratesetting policy. If the Contractor is receiving lower Rates and Charges because of inability to pay and is transferring Project Water to another entity whose Rates and Charges are not adjusted due to inability to pay, the Rates and Charges for transferred Project Water shall be the Contractor's Rates and Charges and will not be adjusted to reflect the Contractor's inability to pay.

(m) Pursuant to the Act of October 27, 1986 (100 Stat. 3050), the Contracting Officer is authorized to adjust determinations of ability to pay every five years.

(n) With respect to the Rates for M&I Water, the Contractor asserts that it is not legally obligated to repay any Project deficits claimed by the United States to have accrued as of the date of this Contract or deficit-related interest charges thereon. By entering into this Contract, the Contractor does not waive any legal rights or remedies that it may have with respect to such disputed issues. Notwithstanding the execution of this Contract, and payments made hereunder, the Contractor may challenge in the appropriate administrative or judicial forums: (1) the existence, computation, or imposition of any deficit charges accruing during the term of the Existing Contract and any preceding interim renewal contracts, if applicable; (2) interest accruing on any such deficits; (3) the inclusion of any such deficit charges or interest in the Rates; (4) the application by the United States of payments made by the Contractor under its

Existing Contract and any preceding interim renewal contracts, if applicable; and (5) the application of such payments in the Rates. The Contracting Officer agrees that the Contractor shall be entitled to the benefit of any administrative or judicial ruling in favor of any other Project M&I contractor on any of these issues and credits for payments heretofore made,, Provided That, the basis for such ruling is applicable to the Contractor.

NON-INTEREST BEARING OPERATION AND MAINTENANCE DEFICITS

8. The Contractor and the Contracting Officer concur that, as of the effective date of this Contract, the Contractor has no non-interest bearing O&M deficits and shall have no further liability therefor.

SALES, TRANSFERS, OR EXCHANGES OF WATER

9. (a) The right to receive Project Water provided for in this Contract may be sold, transferred, or exchanged to others for reasonable and beneficial uses within the State of California if such sale, transfer, or exchange is authorized by applicable Federal and State laws, and applicable guidelines or regulations then in effect. No sale, transfer, or exchange of Project Water under this Contract may take place without the prior written approval of the Contracting Officer, except as provided for in subdivision (b) of this Article, and no such sales, transfers, or exchanges shall be approved absent all appropriate environmental documentation, including but not limited to documents prepared pursuant to NEPA and ESA. Such environmental documentation should include, as appropriate, an analysis of ground-water impacts and economic and social effects, including environmental justice, of the proposed water transfers on both the transferor and transferee.

(b) In order to facilitate efficient water management by means of water transfers of the type historically carried out among Project Contractors located within the same

geographical area and to allow the Contractor to participate in an accelerated water transfer program during the term of this Contract, the Contracting Officer shall prepare, as appropriate, all necessary environmental documentation including, but not limited to, documents prepared pursuant to NEPA and ESA, analyzing annual transfers within such geographical areas and the Contracting Officer shall determine whether such transfers comply with applicable law. Following the completion of the environmental documentation, such transfers addressed in such documentation shall be conducted with advance notice to the Contracting Officer, but shall not require prior written approval by the Contracting Officer. Such environmental documentation and the Contracting Officer's compliance determination shall be reviewed every five years and updated, as necessary, prior to the expiration of the then-existing five-year period. All subsequent environmental documentation shall include an alternative to evaluate not less than the quantity of Project Water historically transferred within the same geographical area.

(c) For a water transfer to qualify under subdivision (b) of this Article, such water transfer must: (i) be for irrigation purposes for lands irrigated within the previous three years, for M&I use, ground-water recharge, ground-water banking, similar ground-water activities, surface water storage, or fish and wildlife resources; not lead to land conversion; and be delivered to established cropland, wildlife refuges, ground-water basins or M&I use; (ii) occur within a single Year; (iii) occur between a willing seller and a willing buyer; (iv) convey water through existing facilities with no new construction or modifications to facilities and be between existing Project Contractors and/or the Contractor and the United States, Department of the Interior; and (v) comply with all applicable Federal, State, and local or tribal laws and requirements imposed for protection of the environment and Indian Trust Assets, as defined under Federal law.

(d) For the purpose of determining whether Section 3405(a)(1)(M) of the CVPIA applies to the Contractor as a transferor or transferee of Project Water, the Contracting Officer acknowledges that the Contractor is within a county, watershed, or other area of origin, as those terms are utilized under California law, of water that constitutes the natural flow of the Sacramento River and its tributaries above the confluence of the American and Sacramento Rivers.

APPLICATION OF PAYMENTS AND ADJUSTMENTS

10. (a) The amount of any overpayment by the Contractor of the Contractor's O&M, capital, and deficit (if any) obligations for the Year shall be applied first to any current liabilities of the Contractor arising out of this Contract then due and payable. Overpayments of more than $1,000 shall be refunded at the Contractor's request. In lieu of a refund, any amount of such overpayment, at the option of the Contractor, may be credited against amounts to become due to the United States by the Contractor. With respect to overpayment, such refund or adjustment shall constitute the sole remedy of the Contractor or anyone having or claiming to have the right to the use of any of the Project Water supply provided for herein. All credits and refunds of overpayments shall be made within 30 days of the Contracting Officer obtaining direction as to how to credit or refund such overpayment in response to the notice to the Contractor that it has finalized the accounts for the Year in which the overpayment was made.

(b) All advances for miscellaneous costs incurred for work requested by the Contractor pursuant to Article 25 of this Contract shall be adjusted to reflect the actual costs when the work has been completed. If the advances exceed the actual costs incurred, the difference will be refunded to the Contractor. If the actual costs exceed the Contractor's advances, the Contractor will be billed for the additional costs pursuant to Article 25.

TEMPORARY REDUCTIONS--RETURN FLOWS

11. (a) Subject to: (i) the authorized purposes and priorities of the Project and the requirements of Federal law; and (ii) the obligations of the United States under existing contracts, or renewals thereof, providing for water deliveries from the Project, the Contracting Officer shall make all reasonable efforts to optimize Project Water deliveries to the Contractor as provided in this Contract.

(b) The Contracting Officer or Operating Non-Federal Entity/Entities may temporarily discontinue or reduce the quantity of Water Delivered to the Contractor as herein provided for the purposes of investigation, inspection, maintenance, repair, or replacement of any of the Project facilities or any part thereof necessary for the delivery of Project Water to the Contractor, but so far as feasible the Contracting Officer or Operating Non-Federal Entity will give the Contractor due notice in advance of such temporary discontinuance or reduction, except in case of emergency, in which case no notice need be given; Provided, That the United States shall use its best efforts to avoid any discontinuance or reduction in such service. Upon resumption of service after such reduction or discontinuance, and if requested by the Contractor, the United States will, if possible, deliver the quantity of Project Water which would have been delivered hereunder in the absence of such discontinuance or reduction.

(c) The United States reserves the right to all seepage and return flow water derived from Water Delivered to the Contractor hereunder which escapes or is discharged beyond the Contractor's Boundaries; Provided, That this shall not be construed as claiming for the United States any right to seepage or return flow being put to reasonable and beneficial use pursuant to this Contract within the Contractor's Boundaries by the Contractor or those claiming by, through, or under the Contractor.

CONSTRAINTS ON THE AVAILABILITY OF WATER

12. (a) In its operation of the Project, the Contracting Officer will use all reasonable means to guard against a Condition of Shortage in the quantity of water to be made available to the Contractor pursuant to this Contract. In the event the Contracting Officer determines that a Condition of Shortage appears probable, the Contracting Officer will notify the Contractor of said determination as soon as practicable.

(b) If there is a Condition of Shortage because of errors in physical operations of the Project, drought, other physical causes beyond the control of the Contracting Officer or actions taken by the Contracting Officer to meet legal obligations then, except as provided in subdivision (a) of Article 18 of this Contract, no liability shall accrue against the United States or any of its officers, agents, or employees for any damage, direct or indirect, arising therefrom.

(c) In any Year in which there may occur a shortage for any of the reasons specified in subdivision (b) above, the Contracting Officer shall apportion the available Project Water supply among the Contractor and others entitled, under existing contracts and future contracts (to the extent such future contracts are permitted under subsections (a) and (b) of Section 3404 of the CVPIA) and renewals thereof, to receive Project Water consistent with the contractual obligations of the United States.

(d) Project Water furnished under this Contract will be allocated in accordance with the then-existing Project M&I Water Shortage Policy. Such policy shall be amended, modified, or superseded only through a public notice and comment procedure.

UNAVOIDABLE GROUNDWATER PERCOLATION

13. To the extent applicable, the Contractor shall not be deemed to have delivered Irrigation Water to Excess Lands or Ineligible Lands within the meaning of this Contract if such

lands are irrigated with groundwater that reaches the underground strata as an unavoidable result of the delivery of Irrigation Water by the Contractor to Eligible Lands.

RULES AND REGULATIONS

14. The parties agree that the delivery of Irrigation Water or use of Federal facilities pursuant to this Contract is subject to Federal Reclamation law, including but not limited to, the Reclamation Reform Act of 1982 (43 U.S.C.390aa et seq.), as amended and supplemented, and the rules and regulations promulgated by the Secretary of the Interior under Federal Reclamation law.

WATER AND AIR POLLUTION CONTROL

15. The Contractor, in carrying out this Contract, shall comply with all applicable water and air pollution laws and regulations of the United States and the State of California, and shall obtain all required permits or licenses from the appropriate Federal, State, or local authorities.

QUALITY OF WATER

16. (a) Project facilities used to deliver Project Water to the Contractor pursuant to this Contract shall be operated and maintained to enable the United States to deliver Project Water to the Contractor in accordance with the water quality standards specified in subsection 2(b) of the Act of August 26, 1937 (50 Stat. 865), as added by Section 101 of the Act of October 27, 1986 (100 Stat. 3050) or other existing Federal laws. The United States is under no obligation to construct or furnish water treatment facilities to maintain or to improve the quality of Water Delivered to the Contractor pursuant to this Contract. The United States does not warrant the quality of Water Delivered to the Contractor pursuant to this Contract.

(b) The O&M of Project facilities shall be performed in such manner as is practicable to maintain the quality of raw water made available through such facilities at the highest level reasonably attainable as determined by the Contracting Officer. The Contractor shall be responsible for compliance with all State and Federal water quality standards applicable to surface and subsurface agricultural drainage discharges generated through the use of Federal

or Contractor facilities or Project Water provided by the Contractor within the Contractor's Boundaries.

WATER ACQUIRED BY THE CONTRACTOR
OTHER THAN FROM THE UNITED STATES

17. (a) Water or water rights now owned or hereafter acquired by the Contractor other than from the United States and Irrigation Water furnished pursuant to the terms of this Contract may be simultaneously transported through the same distribution facilities of the Contractor subject to the following: (i) if the facilities utilized for commingling Irrigation Water and non-Project water were constructed without funds made available pursuant to Federal Reclamation law, the provisions of Federal Reclamation law will be applicable only to the Landholders of lands which receive Irrigation Water; (ii) the eligibility of land to receive Irrigation Water must be established through the certification requirements as specified in the Acreage Limitation Rules and Regulations (43 CFR Part 426); (iii) the water requirements of Eligible Lands within the Contractor's Boundaries can be established and the quantity of Irrigation Water to be utilized is less than or equal to the quantity necessary to irrigate such Eligible Lands; and (iv) if the facilities utilized for commingling Irrigation Water and non-Project water are/were constructed with funds made available pursuant to Federal Reclamation law, the non-Project water will be subject to the acreage limitation provisions of Federal Reclamation law, unless the Contractor pays to the United States the incremental fee described in 43 CFR 426.15. In determining the incremental fee, the Contracting Officer will calculate annually the cost to the Federal Government, including interest, on storing or delivering non-Project water, which for purposes of this Contract shall be determined as follows: The quotient shall be the unpaid distribution system costs divided by the total irrigable acreage within the Contractor's Boundaries. The incremental fee per acre is the mathematical result of such

quotient times the interest rate determined using Section 202 (3) of the Act of October 12, 1982 (96 Stat. 1263). Such incremental fee will be charged to each acre of excess or full cost land within the Contractor's Boundaries that receives non-Project water through Federally financed or constructed facilities. The incremental fee calculation methodology will continue during the term of this Contract absent the promulgation of a contrary Reclamation-wide rule, regulation, or policy adopted after the Contractor has been afforded the opportunity to review and comment on the proposed rule, regulation, or policy. If such rule, regulation, or policy is adopted it shall supercede this provision.

(b) Water or water rights now owned or hereafter acquired by the Contractor, other than from the United States, may be stored, conveyed, and/or diverted through Project facilities, subject to the completion of appropriate environmental documentation, with the approval of the Contracting Officer and the execution of any contract determined by the Contracting Officer to be necessary, consistent with the following provisions:

(1) The Contractor may introduce non-Project water into Project facilities and deliver said water to lands within the Contractor's Boundaries, including Ineligible Lands, subject to payment to the United States and/or to any applicable Operating Non-Federal Entity of an appropriate rate as determined by the applicable Project ratesetting policy, the RRA, and the Project use power policy, if such Project use power policy is applicable, each as amended, modified, or superceded from time to time.

(2) Delivery of such non-Project water in and through Project facilities shall only be allowed to the extent such deliveries do not: (i) interfere with other Project purposes as determined by the Contracting Officer; (ii) reduce the quantity or quality of water available to other Project Contractors; (iii) interfere with the delivery of contractual water

entitlements to any other Project Contractors; or (iv) interfere with the physical maintenance of the Project facilities.

(3) Neither the United States nor the Operating Non-Federal Entity shall be responsible for control, care, or distribution of the non-Project water before it is introduced into or after it is delivered from the Project facilities. The Contractor hereby releases and agrees to defend and indemnify the United States and the Operating Non-Federal Entity, and their respective officers, agents, and employees, from any claim for damage to persons or property, direct or indirect, resulting from the acts of the Contractor, its officers', employees', agents' or assigns', act(s) in (i) extracting or diverting non-Project water from any source, or (ii) diverting such non-Project water into Project facilities.

(4) Diversion of such non-Project water into Project facilities shall be consistent with all applicable laws, and if involving groundwater, consistent with any applicable ground-water management plan for the area from which it was extracted.

(5) After Project purposes are met, as determined by the Contracting Officer, the United States and the Contractor shall share priority to utilize the remaining capacity of the facilities declared to be available by the Contracting Officer for conveyance and transportation of non-Project water prior to any such remaining capacity being made available to non-Project contractors.

OPINIONS AND DETERMINATIONS

18. (a) Where the terms of this Contract provide for actions to be based upon the opinion or determination of either party to this Contract, said terms shall not be construed as permitting such action to be predicated upon arbitrary, capricious, or unreasonable opinions or determinations. Both parties, notwithstanding any other provisions of this Contract, expressly

reserve the right to seek relief from and appropriate adjustment for any such arbitrary, capricious, or unreasonable opinion or determination. Each opinion or determination by either party shall be provided in a timely manner. Nothing in subdivision (a) of Article 18 of this Contract is intended to or shall affect or alter the standard of judicial review applicable under Federal law to any opinion or determination implementing a specific provision of Federal law embodied in statute or regulation.

(b) The Contracting Officer shall have the right to make determinations necessary to administer this Contract that are consistent with the provisions of this Contract, the laws of the United States and of the State of California, and the rules and regulations promulgated by the Secretary of the Interior. Such determinations shall be made in consultation with the Contractor to the extent reasonably practicable.

COORDINATION AND COOPERATION

19. (a) In order to further their mutual goals and objectives, the Contracting Officer and the Contractor shall communicate, coordinate, and cooperate with each other, and with other affected Project Contractors, in order to improve the operation and management of the Project. The communication, coordination, and cooperation regarding operations and management shall include, but not be limited to, any action which will or may materially affect the quantity or quality of Project Water supply, the allocation of Project Water supply, and Project financial matters including, but not limited to, budget issues. The communication, coordination, and cooperation provided for hereunder shall extend to all provisions of this Contract. Each party shall retain exclusive decision making authority for all actions, opinions, and determinations to be made by the respective party.

(b) Within 120 days following the effective date of this Contract, the Contractor, other affected Project Contractors, and the Contracting Officer shall arrange to meet with interested Project Contractors to develop a mutually agreeable, written Project-wide process, which may be amended as necessary separate and apart from this Contract. The goal of this process shall be to provide, to the extent practicable, the means of mutual communication and interaction regarding significant decisions concerning Project operation and management on a real-time basis.

(c) In light of the factors referred to in subdivision (b) of Article 3 of this Contract, it is the intent of the Secretary to improve water supply reliability. To carry out this intent:

(1) The Contracting Officer will, at the request of the Contractor, assist in the development of integrated resource management plans for the Contractor. Further, the Contracting Officer will, as appropriate, seek authorizations for implementation of partnerships to improve water supply, water quality, and reliability.

(2) The Secretary will, as appropriate, pursue program and project implementation and authorization in coordination with Project Contractors to improve the water supply, water quality, and reliability of the Project for all Project purposes.

(3) The Secretary will coordinate with Project Contractors and the State of California to seek improved water resource management.

(4) The Secretary will coordinate actions of agencies within the Department of the Interior that may impact the availability of water for Project purposes.

(5) The Contracting Officer shall periodically, but not less than annually, hold division level meetings to discuss Project operations, division level water management activities, and other issues as appropriate.

(d) Without limiting the contractual obligations of the Contracting Officer under the other Articles of this Contract, nothing in this Article shall be construed to limit or constrain the Contracting Officer's ability to communicate, coordinate, and cooperate with the Contractor or other interested stakeholders or to make decisions in a timely fashion as needed to protect health, safety, or the physical integrity of structures or facilities.

CHARGES FOR DELINQUENT PAYMENTS

20. (a) The Contractor shall be subject to interest, administrative and penalty charges on delinquent installments or payments. When a payment is not received by the due date, the Contractor shall pay an interest charge for each day the payment is delinquent beyond the due date. When a payment becomes sixty (60) days delinquent, the Contractor shall pay an administrative charge to cover additional costs of billing and processing the delinquent payment. When a payment is delinquent ninety (90) days or more, the Contractor shall pay an additional penalty charge of six (6%) percent per year for each day the payment is delinquent beyond the due date. Further, the Contractor shall pay any fees incurred for debt collection services associated with a delinquent payment.

(b) The interest charge rate shall be the greater of the rate prescribed quarterly in the Federal Register by the Department of the Treasury for application to overdue payments, or the interest rate of one-half of one (0.5%) percent per month prescribed by Section 6 of the Reclamation Project Act of 1939 (Public Law 76-260). The interest charge rate shall be determined as of the due date and remain fixed for the duration of the delinquent period.

(c) When a partial payment on a delinquent account is received, the amount received shall be applied, first to the penalty, second to the administrative charges, third to the accrued interest, and finally to the overdue payment.

EQUAL OPPORTUNITY

21. During the performance of this Contract, the Contractor agrees as follows:

(a) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action

shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination, rates of payment or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this nondiscrimination clause.

(b) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without discrimination because of race, color, religion, sex, or national origin.

(c) The Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Contracting Officer, advising the said labor union or workers' representative of the Contractor's commitments under Section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(d) The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(e) The Contractor will furnish all information and reports required by said amended Executive Order and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the Contracting Officer and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(f) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of the said rules, regulations, or orders, this Contract may be canceled, terminated, or suspended, in whole or in part, and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in said amended Executive Order, and such other sanctions may be imposed and remedies invoked as provided in said Executive Order, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(g) The Contractor will include the provisions of paragraphs (a) through (g) in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of said amended Executive Order, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

GENERAL OBLIGATION--BENEFITS CONDITIONED UPON PAYMENT

22. (a) The obligation of the Contractor to pay the United States as provided in this Contract is a general obligation of the Contractor notwithstanding the manner in which the obligation may be distributed among the Contractor's water users and notwithstanding the default of individual water users in their obligations to the Contractor.

(b) The payment of charges becoming due hereunder is a condition precedent to receiving benefits under this Contract. The United States shall not make water available to the Contractor through Project facilities during any period in which the Contractor may be in arrears in the advance payment of water rates due the United States. The Contractor shall not furnish water made available pursuant to this Contract for lands or parties which are in arrears in the advance payment of water rates levied or established by the Contractor.

(c) With respect to subdivision (b) of this Article, the Contractor shall have no obligation to require advance payment for water rates which it levies.

COMPLIANCE WITH CIVIL RIGHTS LAWS AND REGULATIONS

23. (a) The Contractor shall comply with Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d), Section 504 of the Rehabilitation Act of 1975 (P.L. 93-112, as amended), the Age Discrimination Act of 1975 (42 U.S.C. 6101, et seq.) and any other applicable civil rights laws, as well as with their respective implementing regulations and guidelines imposed by the U.S. Department of the Interior and/or Bureau of Reclamation.

(b) These statutes require that no person in the United States shall, on the grounds of race, color, national origin, handicap, or age, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving financial assistance from the Bureau of Reclamation. By executing this Contract, the Contractor agrees to immediately take any measures necessary to implement this obligation, including permitting officials of the United States to inspect premises, programs, and documents.

(c) The Contractor makes this agreement in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts, property discounts, or other Federal financial assistance extended after the date hereof to the Contractor by the Bureau of Reclamation, including installment payments after such date on account of arrangements for Federal financial assistance which were approved before such date. The Contractor recognizes and agrees that such Federal assistance will be extended in reliance on the representations and agreements made in this Article, and that the United States reserves the right to seek judicial enforcement thereof.

PRIVACY ACT COMPLIANCE

24. (a) The Contractor shall comply with the Privacy Act of 1974 (5 U.S.C. 552a) (the Act) and the Department of the Interior rules and regulations under the Act (43 CFR 2.45 et seq.) in maintaining Landholder acreage certification and reporting records, required to be

submitted to the Contractor for compliance with Sections 206 and 228 of the Reclamation Reform Act of 1982 (96 Stat. 1266), and pursuant to 43 CFR 426.18.

(b) With respect to the application and administration of the criminal penalty provisions of the Act (5 U.S.C. 552a(i)), the Contractor and the Contractor's employees responsible for maintaining the certification and reporting records referenced in (a) above are considered to be employees of the Department of the Interior. See 5 U.S.C. 552a(m).

(c) The Contracting Officer or a designated representative shall provide the Contractor with current copies of the Interior Department Privacy Act regulations and the Bureau of Reclamation Federal Register Privacy Act System of Records Notice (Acreage Limitation--Interior, Reclamation-31) which govern the maintenance, safeguarding, and disclosure of information contained in the Landholder's certification and reporting records.

(d) The Contracting Officer shall designate a full-time employee of the Bureau of Reclamation to be the System Manager who shall be responsible for making decisions on denials pursuant to 43 CFR 2.61 and 2.64 amendment requests pursuant to 43 CFR 2.72. The Contractor is authorized to grant requests by individuals for access to their own records.

(e) The Contractor shall forward promptly to the System Manager each proposed denial of access under 43 CFR 2.64; and each request for amendment of records filed under 43 CFR 2.71; notify the requester accordingly of such referral; and provide the System Manager with information and records necessary to prepare an appropriate response to the requester. These requirements do not apply to individuals seeking access to their own certification and reporting forms filed with the Contractor pursuant to 43 CFR 426.18, unless the requester elects to cite the Privacy Act as a basis for the request.

CONTRACTOR TO PAY CERTAIN MISCELLANEOUS COSTS

25. In addition to all other payments to be made by the Contractor pursuant to this Contract, the Contractor shall pay to the United States, within 60 days after receipt of a bill and detailed statement submitted by the Contracting Officer to the Contractor for such specific items of direct cost incurred by the United States for work requested by the Contractor associated with this Contract plus indirect costs in accordance with applicable Bureau of Reclamation policies and procedures. All such amounts referred to in this Article shall not exceed the amount agreed to in writing in advance by the Contractor. This Article shall not apply to costs for routine contract administration.

WATER CONSERVATION

26. (a) Prior to the delivery of water provided from or conveyed through Federally constructed or Federally financed facilities pursuant to this Contract, the Contractor

shall be implementing an effective water conservation and efficiency program based on the Contractor's water conservation plan that has been determined by the Contracting Officer to meet the conservation and efficiency criteria for evaluating water conservation plans established under Federal law. The water conservation and efficiency program shall contain definite water conservation objectives, appropriate economically feasible water conservation measures, and time schedules for meeting those objectives. Continued Project Water delivery pursuant to this Contract shall be contingent upon the Contractor's continued implementation of such water conservation program. In the event the Contractor's water conservation plan or any revised water conservation plan completed pursuant to subdivision (d) of Article 26 of this Contract have not yet been determined by the Contracting Officer to meet such criteria, due to circumstances which the Contracting Officer determines are beyond the control of the Contractor, water deliveries shall be made under this Contract so long as the Contractor diligently works with the Contracting Officer to obtain such determination at the earliest practicable date, and thereafter the Contractor immediately begins implementing its water conservation and efficiency program in accordance with the time schedules therein.

(b) Should the amount of M&I Water delivered pursuant to subdivision (a) of Article 3 of this Contract equal or exceed 2,000 acre-feet per Year, the Contractor shall implement the Best Management Practices identified by the time frames issued by the California Urban Water Conservation Council for such M&I Water unless any such practice is determined by the Contracting Officer to be inappropriate for the Contractor.

(c) The Contractor shall submit to the Contracting Officer a report on the status of its implementation of the water conservation plan on the reporting dates specified in the then existing conservation and efficiency criteria established under Federal law.

(d) At five-year intervals, the Contractor shall revise its water conservation plan to reflect the then-current conservation and efficiency criteria for evaluating water conservation plans established under Federal law and submit such revised water management

plan to the Contracting Officer for review and evaluation. The Contracting Officer will then determine if the water conservation plan meets Reclamation's then-current conservation and efficiency criteria for evaluating water conservation plans established under Federal law.

(e) If the Contractor is engaged in direct ground-water recharge, such activity shall be described in the Contractor's water conservation plan.

EXISTING OR ACQUIRED WATER OR WATER RIGHTS

27. Except as specifically provided in Article 17 of this Contract, the provisions of this Contract shall not be applicable to or affect non-Project water or water rights now owned or hereafter acquired by the Contractor or any user of such water within the Contractor's Boundaries. Any such water shall not be considered Project Water under this Contract. In addition, this Contract shall not be construed as limiting or curtailing any rights which the Contractor or any water user within the Contractor's Boundaries acquires or has available under any other contract pursuant to Federal Reclamation law.

OPERATION AND MAINTENANCE BY OPERATING NON-FEDERAL ENTITY

28. (a) The O&M of a portion of the Project facilities which serve the Contractor, and responsibility for funding a portion of the costs of such O&M, have been transferred to the Operating Non-Federal Entity by separate agreement between the United States and the Operating Non-Federal Entity. That separate agreement shall not interfere with or affect the rights or obligations of the Contractor or the United States hereunder.

(b) The Contracting Officer has previously notified the Contractor in writing that the O&M of a portion of the Project facilities which serve the Contractor has been transferred to the Operating Non-Federal Entity, and therefore, the Contractor shall pay directly to the Operating Non-Federal Entity, or to any successor approved by the Contracting Officer under the terms and conditions of the separate agreement between the United States and the Operating Non-Federal Entity described in subdivision (a) of this Article, all rates, charges, or assessments of any kind, including any assessment for reserve funds, which the Operating

Non-Federal Entity or such successor determines, sets, or establishes for the O&M of the portion of the Project facilities operated and maintained by the Operating Non-Federal Entity or such successor. Such direct payments to the Operating Non-Federal Entity or such successor shall not relieve the Contractor of its obligation to pay directly to the United States the Contractor's share of the Project Rates, Charges, and Tiered Pricing Component (s) except to the extent the Operating Non-Federal Entity collects payments on behalf of the United States in accordance with the separate agreement identified in subdivision (a) of this Article.

(c) For so long as the O&M of any portion of the Project facilities serving the Contractor is performed by the Operating Non-Federal Entity, or any successor thereto, the Contracting Officer shall adjust those components of the Rates for Water Delivered under this Contract representing the cost associated with the activity being performed by the Operating Non-Federal Entity or its successor.

(d) In the event the O&M of the Project facilities operated and maintained by the Operating Non-Federal Entity is re-assumed by the United States during the term of this Contract, the Contracting Officer shall so notify the Contractor, in writing, and present to the Contractor a revised Exhibit "B" which shall include the portion of the Rates to be paid by the Contractor for Project Water under this Contract representing the O&M costs of the portion of such Project facilities which have been re-assumed. The Contractor shall, thereafter, in the absence of written notification from the Contracting Officer to the contrary, pay the Rates, Charges, and Tiered Pricing Component(s) specified in the revised Exhibit "B" directly to the United States in compliance with Article 7 of this Contract.

CONTINGENT ON APPROPRIATION OR ALLOTMENT OF FUNDS

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

BOOKS, RECORDS, AND REPORTS

30. (a) The Contractor shall establish and maintain accounts and other books and records pertaining to administration of the terms and conditions of this Contract, including: the Contractor's financial transactions, water supply data, and Project land and right-of-way agreements; the water users' land-use (crop census), land ownership, land-leasing and water use data; and other matters that the Contracting Officer may require. Reports thereon shall be furnished to the Contracting Officer in such form and on such date or dates as the Contracting Officer may require. Subject to applicable Federal laws and regulations, each party to this Contract shall have the right during office hours to examine and make copies of the other party's books and records relating to matters covered by this Contract.

(b) Notwithstanding the provisions of subdivision (a) of this Article, no books, records, or other information shall be requested from the Contractor by the Contracting Officer unless such books, records, or information are reasonably related to the administration or performance of this Contract. Any such request shall allow the Contractor a reasonable period of time within which to provide the requested books, records, or information.

(c) At such time as the Contractor provides information to the Contracting Officer pursuant to subdivision (a) of this Article, a copy of such information shall be provided to the Operating Non-Federal Entity.

ASSIGNMENT LIMITED--SUCCESSORS AND ASSIGNS OBLIGATED

31. (a) The provisions of this Contract shall apply to and bind the successors and assigns of the parties hereto, but no assignment or transfer of this Contract or any right or interest therein shall be valid until approved in writing by the Contracting Officer.

(b) The assignment of any right or interest in this Contract by either party shall not interfere with the rights or obligations of the other party to this Contract absent the written concurrence of said other party.

(c) The Contracting Officer shall not unreasonably condition or withhold his approval of any proposed assignment.

SEVERABILITY

32. In the event that a person or entity who is neither (i) a party to a Project contract, nor (ii) a person or entity that receives Project Water from a party to a Project contract, nor (iii) an association or other form of organization whose primary function is to represent parties to

Project contracts, brings an action in a court of competent jurisdiction challenging the legality or enforceability of a provision included in this Contract and said person, entity, association, or organization obtains a final court decision holding that such provision is legally invalid or unenforceable and the Contractor has not intervened in that lawsuit in support of the plaintiff(s), the parties to this Contract shall use their best efforts to (i) within 30 days of the date of such final court decision identify by mutual agreement the provisions in this Contract which must be revised, and (ii) within three months thereafter promptly agree on the appropriate revision(s). The time periods specified above may be extended by mutual agreement of the parties. Pending the completion of the actions designated above, to the extent it can do so without violating any applicable provisions of law, the United States shall continue to make the quantities of Project Water specified in this Contract available to the Contractor pursuant to the provisions of this Contract which were not found to be legally invalid or unenforceable in the final court decision.

RESOLUTION OF DISPUTES

33. Should any dispute arise concerning any provisions of this Contract, or the parties' rights and obligations thereunder, the parties shall meet and confer in an attempt to resolve the dispute. Prior to the Contractor commencing any legal action, or the Contracting Officer referring any matter to Department of Justice, the party shall provide to the other party 30 days' written notice of the intent to take such action; Provided, That such notice shall not be required where a delay in commencing an action would prejudice the interests of the party that intends to file suit. During the 30-day notice period, the Contractor and the Contracting Officer shall meet and confer in an attempt to resolve the dispute. Except as specifically provided, nothing herein is intended to waive or abridge any right or remedy that the Contractor or the United States may have.

OFFICIALS NOT TO BENEFIT

34. No Member of or Delegate to Congress, Resident Commissioner, or official of the Contractor shall benefit from this Contract other than as a water user or landowner in the same manner as other water users or landowners.

CHANGES IN CONTRACTOR'S BOUNDARIES

35. (a) While this Contract is in effect, no change may be made in the Contractor's Boundaries, by inclusion or exclusion of lands, dissolution, consolidation, merger, or otherwise, except upon the Contracting Officer's written consent.

(b) Within 30 days of receipt of a request for such a change, the Contracting Officer will notify the Contractor of any additional information required by the Contracting Officer for processing said request, and both parties will meet to establish a mutually agreeable schedule for timely completion of the process. Such process will analyze whether the proposed change is likely to: (i) result in the use of Project Water contrary to the terms of this Contract; (ii) impair the ability of the Contractor to pay for Project Water furnished under this Contract or to pay for any Federally-constructed facilities for which the Contractor is responsible; and (iii) have an impact on any Project Water rights applications, permits, or licenses. In addition, the Contracting Officer shall comply with the NEPA and the ESA. The Contractor will be responsible for all costs incurred by the Contracting Officer in this process, and such costs will be paid in accordance with Article 25 of this Contract.

FEDERAL LAWS

36. By entering into this Contract, the Contractor does not waive its rights to contest the validity or application in connection with the performance of the terms and conditions of this Contract of any Federal law or regulation; Provided, That the Contractor agrees to comply with the terms and conditions of this Contract unless and until relief from application of such Federal law or regulation to the implementing provision of the Contract is granted by a court of competent jurisdiction.

NOTICES

37. Any notice, demand, or request authorized or required by this Contract shall be deemed to have been given, on behalf of the Contractor, when mailed, postage prepaid, or delivered to the Area Manager, Bureau of Reclamation, Northern California Area Office, 16349 Shasta Dam Boulevard, Shasta Lake, California 96019, and on behalf of the United States, when mailed, postage prepaid, or delivered to the Board of Directors of the Corning Water District,

P. O. Box 738, 22240 Gallagher Avenue, Corning, California 96021. The designation of the addressee or the address may be changed by notice given in the same manner as provided in this Article for other notices.

CONFIRMATION OF CONTRACT

38. The Contractor, after the execution of this Contract, shall promptly seek to secure a decree of a court of competent jurisdiction of the State of California, confirming the execution of this Contract. The Contractor shall furnish the United States a certified copy of the final decree, the validation proceedings, and all pertinent supporting records of the court approving and confirming this Contract, and decreeing and adjudging it to be lawful, valid, and binding on the Contractor.

IN WITNESS WHEREOF, the parties hereto have executed this Contract as of the day and year first above written.

THE UNITED STATES OF AMERICA

By: _____
Regional Director, Mid-Pacific Region
Bureau of Reclamation

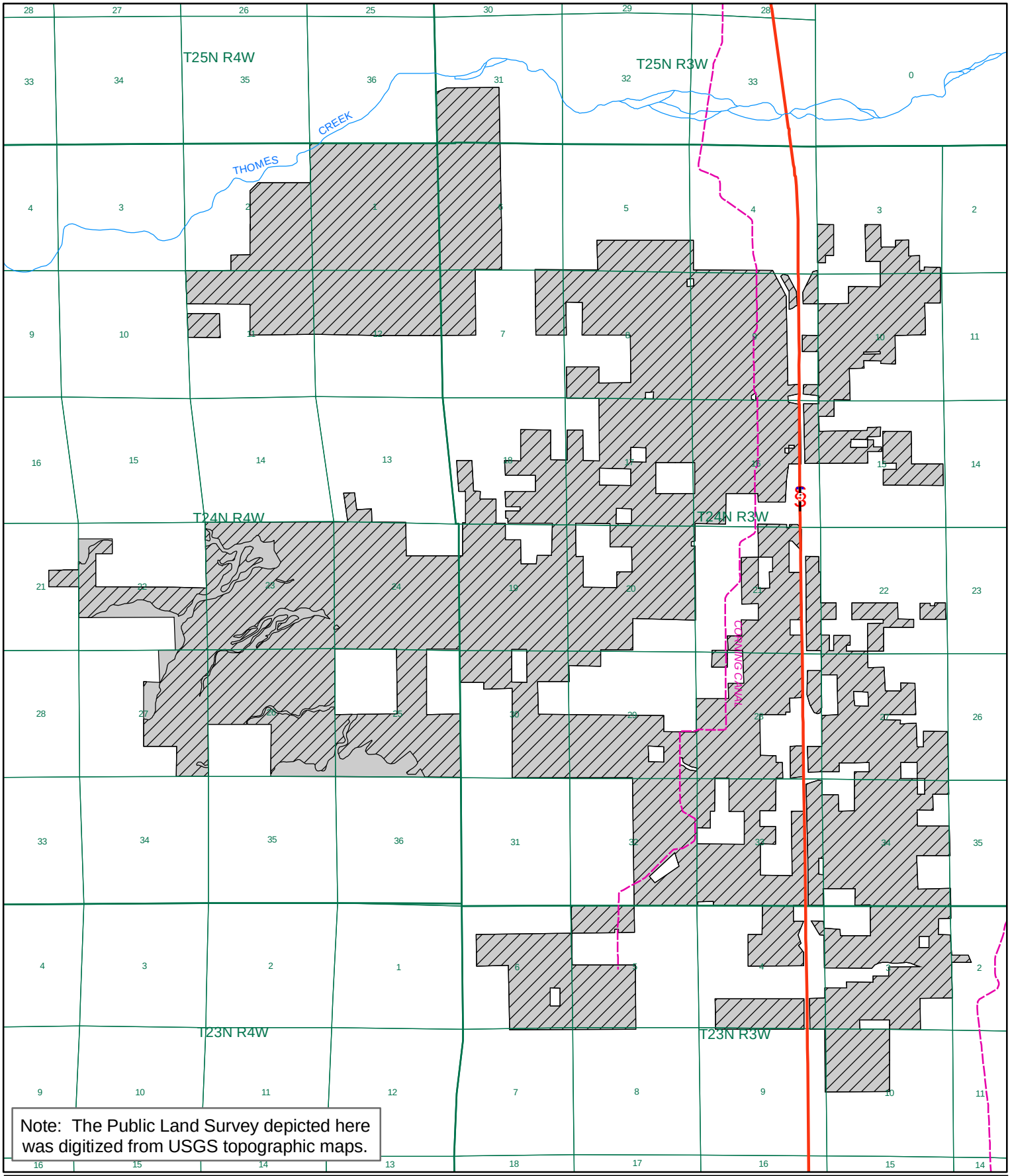
CORNING WATER DISTRICT

By: _____
President of the Board of Directors

Attest:

By: _____
Secretary of the Board of Directors

(I:\LTRC\LTRC Drafts\04-19-2004-01 Corning WD Final LTRC Draft.doc)



Corning Water District

Contract No. 14-06-200-6575-LTR1
Exhibit A

II

Contractor's Service Area

District Boundary

0 0.5 1 2 3 Miles

Date: October 19, 2004
File Name: N:districts\contracts\corning_wd\corning_ltr.mxd

602-202-1

EXHIBIT B
Rates and Charges
CORNING WATER DISTRICT

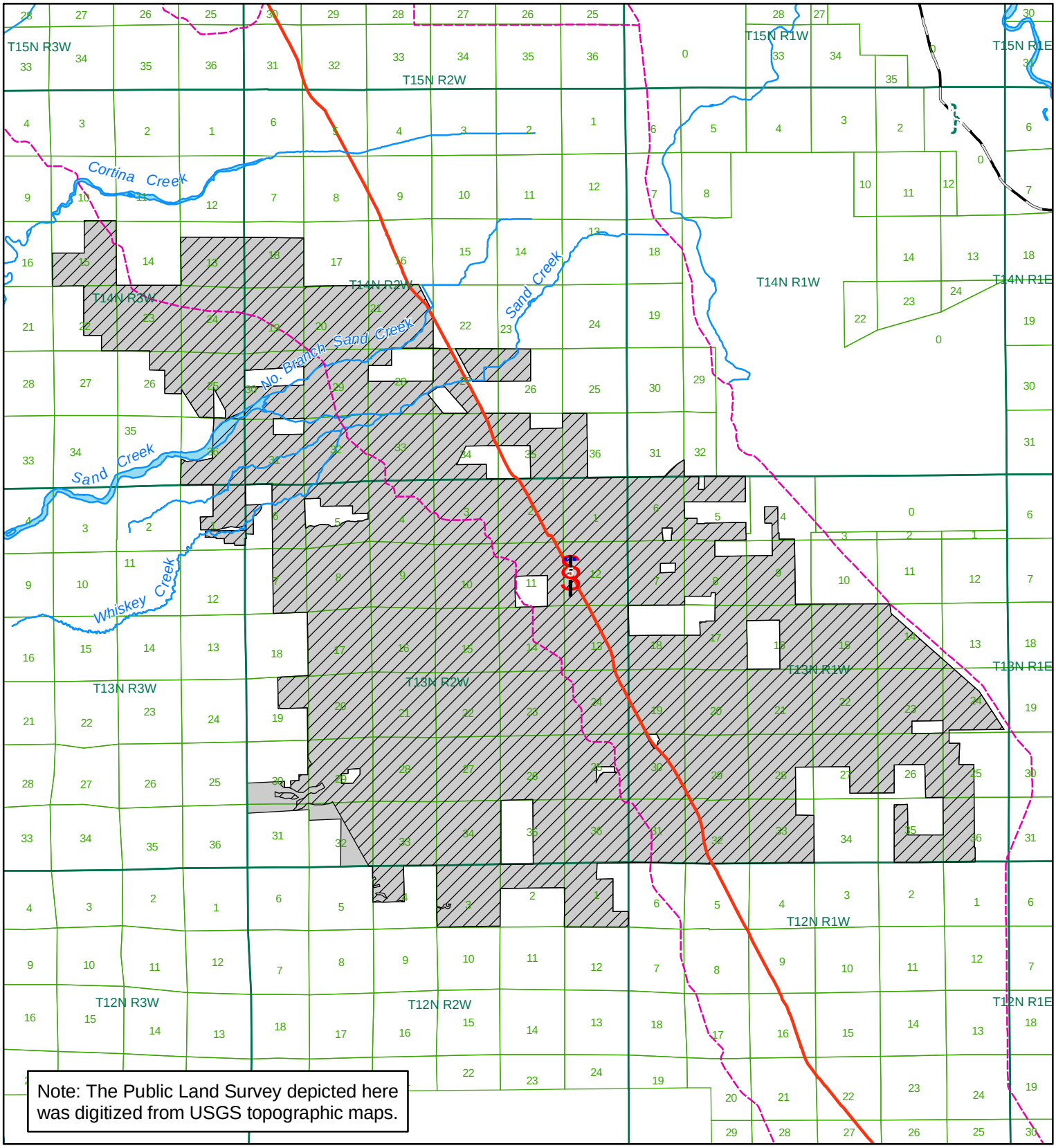
	2003 Rates Per Acre-Foot	
	Irrigation	M&I
CONTRACT RATE * (1st Tier - ≤80% of Contract Total)	$16.61	
2ND TIER [>80% ≤90% of Contract Total] (Sec. 202(3) Full Cost Rate + Contract Rate/ 2) **	$33.35	
3RD TIER [> 90% of Contract Total] (Sec. 202(3) Full Cost Rate) **	$50.08	
FULL-COST RATES: ** RRA Section 202(3) rate is applicable to Qualified Recipients or to Limited Recipients receiving irrigation water on or before October 1, 1981.	$64.34	
RRA Section 205(a)(3) rate is applicable to Limited Recipients that did not receive irrigation water on or before October 1, 1981.	$84.44	
SURCHARGES UNDER P.L. 102-575 TO RESTORATION FUND*** Restoration Payments [3407(d)(2)(A)]	$0.00	

* Capital component of cost-of-service rate is not included in Contract Rate due to ability to pay relief for Contractor established pursuant to the results of the Payment Capacity Analysis for the Tehama-Colusa Water Users Association Service Area as announced by letter dated February 10, 1995.

** Contractors with 9(d) distribution systems do not have the 9(d) Full Cost component included for tiered pricing calculations. See Article 1(j).

*** These surcharges are payments in addition to the water rates and are determined pursuant to Title XXXIV of P.L. 102-575. Restoration Fund surcharges under P.L. 102-575 are on a fiscal year basis (10/1 -9/30). Contractors with ability to pay relief do not pay Restoration Fund charges for irrigation water.

Note: Additional detail of rate components is available on the Internet at http:/www.mp.usbr.gov/ cvpwaterrates/.



Colusa County Water District

Contractor's Service Area

District Boundary

Contract No. 14-06-200-304-A-LTR1

Exhibit A

II

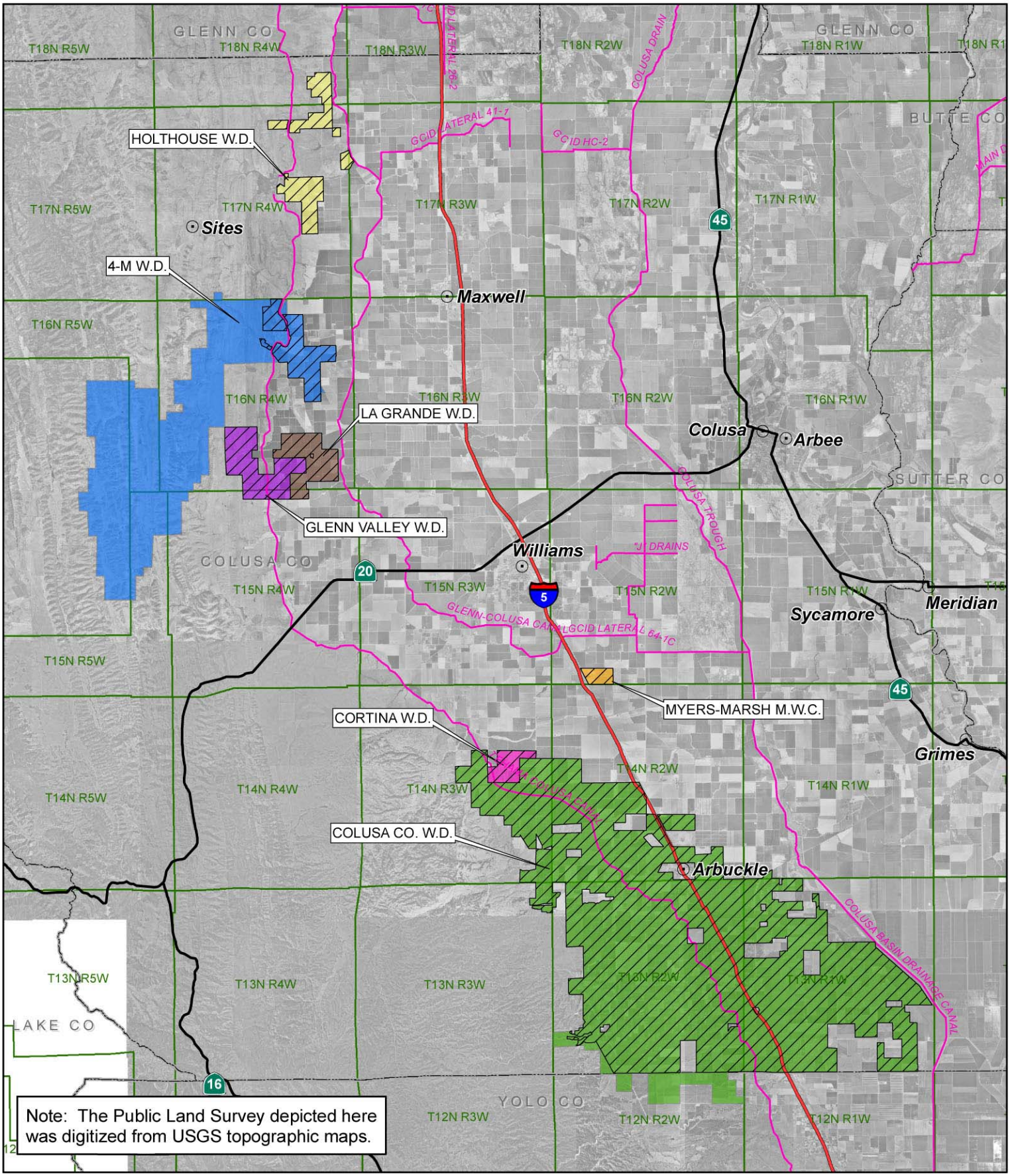
Miles

0 2.5 5

Date: October 13, 2004

File Name: N:\districts\contracts\colusa.mxd

602-208-3797



County of Colusa

Contractor's Service Area

Contract No. 14-06-200-8310A-LTR1
Exhibit A

Date: November 16, 2004
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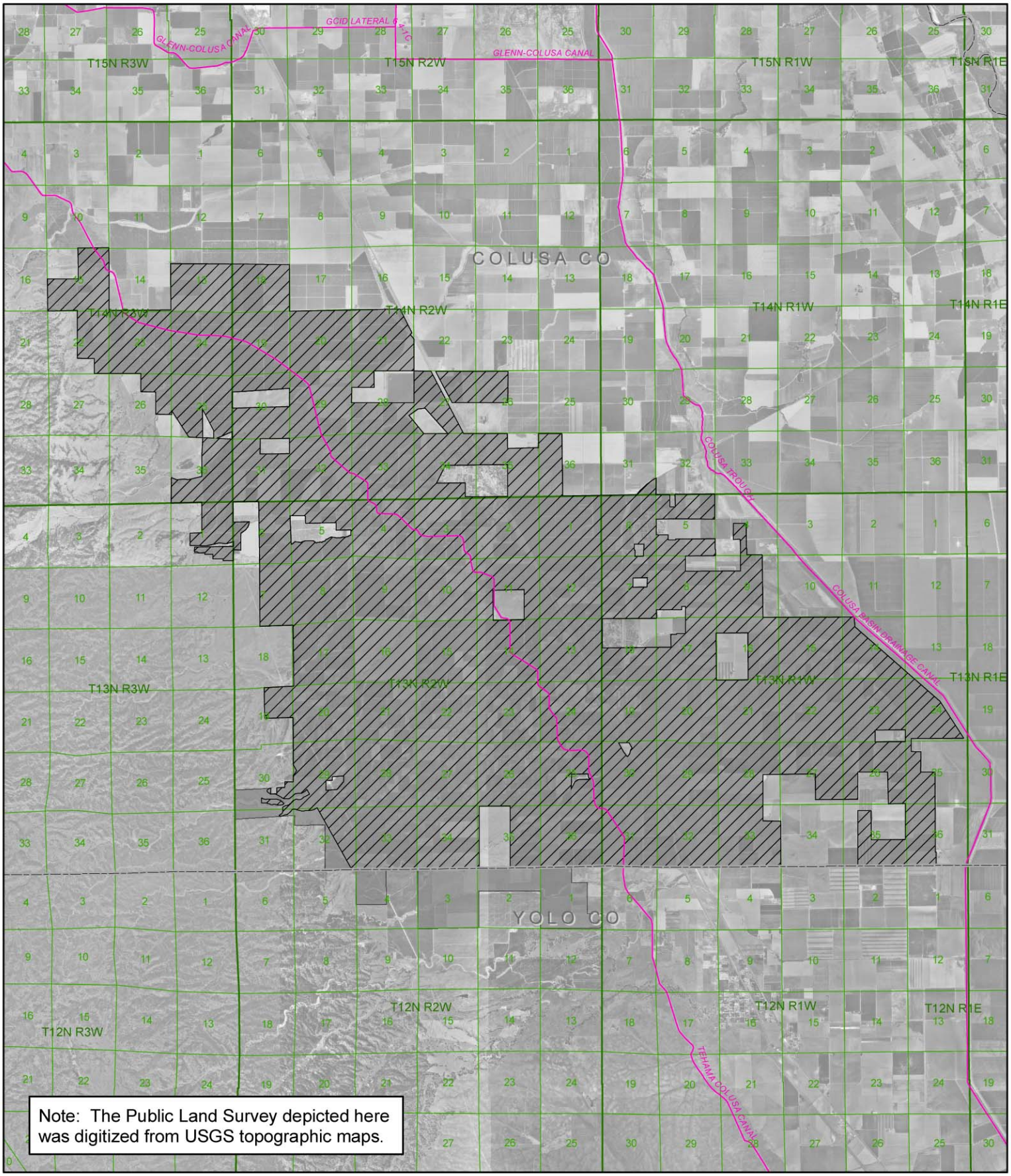
0 2.5 5 Miles

602-202-12



Colusa County Water District

Contractor's Service Area

District Boundary

Contract No. 1-07-20-W0220-R-1

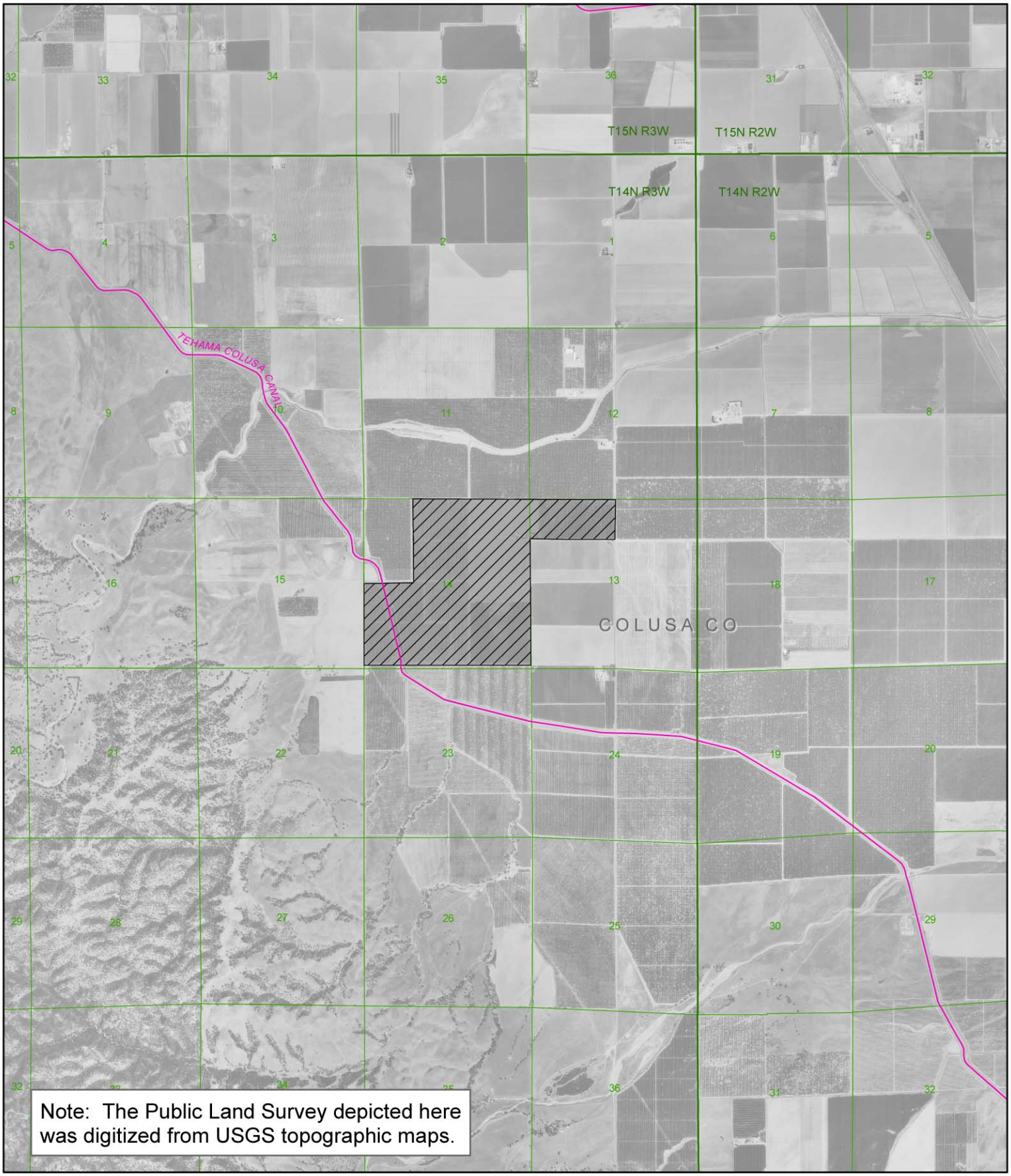
Exhibit A

Date: November 16, 2004

File Name: N:\districts\contracts\colusa\colusa_subcontr.mxd

0 2.5 5 Miles

602-202-13



Cortina Water District

Contractor's Service Area

District Boundary

Contract No. 0-07-20-W0206-R-1
Exhibit A

0 0.5 1 2 Miles

602-202-14

Date: November 17, 2004
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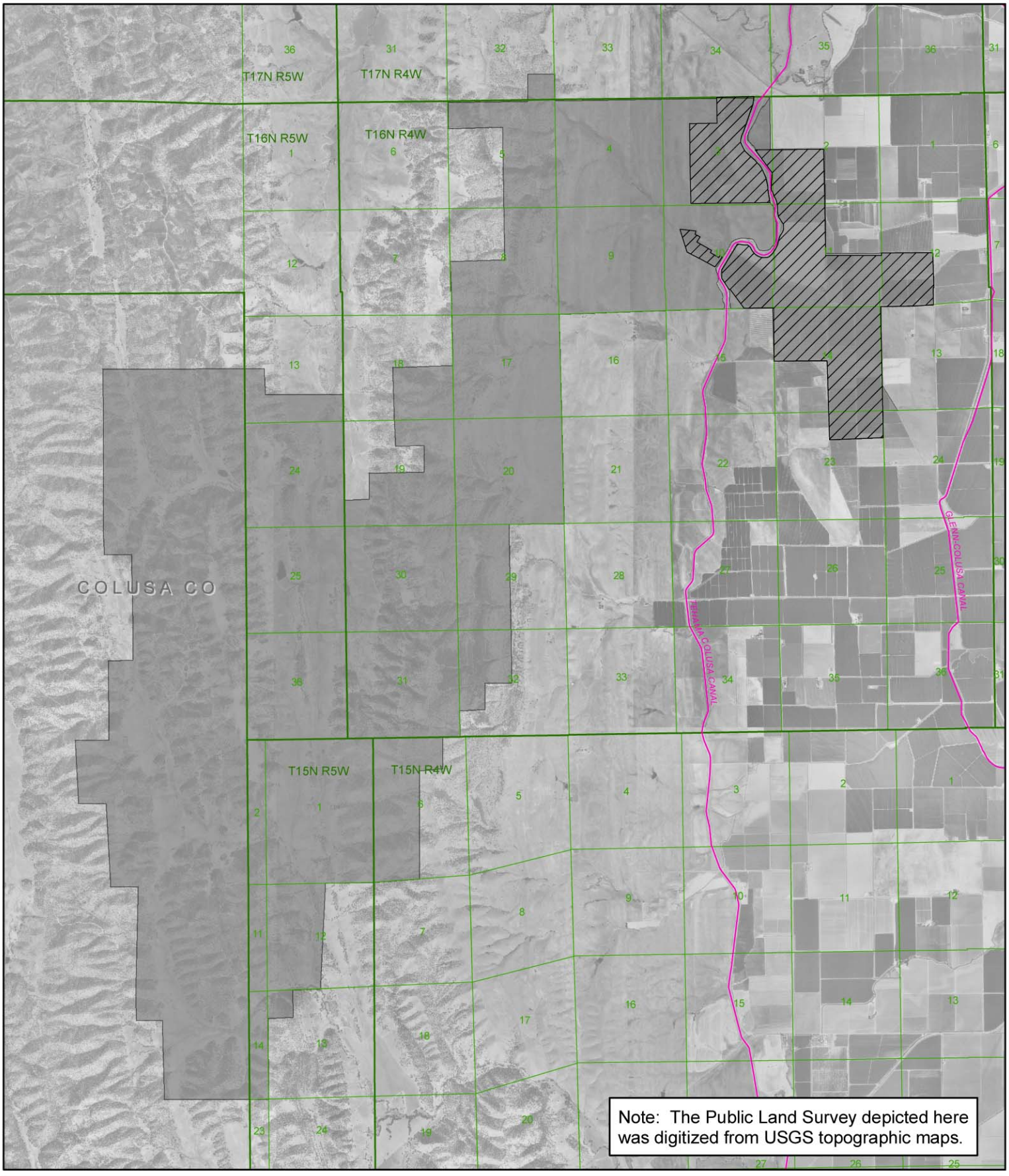

4-M Water District

Contractor's Service Area

District Boundary

Contract No. 0-07-20-W0183-R-1
Exhibit A

0 0.5 1 2 3 Miles

Date: November 17, 2004
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602-202-15

Glenn Valley Water District

Contractor's Service Area

District Boundary

Contract No. 1-07-20-W0219-R-1
Exhibit A

Miles
0 0.5 1 2

Date: November 17, 2004
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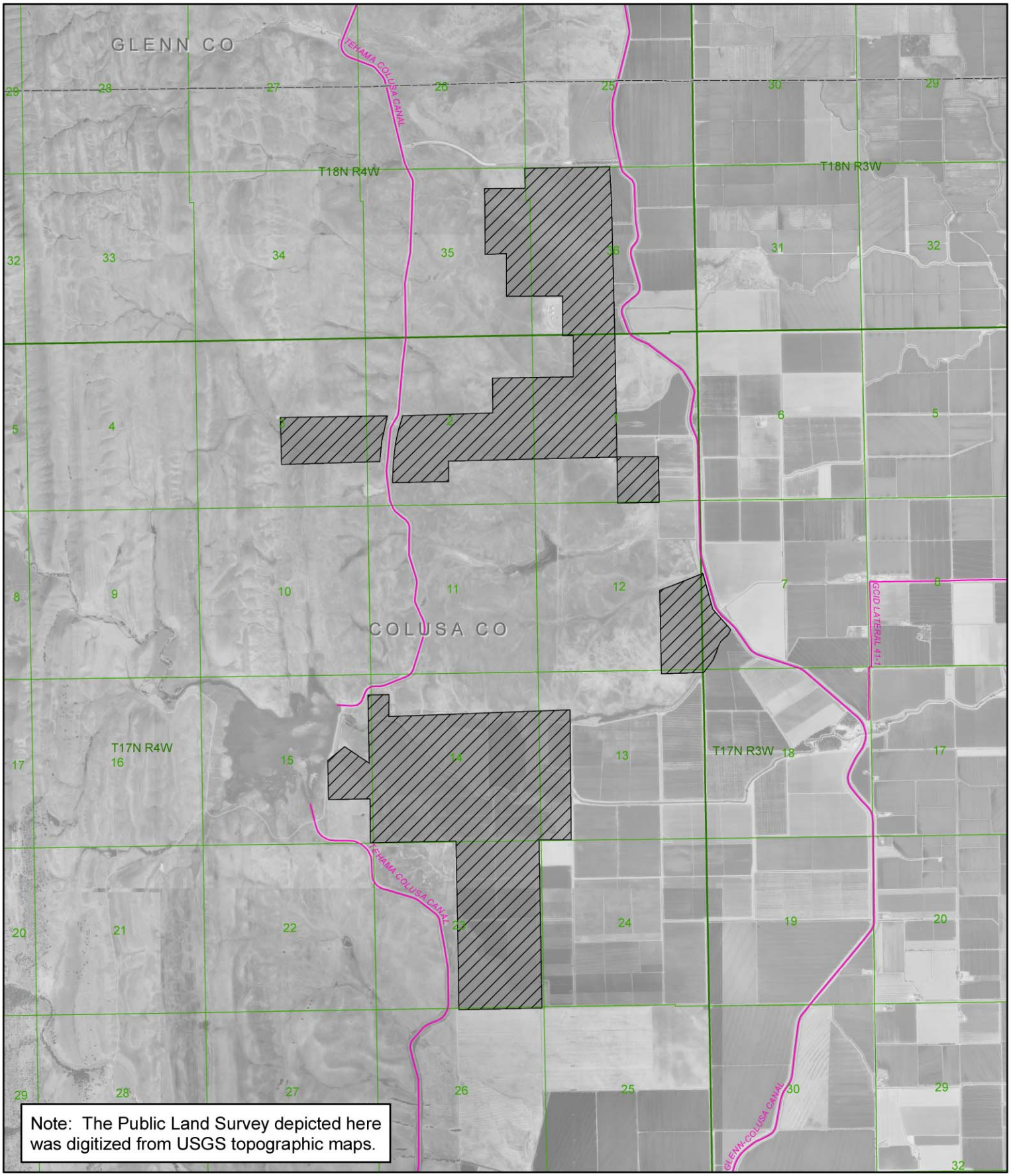
602-202-16



Holthouse Water District

Contractor's Service Area

District Boundary

Contract No. 1-07-20-W0224-R-1
Exhibit A

Miles
0 0.5 1 2

Date: November 17, 2004
File Name: N:\districts\contracts\holthouse_wd\holthouse_subcontr.mxd

602-202-17

La Grande Water District

Contractor's Service Area

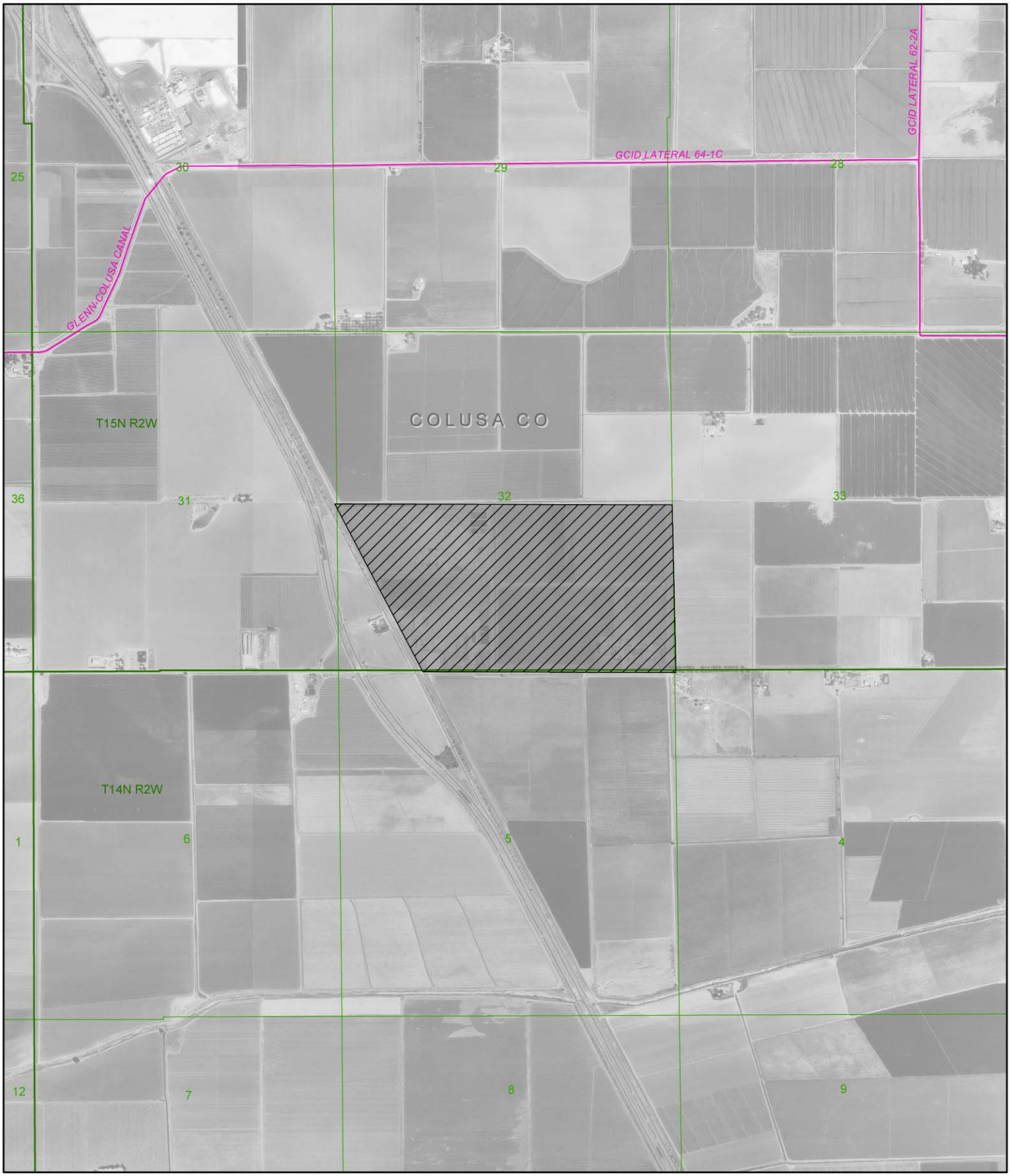
District Boundary

Contract No. 0-07-20-W0190-R-1
Exhibit A

0 0.5 1 2 Miles

Date: November 17, 2004
File Name: N:\districts\contracts\la_grande_wd\la_grande_subcontr.mxd

602-202-18



Myers-Marsh M.W.C.

Contractor's Service Area

District Boundary

Contract No. 1-07-20-W0225-R-1
Exhibit A

Date: November 17, 2004
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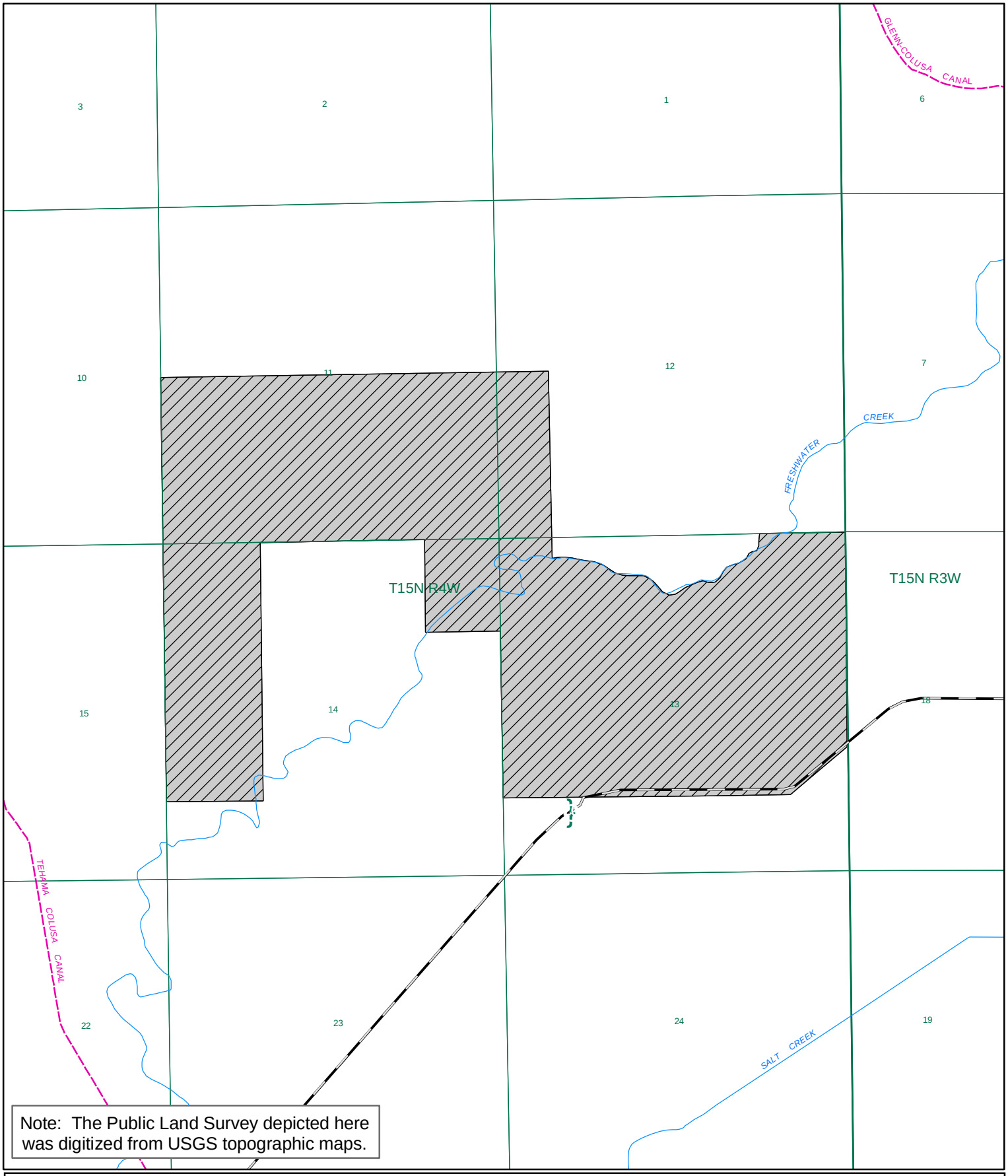
602-202-19



Note: The Public Land Survey depicted here was digitized from USGS topographic maps.

Davis Water District

Contract No. 14-06-200-6001A-LTR1
Exhibit A

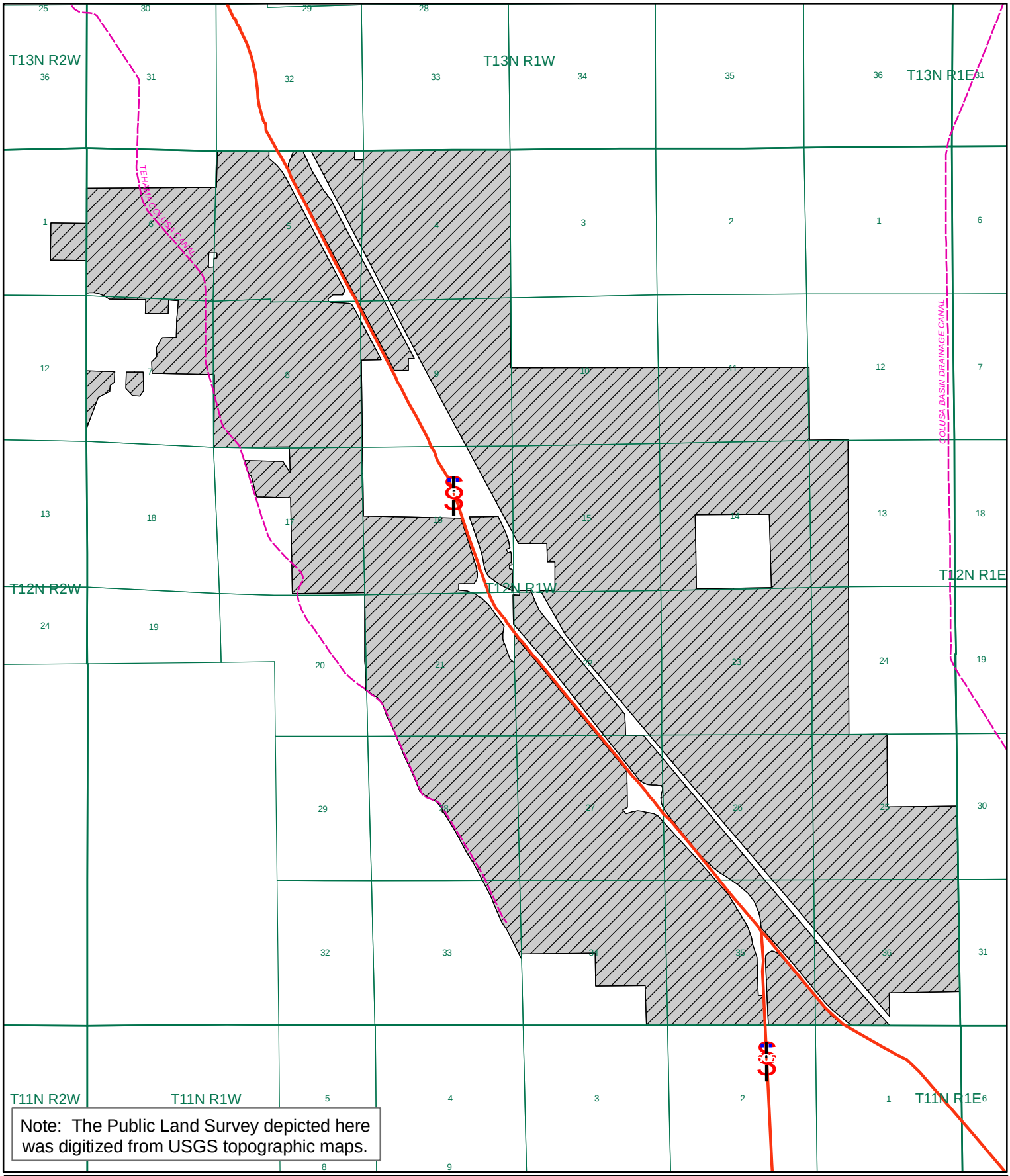
Contractor's Service Area

District Boundary

Miles
0 0.5 1

Date: October 19, 2004
File Name: N:districts\contracts\davis_tc\davis_ltr.mxd

602-202-2



Dunnigan Water District

Contract No. 14-06-200-399-A-LTR1
Exhibit A

II

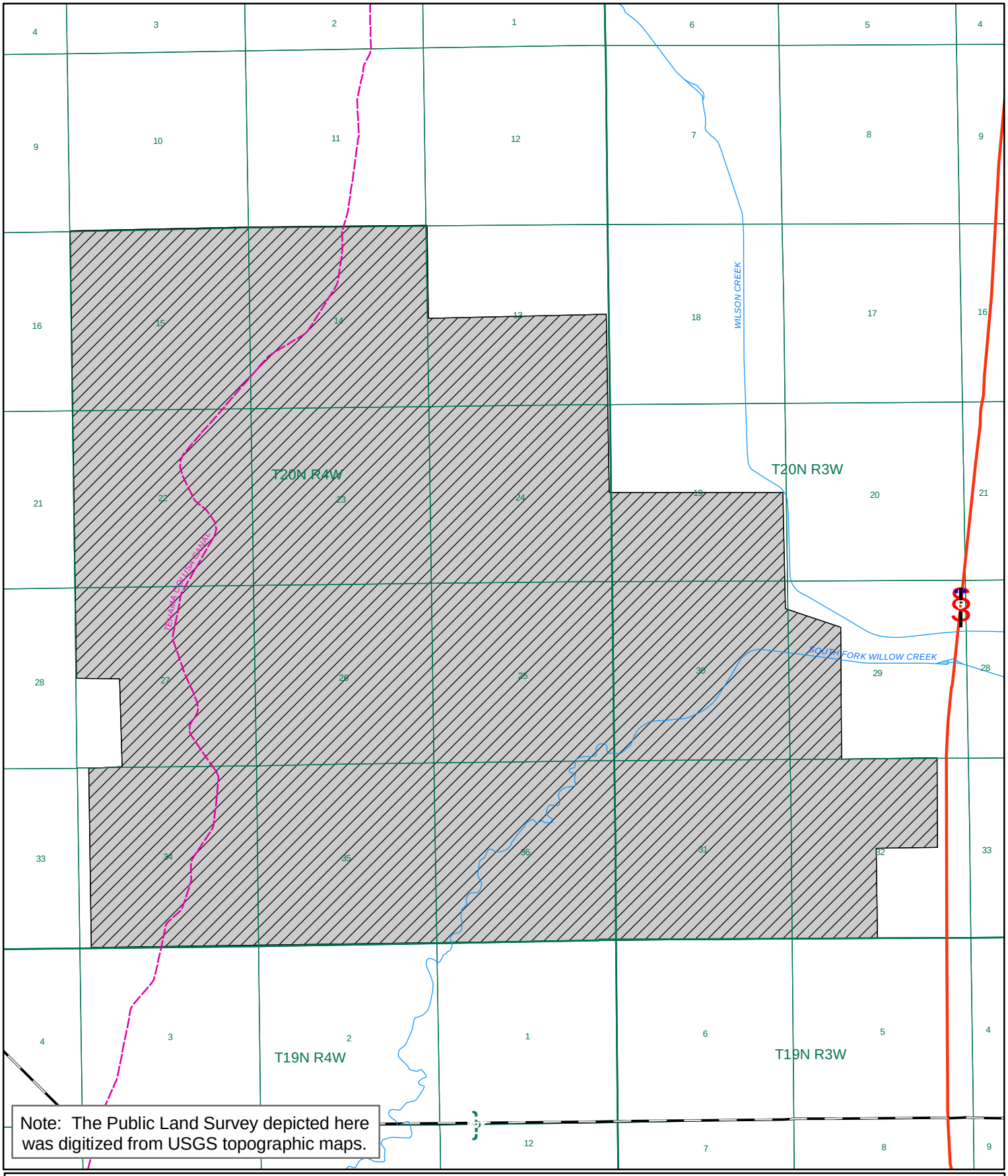
Contractor's Service Area

District Boundary

Miles
0 0.5 1 2

Date: October 19, 2004
File Name: N:districts\contracts\dunnigan_wd\dunnigan.mxd

602-202-3



Glide Water District

Contract No. 7-07-20-W0040-LTR1

Exhibit A

II

District Boundary

Contractor's Service Area

Miles

0 0.5 1 2

Date: October 19, 2004

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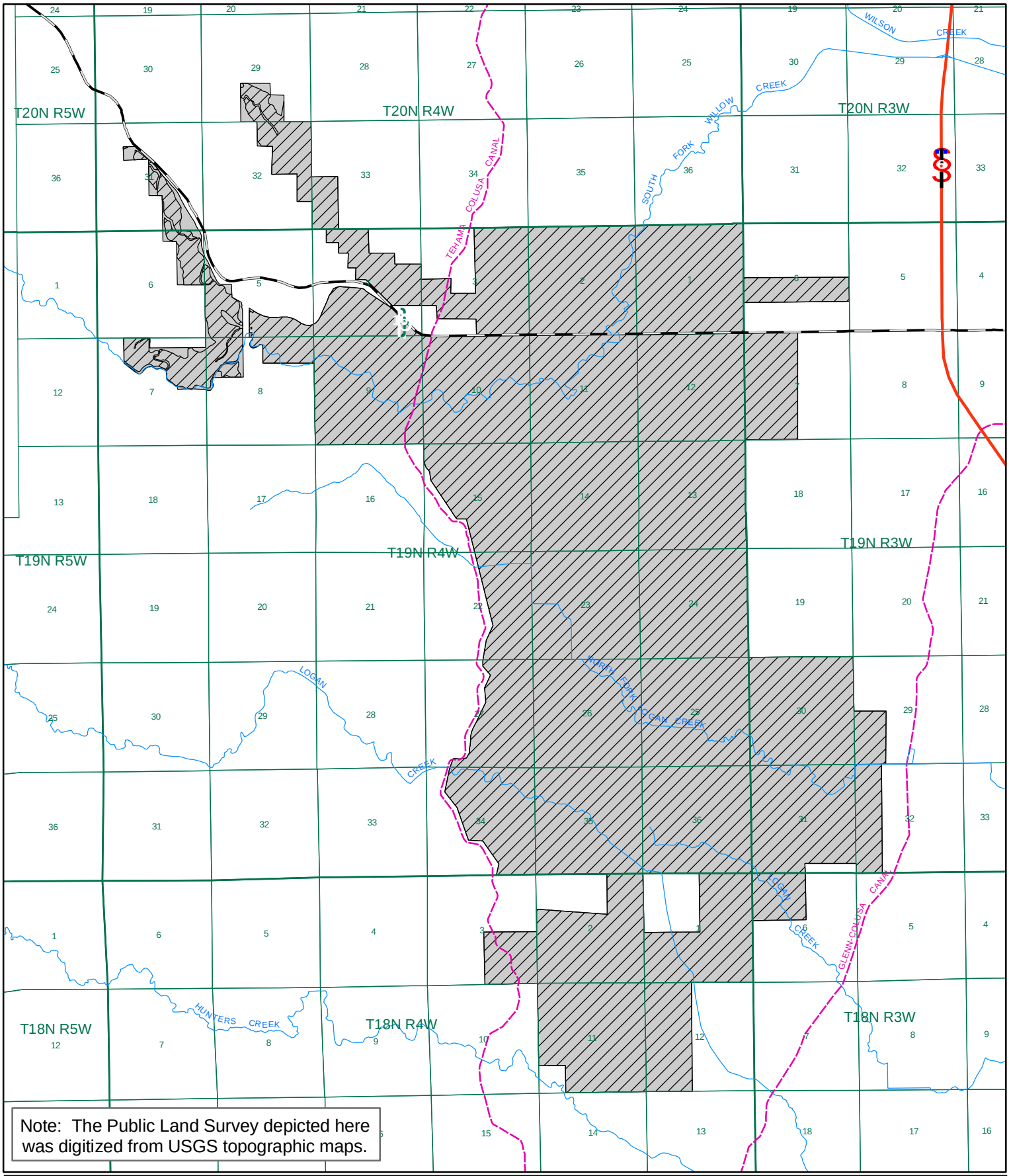
602-202-4



Kanawha Water District

Contract No. 14-06-200-466-A-LTR1

Exhibit A

II

Contractor's Service Area

District Boundary

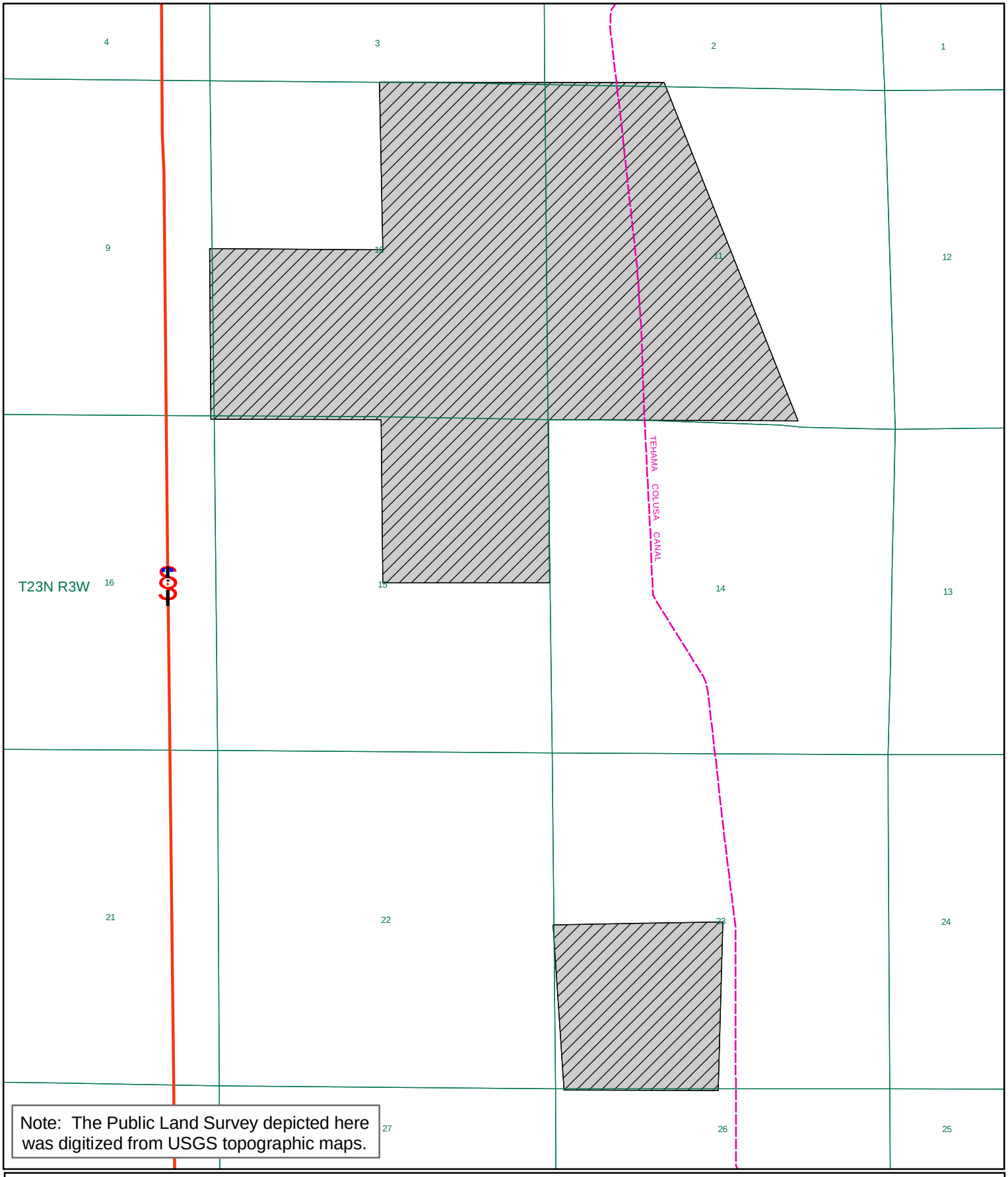
Miles

0 0.5 1 2 3

Date: October 19, 2004

File Name: N:districts\contracts\kanawha\kanawha_ltr.mxd

602-202-5



Note: The Public Land Survey depicted here was digitized from USGS topographic maps.

Kirkwood Water District

Contract No. 7-07-20-W0056-LTR1
Exhibit A

II

Contractor's Service Area

District Boundary

0 0.5 Miles

Date: October 19, 2004
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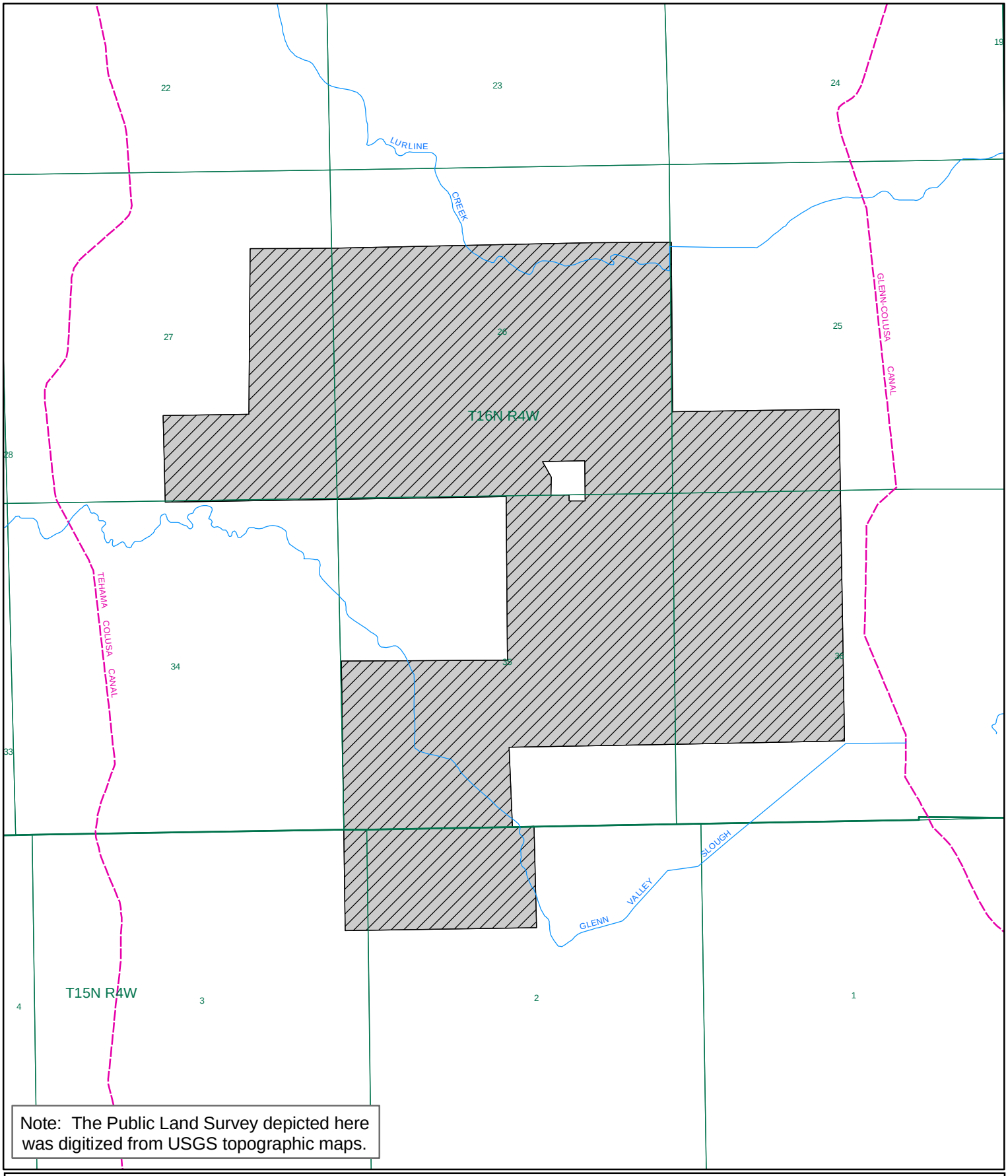
602-202-6



Note: The Public Land Survey depicted here was digitized from USGS topographic maps.

La Grande Water District

Contract No. 7-07-20-W0022-LTR1
Exhibit A

II

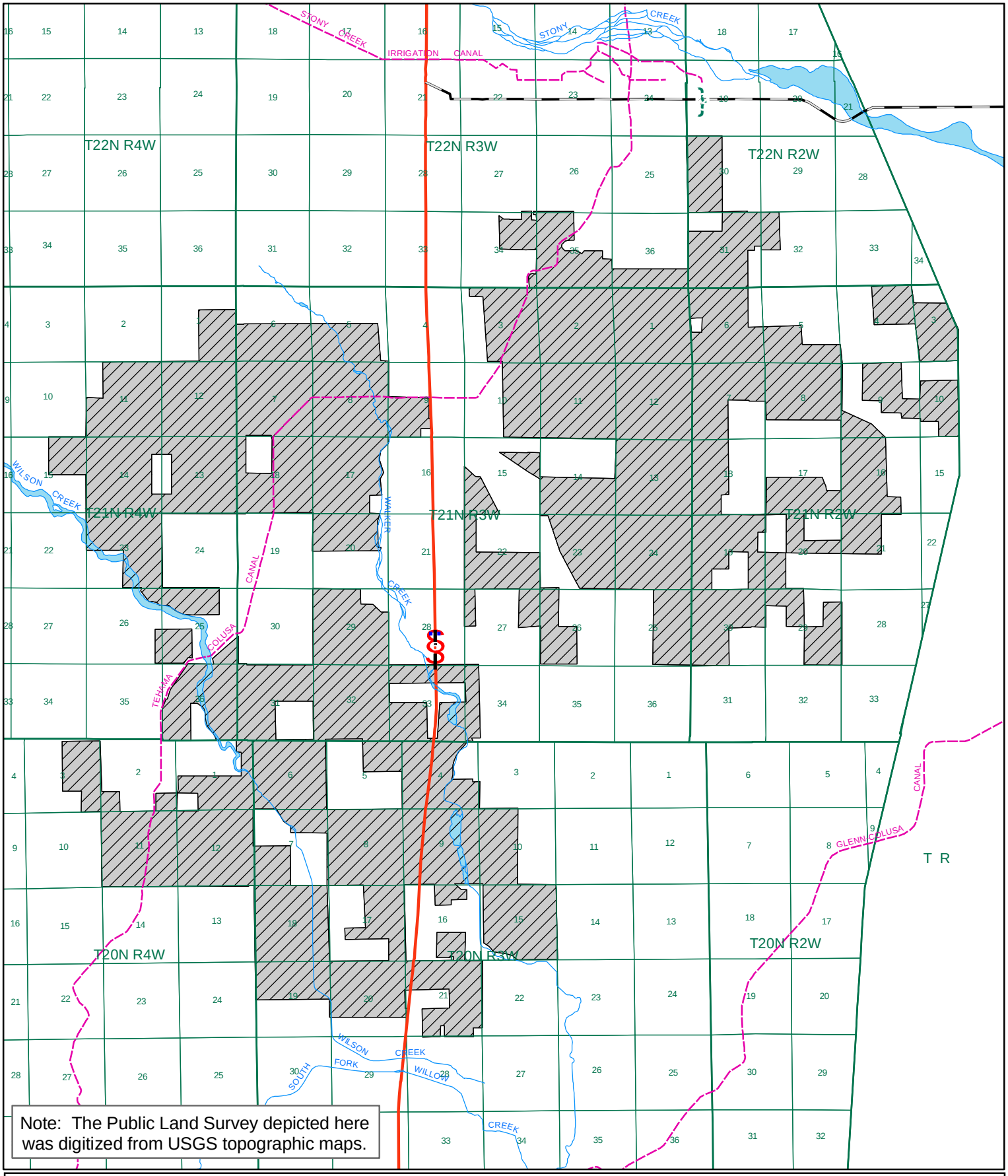
Contractor's Service Area

District Boundary

Miles
0 0.5 1

Date: October 19, 2004
File Name: N:districts\contracts\la_grande_wd\la_grande_ltr.mxd

602-202-7



Orland-Artois Water District

Contractor's Service Area

District Boundary

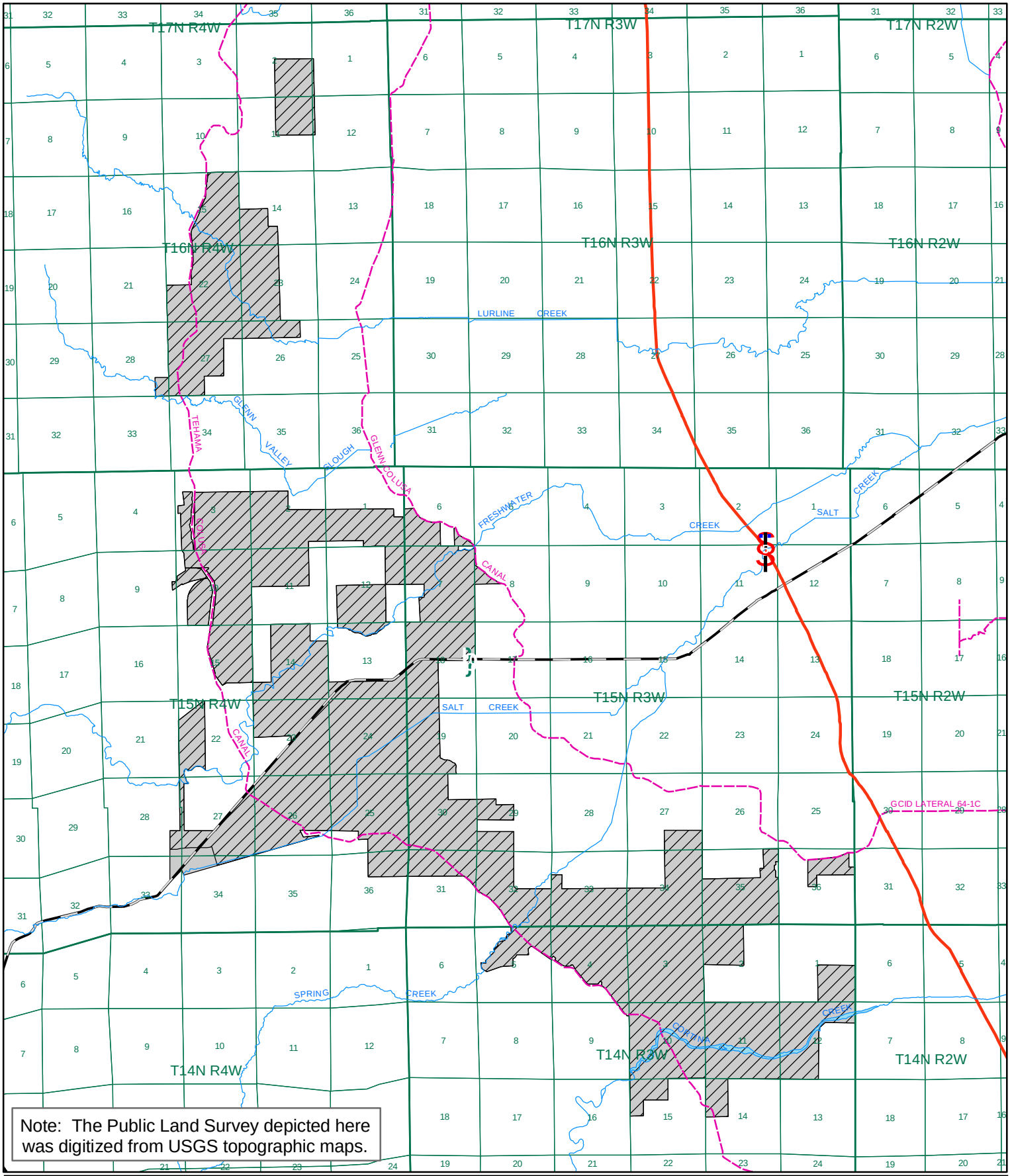
Contract No. 14-06-200-8382A-LTR1
Exhibit A

II

Miles
0 0.5 1 2 3 4 5

Date: October 19, 2004
File Name: N:\districts\contracts\orland_artois\orland_artois_ltr.mxd

602-202-8



Westside Water District

Contractor's Service Area

District Boundary

Contract No. 14-06-200-8222-LTR1
Exhibit A

II

Miles
0 0.5 1 2 3 4 5

Date: October 19, 2004
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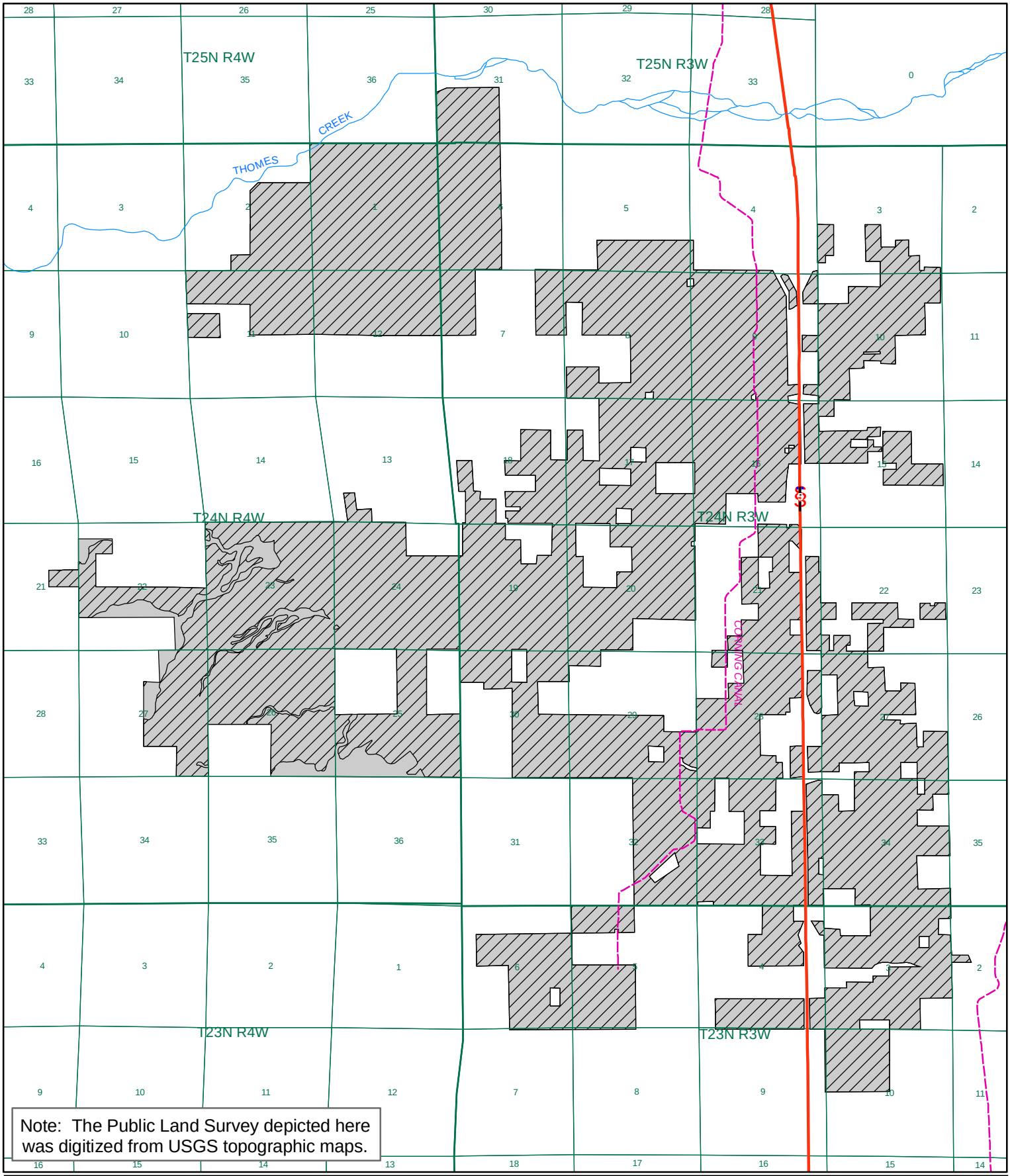
602-202-9



Corning Water District

Contract No. 14-06-200-6575-LTR1
Exhibit A

II

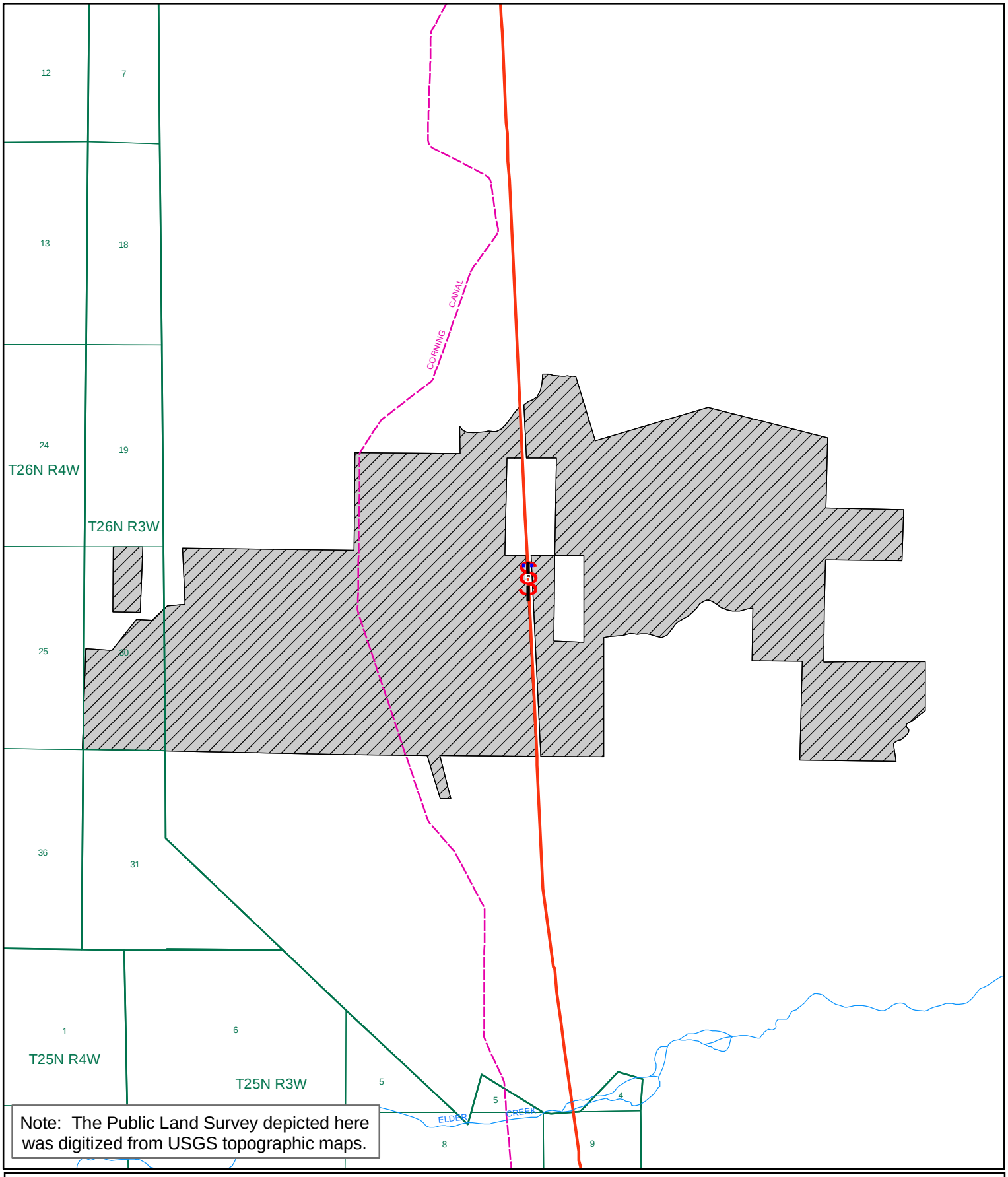
Contractor's Service Area

District Boundary

0 0.5 1 2 3 Miles

Date: October 19, 2004
File Name: N:districts\contracts\corning_wd\corning_ltr.mxd

602-202-1



Proberta Water District

Contractor's Service Area

District Boundary

Contract No. 14-06-200-7311-LTR1
Exhibit A

II

Miles
0 0.5 1 2

Date: October 19, 2004
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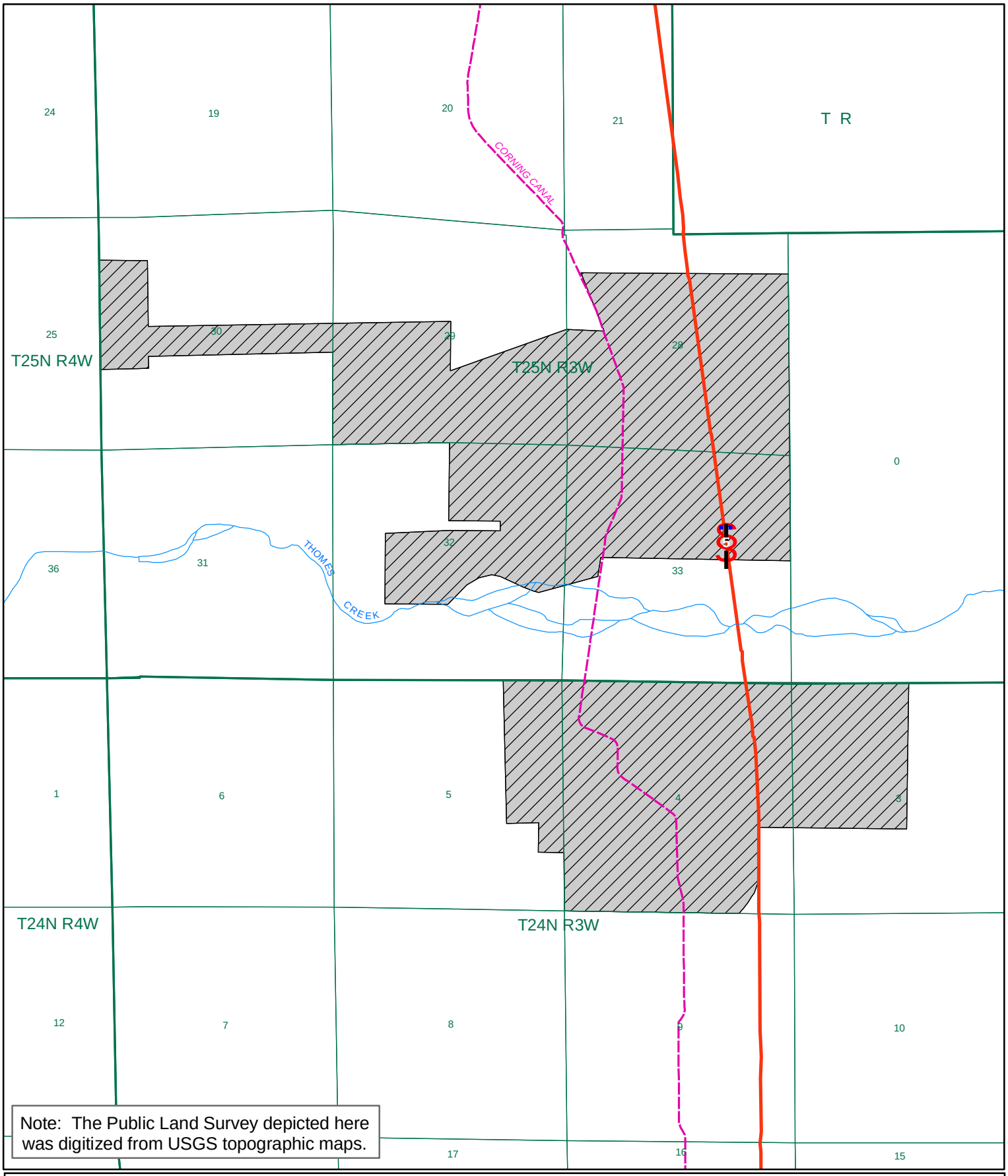


Note: The Public Land Survey depicted here was digitized from USGS topographic maps.

Thomes Creek Water District

Contractor's Service Area

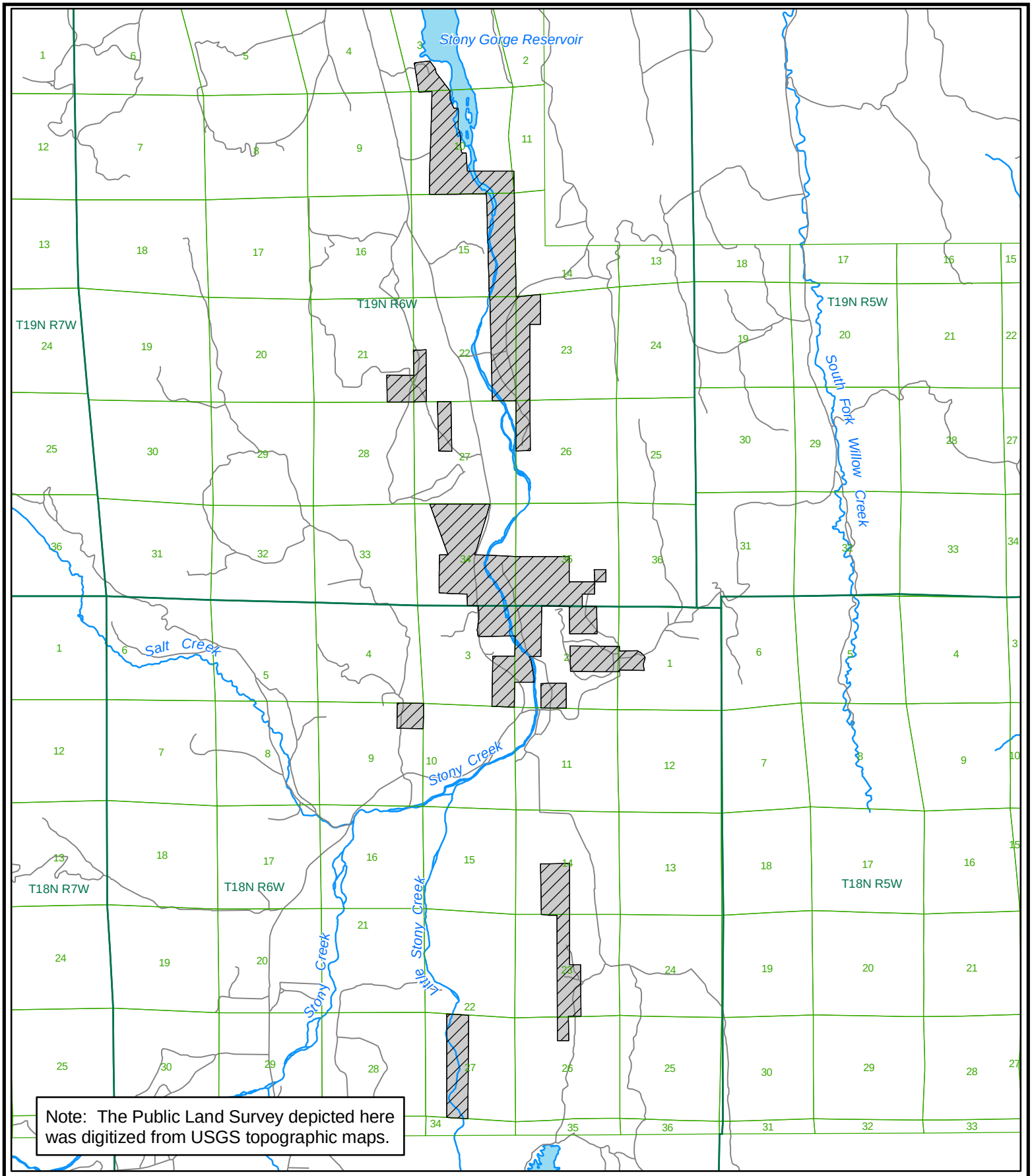
District Boundary

Contract No. 14-06-200-5271A-LTR1
Exhibit A

Miles
0 0.5 1

Date: October 19, 2004
File Name: N:\districts\contracts\thomes_creek\thomes_creek_ltr.mxd

602-202-11



Stony Creek Water District

II

Contract No. 2-07--20-W0261-LTR1

Exhibit A

District Boundary

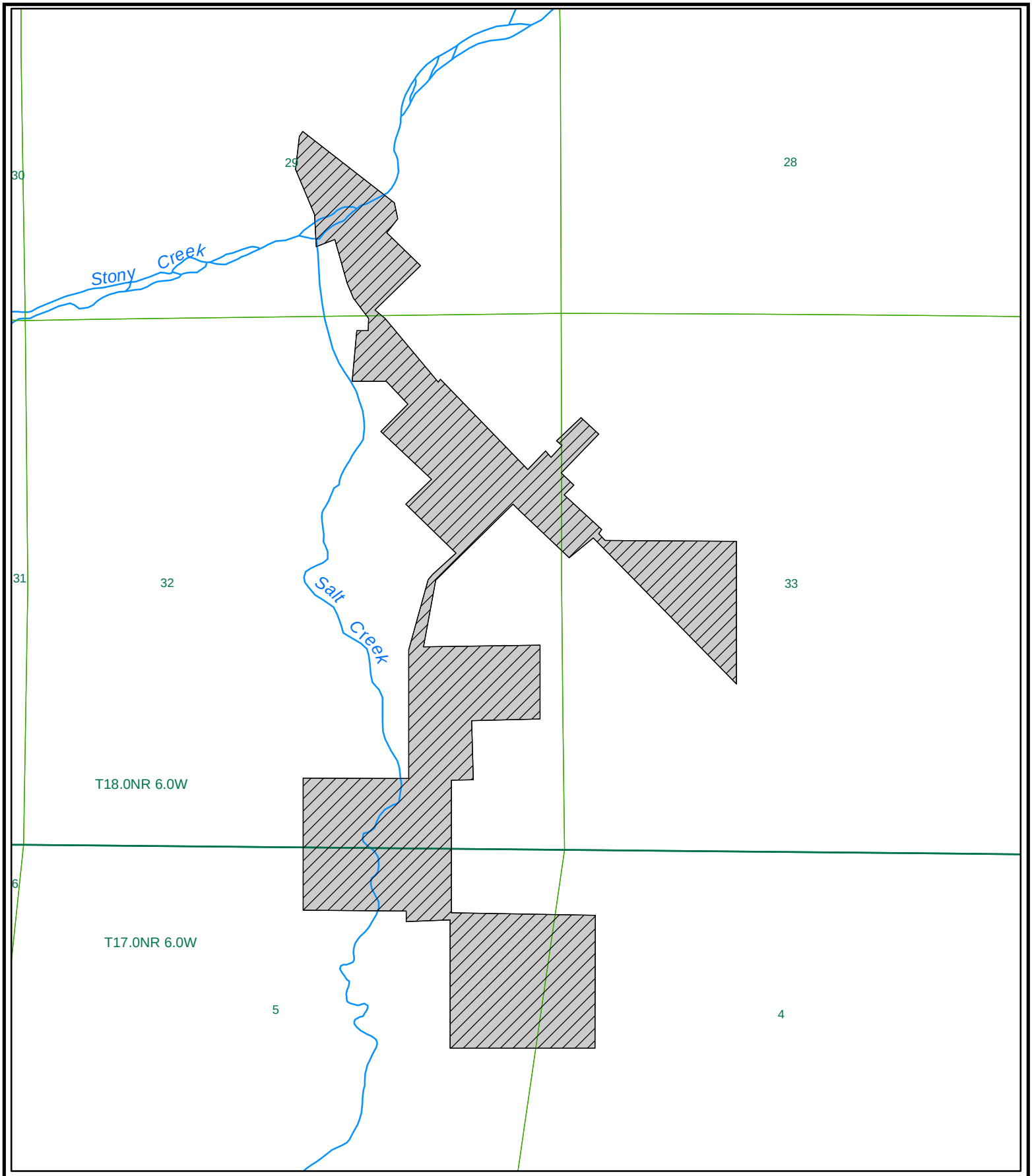
Contractor's Service Area

0 2.5 5 Miles

Date: October 12, 2004

File Name: N:\districts\contracts\stony_creek\stony_creek.mxd

214-202-11



County of Colusa - Stonyford II

Contract No. 4-07-20-W0348-LTR1

Exhibit A

Contractor's Service Area

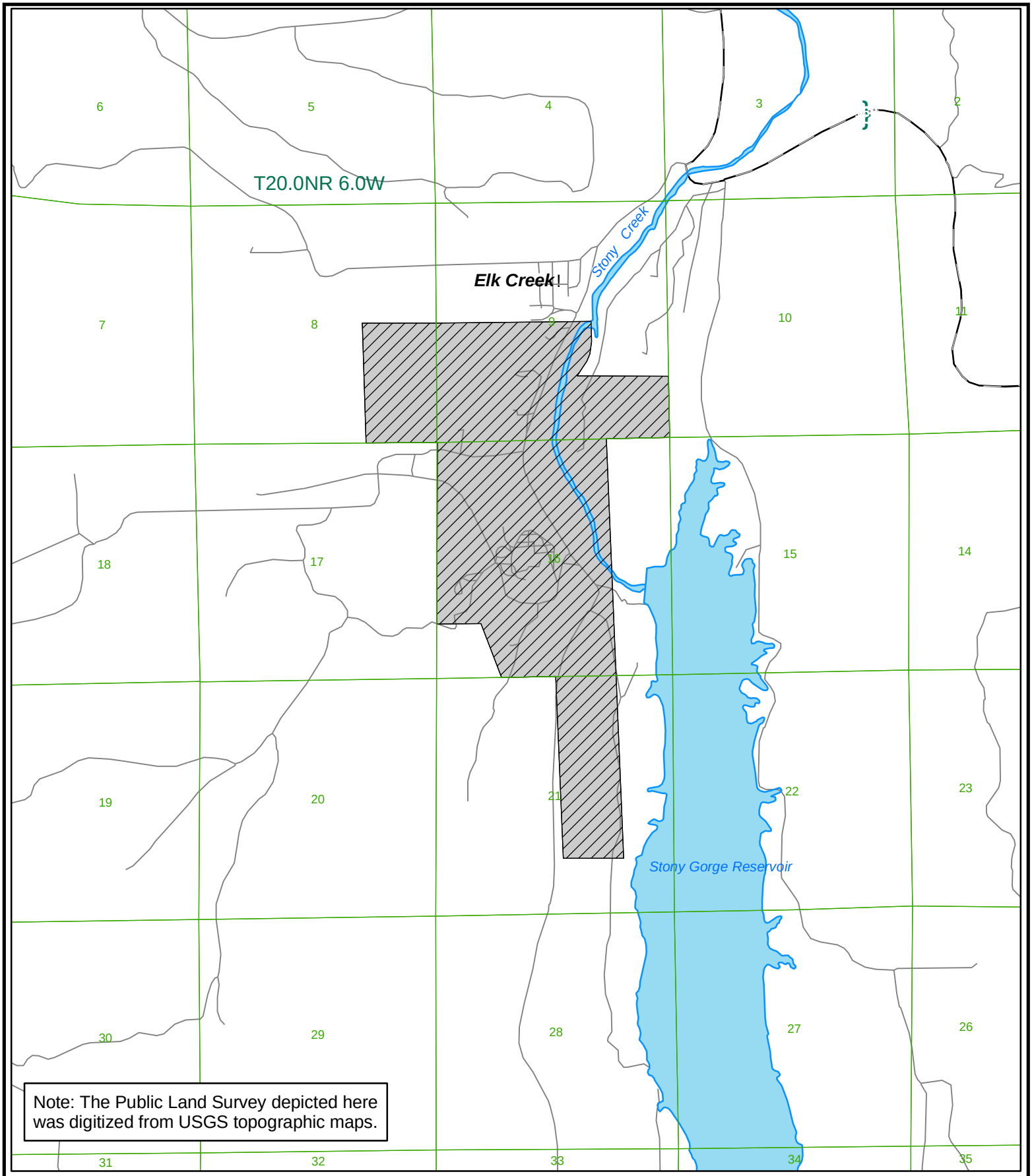
District Boundary

Miles

0 0.5 1

Date: October 12, 2004
File Name: N:\districts\contracts\stonyford\stonyford.mxd

214-202-3



Note: The Public Land Survey depicted here was digitized from USGS topographic maps.

Whitney Construction, Inc.

Contract No. 14-06-200-5749A-LTR1

Exhibit A

II

Contractor's Service Area

District Boundary

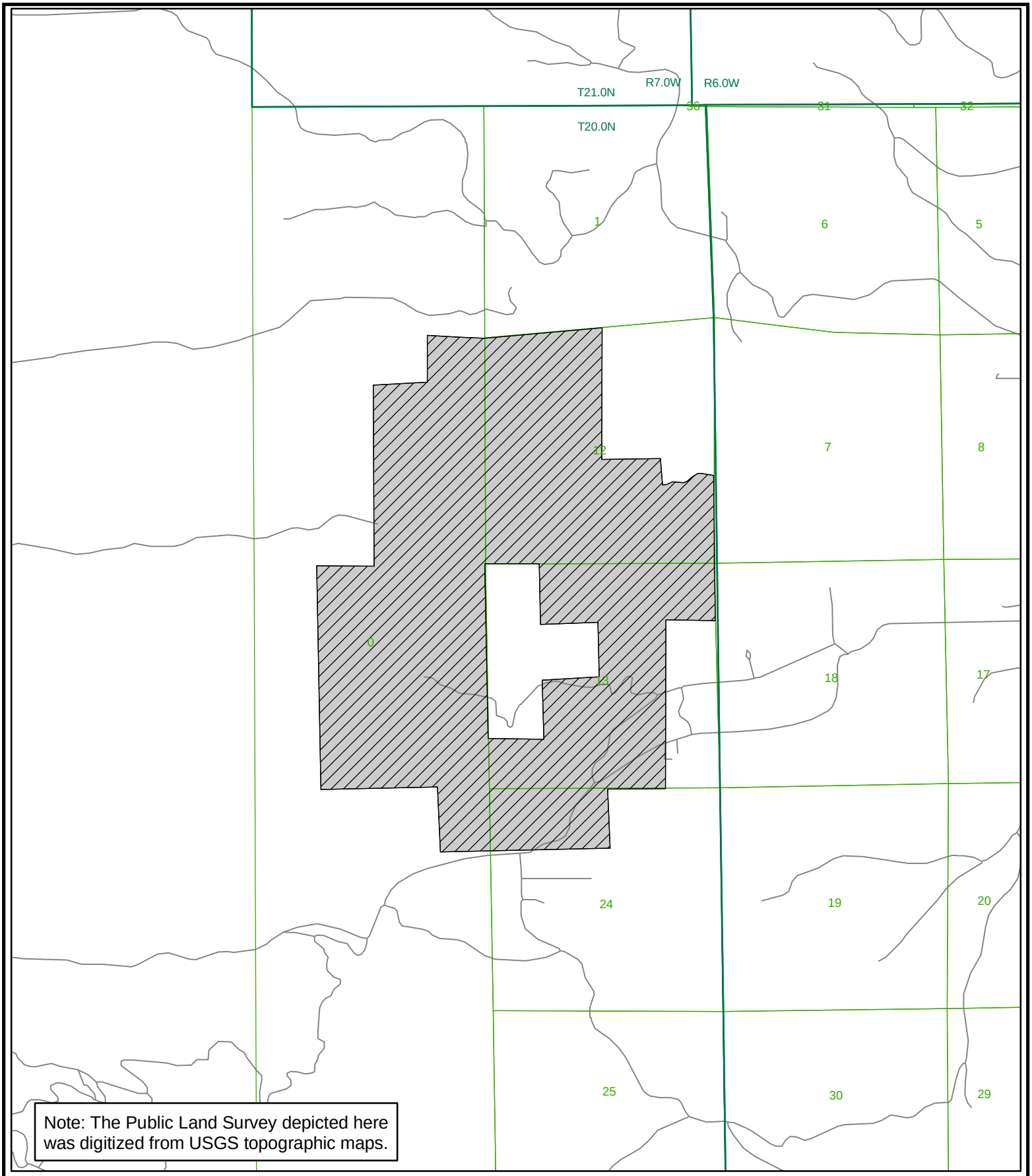
Miles

0 0.5 1

Date: October 12, 2004

File Name: N:\districts\contracts\whitney_construction\whitney.mxd

214-202-14



Note: The Public Land Survey depicted here was digitized from USGS topographic maps.

Contractor's Service Area

District Boundary

4-E Water District

Contract No. 3-07-20-W0312-LTR1 II

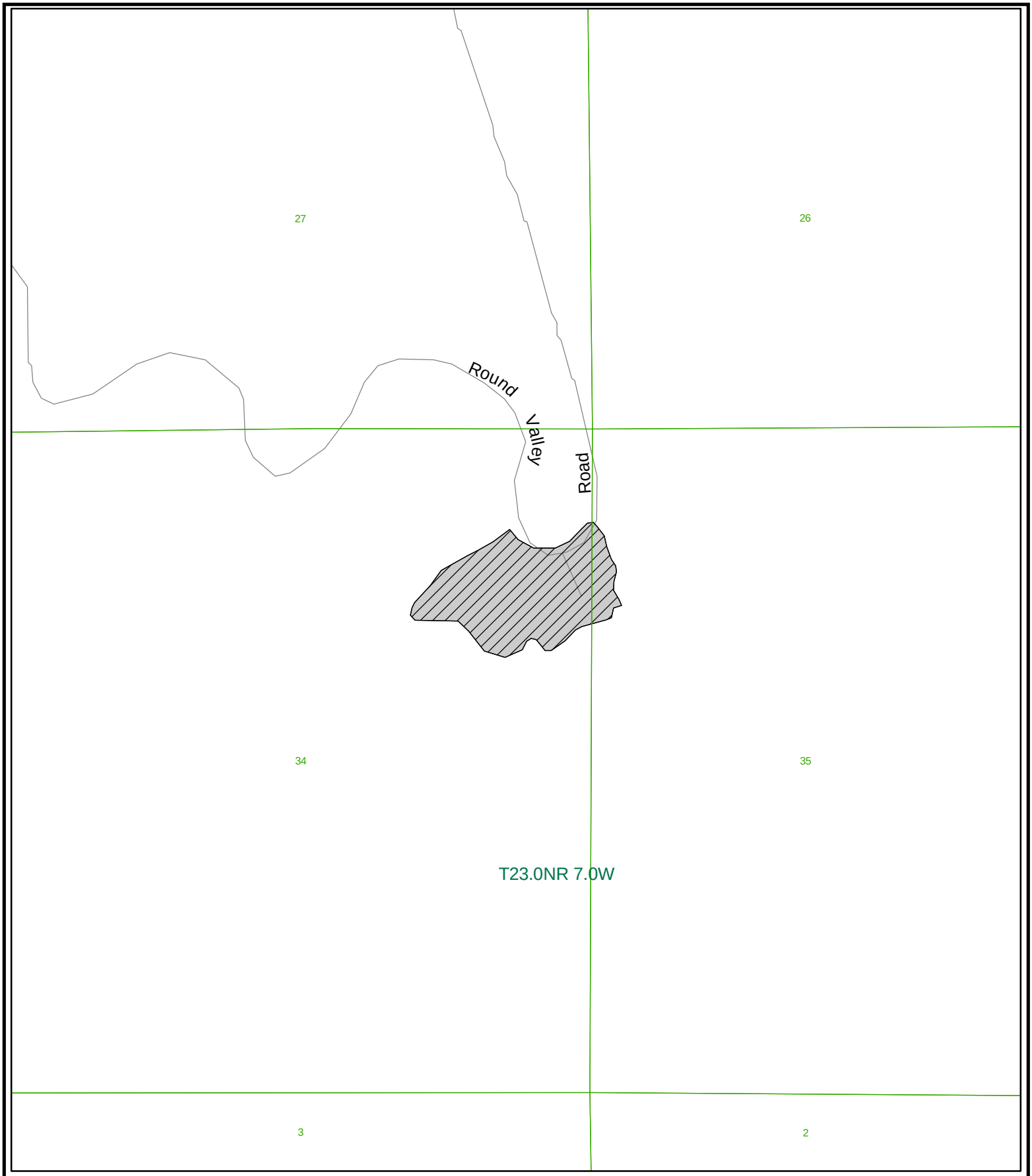
Exhibit A

Miles

0 0.5 1

Date: October 12, 2004
File Name: N:\districts\contracts\4_E_WD\4-E.mxd

214-202-4



U.S. Forest Service - Salt Creek

Contract No. 14-06-200-3621A-LTR1
Exhibit A

II

Contractor's Service Area

District Boundary

Miles
0 0.25 0.5

Date: October 12, 2004
File Name: N:\districts\contracts\usfs_salt_creek\usfs_salt_creek.mxd

214-202-15

United States Department of the Interior

BUREAU OF RECLAMATION

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In reply refer to:
1-1-04-I-0721

FEB 15 2005

Memorandum

To: Area Manager, Northern California Area Office, Bureau of Reclamation, Sacramento, California

From: Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Conclusion of Consultation on Long-Term Renewal of Five Water Service Contract in the Sacramento River Division

This memorandum is in response to your April 13, 2004, letter requesting formal consultation on the proposed long term renewal of Central Valley Project water service contracts in the Shasta, Trinity, and Sacramento River Divisions of the Northern California Area Office. Your request was received by the U.S. Fish and Wildlife Service (Service) on April 14, 2004. This response is in accordance with the Endangered Species Act of 1973, as amended.

Conclusion of Informal Consultation

We have reviewed the information provided in your April 13, 2004 letter; the accompanying Biological Assessments for long-term contract renewals provided for the Shasta and Trinity River Divisions (dated August 2003) and the Black Butte, Corning Canal, and Tehama-Colusa Canal Units (dated April 2004); supplemental information provided by your office and by the U.S. Bureau of Reclamation (Reclamation) Mid-Pacific Regional Office, including GIS data; and other information available to us. We have determined that the proposed renewal of the Sacramento River Division's long term water service contract for the Kirkwood Water District, Glide Water District, Stonyford, Whitney Construction, and the U.S. Forest Service is not likely to adversely affect listed species or critical habitat.

For most of the water districts, there are no listed species, associated habitats, or critical habitat within the district boundaries and therefore we do not believe that there will be measurable direct or indirect effects on them as a result of the proposed action. However, there may be seasonal wetlands that have the potential to support listed vernal pool crustacean habitat within the Kirkwood Water District boundaries.

Projects or actions that involve significant modification of the landscape could contribute to adverse affects to vernal pool crustaceans, should they occur in this area of the district. For instance, the proposed water service contract for Kirkwood allows the district the opportunity to

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receive water for municipal and industrial (M&I) purposes including for use in municipalities and commercial and residential developments. This availability of M&I water to the district could result in growth-inducing effects resulting in land transfers and/or sales where the land could be significantly altered and habitat destroyed. If constructed in the area of the district where vernal pools currently exist, these projects will contribute to the loss and degradation of habitats of listed species across their range, particularly in Tehama County. These activities may alter vernal pool crustacean habitat and can potentially harass, harm, injure, or kill these species.

In most cases, these actions would be subject to Federal review. Projects involving waters of the United States, including many vernal pools and seasonal wetlands, may require a 404 permit from the U.S. Army Corps of Engineers. Approvals or permitting by Federal agencies constitutes a Federal action pursuant to the Act and would therefore require Section 7 consultation prior to the action. The Service will analyze these projects or actions to determine if they will result in the jeopardy of federally-listed species and/or adverse modification and destruction of critical habitat for these species. Projects that involve the establishment of annually-tilled crops in the area where vernal pools currently exist, are prohibited by the Farm Bill from filling any seasonal wetland, including vernal pools, to establish such crops. Prior to the establishment of additional crops, landowners must consult the Natural Resources Conservation Service who will determine if the proposed establishment of such crops is compliant with the Farm Bill and the Act.

Due to the likelihood that Federal review would be required for actions that would adversely affect vernal pool crustaceans and/or their associated habitats, we do not believe that there will be measurable direct or indirect effects on them as a result of the proposed action. This consultation does not exempt private parties from the prohibitions of section 9 of the Act for incidental take that may result from the use or application of Central Valley Project water.

This concludes informal consultation on renewal of the Kirkwood Water District, Glide Water District, Stonyford, Whitney Construction, and the U.S. Forest Service CVP water service contracts. No further action is needed unless: (1) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered; (2) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered; or (3) a new species is listed or critical habitat designated that may be affected by the action; and (4) discretionary Federal agency involvement or control over the action is maintained (or is authorized by law). Reclamation should continue to monitor these actions and review this determination as needed based on the reinitiation criteria.

If you have questions regarding the proposed project, please contact Jan Knight at (916) 414-6620.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In reply refer to:
1-1-04-I-2978

14 February 2005

Memorandum

To: Area Manager, Northern California Area Office, Bureau of Reclamation, Sacramento, California

From: FOR Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Conclusion of Informal Consultation on Long-Term Renewal of the Proberta Water Service Contract in the Sacramento River Division

This memorandum is in response to your April 13, 2004, letter requesting formal consultation on the proposed long term renewal of Central Valley Project water service contracts in the Shasta, Trinity, and Sacramento River Divisions of the Northern California Area Office. Your request was received by the U.S. Fish and Wildlife Service (Service) on April 14, 2004. This response is in accordance with the Endangered Species Act of 1973, as amended.

Conclusion of Informal Consultation

We have reviewed the information provided in your April 13, 2004 letter; the accompanying Biological Assessments for long-term contract renewals provided for the Shasta and Trinity River Divisions (dated August 2003) and the Black Butte, Corning Canal, and Tehama-Colusa Canal Units (dated April 2004); supplemental information provided by your office and by the U.S. Bureau of Reclamation (Reclamation) Mid-Pacific Regional Office, including GIS data; and other information available to us. We have determined that the proposed renewal of the Sacramento River Division's long term water service contract for the Proberta Water District is not likely to adversely affect listed species or critical habitat.

There are no listed species, associated habitats, or critical habitat within the Proberta Water District and therefore we do not believe that there will be measurable direct or indirect effects on them as a result of the proposed action.

This concludes informal consultation on the Proberta Water District water service contract. No further action is needed unless: (1) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered; (2) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered; or (3) a new species is listed or critical habitat designated that may be affected by the action; and (4) discretionary Federal agency involvement or control over

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the action is maintained (or is authorized by law). Reclamation should continue to monitor these actions and review this determination as needed based on the reinitiation criteria.

Based on the information provided in your April 13, 2004 letter; the accompanying Biological Assessments for long-term contract renewals provided for the Shasta and Trinity River Divisions (dated August 2003); the Feather Water District (dated April 2004) and the Black Butte, Corning Canal, and Tehama-Colusa Canal Units (dated April 2004); supplemental information provided by your office and by the Reclamation Mid-Pacific Regional Office, including GIS data; and other information available to us, we have determined that ground-truthing specific areas within the districts is necessary to determine adverse affects, as appropriate, for the Kirkwood Water District.

We are coordinating with Reclamation staff to facilitate those efforts. Once our analysis is complete, we will issue our determination for the Kirkwood Water District water service contract.

This represents the Service's review of the actions presented in your April 13, 2004, request for formal consultation on long-term renewal of the Proberta Water District water service contract.

If you have questions regarding the proposed project, please contact Jan Knight at (916) 414-6620.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

January 10, 2005

JAN 1 2 2005

In Reply Refer To:
151422SWR04SA9164:HLB

Michael J. Ryan
Area Manager
United States Bureau of Reclamation
2800 Cottage Way
Sacramento, California 95825

Dear Mr. Ryan:

This letter responds to your April 16, 2004 letter requesting formal consultation with the National Marine Fisheries Service (NOAA Fisheries) on the U.S. Bureau of Reclamation's (Reclamation) Long-Term Contract Renewal (LTCR) of Federal Central Valley Project (CVP) water service contracts in the Sacramento River Divisions's Black Butte, Corning Canal, and Tehama-Colusa Canal Units, in Tehama, Glenn, Colusa, and Yolo Counties, California. This consultation concerns impacts to Federally listed endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), threatened Central Valley spring-run Chinook salmon (*O. tshawytscha*), threatened Central Valley steelhead (*O. mykiss),* candidate Central Valley fall/late fall-run Chinook salmon (*O. tshawytscha*), and the designated critical habitat of Sacramento River winter-run Chinook salmon and the Essential Fish Habitat (EFH) of Pacific Salmon.

At Relcamation's request, initiation of this consultation was delayed until completion of section 7 consultation on the Long-Term Operations, Criteria, and Plan (OCAP) for the coordinated operations of the CVP and the California State Water Project (SWP). The reason for this request was that Reclamation believed that all aquatic concerns would be addressed in the OCAP consultation and therefore it was a necessary precursor to completing this contract specific consultation. The OCAP consultation was completed with the issuance of a biological opinion by NOAA Fisheries on October 22, 2004 (OCAP BO).

Reclamation proposes to renew eighteen water service contracts in the Sacramento River Division's Black Butte, Corning Canal, and Tehama-Colusa Canal Units. These include 10 contracts and 7 subcontracts in the Tehama-Colusa Canal Unit, 3 contracts in the Corning Canal Unit, and 5 contracts in the Black Butte Unit. Fifteen contracts have an agriculture purpose (*i.e.*, irrigation) or a combined purpose (*i.e.*, irrigation, municipal, and industrial) and will be renewed for 25 years. Three contracts that have only a municipal and industrial (M&I) purpose will be renewed for 40 years. Renewed contracts will be effective beginning March 2005, and will expire in February 2029, with the exception of the three M&I contracts which will expire in February 2044. Water will continue to be delivered through existing CVP

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facilities and will be placed to beneficial use within the authorized place of use for CVP water. The proposed action does not include construction, installation, or modification of any new facilities or structures.

The Sacramento River Division provides for the transport of water to the three units through releases from Shasta and Keswick Dams. Some of the water comes from the Trinity River via the Trinity River Division. Once in the Sacramento River, CVP water is diverted by the Red Bluff Diversion Dam (RBDD) into the Tehama-Colusa and Corning Canals for distribution to water contractors. The Sacramento River Division also is served by supplemental diversions through the Constant Head Orifice (CHO) on lower Stony Creek.

The eighteen water contracts address the annual delivery of approximately 325,000 acre feet (af) of CVP water. Up to 285,800 af of contract water will be delivered to the Tehama-Colusa Canal Unit, and up to 32,900 af and 3,120 af will be delivered to the Corning Canal and Black Butte Units, respectively. Annual contract water quantities range from 25 to 62,00 af each. Actual water delivery to the contractors varies based on Reclamation's annual allocation. Water demand is dependant upon climate, but generally diversions begin approximately April 1 and cease October 31. Water demand is highest between May 1 and October 1.

All diversions are screened, except at the CHO on lower Stony Creek where water can be diverted for a 45-day period in the spring (*i.e.,* April 1 to May 15), and a 45-day period in the fall (*i.e.,* September 15 to October 30). During these periods, water cannot be diverted from the Sacramento River into the Tehama-Colusa Canal by gravity flow at RBDD because the dam gates are up to allow upstream fish passage. CVP water is pumped into the Tehama-Colusa Canal and supplemented with water through the CHO diversion on Stony Creek.

NOAA Fisheries has reviewed the project description for the proposed action and other pertinent information related to this consultation, including the OCAP BO and lower Stony Creek Water Management and Operations biological opinion (lower Stony Creek BO), issued March 11, 2002. The OCAP BO found that CVP actions providing water to contractors in Reclamation's Sacramento River Division are likely to adversely affect Federally listed Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead, and the critical habitat of winter-run Chinook salmon, due to reservoir releases, Sacramento River flows, water temperatures, and physical facility operations that reduce habitat availability and suitability. These effects are expected to impact and result in the take of individual fish by delaying or blocking adult migration into suitable spawning habitat and decreasing spawning success, killing vulnerable life stages such as eggs, larvae, and juveniles due to stranding or elevated water temperatures, or increasing the likelihood of disease or juvenile vulnerability to predation due to temperature stress. The OCAP BO determined that the anticipated level of take is not likely to jeopardize the continued existence of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, or Central Valley steelhead, and is not likely to destroy or adversely modify the designated critical habitat Sacramento River winter-run Chinook salmon.

The lower Stony Creek BO found that diversion of water from Stony Creek into the CHO is likely to adversely affect Central Valley steelhead due to fish entrainment into the unscreened

diversion canal, and reduced instream flow below the diversion point. These effects are expected to impact individual fish through killing entrained juveniles, and delaying adult migration into suitable spawning habitat and decreasing spawning success. The lower Stony Creek BO determined that the anticipated level of take is not likely to jeopardize the continued existence of Central Valley steelhead, and is not likely to destroy or adversely modify the designated critical habitat Sacramento River winter-run Chinook salmon.

Following review of the biological assessment, additional information provided, and the best scientific and commercial information currently available, we find that the effects of Reclamation's LTCRs in the Sacramento River Divisions's Black Butte, Corning Canal, and Tehama Colusa Canal Units on Federally listed endangered winter-run Chinook salmon, Federally listed threatened Central Valley spring-run Chinook salmon, and threatened Central Valley steelhead, and the designated critical habitat of winter-run Chinook salmon were previously analyzed in the OCAP BO, and the lower Stony Creek BO. We do not anticipate additional effects of the proposed LCTR which were not considered in either the OCAP BO or lower Stony Creek BO. These biological opinions include incidental take statements pursuant to section 7(b)(4) and section 7(o)(2) of the Endangered Species Act (ESA) that exempt anticipated project impacts from the prohibitions of section 9.

NOAA Fisheries' determination that adverse effects of LTCRs in the Sacramento River Division's Black Butte, Corning Canal, and Tehama-Colusa Canal Units have been considered in previous biological opinions is contingent upon Reclamation implementing all measures intended to prevent and minimize impacts to fish and fish habitat identified in the OCAP BO and the lower Stony Creek BO. No further action pursuant to the ESA is necessary by Reclamation, however, re-nintiation of the consultation process may be required if one of the following criteria is met: (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this review; (2) the action is subsequently modified in a manner that causes adverse effects to listed species; or (3) a new species is listed or critical habitat designated that may be affected by this action.

This letter identifies aspects of the project that were previously considered in existing biological opinions. No additional incidental take is authorized for this specific action beyond the amount or extent of incidental take anticipated in the March 22, 2002 lower Stony Creek BO, or the October 22, 2004 OCAP BO. Specifically, this letter does not address potential effects to salmonids and their habitat from the aspects of the contract renewal related to the Black Butte Unit and the CHO beyond March 2005, and effects related to the Corning Canal and Tehama-Colusa Canal Units beyond 2030.

Essential Fish Habitat

In addition, we find the NOAA Fisheries OCAP EFH consultation, and the lower Stony Creek Water Management and Operations EFH consultation addressed effects to EFH for Pacific salmon as described in Amendment 14 of the Pacific Salmon Fishery Management Plan pursuant to the MSA. We find no additional effects of this project to EFH that were not analyzed in those consultations. Therefore, additional EFH Conservation Recommendations will not be provided. Written response as required under section 305(b)(4)(B) of the

Magnuson-Stevens Act and Federal regulations (50 CFR § 600.920) will not be required. Should additional information reveal that the project may affect EFH and/or impact salmonids in a way not previously considered, or should the action be modified in a way that may cause additional effects to EFH, this determination may be reconsidered.

If you have any questions regarding this correspondence or if NOAA Fisheries can provide further assistance on this project, please contact Mr. Howard Brown in our Sacramento Area Office, 650 Capitol Mall, Suite 8-300, Sacramento, California 95814. Mr. Brown may be reached by telephone at (916) 930-3608, or by Fax at (916) 930-3629.

Sincerely,

for Rodney R. McInnis
Regional Administrator

cc: NOAA Fisheries-PRD, Long Beach California
Frank Michny (MP-150), Bureau of Reclamation, Mid-Pacific Region, Sacramento, CA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In reply refer to:
1-1-04-I-2949

NOV 12 2004

Memorandum

To: Area Manager, Northern California Area Office, Bureau of Reclamation, Sacramento, California

From: for Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California
Peter A. Cross

Subject: Conclusion of Informal Consultation on Long-Term Renewal of Six Water Service Contracts in the Shasta, Trinity, and Sacramento River Divisions and Request for Supplemental Information for Six Others

This memorandum is in response to your April 13, 2004, letter requesting formal consultation on the proposed long term renewal of Central Valley Project water service contracts in the Shasta, Trinity, and Sacramento River Divisions of the Northern California Area Office. Your request was received by the U.S. Fish and Wildlife Service (Service) on April 14, 2004. This response is in accordance with the Endangered Species Act of 1973, as amended.

Conclusion of Informal Consultation

We have reviewed the information provided in your April 13, 2004 letter; the accompanying Biological Assessments for long-term contract renewals provided for the Shasta and Trinity River Divisions (dated August 2003) and the Black Butte, Corning Canal, and Tehama-Colusa Canal Units (dated April 2004); supplemental information provided by your office and by the U.S. Bureau of Reclamation (Reclamation) Mid-Pacific Regional Office, including GIS data; and other information available to us. We have determined that the proposed renewal of long term water service contracts is not likely to adversely affect listed species or critical habitat in the following six water districts:

Shasta and Trinity Divisions
City of Redding
City of Shasta Lake
Clear Creek Community Services

Sacramento River Division
Orland-Artois
Corning
Thomes Creek

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There are either no listed species or critical habitat within the action area (defined for this analysis as the water service area of each water district) or, if listed species or critical habitat are present or likely to occur within the action area, we do not believe that there will be measurable direct or indirect effects on them as a result of the proposed action.

This concludes informal consultation on the six water service contracts listed above. No further action is needed unless: (1) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered; (2) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered; or (3) a new species is listed or critical habitat designated that may be affected by the action; and (4) discretionary Federal agency involvement or control over the action is maintained (or is authorized by law). Reclamation should continue to monitor these actions and review this determination as needed based on the reinitiation criteria.

Based on the information provided in your April 13, 2004 letter; the accompanying Biological Assessments for long-term contract renewals provided for the Shasta and Trinity River Divisions (dated August 2003); the Feather Water District (dated April 2004) and the Black Butte, Corning Canal, and Tehama-Colusa Canal Units (dated April 2004); supplemental information provided by your office and by the Reclamation Mid-Pacific Regional Office, including GIS data; and other information available to us, we have determined that ground-truthing specific areas within the districts is necessary to determine adverse affects, as appropriate, for the Kirkwood Water District and the Proberta Water District.

We are coordinating with Reclamation staff to facilitate those efforts. Once our analysis is complete, we will issue our determination for the two districts listed above.

Initiation of Formal Consultation and Request for Supplemental Information

This request for supplemental information addresses deficits in the biological assessments. Until we receive the supplemental information we cannot proceed with the formal consultations. The requested information is consistent with the *Central Valley Project Improvement Act*, the *Biological Opinion on Implementation of the CVPIA and Continued Operation and Maintenance of the CVP* (Service File # 1-1-98-F-0124) (CVPIA Opinion), and is pursuant to the regulations governing interagency consultations (50 CFR §402.14(c)).

A. Please provide Water Needs Assessments for the following districts, or written confirmation that they receive less than the minimum delivery to require a Water Needs Assessment: Black Butte Unit, Mountain Gate, Keswick, USFS, Centerville Community Services, and Shasta Community Services. Please provide us with the appropriate Water Needs Assessments so that we may begin formal consultation on these districts.

This represents the Service's review of the actions presented in your April 13, 2004, request for formal consultation on long-term renewal of the six water service contracts listed above in the Shasta, Trinity, and Sacramento River Divisions.

If you have questions regarding the proposed project, please contact Allison Arnold or Jan Knight at (916) 414-6620 or (916) 414-6645.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In reply refer to:
1-1-04-F-0227

AUG 17 2004

Mr. Michael J. Ryan
Area Manager
U.S. Bureau of Reclamation
Northern California Area Office
16349 Shasta Dam Boulevard
Shasta Lake, California 96019-8400

Subject: Conclusion of Informal Consultation on Long Term Renewal of Sixteen Water Service Contracts in the Shasta, Trinity, and Sacramento River Divisions, and Request for Supplemental Information on Nine Other Water Districts

Dear Mr. Ryan:

This memorandum is in response to your April 13, 2004, letter requesting formal consultation on the proposed long term renewal of Central Valley Project water service contracts in the Shasta, Trinity, and Sacramento River Divisions of the Northern California Area Office. Your request was received by the U.S. Fish and Wildlife Service (Service) on April 14, 2004. This response is in accordance with the Endangered Species Act of 1973, as amended.

Conclusion of Informal Consultation

We have reviewed the information provided in your April 13, 2003 letter, the accompanying Biological Assessments for long-term contract renewals provided for the Shasta and Trinity River Divisions (dated August 2003), the Feather Water District (dated April 2004), and the Black Butte, Corning Canal, and Tehama-Colusa Canal Units (dated April 2004), supplemental information provided by your office and by the U.S. Bureau of Reclamation (Reclamation) Mid-Pacific Regional Office, including GIS data, and other information available to us, and determined that the proposed renewal of long term water service contracts is not likely to adversely affect listed species or critical habitat in the following 16 water districts:

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Shasta and Trinity Divisions
Shasta County Water Agency
Bella Vista
Shasta CSD
Mountain Gate CSD
Feather

Sacramento River Division
Kanawha
Stony Creek
4-E
Corning
Orland-Artois
La Grande*
Westside*
Davis*
Colusa County*
County of Colusa*
Dunnigan*

There are either no listed species or critical habitat within the action area (defined for this analysis as the water service area of each water district) or, if listed species or critical habitat are present or likely to occur within the action area (water districts marked by an asterisk *), we do not believe that there will be measurable direct or indirect effects on them as a result of the proposed action. However, we are still analyzing possible adverse affects to listed species by operation and maintenance of conveyance facilities in the water districts marked with an asterisk (*). We are addressing the effects of these actions in a separate, ongoing area-wide consultation with your office because it is our understanding that information is not uniformly available on operation and maintenance of federal conveyance facilities at the water district level.

This concludes informal consultation on the 16 water service contracts listed above. No further action is needed unless: (1) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered; (2) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered; or (3) a new species is listed or critical habitat designated that may be affected by the action, and (4) discretionary Federal agency involvement or control over the action is maintained (or is authorized by law). Reclamation should continue to monitor these actions and review this determination as needed based on the reinitiation criteria.

Based on the information provided in your April 13, 2003 letter, the accompanying Biological Assessments for long-term contract renewals provided for the Shasta and Trinity River Divisions (dated August 2003), the Feather Water District (dated April 2004), and the Black Butte, Corning Canal, and Tehama-Colusa Canal Units (dated April 2004), supplemental information provided

by your office and by the Reclamation Mid-Pacific Regional Office, including GIS data, and other information available to us, we have determined that ground-truthing specific areas within some districts is necessary to determine adverse affects, as appropriate, for the following districts:

City of Redding
City of Shasta Lake
Clear Creek CSD
Kirkwood
Orland-Artois
Corning
Proberta
Thomes Creek

We are coordinating with Reclamation staff to facilitate those efforts. Once our analysis is complete, we will issue our determination for those districts listed above.

Initiation of Formal Consultation and Request for Supplemental Information

This request for supplemental information addresses deficits in the four biological assessments. Until we receive the supplemental information we cannot proceed with the formal consultations. The requested information is consistent with the *Central Valley Project Improvement Act*, the *Biological Opinion on Implementation of the CVPIA and Continued Operation and Maintenance of the CVP* (Service File # 1-1-98-F-0124) (CVPIA Opinion), and is pursuant to the regulations governing interagency consultations (50 CFR §402.14(c)).

A. Exhibit A is missing from all draft contracts currently on display for public review and comment on Reclamation's web site. Please provide us with all appropriate Exhibit A's so that we fully understand the proposed action.

B. Please provide Water Needs Assessments for the following districts, or written confirmation that they receive less than the minimum delivery to require a Water Needs Assessment: Black Butte Unit, Mountain Gate, Keswick, USFS, Centerville Community Services, and Shasta Community Services. Please provide us with the appropriate Water Needs Assessments so that we may begin formal consultation on these districts.

This represents the Service's review of the actions presented in your April 13, 2004, request for formal consultation on the proposed Long-term Contract Renewals for Northern California Area Offices located in Shasta, Tehama, Glenn, Colusa, and Yolo counties, California.

If you have questions regarding the proposed Long Term Renewal of Water Service Contracts project, please contact Allison Arnold or Jan Knight at (916) 414-6620 or -6645.

Sincerely yours,

Kenneth D. Sanchez
Acting Field Supervisor

cc:
USBR, Sacramento, CA, (Attn: Frank Michny)
USBR, Shasta Lake, CA, (Attn: Buford Holt)
CDFG, Red Bluff, CA, (Attn: Paul Ward)