UNITIED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

MID-PACIFIC REGION

SOUTH-CENTRAL CALIFORNIA AREA OFFICE
FRESNO, CALIFORNIA

FINDING OF NO SIGNIFICANT IMPACT

Kern-Tulare and Rag Gulch Water Districts
25- Year Conjunctive Use
Groundwater Storage and Extraction Project
With North Kern Water Storage District

Central Valley Project
Sacramento, California

FONSI-05-120

Recommended by:

Laura Myers
Natural Resource Specialist
South Central California Area Office

Date: 3/10/06

Concurred by:

Kathy Wood
Resource Management Division Chief
South Central California Area Office

Date: 3/17/06

Approved by:

Michael Jackson
Acting Area Manager
South Central California Area Office

Date: 3/22/06

FINDING OF NO SIGNIFICANT IMPACT
KERN-TULARE AND RAG GULCH WATER DISTRICTS
25-YEAR CONJUNCTIVE USE
GROUNDWATER STORAGE AND EXTRACTION PROJECT
WITH NORTH KERN WATER STORAGE DISTRICT
FONSI 05-120

BACKGROUND

In accordance with Section 102 (2) (c) of the National Environmental Policy Act of 1969 (NEPA), as amended, the Bureau of Reclamation has prepared an Environmental Assessment (EA) for *Kern-Tulare and Rag Gulch Water Districts 25-year Conjunctive Use Groundwater Storage and Extraction Project with North kern Water Storage District*, dated *January 30, 2006* and is incorporated by reference.

Reclamation proposes to approve a 25-year water banking program in which Kern-Tulare and Rag Gulch Water Districts (KTRG) would bank Central Valley Project (CVP) water in North Kern Water Storage District's (NKWSD) existing facilities. KTRG would bank CVP water in years when they had water in excess of their immediate needs. The most likely sources for the banked water would be from purchased CVP water (transfers) and Section 215 water available from the Friant-Kern Canal (FKC), but could also include water from their CVP contract supply. KTRG would then recover the banked water during dry years when their water supply is insufficient to meet their irrigation demand. The project area is defined as the area encompassed by KTRG and NKWSD and would continue until February 28, 2031.

As agreed upon in the contract between KTRG and NKWSD, KTRG's total water storage capacity at NKWSD is 33,333 acre-feet (AF), with 10% to remain in the bank, leaving 30,000 AF as the maximum banked recoverable supply KTRG can store at any one. However, KTRG can only recover up to 5,000 AF from NKWSD in a given year. In 2005, KTRG did a one time bank of 33,333 AF of CVP water to reach full capacity in the bank. The environmental assessment analyzed the recovery of banked CVP water as needed, up to 5,000 AF per year and the banking of CVP water as available, not exceeding 33,333 AF of banked water at one time.

FINDINGS

In accordance with NEPA, the South Central California Area Office of Reclamation has found that the proposed long-term groundwater storage and extraction project is not a major federal action that would significantly affect the quality of the human environment. Consequently, an environmental impact statement is not required. This determination is supported by the following factors:

1. Surface Water Resources: KTRG would bank CVP water in wet years when their water demand has been met or they do not need the CVP water at the particular time it was made available to them. KTRG's CVP water supply for the banking project would come from three potential sources: CVP contract supply, Section 215 water or CVP transfer water. KTRG would not overburden other water resources to make water available for banking. Pumping, conveyance and deliveries would occur in existing facilities. The Proposed Action would not alter any CVP

or State Water Project (SWP) entitlement or impede any obligations to deliver water to other CVP or SWP contractors, fish or wildlife purposes.

2. Water Quality: In 2001, NKWSD completed construction of a well which is located near the FKC and about midway between two of this project's wells. Water samples were collected from this well and were found to be in compliance with Reclamation's policy for discharge of groundwater into the FKC (See Appendix A for Water Quality Standards). It is expected that the water quality in each of the four project wells would also satisfy Reclamation's policy.

3. Groundwater Resources: KTRG would not pump groundwater beyond the average 15,000 AF per year as a substitute for CVP supplies for the purpose of making water available for banking. This will be verified by Reclamation in the annual reports KTRG are required to submit as discussed in section 2.2.3 of the EA. The proposed project would not adversely affect the groundwater under KTRG. In fact, the Proposed Action would likely decrease reliance on groundwater pumping by landowners in KTRG during dry years. The Proposed Action would result in the return of an estimated 5,000 AF during a dry year. The availability of 5,000 AF of additional irrigation water in a dry year would reduce the need for groundwater pumping in dry years.

   The potential for long-term recharge within NKWSD may raise local groundwater levels, but would have no impacts to groundwater quality within the district. The Proposed Action could result in lower groundwater levels in the vicinity of the extraction wells during extraction operations. However, the Proposed Action would result in a net increase in groundwater levels since water must be banked before it can be extracted. Groundwater levels in the vicinity of the extraction wells and extraction operations would be monitored by NKWSD. Modifications to pumping and operations would be implemented if impacts are found to be more substantial than what would be expected without the project.

4. Geology and Soils: The Proposed Action would have minimal impacts on subsidence. During dry years, it can be expected that all of the active wells in NKWSD would be used to meet irrigation water needs during the peak irrigation months. The average annual pumping from existing landowner and NKWSD wells is estimated to be 65,000 acre-feet per year. The increased pumping of up to 5,000 AF from the four project wells would be insignificant compared to that of the existing wells.

5. Land Use: The proposed project would maintain agricultural lands by providing reliable water during dry years to KTRG. The Proposed Action would not result in increased or decreased water supplies in KTRG or NKWSD that would induce growth or land use changes as both districts are fully built out and supply no water to customers other than agricultural users.

6. Biological Resources: The Proposed Action would sustain existing agricultural lands within KTRG resulting in no effects on listed or other status species. The pumping and transfer of water from NKWSD to KTRG would have no effect on species of concern due to the small amount of water involved in the action in relation to the large amount of water routinely transferred through the FKC. Additionally, no change in diversions of water from the San Joaquin River will occur as a result of the Proposed Action, nor will it require the construction of any new facilities.

7. Cultural Resources: The Proposed Action will not impact cultural resources, as facilities have already been constructed and existing recharge and extraction operations would continue to

operate as has historically occurred. The condition of archaeological and cultural resources with the implementation of the Proposed Project would be the same as it would be under existing conditions; therefore, no additional effects to archaeological and cultural resources would occur.

8. No Indian Trust Assets are located in the project area.

9. Socio-economic Resources: The Proposed Action would provide water to sustain existing crop lands. Businesses rely on these crops to maintain jobs. The Proposed Action would continue to support the economic vitality in the region.

   The Proposed Action would likely result in less energy usage and costs for pumping groundwater in KTRG providing a benefit to the landowners. This benefit would mainly occur in dry years on a small scale and would not result in major impacts to socio-economic resources. Similarly, less pumping would result in a slight benefit for energy users. However, this benefit would be minor.

10. Environmental Justice: The project would not cause any harm to minority or disadvantaged populations within KTRG or NKWSD. These populations/communities are unlikely to be greatly affected by the increase in dependability of the water supply for the districts, because changes in agricultural land use, commodities, or practices are anticipated to be minor.

11. Cumulative Impacts: The approval of the project could facilitate groundwater banking actions in other areas. However, the Proposed Action would not establish a precedent for future actions. Approval would not have highly controversial or uncertain environmental effects or involve unique or unknown environmental risks.

    Multiple groundwater banking programs, transfers and exchanges of water occur throughout the San Joaquin Valley each year. These water service actions improve operational efficiency, decrease operating costs, provide options for managing the finite water supplies and are consistent with the Central Valley Project Improvement Act (CVPIA) (H.R. 429, Public Law 102-575).

    The Proposed Action when combined with short-term and/or permanent water service actions as described would not result in increases or decreases of water diverted from rivers or waterways and would have minimal impacts to surface water resources.

    NKWSD has been banking groundwater for in-district uses for over 50 years. The Kern Fan Monitoring and Semitropic Monitoring Committees have been established to monitor the impacts of the water banks in the area. Extraction operations would be modified if impacts to adjacent wells are found to be more than what would be expected without the project.

    Better management of water supplies and providing lower priced water does not result in more than minor profits for the contractors and landowners. Farmers must compete in a highly competitive agricultural market and crop prices fluctuate on a wide scale. Historically, the water contractors have sought ways to provide water at the most economical price to their customers to offset the dramatic changes in the agricultural market. Increased profits are used by the contractors for administering, maintaining and improving their manpower, infrastructure, and facilities.

RECLAMATION

Managing Water in the West

FINAL ENVIRONMENTAL ASSESSMENT
of

KERN-TULARE AND RAG GULCH WATER DISTRICTS
25-YEAR CONJUNCTIVE USE
GROUNDWATER STORAGE AND EXTRACTION PROJECT
WITH NORTH KERN WATER STORAGE DISTRICT

EA-05-120

March 9, 2006

U.S. Department of the Interior
Bureau of Reclamation
South Central California Area Office
1243 N Street
Fresno, California 93721

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List of Acronyms, Abbreviations and Definition of Terms

AF (acre-foot) - The volume of water required to cover 1 acre of land (43,560 square feet) to a depth of 1 foot. One acre-foot is equal to 325,851 gallons, which is enough water for a family of four for an entire year.
Aquifer - A geologic formation (soil or rock), group of formations, or part of a formation capable of storing, receiving and transmitting water. An aquifer is capable of yielding enough water to support a well or spring.
Conjunctive Use - The combined use of surface and ground waters to serve a particular purpose. For example, during dry years in a conjunctive use program, drinking water needs are largely met with groundwater. During wet years, surface water is the primary sources of drinking water, allowing the groundwater table to replenish naturally.
CVP – Central Valley Project.
CVPIA - Central Valley Project Improvement Act
Diversion - A channel constructed across the land slope to intercept surface runoff and conduct it to an outlet.
DWR - California Department of Water Resources.
Groundwater - Water stored underground in rock crevices and in the pores of geologic materials that make up the Earth's crust.
KTRG – Kern-Tulare WD and Rag Gulch WD, collectively.
NEPA - National Environmental Policy Act.
NKWSD – North Kern Water Storage District
Overdraft - The reduction of groundwater storage that occurs when withdrawals from an aquifer exceed recharge. Sometimes referred to as mining of groundwater.
Percolation - The downward movement of water through the openings in soil or rock.
Recharge - The replenishment of groundwater by seepage of precipitation and runoff. Also stated as the process of addition of water to the saturated zone.
Reclamation – U.S. Bureau of Reclamation.
Saturated Zone - The zone in a soil profile or geologic formation in which all pore spaces are filled with water.
Section 215 Water – Refers to Section 215 of the Reclamation Reform Act of 1989; describes an unusually large water supply not otherwise storable for project purposes; or infrequent or otherwise unmanaged flood flows of short duration.
SWP - State Water Project.
Watershed - The land area that drains water to a particular stream, river, or lake. It is a land feature that can be identified by tracing a line along the highest elevations between two areas on a map, often a ridge.

Kern-Tulare and Rag Gulch Water Districts
25 Year Conjunctive-Use Groundwater Storage and Extraction Project
With North Kern Water Storage District

EA-05-120

SECTION 1 PURPOSE OF AND NEED FOR ACTION

1.1 BACKGROUND

Kern-Tulare Water District and Rag Gulch Water District (collectively known as KTRG) are Central Valley Project (CVP) Cross Valley contractors and share common distribution facilities and staff. KTRG are located on the border of Kern and Tulare counties, east of the Friant-Kern Canal (FKC) (Figure 1-1). Kern-Tulare Water District has a contract with Reclamation for 40,000 acre-feet of annual water supply from the CVP. Rag Gulch Water District has a contract with Reclamation for 13,300 acre-feet of annual water supply from the CVP.

Kern-Tulare Water District has a contract with the City of Bakersfield for an average of 20,000 acre-feet per year of Kern River water and Rag Gulch Water District has a similar contract for an average of 3,000 acre-feet per year. Water under these contracts is delivered to the Kern County Water Agency Improvement District No. 4 in exchange for SWP water. The SWP water is conveyed through the Cross Valley Canal to the Friant-Kern Canal, where it is exchanged with a Friant Contractor for water available in the Friant-Kern Canal (FKC).

Irrigation water service is provided to approximately 20,000 acres of high-value permanent crops (grapes, citrus, and nuts) located east of Delano in Kern and Tulare counties. The annual irrigation demand is approximately 55,000 AF, of which the two districts have historically provided approximately 40,000 AF through imported surface water supplies including water from the Kern River. The remaining 15,000 AF is provided by groundwater which is pumped by water users. Groundwater within the districts is deep (averaging approximately 450 feet below the ground surface) and of marginal quality. Most water users must blend groundwater with district-supplied water to satisfy crop water quality requirements. The two districts are unable to fully meet the irrigation demand of the crops due to limited distribution system capacity

As stated above KTRG are CVP Cross Valley (CV) contractors. CV Contractor's CVP supplies are available through either the Friant-Kern Canal (FKC) or in the Delta. CV Contractor deliveries from the FKC are only available when all the other Friant supplies have been met and water is available in Lake Millerton. The CV Contractor supplies are not commonly available in Lake Millerton for the CV Contractors and have only been available a handful of times in the past 20 years. When CVP supplies are available in Lake Millerton for the CV Contractors, it is for a large volume of water up to the contract quantity for only a short period of time.

CV Contractor deliveries from the Delta are typically made available by Reclamation in Clifton Court Forebay. Due to CVP conveyance constraints, these Delta supplies are not typically conveyed through CVP facilities. CVP conveyance occurs infrequently and when it does occur, it is for a very short duration. The typical conveyance mechanism is conveyance by the California Department of Water Resources (DWR).

DWR delivers the CV Contractor's CVP water through the State Water Project facilities to Reach 12E of the California Aqueduct. From there the CV Contractor's CVP water is typically delivered through the Cross Valley Canal for direct delivery and/or by exchange arrangements under Article 5 of the CVP contracts with Arvin Edison Water Storage District (Arvin Edison) or others. DWR only pumps this water from the Delta and conveys this CVP water through the California Aqueduct when, and if, all other SWP requirements have been met.

In the last five years this pumping window has typically occurred at the margins of the growing season in early spring (March or April) and/or late summer (August through October.) These pumping windows were made available on short notice and for a limited time, in some cases a week or two. The water was available outside of the majority of the agricultural demand pattern and often with such a short duration that it is difficult to make use of the entire contract supply due to non-Delta delivery constraints even if there was an agricultural demand at the time.

CV Contractor's long-term contract supplies are typically available in high volume bursts of short duration and frequently with short notice. This is a difficult pattern for meeting agricultural demands in their district. The opportunity for groundwater banking could help match agricultural demand with supply when needed and is not expected to change the last five year pattern with which long-term contract supplies are delivered.

North Kern Water Storage District (NKWSD), a non-CVP Contractor, is located south-southwest and downstream from KTRG and is practically bisected by the FKC (Figure 1-1). NKWSD is fully developed to irrigate agriculture with water supplies principally from the Kern River and pumped groundwater. Historical surface water supplies to NKWSD have ranged from less than 10,000 acre feet per year to nearly 400,000 acre feet per year. As a result of this highly variable water supply, NKWSD has developed an extensive groundwater banking and extraction program utilizing the groundwater reservoir to regulate its water supplies. NKWSD has successfully operated its conjunctive use project for over 50 years and, through this proposed project, seeks to enhance its existing conjunctive use operations.

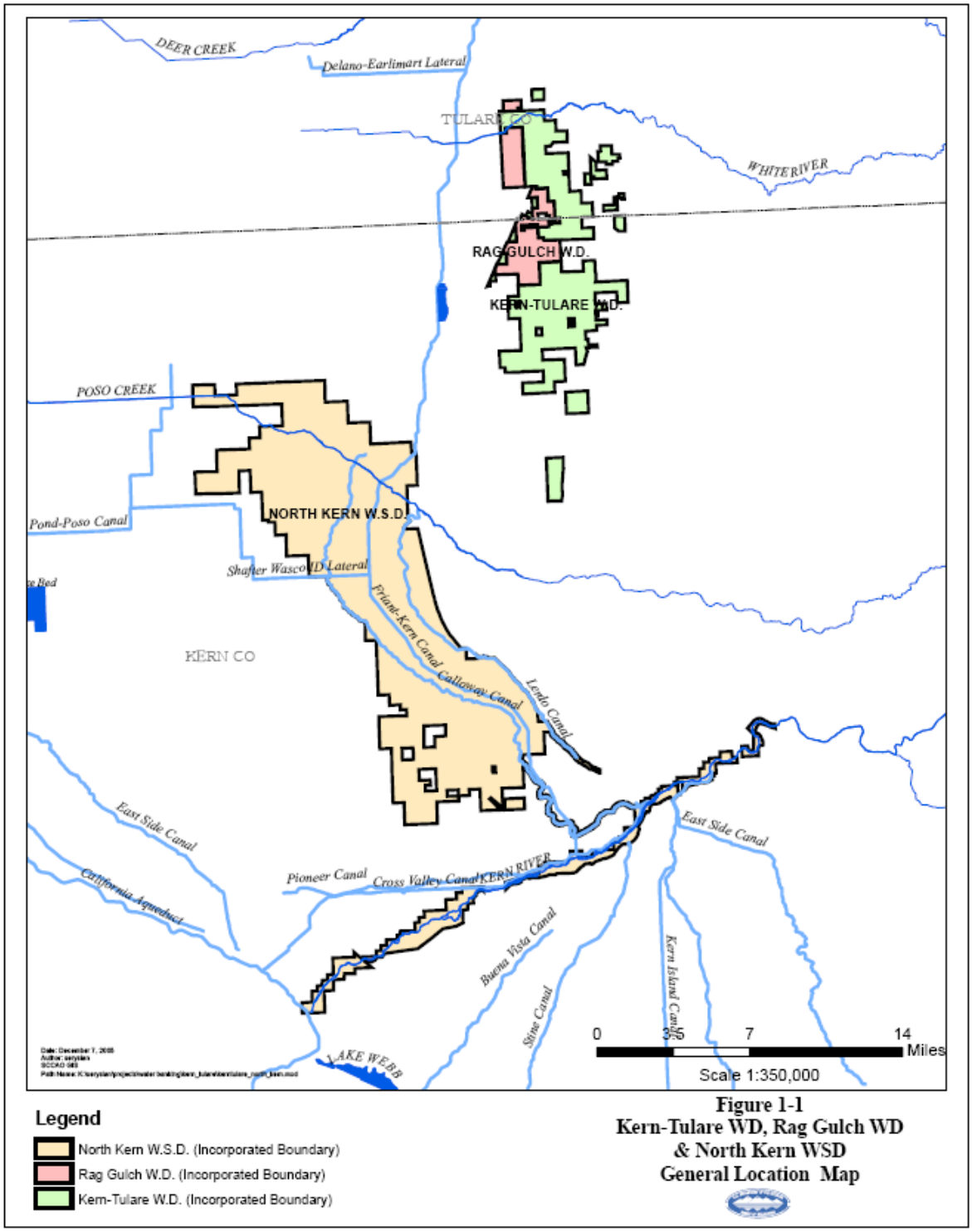

Figure 1-1
Kern-Tulare WD, Rag Gulch WD & North Kern WSD
General Location Map

1.2 PURPOSE AND NEED

The Proposed Action is a project that involves two components for Reclamation's consideration for approval. The two components are groundwater banking and exchanging of CVP water.

The purpose of groundwater banking is to provide a reliable source of water during dry years. In an above normal water years, KTRG has surplus surface water supplies that will otherwise be lost for use by KTRG unless the water can be stored in a groundwater bank for later use. In dry years, KTRG has reduced surface water supplies and must rely heavily on low quality ground water to meet the remaining needs of the district. The ability to retrieve banked water will reduce the over draft of the ground water supplies and provide better quality water.

The purpose for the exchange is to facilitate the recovery of banked water to KTRG. The exchange is needed because there is no physical means to convey the banked water from NKWSD directly to KTRG.

1.3 SCOPE AND POTENTIAL ISSUES OF THIS ENVIRONMENTAL ASSESSMENT

1.3.1 Scope

As agreed upon in the contract between KTRG and NKWSD, KTRG's total water storage capacity at NKWSD is 33,333 acre-feet (AF), with 10% to remain in the bank, leaving 30,000 AF as the maximum banked recoverable supply KTRG can store at any one. However, KTRG can only recover up to 5,000 AF from NKWSD in a given year. In 2005, KTRG did a one time bank of 33,333 AF of CVP water to reach full capacity in the bank. This environmental assessment analyzes the recovery of banked CVP water as needed, up to 5,000 AF per year and the banking of CVP water as available, not exceeding 33,333 AF of banked water at one time. The purchasing of CVP water for banking purposes is not within the scope of this EA. Only the banking of such water is covered.

1.3.2 Potential Issues

The potentially affected resources in the project vicinity include:

- Surface water
- Groundwater
- Geology and Soils
- Biological resources
- Land Use
- Cultural resources
- Indian Trusts Assets
- Socioeconomic
- Environmental Justice

SECTION 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This EA considers two alternatives: the No Action Alternative and the Proposed Action Alternative.

2.1 ALTERNATIVE A: CONTINUE PRESENT ACTIONS – NO ACTION

Under the No Action Alternative, Reclamation does not approve the storage of CVP water from KTRG to NKWSD. NKWSD would continue to engage in banking opportunities and exchanges and investigate strategies to improve groundwater conditions and facilities. KTRG would continue to find new ways of increasing supply reliability and engage in transfers and exchanges with other agencies to help reduce the impacts of critical dry year shortages.

2.2 ALTERNATIVE B: PROPOSED ACTION

2.2.1 KTRG/NKWSD Groundwater Banking Project

Reclamation proposes to approve a 25-year water banking program in which KTRG would bank CVP water in NKWSD's existing facilities. KTRG would bank CVP water in years when they have water in excess of their immediate needs. The most likely sources for the banked water would be from purchased CVP water (transfers) and Section 215 water (see definition) available from the Friant-Kern Canal, but could also include water from their CVP contract supply. KTRG would then recover the banked water during dry years when their water supply is insufficient to meet their irrigation demand. The project area is defined as the area encompassed by KTRG and NKWSD and would continue until February 28, 2031.

As agreed upon in the contract between KTRG and NKWSD, KTRG's total water storage capacity at NKWSD is 33,333 AF, with 10% to remain in the bank, leaving 30,000 AF as the maximum banked recoverable supply KTRG can store at any one. However, KTRG can only recover up to 5,000 AF from NKWSD in a given year. In 2005, KTRG did a one time bank of 33,333 AF of CVP water to reach full capacity in the bank. This environmental assessment analyzes the recovery of banked CVP water as needed, up to 5,000 AF per year and the banking of CVP water as available, not exceeding 33,333 AF of banked water at one time.

2.2.2 Required Conveyance Systems

2.2.2.1 Delivery of KTRG's CVP water to NKWSD

As previously mentioned, KTRG wants to bank water that could come from several different sources: CVP contract supply, purchased CVP water and Section 215 water available from the Friant-Kern Canal. Whatever the source, the conveying of water to NKWSD from KTRG will most likely occur as follows:

- KTRG will not take possession of the CVP water on the FKC, and instead deliver it down to NKWSD.
- NKWSD will take possession of the CVP water from the turnout at milepost 144.9 on the FKC (See Figure 3-1).
- NKWSD will use the CVP water for recharge through the use of spreading basins, natural unlined channels, and direct irrigation ("in lieu" banking).

2.2.2.2 Recovery of Banked CVP water from NKWSD to KTRG

The recovery of up to 5,000 AF of water per year to KTRG from NKWSD has 4 different possibilities. The most likely would occur as follows:

- NKWSD will pump the groundwater from four wells (Figure 3-1) into the FKC. The water must meet Reclamation's water quality standards (See Appendix A for Water Quality Standards).
- This water will be delivered to a CVP contractor downstream (i.e. Arvin-Edison or Shafter-Wasco ID).
- The downstream CVP contractor will make a like amount of water available further upstream on the FKC to be delivered to KTRG.
- KTRG will take possession of the water from the FKC.

However, there may be times when NKWSD has surface water from the Kern River available for exchange with KTRG in lieu of pumping back the groundwater. In this event, KTRG will recover up to 5,000 AF of their bank supply by exchange of NKWSD Kern River water with a CVP contractor downstream, and a like amount will be deducted from KTRG's water bank account. However, if at anytime non-project water is pumped directly into Federal facilities, this would require a Warren Act contract and is out of the scope of this EA. The exchange can take place in several ways:

- Kern River water can be delivered into NKWSD's Beardsley canal off of the Kern River and discharged into the Friant-Kern Canal in an existing facility where NKWSD's 8-17 ditch crosses the FKC. Then the Kern water will be exchanged with a Friant contractor downstream on the FKC. A Warren Act contract would be required to cover the introduction of Kern River water into a Federal facility (the FKC) and is out of the scope of this EA.
- Kern River water can be delivered to KCWA ID4 in exchange for SWP water or groundwater in the Cross Valley Canal (CVC). Water in the CVC can be delivered through Kern-Tulare's siphons into the FKC.
- Kern River water can be delivered to Arvin-Edison through Arvin-Edison's turnouts off the Carrier Canal in exchange for Arvin-Edison Friant water supplies.

2.2.3 Terms and Conditions

The following terms define the Proposed Action:

- The amount of CVP water on deposit in the NKWSD banking facilities at any one time by Kern-Tulare and Rag Gulch after the 10% loss will not exceed 30,000 acre-feet. The Proposed Action would yield a maximum annual dry year supply of up to 5,000 acre feet of water. CVP water must be banked before extraction and delivery to KTRG.

- Conveyance of CVP water for this action would be done through an existing turnout from the Friant-Kern Canal and four existing wells that discharge directly into the Friant-Kern Canal (Figure 3-1). The exchange would be in a 1 to 1 ratio with a 10% allowance for losses to remain in the bank. The 10%, one time, loss is accounted for when the water is first banked.

- CVP water withdrawn from the bank must be used by Kern-Tulare and Rag Gulch within their respective authorized service areas. In those cases where banked CVP water is withdrawn for purposes other than in-district use, such use will be subject to the water transfer provisions of CVPIA. CVP water would be subject to the provisions of the Reclamation Reform Act (RRA) and would be delivered only to eligible lands.

- Reclamation would annually review the status of the balance of CVP vs. non-CVP water in the NKWSD account and determine compliance with RRA, and verify application of the appropriate water rate.

- The use of federal facilities such as the Friant-Kern Canal for conveyance of return water from NKWSD must be approved by the Contracting Officer. Water quality requirements will be imposed on all extracted groundwater introduced into federal facilities, such as into the Friant-Kern Canal, via the Cross Valley Canal or other non-CVP facilities.

- KTRG and NKWSD would engage in a groundwater monitoring program and report the results to Reclamation on an annual basis.

- The reports provided by KTRG will contain sufficient detail to enable Reclamation to be able to track by each contract (KT and RG) separately the CVP water being banked (quantities and how the water was made available) and where the banked CVP water goes once it is extracted, whether by direct delivery or exchange.

SECTION 3 AFFECTED ENVIRONMENT

The context for this Environmental Assessment (EA) is the valley floor of the San Joaquin Valley within Kern County and focusing on lands and resources in and around KTRG and NKWSD. This section identifies the affected environment, conditions that currently exist, and the areas of concern that may be affected by the Proposed Action. This section also identifies the environmental trends that currently exist.

3.1 SURFACE WATER RESOURCES

3.1.1 CVP Facilities

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

3.1.2 Kern-Tulare/Rag Gulch Water Districts

Kern-Tulare Water District has a contract with Reclamation for 40,000 acre-feet of annual water supply from the CVP. Rag Gulch Water District has a contract with Reclamation for 13,300 acre-feet of annual water supply from the CVP. Both districts have executed a long-term exchange agreement with Arvin-Edison Water Storage District (Arvin-Edison) in order to receive their CVP supply. To convey the CVP water supply from the Delta, where KTRG's CVP water supply originates, DWR conveys water under the CVP contract through the California Aqueduct to Tupman. From Tupman, the water is conveyed in the Cross Valley Canal where it is either delivered directly to the Friant-Kern Canal or exchanged with Arvin-Edison for water available in the Friant-Kern Canal (KTRG, 2003).

Kern-Tulare Water District has a contract with the City of Bakersfield for an average of 20,000 acre-feet per year of Kern River water and Rag Gulch Water District has a similar contract for an average of 3,000 acre-feet per year. Water under these contracts is delivered to the Kern County Water Agency Improvement District No. 4 in exchange for SWP water. The SWP water is conveyed through the Cross Valley Canal, where it is either delivered directly to the Friant-Kern Canal or exchanged with Arvin-Edison for water available in the Friant-Kern Canal.

KTRG is partners in another 25-year conjunctive-use groundwater storage and extraction program with Rosedale-Rio Bravo Water Storage District in which Reclamation provided funding from the CALFED Bay-Delta Program. The project yields an estimated dry year supply of 9,000 AF to KTRG (KTRG, 2001b).

KTRG may also receive Section 215 water. KTRG have second priority to receive Section 215 water after the Friant Division Contractors. Section 215 water would be made available to KTRG in Millerton Lake via FKC.

KTRG may also purchase water - also known as transfers. Purchased CVP water for banking purposes would be between willing buyers and willing sellers and would require further environmental analysis.

3.1.3 North Kern Water Storage District

NKWSD encompasses about 60,000 fully developed acres of agricultural land with water supplies principally from the Kern River and pumped groundwater. Historical surface water supplies to NKWSD have ranged from less than 10,000 acre feet per year to nearly 400,000 acre feet per year. As a result of this highly variable water supply, NKWSD has developed an extensive groundwater recharge and extraction program utilizing the groundwater reservoir to regulate its water supplies. NKWSD has successfully operated its conjunctive use project for over 50 years and, through this proposed project, seeks to enhance its existing conjunctive use operations. NKWSD also has a contract with the City of Bakersfield that is handled by KCWA for surface water from the Kern River. This water is used solely for irrigation or groundwater recharge (NKWSD, 2001).

As described previously, the Proposed Action includes the recovery and discharge of groundwater into the Friant-Kern Canal from time to time. The Friant-Kern Canal (FKC) principally conveys San Joaquin River water which is of excellent quality for irrigation uses. Reclamation has established a draft policy regarding the discharge of groundwater into the FKC which addresses water quality.

The turnout that would be used for the conveyance of KTRG's CVP water to NKWSD is located at milepost 144.9 on the FKC, and was licensed by Reclamation in November 2002 and constructed in December 2003 (Figure 3-1). The turnout releases water from the FKC into NKWSD's Lateral 8-1.

Four wells were constructed for this project in November 2005 (Figure 3-1). Reclamation had no authority over the construction of the wells. The construction of the wells was analyzed in an Initial Study done by NKWSD in 2001.

Three separate water pipelines (pump-ins) will be used to convey the pumped groundwater into the FKC. These pipelines are located at mileposts 129.94, 133.41 and 136.63 on the FKC. A license was granted by Reclamation for the installation of the three discharge pipelines in October 2005, and was constructed in December 2005 (Figure 3-1). An Endangered Species Clearance Survey Report was completed by NKWSD in 2004. This survey analyzed the affects of constructing the pipelines on potential species of concern and proposed avoidance measures to be taken.

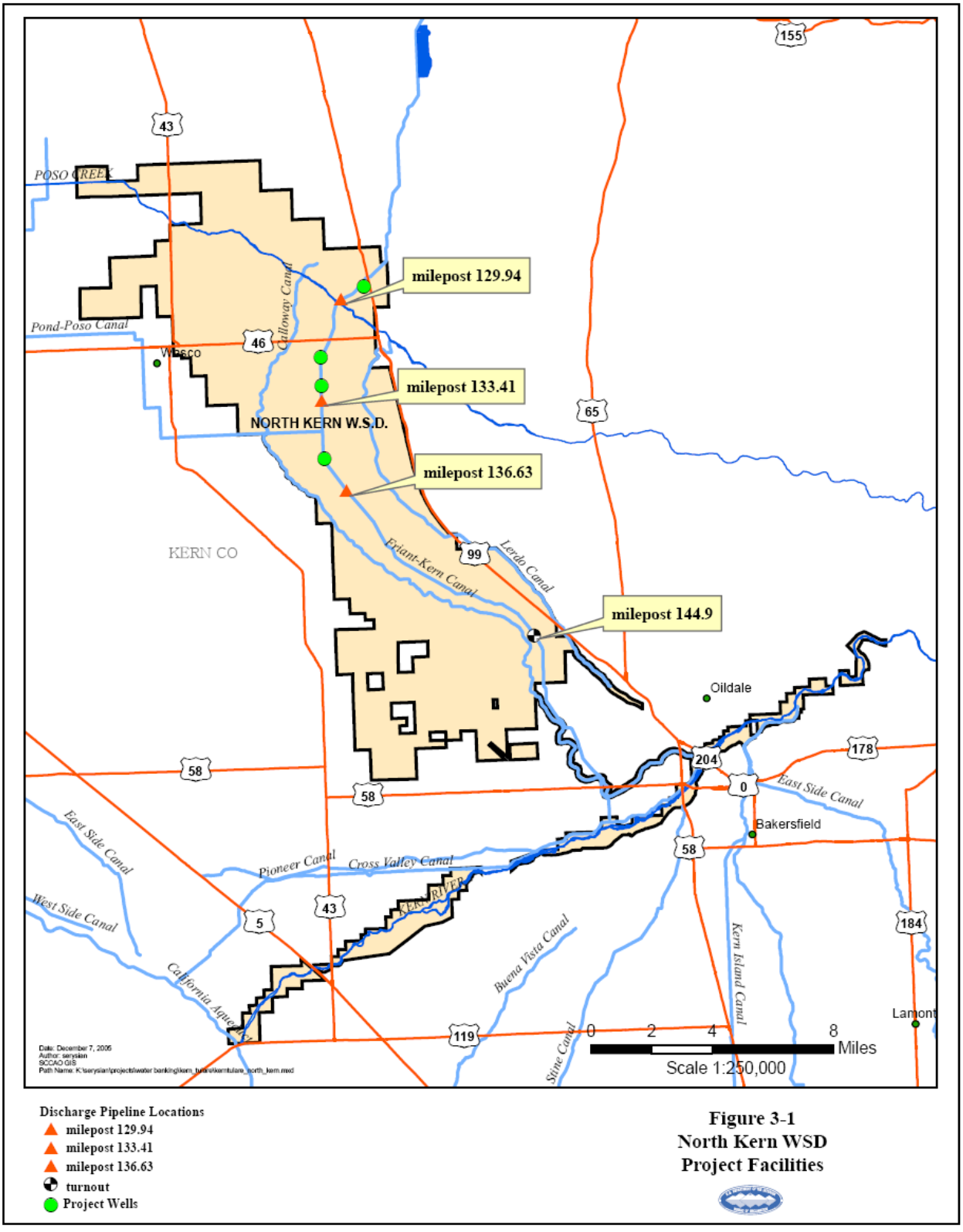

Figure 3-1
North Kern WSD
Project Facilities

3.2 GROUNDWATER RESOURCES

3.2.1 KTRG Groundwater Supply

The depth to groundwater varies from about 200 feet to over 600 feet throughout KTRG (Figure 3-2). There are static groundwater levels taken in the spring and do not include the temporary drawdown of 50 to 100 feet caused by pumping. Sources of groundwater replenishment include underflow in KTRG from both the east and west

Wells drilled on the west side of KTRG tap into the continental deposits. Continental deposits comprise an unconfined aquifer. Groundwater in the continental deposits contains between 250 ppm and 400 ppm total dissolved solids and is of a calcium bicarbonate or dodium bicarbonate chemical type. The water is classified as suitable for irrigation.

In the easterly portion of KTRG, a number of wells drilled to depths of 1,400 to 2,500 feet tap highly permeable deposits of the Santa Margarita and/or the Ocese Formations. These formations form an unconfined aquifer and contain useable groundwater. Groundwater in these deposits is sodium chloride in character with total dissolved solids concentrations between 300 ppm and 500 ppm and is classed as having medium to high salinity hazard and high to very high sodium hazard.

The annual irrigation demand is approximately 55,000 acre-feet, of which KTRG has historically provided approximately 43,000 AF. The remaining 15,000 AF is provided by groundwater that is pumped by water users.

A 1922 to 1990 analysis of water supply and demand for KTRG was performed in a feasibility study for the districts. The analysis was made assuming a recurrence of 1922 through 1990 hydrology. The analysis indicated that KTRG would have water supplies available for banking in 67 percent of all years. In 33% of all years, KTRG would be short of meeting historical water demand and would therefore withdraw banked water during these years (KTRG, 2001c). This analysis is shown in Table 3-1 below.

TABLE 3-1: WATER SUPPLY AND DEMAND FOR KTRG (QUANTITIES IN AF) (KTRG, 2001C).

	Surface Water Provided by KTRG				
	Available				(Avail for Banking)
Year	Kern River	CVP	Total	Total Used	Unused
1922	23,000	47,970	70,970	43,000	27,970
1923	23,000	37,310	60,310	43,000	17,310
1924	0	0	0	0	0
1925	23,000	23,985	46,985	43,000	3,985
1926	19,090	5,330	24,420	24,420	0
1927	23,000	45,305	68,305	43,000	25,305
1928	12,880	34,645	47,525	43,000	4,525
1929	14,030	7,995	22,025	22,025	0
1930	17,135	2,665	19,800	19,800	0
1931	0	0	0	0	0
1932	23,000	29,315	52,315	43,000	9,315
1933	23,000	0	23,000	23,000	0
1934	3,105	0	3,105	3,105	0
1935	23,000	31,980	54,980	43,000	11,980
1936	23,000	37,310	60,310	43,000	17,310
1937	27,255	42,640	69,895	43,000	26,895
1938	27,255	53,300	80,555	43,000	37,555
1939	23,000	13,325	36,325	36,325	0
1940	23,000	34,645	57,645	43,000	14,645
1941	27,255	53,300	80,555	43,000	37,555
1942	23,000	45,305	68,305	43,000	25,305
1943	27,255	47,970	75,225	43,000	32,225
1944	23,000	23,985	46,985	43,000	3,985
1945	27,255	37,310	64,565	43,000	21,565
1946	23,000	37,310	60,310	43,000	17,310
1947	23,000	15,990	38,990	38,990	0
1948	14,835	37,310	52,145	43,000	9,145
1949	11,730	18,655	30,385	30,385	0
1950	23,000	39,975	62,975	43,000	19,975
1951	23,000	39,975	62,975	43,000	19,975
1952	27,255	53,300	80,555	43,000	37,555
1953	23,000	39,975	62,975	43,000	19,975
1954	23,000	39,975	62,975	43,000	19,975
1955	23,000	15,990	38,990	38,990	0
1956	23,000	53,300	76,300	43,000	33,300
1957	23,000	42,540	65,540	43,000	22,540
1958	27,255	50,635	77,890	43,000	34,890
1959	6,555	26,650	33,205	33,205	0
1960	11,500	13,325	24,825	24,825	0
1961	0	21,320	21,320	21,320	0
1962	23,000	34,645	57,645	43,000	14,645
1963	23,000	42,640	65,640	43,000	22,640
1964	15,985	10,660	26,645	26,645	0
1965	23,000	45,305	68,305	43,000	25,305
1966	23,000	23,985	46,985	43,000	3,985
1967	27,255	53,300	80,555	43,000	37,555
1968	23,000	37,310	60,310	43,000	17,310
1969	27,255	53,300	80,555	43,000	37,555
1970	23,000	42,640	65,640	43,000	22,640
1971	23,000	37,310	60,310	43,000	17,310
1972	7,820	37,310	45,130	43,000	2,130
1973	27,255	45,305	72,560	43,000	29,560
1974	23,000	39,975	62,975	43,000	19,975
1975	23,000	42,640	65,640	43,000	22,640
1976	5,635	18,655	24,290	24,290	0
1977	0	0	0	0	0
1978	27,255	53,300	80,555	43,000	37,555
1979	23,000	31,980	54,980	43,000	11,980
1980	27,255	53,300	80,555	43,000	37,555
1981	23,000	18,655	41,655	41,655	0
1982	27,255	53,300	80,555	43,000	37,555
1983	27,255	53,300	80,555	43,000	37,555
1984	23,000	47,970	70,970	43,000	27,970
1985	23,000	10,660	33,660	33,660	0
1986	27,255	53,300	80,555	43,000	37,555
1987	20,125	7,995	28,120	28,120	0
1988	10,810	5,330	16,140	16,140	0
1989	22,655	7,995	30,650	30,650	0
1990	345	18,655	19,000	19,000	0
AVG	20,073	31,631	51,704	36,443	15,262

3.2.2 Groundwater Management

The Tulare Lake Hydrologic Region comprises the drainage area of the San Joaquin Valley south of the San Joaquin River. The Tulare Lake Hydrologic Region is essentially a closed basin since surface water drains north into the San Joaquin River only in years of extreme rainfall.

The region has 12 distinct groundwater basins and 7 sub-basins of the San Joaquin Valley groundwater Basin, which crosses north into the San Joaquin River Hydrologic Region. These basins underlie approximately 5.33 million acres (8,330 square miles) or 49 percent of the entire Hydrologic Region area. A map of the region can be seen in Figure 3-3, and Table 3-2 list characteristics of each groundwater basin and sub-basin.

Groundwater has historically been important to both urban and agricultural uses, accounting for 41 percent of the region's total annual supply and 35 percent of all groundwater use in the State. Groundwater use in the region represents about 10 percent of the State's overall supply for agricultural and urban uses. The aquifers are generally quite thick in the San Joaquin Valley sub-basins with groundwater wells commonly exceeding 1,000 feet in depth. The maximum thickness of freshwater-bearing deposits (4,400 feet) occurs at the southern end of the San Joaquin Valley. Typical well yields in the San Joaquin Valley range from 300 gpm to 2,000 gpm with yields of 4,000 gpm possible. The smaller basins in the mountains surrounding the San Joaquin Valley have thinner aquifers and generally lower well yields averaging less than 500 gpm.

KTRG and NKWSD reside within the Kern County groundwater sub-basin (Figure 3-2) within the San Joaquin Valley Basin encompassed by the Tulare Lake Hydrologic Region. The Kern County groundwater basin includes the Kern River and the Poso Creek drainage areas, as well as the drainage areas of west side streams in Kern County. The Kern County Basin has been identified by DWR as being critically over-drafted. By definition, "a basin is subject to critical conditions of overdraft when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts" (DWR, 2003).

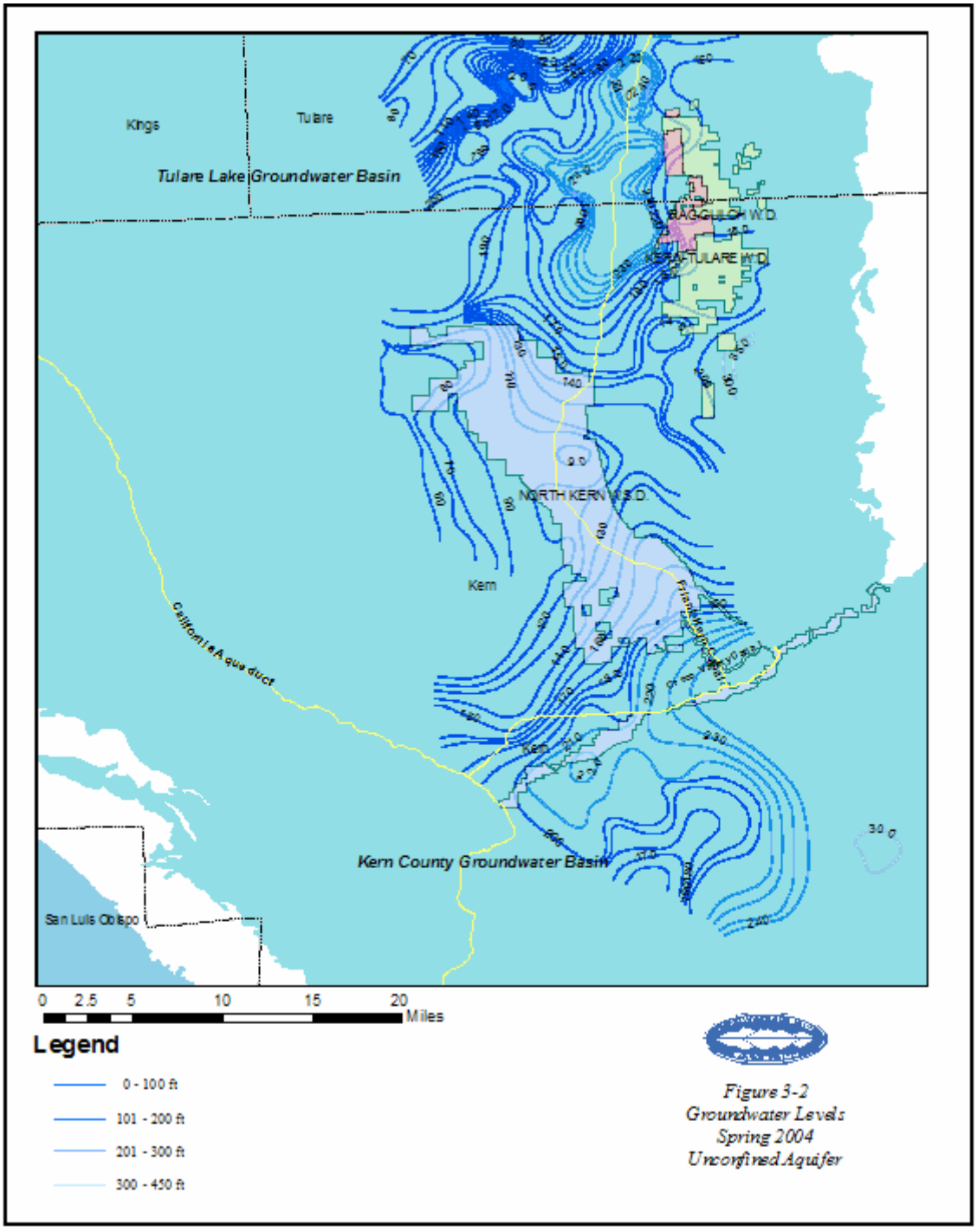

Figure 3-2
Groundwater Levels
Spring 2004
Unconfined Aquifer

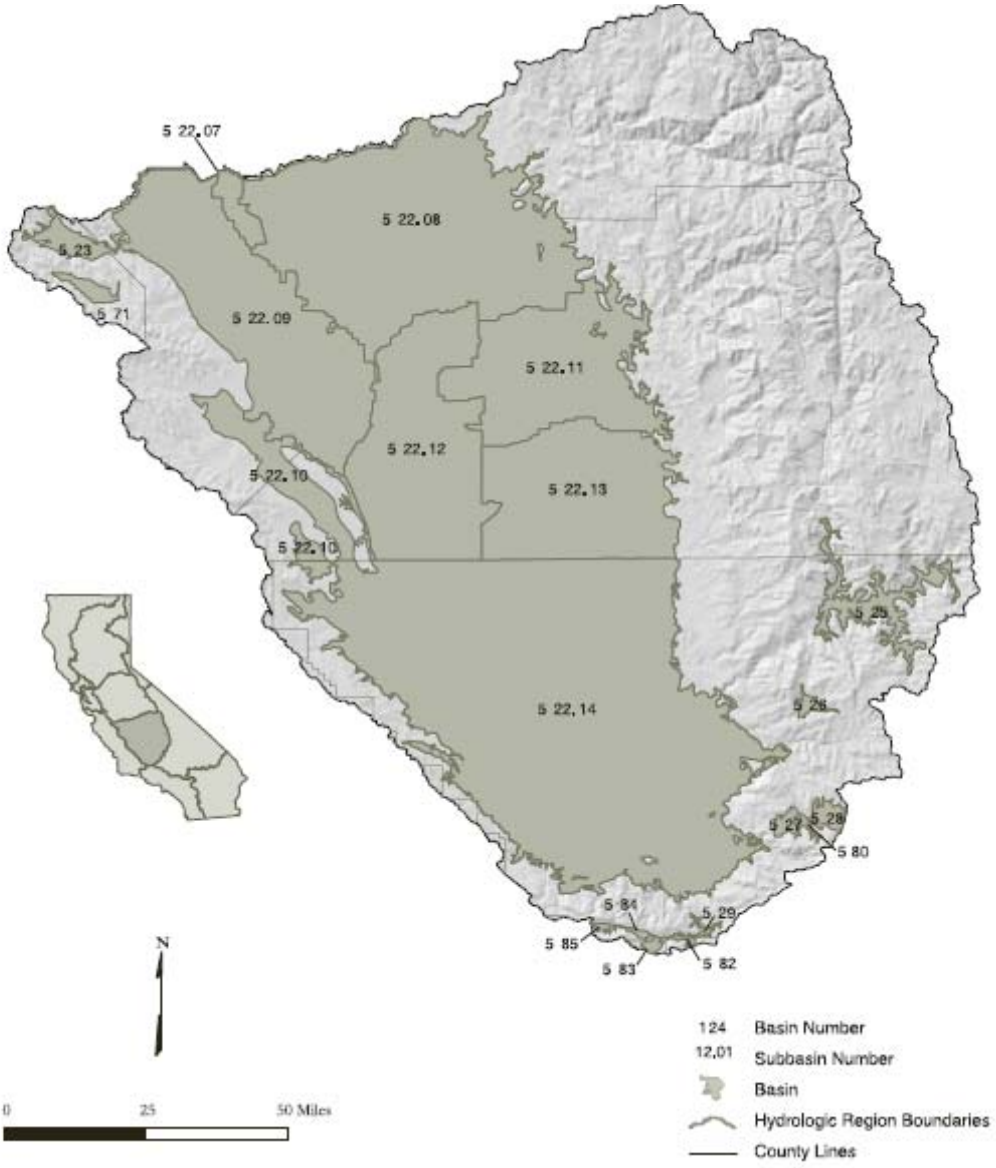

Figure 3-3: Tulare Lake Hydrologic Region (DWR, 2003).

TABLE 3-2: TULARE LAKE HYDROLOGIC REGION GROUNDWATER DATA

Basin/ Sub-basin	Basin Name	Area (acres)	GW Budget Type	Well Yields (gpm)		Types of Monitoring			TDS (mg/L)	
				Max	Average	Levels	Quality	Title 22	Average	Range
5-22	San Joaquin Valley									
5-22.08	Kings	976000	C	3000	500-1500	909	-	722	200-700	40-2000
5-22.09	Westside	640000	C	2000	1100	960	-	50	520	220-35000
5-22.10	Pleasant Valley	146000	B	3300	-	151	-	2	1500	1000-3000
5-22.11	Kaweah	446000	B	2500	1000-2000	568	-	270	189	35-580
5-22.12	**Tulare Lake**	**524000**	**B**	**3000**	**300-1000**	**241**	**-**	**86**	**200-600**	**200-40000**
5-22.13	Tule	467000	B	3000	-	459	-	150	256	200-30000
5-22.14	**Kern County**	**1950000**	**A**	**4000**	**1200-1500**	**2258**	**249**	**476**	**400-450**	**150-5000**
5-23	Panoche Valley	33100	C	-	-	48	-	-	1300	394-3530
5-25	Kern River Valley	74000	C	3650	350	-	-	92	378	253-480
5-26	Walker Basin Creek Valley	7670	C	650	-	-	-	1	-	-
5-27	Cummings Valley	10000	A	150	56	51	-	15	344	-
5-28	Tehachapi Valley west	14800	A	1500	454	64	-	19	315	280-365
5-29	Castac Lake valley	3600	C	400	375	-	-	3	583	570-605
5-71	Vallecitos Creek Valley	15100	C	-	-	-	-	0	-	-
5-80	Brite Valley	3170	A	500	50	-	-	-	-	-
5-82	Cuddy Canyon Valley	3300	C	500	400	-	-	3	693	695
5-83	Cuddy Ranch Valley	4200	C	300	180	-	-	4	550	480-645
5-84	Cuddy Valley	3500	A	160	135	3	-	3	407	325-645
5-85	Mil Portero Area	2300	C	3200	240	7	-	7	460	372-657

Source: DWR, 2003

3.2.3 Groundwater Quality

In general, groundwater quality throughout the region is suitable for most urban and agricultural uses with only local impairments. The primary constituents of concern are high TDS, nitrate, arsenic, and organic compounds.

The areas of high TDS content are primarily along the west side of the San Joaquin Valley and in the trough of the valley. High TDS content of west-side water is due to recharge of stream flow originating from marine sediments in the Coast Range. High TDS content in the trough of the valley is the result of concentration of salts because of evaporation and poor drainage. Table 3-2, above, shows the average and range of TDS in each groundwater basin and sub-basin in the Tulare Lake Hydrologic Region.

In the central and west-side portions of the valley, where the Corcoran Clay confining layer exists, water quality is generally better beneath the clay than above it. Nitrates may occur naturally or as a result of disposal of human and animal waste products and fertilizer. Areas of high nitrate concentrations are known to exist near the town of Shafter and other isolated areas in the San Joaquin Valley. High levels of arsenic occur locally and appear to be associated with lakebed areas. Elevated arsenic levels have been reported in the Tulare Lake, Kern Lake and Buena Vista Lake bed areas. Organic contaminants can be broken into two categories, agricultural and industrial. Agricultural pesticides and herbicides have been detected throughout

the valley, but primarily along the east side where soil permeability is higher and depth to groundwater is shallower. The most notable agricultural contaminant is DBCP, a now-banned soil fumigant and known carcinogen once used extensively on grapes. Industrial organic contaminants include TCE, DCE, and other solvents. They are found in groundwater near airports, industrial areas, and landfills (DWR 2003).

Table 3-3 lists the three most frequently occurring contaminants in each of the six contaminant groups and shows the number of wells in the Hydrologic Region that exceeded the MCL for those contaminants.

TABLE 3-3: MOST FREQUENTLY OCCURRING CONTAMINANTS BY CONTAMINANT GROUP IN THE TULARE LAKE HYDROLOGIC REGION.

Contaminant Group	Contaminant - # of wells	Contaminant - # of wells	Contaminant - # of wells
Inorganics – Primary	Fluoride – 32	Arsenic – 16	Aluminum – 13
Inorganics – Secondary	Iron – 155	Manganese – 82	TDS – 9
Radiological	Gross Alpha – 74	Uranium – 24	Radium 228 – 8
Nitrates	Nitrate (NO3) – 83	Nitrate + Nitrite – 14	Nitrite (N) – 3
Pesticides	DBCP – 130	EDB – 24	Di(2-Ethylhexyl)phthalate – 7
VOCs/SVOCs	TCE – 17	PCE – 16	Benzene -6 MTBE - 6

Source: DWR, 2003

DBCP = Dibromochloropropane
EDB = Ethylenedibromide
TCE = Trichloroethylene
PCE = Tetrachloroehylene
VOC = Volatile organic compound

Salinity is the primary contaminant affecting water quality and habitat in the Tulare Lake Hydrologic Region, a consequence of agriculture compounded by groundwater overdraft. Agricultural runoff and drainage are also the main sources of nitrate, pesticides, and selenium that can impact groundwater and surface water beneficial uses. The region also has a relatively large concentration of dairies that contribute microbes, salinity, and nutrients to both surface water and groundwater. Nitrate has contaminated more than 400 square miles of groundwater in the region. In addition, more than 800 oilfields discharge a wide variety of contaminants to the waters of the region. On the region's west side, salinity, sulfate, boron, chloride, and selenium limit the uses of groundwater (DWR, 2005).

Where groundwater quality is marginal to unusable for agriculture, farmers use good quality surface water to irrigate crops, or blend higher quality surface water with poor quality groundwater to create a larger supply. The inefficiency of some crop irrigation systems can increase percolation of irrigation water into the shallow unconfined aquifers, causing drainage problems and degrading groundwater quality. This marginal to poor quality groundwater has mounded up to reach crop root zones in this area and is threatening the viability of agriculture there. Naturally occurring arsenic and man-made organic chemicals--pesticides and industrial chemicals--have contaminated groundwater used as domestic water in the region. For example,

the lone well that provides water for city of Alpaugh's 760 residents contains unsafe levels of naturally occurring arsenic. By 2006, new federal and State rules will force more than 50 central San Joaquin Valley communities, including Hanford, Pixley, and Tranquility, to cut arsenic levels to one-fifth the current allowable levels

3.3 LAND USE

KTRG and NKWSD consist of primarily rural agricultural lands. Delano, McFarland, Shafter and the City of Bakersfield are near the project area. However, they are not within NKWSD or KTRG. Numerous other businesses, institutions, and governmental agencies provide further support to the area.

Land use in KTRG is predominately agricultural and is summarized in Table 3-3. The information in the table was extracted from Table 4.1 of the USFWS January 19, 2001 Biological Opinion on USBR Long Term Contract Renewal of Friant Division and Cross Valley Unit Contracts.

TABLE 3-4: LAND USE PERCENTAGES.

	Percent of District		
	Kern-Tulare Water District	Rag Gulch Water District	KTRG (Combined)
Industrial	0	0	0
Mixed Urban or Built-up Land	0	0	0
Cropland and Pasture	22	15	20
Total Lower Habitat Value/Converted Areas:	22	15	21
Transportation, Communications and Utilities	0	0	0
Orchards, Groves, Vineyards, Nurseries, etc.	63	83	67
Total Variable-Substantial to Low Habitat Value:	64	83	68
Idle Farmland	0	1	0
Herbaceous, and Shrub and Brush Rangeland	14	0	11
Water and Reservoirs	0	0	0
Total Moderate to High Habitat Value:	14	2	12
Industrial	0	0	0
District Total	100	100	100

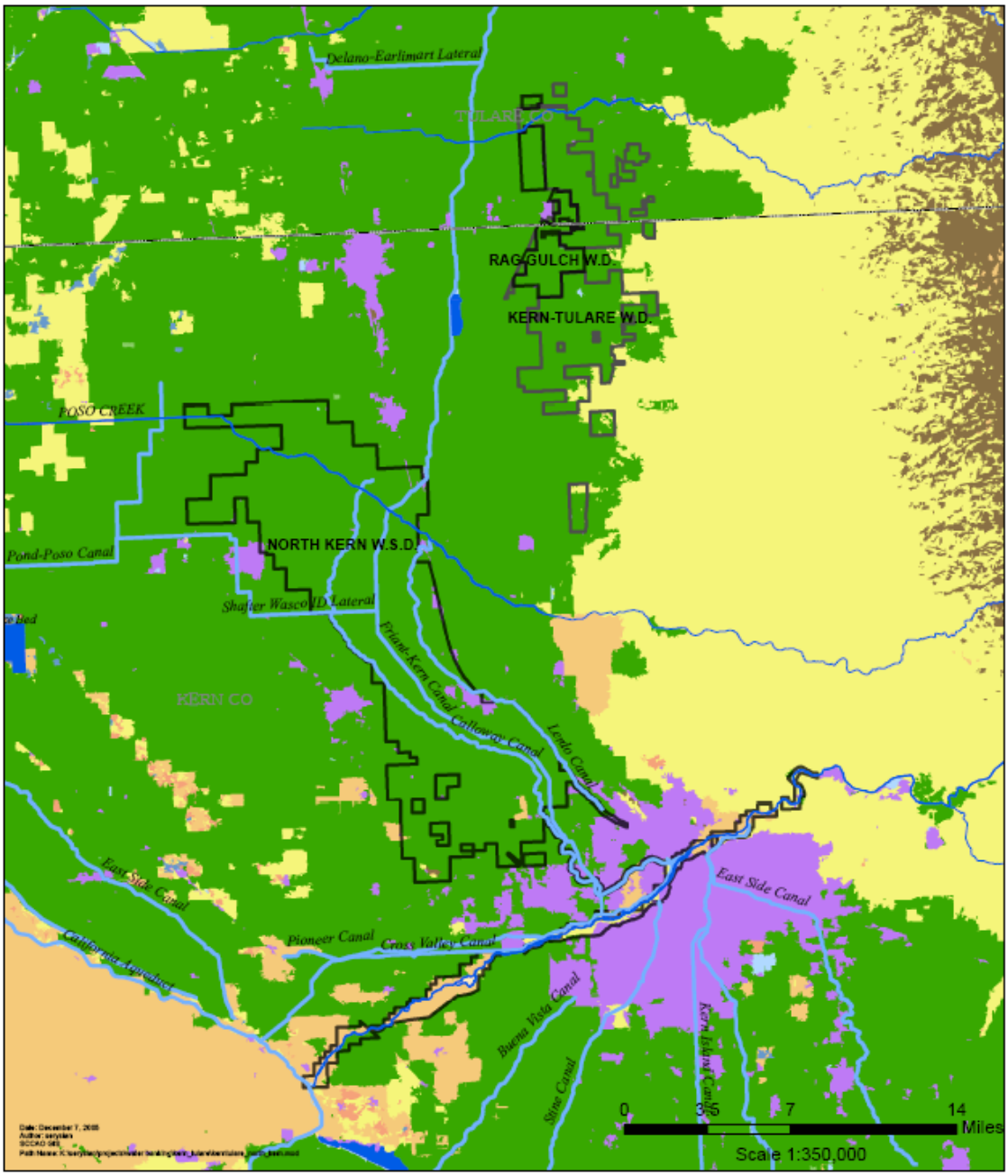

Figure 3-4
Kern-Tulare WD, Rag Gulch WD & North Kern WSD
Land Use Map

3.4 GEOLOGY AND SOILS

Soils within NKWSD are predominately of the Kimberlina-Wasco Association and are characterized as well-drained, fine sandy loam and sandy loam. These soils grade into well-drained loam to the north (the McFarland Association) and well-drained sandy loam to the south (the Milham Association). To the east lies well-drained sandy loam and course sandy loam (principally the Delano-Lewkalb-Driver Association).

Subsidence has been identified in the northern portion of NKWSD, principally in the area lying north of State Highway 46. During the period from 1926 to 1962, the maximum subsidence is indicated to be about four feet at NKWSD's northern boundary. NKWSD implemented a project in the 1950s to mitigate groundwater level declines by diverting more Kern River water into the District. In addition, deliveries of imported CVP and State Water Project water to NKWSD's neighboring water agencies commenced in the 1950s and 1970s, respectively. As a result of this increase in imported water supplies, subsidence over the period from 1962 to 1988 was about one foot near the east edge of the District and essentially zero at the west edge of the District (NKWSD, 2001).

Soils within KTRG are primarily sandy loams, loams, and sandy clays. These soils are productive for tree and vine crops as well as pasture (KTRG, 2001a).

Prior to the formation of the two districts, groundwater levels were falling at a rate of approximately 10 feet per year, groundwater was degrading and subsidence of the land surface was occurring. As a result of importation of district water into the area, groundwater conditions have improved dramatically and subsidence has stopped.

3.5 BIOLOGICAL RESOURCES

3.5.1 Potentially Affected Listed and Proposed Species in Kern-Tulare WD

The following federally listed, proposed and candidate species potentially occurring in Kern-Tulare Water District was obtained on December 2, 2005 by accessing the U.S. Fish and Wildlife Database: http://www.fws.gov/pacific/sacramento/es/spp_lists/auto_list.cfm (document number 051202043732). The list is for the Deepwell Ranch, McFarland, North of Oildale, Delano East and Richgrove 7 ½ minute U.S. Geological Survey quadrangles, which are overlapped by Kern-Tulare Water District. For birds, a county-wide list was obtained on December 2, 2005 (document number 051202044106) for Kern County and on December 5, 2005 (document number 051205050334) for Tulare County. Also listed is a species protected by the MBTA.

Invertebrates
Branchinecta lynchi - vernal pool fairy shrimp (T)
Desmocerus californicus dimorphus - valley elderberry longhorn beetle (T)

Fish
Hypomesus transpacificus - delta smelt (T)

Amphibians
Rana aurora draytonii - California red-legged frog (T)

Reptiles
Gambelia silus - blunt-nosed leopard lizard (E)
Thamnophis gigas - giant garter snake (T)

Birds
Athene cunicularia hypugea - western burrowing owl (MBTA)
Coccyzus americanus occidentalis - western yellow-billed cuckoo (C) (Kern County)
Empidonax traillii extimus - southwestern willow flycatcher (E) (Kern County)
Gymnogyps californianus - California condor (E) (Kern and Tulare Counties)
Haliaeetus *leucocephalus* - bald eagle (T)
Vireo bellii pusillus – least Bell's vireo (E) (Kern County)

Mammals
Dipodomys nitratoides nitratoides - Tipton kangaroo rat (E)
Vulpes macrotis mutica - San Joaquin kit fox (E)

Plants
Pseudobahia peirsonii - San Joaquin adobe sunburst (T)
Opuntia treleasei - Bakersfield cactus (E)

3.5.2 Potentially Affected Listed and Proposed Species in Rag Gulch WD

The following federally listed, proposed and candidate species potentially occurring in Rag Gulch Water District was obtained on December 2, 2005 by accessing the U.S. Fish and Wildlife Database: http://www.fws.gov/pacific/sacramento/es/spp_lists/auto_list.cfm (document number 051202043941). The list is for the Deepwell Ranch, Delano East and Richgrove 7 ½ minute U.S. Geological Survey quadrangles, which are overlapped by Rag Gulch Water District. For birds, a county-wide list was obtained on December 2, 2005 (document number 051202044106) for Kern County and on December 5, 2005 (document number 051205050334) for Tulare County. Also listed is a species protected by the MBTA.

Invertebrates
Branchinecta lynchi - vernal pool fairy shrimp (T)
Desmocerus californicus dimorphus - valley elderberry longhorn beetle (T)

Fish
Hypomesus transpacificus - delta smelt (T)

Amphibians
Rana aurora draytonii - California red-legged frog (T)

Reptiles
Gambelia silus - blunt-nosed leopard lizard (E)
Thamnophis gigas - giant garter snake (T)

Birds
Athene cunicularia hypugea - western burrowing owl (MBTA)
Coccyzus americanus occidentalis - western yellow-billed cuckoo (C) (Kern County)
Empidonax traillii extimus - southwestern willow flycatcher (E) (Kern County)

Gymnogyps californianus - California condor (E) (Kern and Tulare Counties)
Haliaeetus *leucocephalus* - bald eagle (T)
Vireo bellii pusillus - least Bell's vireo (E) (Kern County)

Mammals
Dipodomys nitratoides nitratoides - Tipton kangaroo rat (E)
Vulpes macrotis mutica - San Joaquin kit fox (E)

Plants
Pseudobahia peirsonii - San Joaquin adobe sunburst (T)

3.5.3 Potentially Affected Listed and Proposed Species in NKWSD

The following federally listed, proposed and candidate species potentially occurring in North Kern Water Storage District was obtained on December 2, 2005 by accessing the U.S. Fish and Wildlife Database: http://www.fws.gov/pacific/sacramento/es/spp_lists/auto_list.cfm (document number 051202042003). The list is for the Oil Center, Oildale, Rosedale, Stevens, Gosford, Tupman, McFarland, Famoso, Pond, Wasco NW, Wasco SW and Wasco 7 ½ minute U.S. Geological Survey quadrangles, which are overlapped by North Kern Water Storage District. For birds, a county-wide list was obtained on December 2, 2005 (document number 051202044106). Also listed are two species protected by the MBTA.

Invertebrates
Branchinecta lynchi - vernal pool fairy shrimp (T)
Desmocerus californicus dimorphus - valley elderberry longhorn beetle (T)

Fish
Hypomesus transpacificus - delta smelt (T)

Amphibians
Rana aurora draytonii - California red-legged frog (T)

Reptiles
Gambelia silus - blunt-nosed leopard lizard (E)
Thamnophis gigas - giant garter snake (T)

Birds
Athene cunicularia hypugea - western burrowing owl (MBTA)
Buteo swainsoni - Swainson's hawk (MBTA)
Coccyzus americanus occidentalis - western yellow-billed cuckoo (C) (County)
Empidonax traillii extimus - southwestern willow flycatcher (E) (County)
Gymnogyps californianus - California condor (E) (County)
Haliaeetus *leucocephalus* - bald eagle (T)
Vireo bellii pusillus - least Bell's vireo (E) (County)

Mammals
Dipodomys ingens - giant kangaroo rat (E)
Dipodomys nitratoides *nitratoides* - Tipton kangaroo rat (E)
Sorex ornatus relictus - Buena Vista Lake shrew (E)

Vulpes macrotis mutica - San Joaquin kit fox (E)

Plants
Monolopia congdonii - San Joaquin woolly-threads (E)
Pseudobahia peirsonii - San Joaquin adobe sunburst (T)
Opuntia treleasei - Bakersfield cactus (E)

3.5.4 Critical Habitats within Kern-Tulare Water District, Rag Gulch Water District and North Kern Water Storage District

"Critical habitat" is defined in section 3(5)(A) of the Federal Endangered Species Act and includes:

Areas within a listed species' current (at time of listing) range that contain the physical or biological features that are essential to that species' conservation or that for some reason require special management; and areas outside the species' current range that the Secretary determines to be essential to its conservation.

Primary constituent elements (PCEs) are those physical and biological features of designated or proposed critical habitat essential to the conservation of the species, including, but not limited to: (1) space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and (5) habitats that are protected from disturbance or are representative of the historic geographic and ecological distributions of a species (ESA §3(5)(A)(i), 50 CFR §424.12(b)).

No critical habitats occur within KTRG or NKWSD, where under the Proposed Action Alternative the CVP supplies will be banked. Critical habitat for the delta smelt does appear on quad lists for the districts. Designated and proposed critical habitats were queried from the U.S. Fish and Wildlife Service's website: http://www.fws.gov/pacific/sacramento/es/spp_list.htm.

TABLE 3-5: QUANTITIES OF HABITAT OF CONCERN IN THE PROJECT AREA.

Quantities of Habitat of Concern in the Project Area* (ac)		
	Within KTRG and NKWSD	Within 5 miles of the district's, but outside of either district's boundaries
Cropland and Pasture	31,370	114,929
Herbaceous Rangeland	788	62,424
Idle farmland	1,141	7,943
Riparian communities	4	3,835
Ruderal or unclassified rangeland	3,998	23,837
Shrub and Brush Rangeland	1,674	24,784
Wetland	0	1,044
Non-forested Wetlands	0	13,132
Orchards and Vineyards	24,805	117,639

*--From Reclamation GIS layer "lu2000sjv.shp"

3.5.5 Species Accounts

The Species Accounts as well as discussions of the above mentioned critical habitats are addressed in an updated report titled *Species Accounts: Long-term Groundwater Banking Project Storage and Return of Central Valley Project Water from Kern-Tulare and Rag Gulch Water Districts to North Kern Water Storage District* dated January 31, 2006 and in the *Biological Opinion on U.S. Bureau of Reclamation Long Term Contract Renewal of Friant Division and Cross Valley Unit Contracts* dated January 2001 (FWS, 2001). Both the BO and Species Accounts report contain detailed information and are herein incorporated by reference. The species accounts are not repeated here.

3.6 CULTURAL RESOURCES

Cultural Resources is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. The San Joaquin Valley is rich in historical and pre-historic cultural resources. Cultural resources in this area are generally prehistoric in nature and include remnants of native human populations that existed before European settlement. Prior to the 18th Century, many Native American tribes inhabited the Central Valley. It is possible that many cultural resources lie undiscovered across the valley. However, the lands have historically been cultivated for agricultural purposes and have been routinely tilled and irrigated. Any archaeological resources that may be present have likely been impacted by these agricultural practices.

3.7 INDIAN TRUST ASSETS

Indian Trust Assets are legal interests in property or rights held in trust by the United States for Indian Tribes or individual Native Americans. Trust status originates from rights imparted by treaties, statutes, or executive orders. Such assets cannot be sold, leased or otherwise alienated without Federal approval.

Indian reservations, ranches, and allotments are common Indian Trust Assets. Allotments are parcels of land held in trust for specific individuals that may be located outside reservation boundaries. In addition, such assets include the right to access certain traditional areas and perform traditional ceremonies. There are no Indian Trust Assets in KTRG or NKWSD.

3.8 SOCIOECONOMIC RESOURCES

As stated earlier, NKWSD and KTRG are comprised of mainly irrigated agricultural lands. There are many communities across the area where farm workers reside. There are many small businesses that support agriculture such as feed and fertilizer sales, machinery sales and service, pesticide applicators, transport, packaging, and marketing.

3.9 ENVIRONMENTAL JUSTICE

Executive Order 12898, dated February 11, 1994, requires Federal agencies to ensure that their actions do not disproportionately impact minority and disadvantaged populations. The market for seasonal workers on local farms draws thousands of migrant workers, commonly of Hispanic origin from Mexico and Central America. The population of some small communities typically increases during late summer harvest.

SECTION 4 ENVIRONMENTAL CONSEQUENCES

4.1 SURFACE WATER RESOURCES

4.1.1 No Action

Water supplies would be the same as the existing conditions; therefore, no additional effects are associated with this alternative. Retrieval of previously banked water would occur in the future using separate time specific environmental documentation and contracting officer approval under the term and conditions agreed to in the 2005 banking project until such time the previously banked water is depleted.

4.1.2 Proposed Action

KTRG would bank CVP water in wet years when their water demand has been met or they do not need the CVP water at the particular time it was made available to them. KTRG's CVP water supplies for the banking project would come from three potential sources: CVP contract supply, Section 215 water or CVP transfer water. KTRG would not overburden other water resources to make water available for banking. Pumping, conveyance and deliveries would occur in existing facilities. The Proposed Action would not alter any CVP or SWP entitlement or impede any obligations to deliver water to other CVP or SWP contractors, fish or wildlife purposes.

As previously stated, when KTRG does receive their CVP contract water supply, it is usually not at the most desirable time - during the growing season. Therefore, KTRG could bank some of its CVP contract supply until needed. This would cause no additional effects to other resources since it would only be a difference of timing.

Section 215 water is surplus water, such as flood flows, that cannot be stored for project purposes. KTRG could bank Section 215 water made available to them for use during dry years when they are unable to meet their irrigation demands. Given that Section 215 water is excess water, it will cause no significant effects to surface water resources.

CVP transferred or purchased water is also an available source for KTRG for banking in NKWSD. In this case, the transfer would be between willing sellers and willing buyers. Water available for transfer would be limited to CVP water that would have been consumptively used or irretrievably lost to beneficial use during the year of the transfer. Any transferred water purchased by KTRG for groundwater banking under this project would require its own environmental analysis and will not be analyzed in this document.

In 2001, NKWSD completed construction of a well which is located near the FKC and about midway between two of this project's wells. Water samples were collected from this well and were found to be in compliance with Reclamation's policy for discharge of groundwater into the FKC (See Appendix A for Water Quality Standards). It is expected that the water quality in each of the four wells would also satisfy Reclamation's policy.

If through the monitoring required under provisions of Friant Water Authority (FWA) and Reclamation policies, the water pumped from a given Project well fails to meet the criteria for discharging groundwater into the FKC, the water from that well would not be pumped into the FKC until subsequent testing have demonstrated compliance. If compliance cannot be achieved

for a given well, a replacement well may be constructed under a separate action not covered by this document.

4.1.3 Cumulative Effects

The extraction of groundwater would occur during dry years when surface waters supplies are reduced and capacity exists. The Proposed Action would not result in any impacts to canals, facilities or operations for delivering surface water supplies.

NKWSD operates facilities that could potentially provide the district additional water supplies through deliveries of high flood flows, water transfers, and exchanges. NKWSD could request a contract for CVP water under Section 215 of the Reclamation Reform Act for surplus water. Surplus water is flood waters that are not storable behind dams. This surplus flood water is available intermittently during high flows when water is abundant and there is little demand. Reclamation distributes this water to willing contractors to quickly disperse these flood flows to prevent flooding downstream. This surplus water is offered to the CVP contractors, and if any of this water is still available, to the non-CVP contractors.

Reclamation is developing an environmental assessment for short term transfers and exchanges between non-CVP and CVP contractors. The proposed water service actions involve multiple water agencies and the environmental assessment is in preliminary stages. If this document were approved, NKWSD could be a recipient of additional water supplies.

Reclamation is revising a draft environmental assessment for a proposed operational agreement with Reclamation District No. 770. This proposed project would allow flood flows from the Kings, Kaweah and Tule Rivers into the FKC under certain terms and conditions. The proposal would divert this flood water prior to flowing into the Tulare Lake Basin and causing damage. Under this proposed alternative, if approved, KTRG could divert water to NKWSD via the FKC.

KTRG is partners in another 25-year conjunctive-use groundwater storage and extraction program with Rosedale-Rio Bravo Water Storage District in which Reclamation provided funding from the CALFED Bay-Delta Program. The project yields an estimated dry year supply of 9,000 AF to KTRG.

The above water service actions are in various stages of development and require separate environmental analysis, review and approvals to the Proposed Action. The amount of water available under the above actions is difficult to predict due to the variability of hydrological conditions and high flow events. The above water service actions can be summed up as actions needed to protect and maintain existing croplands through managing existing water supplies. Transfers and exchanges are typically short term actions occurring between willing sellers and willing buyers based on a fluctuating agricultural market and hydrological conditions. Transfers and exchanges are used to move and manage existing water supplies and do not result in additional diversions from rivers or waterways although diversion points and timing may change. Diverting high water flows from rivers results in the protection of existing croplands, property, and lives from damaging flood flows. The short term and intermittent availability of water under the above actions could result in minor cumulative impacts to surface water resources.

Other water related actions are long-term contract renewals for the CVP contractors in the San Joaquin Valley. These long-term contracts are the renewal of existing or interim contracts and

are a long-term source of water supplies. However, since they are a continuation of contract supplies that have occurred over the past several decades there could be minor cumulative effects to surface water resources.

The Proposed Action when combined with the above described short-term and/or permanent water service actions would not result in increases or decreases of water diverted from rivers or waterways. It is possible that surface water resources may experience minor cumulative impacts.

4.2 GROUNDWATER RESOURCES

4.2.1 No Action

Under the No Action Alternative there may be continued impacts to groundwater resources. Water from this project would not be brought in to help recharge the groundwater and the overdraft in the Tulare Lake Region would continue to result in declining groundwater levels at the current rate, as described in the previous groundwater section (Section 3.2).

4.2.2 Proposed Action

KTRG would bank CVP water in wet years when their water demand has been met or they do not need the CVP water at the particular time it was made available to them. KTRG's CVP water supplies for the banking project would come from three potential sources: CVP contract supply, Section 215 water or CVP transfer water. The annual irrigation demand is approximately 55,000 acre-feet, of which KTRG has historically provided approximately 40,000 AF of surface water supplies. Typically, Kern River water is used as much as possible to a maximum of 23,000 ac-ft per year, and then CVP water via exchange is used to its maximum extent, together resulting in the 40,000 AF of surface water used for irrigation. The remaining 15,000 AF is provided by groundwater that is pumped by water users. Landowners in KTRG typically pump approximately 15,000 AF per year of groundwater in normal years with increased reliance on groundwater in dry years.

KTRG would not pump groundwater beyond the average 15,000 AF per year as a substitute for CVP supplies for the purpose of making water available for banking. This will be verified by Reclamation in the annual reports KTRG are required to submit as discussed in section 2.2.3 of this EA. The proposed project would not adversely affect the groundwater under KTRG. In fact, the Proposed Action would likely decrease reliance on groundwater pumping by landowners in KTRG during dry years. This decrease would result in a slight benefit to groundwater under KTRG. The Proposed Action would result in the return of an estimated 5,000 AF during a dry year. The availability of 5,000 AF of additional irrigation water in a dry year would reduce the need for groundwater pumping in dry years.

A 1922 to 1990 analysis of water supply and demand for KTRG was performed in a feasibility study for the districts. The analysis was made assuming a recurrence of 1922 through 1990 hydrology. The analysis indicated that KTRG would have water supplies available for banking in 67 percent of all years. In 33% of all years, KTRG would be short of meeting historical water demand and would therefore withdraw banked water during these years (KTRG, 2001c). The data can be seen in Table 3-1.

The potential for long-term recharge within NKWSD may raise local groundwater levels, but would have no impacts to groundwater quality within the district. The Proposed Action could result in lower groundwater levels in the vicinity of the extraction wells during extraction operations. However, the Proposed Action would result in a net increase in groundwater levels

since water must be banked before it can be extracted. Groundwater levels in the vicinity of the extraction wells and extraction operations would be monitored by NKWSD. Modifications to pumping and operations would be implemented if impacts are found to be more substantial than what would be expected without the project.

Implementation of the Proposed Action may result in the delivery of more water to the groundwater basin underlying NKWSD than would have occurred absent the Project. NKWSD may choose to purchase less water on the spot market, keeping the recharge operations similar to those before the project. The groundwater basin under NKWSD is considered a closed basin and very little of the banked water would leave the project area. The impact of the proposed extraction facilities was evaluated in the incorporated Environmental Assessment and Initial Study of the NKWSD Groundwater Storage Project. This study found that a conjunctive use program, that includes banking and water extraction facilities, can be operated such that it would not have an adverse effect on the groundwater levels within NKWSD or the surrounding areas. No decrease in groundwater quality is anticipated since the water to be recharged is from similar sources as have been historically recharged by NKWSD in its existing facilities.

4.2.3 Cumulative Effects

The Proposed Action in conjunction with similar groundwater banking projects in the area (those operated by Kern County Water Agency and others) could result in lower groundwater levels in the vicinity of the extraction wells during extraction operations. However, the project would result in a short term increase in groundwater levels since water must be banked before it can be extracted. Groundwater levels in the vicinity of the extraction wells and extraction operations would be monitored by NKWSD. Modifications to pumping and operations would be implemented if impacts to adjacent wells are found to be more than what would be expected without the Proposed Action.

The net result of implementation of the Proposed Action would be to bring more water into the groundwater basin and that would improve groundwater levels. The impact of the proposed extraction facilities was evaluated in the Initial Study in Environmental Aspects of the North Kern Groundwater Storage Project. This study found that, with the 10% banking loss component included in the project, lowering of water levels below the without-Project condition is considered unlikely and, if it occurs, it can be expected to be temporary, relatively small in magnitude, and localized in extent.

The Proposed Action would not adversely affect the water quality in the area. The project would allow for a short term increase in groundwater supply within NKWSD. No decrease in groundwater quality is anticipated since the water to be recharged is from similar sources as have been historically recharged by NKWSD in its existing facilities. As previously stated, KTRG did a one time bank of 33,333 AF of CVP water. From this point onward, they cannot bank any more water until they have first recovered a portion of their water.

KTRG is partners in another 25-year conjunctive-use groundwater storage and extraction program with Rosedale-Rio Bravo Water Storage District in which Reclamation provided funding from the CALFED Bay-Delta Program. The project yields an estimated dry year supply of 9,000 AF to KTRG.

NKWSD has been banking groundwater for in-district uses for over 50 years. The Kern Fan Monitoring and Semitropic Monitoring Committees have been established to monitor the impacts of the water banks in the area. Extraction operations would be modified if impacts to adjacent wells are found to be more than what would be expected without the project.

4.3 GEOLOGY AND SOILS

4.3.1 No Action

No changes would occur and no disturbances would occur to soils or geological resources.

4.3.2 Proposed Action

The Proposed Action would have minimal impacts on subsidence. During dry years, it can be expected that all of the active wells in NKWSD would be used to meet irrigation water needs during the peak irrigation months. The average annual pumping from existing landowner and NKWSD wells is estimated to be 65,000 acre-feet per year. The increased pumping of up to 5,000 AF from the four project wells would be insignificant compared to that of the existing wells.

The continued irrigation of lands within KTRG during dry years would not have any effect on the soils and geology of the district.

4.3.3 Cumulative Effects

The Proposed Action does not involve any activities that would result in more than minor impacts to soils or geological resources when added to other projects.

Storage operations involve the delivery of water into NKWSD for delivery to spreading basins (direct recharge). The additional water being applied to the basins and being recovered form the groundwater basin would have no effect on soil subsidence.

4.4 LAND USE

4.4.1 No Action

Land use conditions under the No Action Alternative would remain the same as the existing land use conditions described above; therefore, no additional effects to land use are associated with this alternative.

4.4.2 Proposed Action

The proposed project would maintain agricultural lands by providing reliable water during dry years to KTRG. The Proposed Action would not result in increased or decreased water supplies in KTRG or NKWSD that would induce growth or land use changes as both districts are fully built out and supply no water to customers other than agricultural users.

4.4.3 Cumulative Effects

Land use trends around NKWSD in recent years have resulted in urbanization of agricultural lands. This trend is typically caused by economic pressures and is likely to continue with or without these water service actions.

The long-term renewal of CVP contracts and contract assignments result in permanent supplies of water delivered to the contractors. It is possible these actions could result in water supplies to be made available to support growth. However, the Proposed Action is a separate action and does not facilitate the renewal or assignments of contracts or contribute to incremental cumulative changes in land uses.

4.5 BIOLOGICAL RESOURCES

4.5.1 No Action

Under the No Action Alternative there are no impacts to wildlife and special status species, as no new facilities would be constructed and existing deliveries would continue to operate as has historically occurred. The conditions of special status wildlife species and habitats under the No Action Alternative would be the same as they would be under existing conditions described in the Affected Environment; therefore, no additional effects to special status species or critical habitats are associated with this alternative.

4.5.2 Proposed Action

The Proposed Action would result in net increases of surface water deliveries in NKWSD and an increase in groundwater levels. The water would be used for direct recharge or used to irrigate existing crops as a substitute for the groundwater supply. The Proposed Action would sustain existing agricultural lands within KTRG resulting in no effects on listed or other status species. The pumping and transfer of water from NKWSD to KTRG would have no effect on species of concern due to the small amount of water involved in the action vs. the large amount of water routinely transferred through the FKC. Additionally, no change in diversions of water from the San Joaquin River will occur as a result of the Proposed Action; therefore, there will be no effects on the delta smelt or any of the primary constituents of its designated critical habitat.

4.5.3 Cumulative Effects

The Proposed Action when added to other existing and proposed actions does not contribute to cumulative impacts to wildlife resources. No permanent facilities would be constructed that would prevent movement of species or loss of foraging opportunities. The Proposed Action when added to other temporary or permanent water service actions does not contribute or result in additional affects to listed species.

4.6 CULTURAL RESOURCES

4.6.1 No Action

Under the No Action Alternative there are no impacts to cultural resources, as no new facilities would be constructed and existing recharge and extraction operations would continue to operate as has historically occurred. The condition of archaeological and cultural resources under the No Action Alternative would be the same as it would be under existing conditions; therefore, no additional effects to archaeological and cultural resources are associated with this alternative.

4.6.2 Proposed Action

Under the Proposed Action alternative, there are no impacts to cultural resources, as facilities have already been constructed and existing recharge and extraction operations would continue to operate as has historically occurred. The condition of archaeological and cultural resources under the Proposed Action Alternative would be the same as it would be under existing

conditions; therefore, no additional effects to archaeological and cultural resources are associated with this alternative.

4.6.3 Cumulative Effects

The Proposed Action when added to other activities does not contribute to cumulative affects to archeological or cultural resources.

4.7 INDIAN TRUST ASSETS

4.7.1 No Action

No Indian Trust Assets are in the project area. The condition of Indian trust resources under the No Action Alternative would be the same as it would be under existing conditions; therefore, no additional effects to Indian Trust Resources are associated with this alternative.

4.7.2 Proposed Action

No Indian Trust Assets are in the project area.

4.7.3 Cumulative Effects

No Indian Trust Assets are in the project area; this action would have no cumulative impacts on Indian Trust Assets.

4.8 SOCIO-ECONOMICAL RESOURCES

4.8.1 No Action

The No Action Alternative would have no impact on Socio-economic Resources. NKWSD would continue to engage in banking opportunities and exchanges to maximize management of their water supply within the facilities available to them either in district or utilizing other district's facilities as approved by Reclamation and DWR. KTRG would continue to engage in transfers and exchanges with other agencies to help reduce the impacts of critical dry year shortages. Conditions would be the same as the existing conditions; therefore, no additional impacts are associated with this alternative.

4.8.2 Proposed Action

The Proposed Action would provide water to sustain existing crop lands. Businesses rely on these crops to maintain jobs. The Proposed Action would continue to support the economic vitality in the region.

The Proposed Action could result in minor impacts to socio-economic resources. KTRG and NKWSD may save energy and costs through exchanges of available surface water supplies in lieu of pumping groundwater. This cost savings would be minimal over the long-term since the availability of surface water supplies are typically limited.

Due to the Proposed Action, NKWSD will have higher ground water elevations that will result in lower lift costs.

The Proposed Action would likely result in less energy usage and costs for pumping groundwater in KTRG providing a benefit to the landowners. This benefit would mainly occur in dry years on a small scale and would not result in major impacts to socio-economic resources. Similarly, less pumping would result in a slight benefit for energy users. However, this benefit would be minor.

4.8.3 Cumulative Effects

The approval of the project could facilitate groundwater banking actions in other areas. However, the Proposed Action would not establish a precedent for future actions. Approval would not have highly controversial or uncertain environmental effects or involve unique or unknown environmental risks.

Multiple groundwater banking programs, transfers and exchanges of water occur throughout the San Joaquin Valley each year. These water service actions provide options for managing the finite water supplies and are consistent with CVPIA. These water service actions could result in increased profits for the contractors. Managing the finite water supplies and providing lower priced water does not result in more than minor profits for the contractors and landowners. Farmers must compete in a highly competitive agricultural market and crop prices fluctuate on a wide scale. Historically, the water contractors have sought ways to provide water at the most economical price to their customers to offset the dramatic changes in the agricultural market. Increased profits are used by the contractors for administering, maintaining and improving their manpower, infrastructure, and facilities.

4.9 ENVIRONMENTAL JUSTICE

4.9.1 No Action

The No Action Alternative would have no impact on environmental justice. NKWSD would continue to engage in banking opportunities and exchanges to maximize management of their water supply within the facilities available to them either in district or utilizing other district's facilities as approved by Reclamation and DWR. KTRG would continue to engage in transfers and exchanges with other agencies to help reduce the impacts of critical dry year shortages. Conditions would be the same as the existing conditions; therefore, no additional impacts are associated with this alternative.

4.9.2 Proposed Action

The project would not cause any harm to minority or disadvantaged populations within KTRG or NKWSD. These populations/communities are unlikely to be greatly affected by the increase in dependability of the water supply for the districts, because changes in agricultural land use, commodities, or practices are anticipated to be minor.

4.9.3 Cumulative Effects

This project would not have any measurable impact on minority or disadvantaged populations within KTRG or NKWSD in conjunction with other activities.

SECTION 5 CONSULTATION AND COORDINATION

5.1 FISH AND WILDLIFE COORDINATION ACT (16 USC . 651 ET SEQ.)

The Fish and Wildlife Coordination Act 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 FWS and is being jointly implemented. The Proposed Action does not involve construction projects. Therefore the FWCA does not apply.

5.2 ENDANGERED SPECIES ACT (16 USC . 1521 ET SEQ.)

Section 7 of the Endangered Species Act requires Federal agencies, in consultation with the Secretary of the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species.

The Proposed Action would support existing uses and conditions. No native lands would be converted or cultivated with CVP water. Lands fallowed for three or more consecutive years would require surveys for wildlife species including threatened and endangered species prior to application of this water. Subsequent environmental review and consultations, if applicable would be required to irrigate lands fallowed three or more consecutive years. Therefore, the Proposed Action would have no effect on federally listed threatened or endangered species or their designated habitats. A Notice of No Effect is being sent to the Fish and Wildlife Service to inform them of the above conclusion.

5.3 NATIONAL HISTORIC PRESERVATION ACT (15 USC 470 ET SEQ.)

Section 106 of the National Historic Preservation Act requires federal agencies to evaluate the effects of federal undertakings on historical, archaeological and cultural resources. Due to the nature of the proposed project, there will be no effect on any historical, archaeological or cultural resources, and no further compliance actions are required.

5.4 MIGRATORY BIRD TREATY ACT (16 USC SEC. 703 ET SEQ.)

The Migratory Bird Treaty Act implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Unless permitted by regulations, the Act provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Subject to limitations in the Act, the Secretary of the Interior (Secretary) may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting or exporting of any migratory bird, part, nest or egg will be allowed, having regard for temperature zones, distribution, abundance, economic value, breeding habits and migratory flight patterns.

The Proposed Action would have no effect on birds protected by the Migratory Bird Treaty Act.

5.5 EXECUTIVE ORDER 11988 – FLOODPLAIN MANAGEMENT AND EXECUTIVE ORDER 11990-PROTECTION OF WETLANDS

Executive Order 11988 requires Federal agencies to prepare floodplain assessments for actions located within or affecting flood plains, and similarly, Executive Order 11990 places similar requirements for actions in wetlands. The project would not affect either concern.

SECTION 6 LIST OF PREPARERS AND REVIEWERS

Laura Myers, Natural Resource Specialist, SCCAO
Lynne Silva, Environmental Protection Specialist, SCCAO
Shauna McDonald, Wildlife Biologist, SCCAO
Mike Heaton, Special Projects, MPR
Charles Jachens, Regional Agriculture Engineer, MPR

SECTION 7 REFERENCES

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Appendix A

Table 1 - Water Quality Monitoring Requirements

What will be measured in the water?	Water to be Tested	How often will a sample be collected?	When will the samples be collected?	Who will collect samples? (7)
Constituents of Concern (1)(6)	CVP water in the canal	Quarterly	January, April, June, October	Reclamation (CVP Baseline Program)
	Non-project water at source (2)	Annual	Within 3 days of pumping into the canal	Contractor
Bacterial organisms (3)	Canal water upstream of discharge point (5)	Monthly	While pumping into the canal	Contractor
	Non-project water at source (2)	Monthly	While pumping into the canal	Contractor
	Canal water downstream of discharge point (5)	Monthly	While pumping into the canal	Contractor
Electrical conductivity, turbidity (4)	Canal water upstream of discharge point (5)	Weekly	While pumping into the canal	Friant Water Authority
	Non-project water at source (2)	Weekly	While pumping into the canal	Friant Water Authority
	Canal water downstream of discharge point (5)	Weekly	While pumping into the canal	Friant Water Authority
Other constituents of concern (6)	Canal water upstream of discharge point (5)	(6)	While pumping into the canal	Contractor
	Non-project water at source (2)	(6)	While pumping into the canal	Contractor
	Canal water downstream of discharge point (5)	(6)	While pumping into the canal	Contractor

Notes:

(1) See Table 2.

(2) Definition of Non-Project Water from Article 1 of the Contract; perhaps list the specific sites of approved wells and mileposts on the canal of discharge points.

(3) Cryptosporidium, Giardia, total coliform bacteria.

(4) Field measurements.

(5) Location to be determined by the Contracting Officer.

(6) To be determined by the Contracting Officer, if necessary.

(7) All samples must be collected and analyzed according to the 2004 Quality Assurance Project Plan.

This water quality monitoring program is subject to review at any time by the Contracting Officer.

Revised:
12/16/2004 SCC-107

Table 2. California and Federal Drinking Water Standards (Maximum Contaminant Levels)

CONSTITUENT OR PARAMETER	Units	California Department of Health Services (DHS)				U.S. Environmental Protection Agency (US EPA)				CAS Registry Number	Synonyms and Abbreviations
		Primary MCL	Note	Secondary MCL	Note	Primary MCL	Note	Secondary MCL	Note		
General Mineral											
Chloride	mg/L			250	f			250		16887-00-6	Cl–
Chlorine (as Cl_2)	mg/L	4	k, x			4	c			7782-50-5	Cl2
Chlorite	mg/L	1	k			1	t			7758-19-2	ClO_2–
Cyanide	ug/L	150				200	r			57-12-5	CN–, HCN, Hydrogen cyanide
Fluoride	mg/L	2	o			4	o	2		16984-48-8	F–, Fluorine, soluble
Foaming agents (MBAS)	ug/L			500				500			Methylene blue active substances
Iron	ug/L			300				300		7439-89-6	Fe
Langlier Index (corrosivity)				Non-corrosive				Non-corrosive			
Manganese	ug/L			50				50		7439-96-5	Mn
Nitrate (as N)	mg/L	45	e			10	l			14797-55-8	NO_3–
Nitrite	mg/L	1	l			1	l			14797-65-0	NO_2–
pH	units							6.5 to 8.5	b		negative log of H+ concentration
Specific conductance (EC)	uS/cm			900	g						Electrical Conductivity, EC
Sulfate	mg/L			250	f	500	k	250		14808-79-8	SO_4=
Total dissolved solids (TDS)	mg/L			500	h			500			TDS
Zinc	mg/L			5				5		7440-66-6	Zn
General Physical											
Color	units			15				15			
Odor	threshold units			3				3			
Turbidity	NTU	1 / 5	j, k	5		1 / 5	j				
Inorganic Chemical Metals											
Aluminum	ug/L	1,000		200				50 to 200	b	7429-90-5	Al
Antimony	ug/L	6				6				7440-36-0	Sb
Arsenic	ug/L	50				10	as of 1/23/2006			7440-38-2	As
Asbestos	MFL					7				1332-21-4	
Barium	ug/L	1,000				2,000				7440-39-3	Ba
Beryllium	ug/L	4				4				7440-41-7	Be
Cadmium	ug/L	5				5				7440-43-9	Cd
Chromium (total)	ug/L	50				100				7440-47-3	Cr (total)

Copper	ug/L	1,300	q	1,000	1,300	q	1,000	7440-50-8	Cu
Lead	ug/L	15	q		15	q		7439-92-1	Pb
Mercury (inorganic)	ug/L	2			2			7439-97-6	Hg (inorganic)
Nickel	ug/L	100						7440-02-0	Ni
Selenium	ug/L	50			50			7782-49-2	Se
Silver	ug/L			100			100	7440-22-4	Ag
Thallium	ug/L	2			2			7440-28-0	Th
Radiochemistry									
Radioactivity, Gross Alpha	pCi/L	15	p		15	p			Gross Alpha radioactivity
Radioactivity, Gross Beta	pCi/L	50 pCi/L or 4 mrem/yr	k, w		4 mrem/yr				Gross Beta radioactivity
Radium-226 + Radium-228	pCi/L	5			5			7440-14-4	226Ra + 228Ra
Radon	pCi/L				300	k		14859-67-7	Rn
Strontium-90	pCi/L	8	w					10098-97-2	90Sr
Tritium	pCi/L	20,000	w					10028-17-8	3H
Uranium	pCi/L	20			30	as of 12/8/2003		7440-61-1	U
Microbiology									
Cryptosporidium									
Fecal Coliform									
Giardia									
Total Coliform									
Organics									
Acrylamide	ug/L		m			m		79-06-1	2-Propeneamide
Alachlor	ug/L	2			2			15972-60-8	Alochlor, Lasso, Alanex
Aldicarb	ug/L				3	u		116-06-3	Temik
Aldicarb sulfone	ug/L				3	u		1646-88-4	
Aldicarb sulfoxide	ug/L				4	u		1646-87-3	
Atrazine	ug/L	1			3			1912-24-9	Aatrex, Atranex, Crisazina
Bentazon	ug/L	18						25057-89-0	Basagran
Benz(a)anthracene	ug/L				0.1	k		56-55-3	1,2-Benzanthracene, Benzo(a)anthracene, a polynuclear aromatic hydrocarbon
Benzene	ug/L	1			5			71-43-2	
Benzo(a)pyrene	ug/L	0.2			0.2			50-32-8	BaP, 3,4-Benzopyrene, a polynuclear aromatic hydrocarbon
Bromate	ug/L	10	k		10	t		15541-45-4	
Bromoacetic acid	ug/L	60	k, n		60	n, t		79-08-3	A haloacetic acid
Bromodichloromethane	ug/L	100 / 80	a, k		80	a, v		75-27-4	Dichlorobromomethane, BDCM, a trihalomethane

Bromoform	ug/L	100 / 80	a, k	80	a, v			75-25-2	Tribromomethane, a trihalomethane
Carbofuran	ug/L	18		40				1563-66-2	Furadan
Carbon tetrachloride	ug/L	0.5		5				56-23-5	Tetrachloromethane, Freon 10
Chloramine	ug/L	4,000	k, x	4,000	c			127-65-1	NH2C, lMonochloramine
Chlordane	ug/L	0.1		2				57-74-9	Chlordan
Chlorine dioxide	ug/L	800	k, y	800	d			10049-04-4	ClO2
Chloroacetic acid	ug/L	60	k, y	60	n, t			79-11-8	Monochloroacetic acid, A haloacetic acid
Chlorobenzene	ug/L	70		100				108-90-7	Monochlorobenzene
Chloroform	ug/L	100 / 80	a, k	80	a, v			67-66-3	Trichloromethane, Freon 20
2,4-D	ug/L	70		70				94-75-7	2,4-Dichlorophenoxyacetic acid
Dalapon	ug/L	200		200				75-99-0	Dowpon, 2,2-Dichloropropionic acid
Dibromoacetic acid	ug/L	60	k, n	60	n, t			631-64-1	A haloacetic acid
Dibromochloromethane (THM)	ug/L	100 / 80	a, k	80	a, v			124-48-1	Chlorodibromomethane
Dibromochloropropane (DBCP)	ug/L	0.2		0.2				96-12-8	1,2-Dibromo-3-chloropropane, DBCP
1,2-Dibromoethane	ug/L	0.05		0.05				106-93-4	Ethylene dibromide, EDB
Dichloroacetic acid	ug/L	60	k, n	60	n, t			79-43-6	A haloacetic acid
1,2-Dichlorobenzene	ug/L	600		600		10	k	95-50-1	o-Dichlorobenzene, o-DCB
1,4-Dichlorobenzene	ug/L	5		75		5	k	106-46-7	p-Dichlorobenzene, PDB, p-DCB
1,1-Dichloroethane	ug/L	5						75-34-3	1,1-DCA
1,2-Dichloroethane	ug/L	0.5		5				107-06-2	1,2-DCA, Ethylene dichloride, Freon 150
1,1-Dichloroethylene	ug/L	6		7				75-35-4	1,1-Dichloroethene, 1,1-DCE, Vinylidene chloride
cis-1,2-Dichloroethylene	ug/L	6		70				156-59-2	cis-1,2-Dichloroethene, cis-1,2-DCE
trans-1,2-Dichloroethylene	ug/L	10		100				156-60-5	trans-1,2-Dichloroethene, trans-1,2-DCE
Dichloromethane	ug/L	5		5				75-09-2	Methylene chloride
1,2-Dichloropropane	ug/L	5		5				78-87-5	Propylene dichloride component of D-Dminor component of Telone
1,3-Dichloropropene	ug/L	0.5						542-75-6	1,3-Dichloropropylene component of D-Dmajor component of Telone
Di(2-ethylhexyl)adipate	ug/L	400		400				103-23-1	DEHA
Di(2-ethylhexyl)phthalate	ug/L	4		6				117-81-7	Bis(2-ethylhexyl) phthalate, DEHP, a phthalate acid ester (PAE)
Dinoseb	ug/L	7		7				88-85-7	DNBP
Dioxin	ug/L	0.00003		0.00003				1746-01-6	2,3,7,8-TCDD, 2,3,7,8-Tetrachlorodibenzo-p-dioxin
Diquat	ug/L	20		20				85-00-7	Aquacide, Reglone
EDB (Ethylene dibromide)	ug/L			0.05				206-93-4	

Endothal	ug/L	100			100					145-73-3	Endothall
Endrin	ug/L	2			2					72-20-8	Endrex, Hexadrin
Epichlorohydrin	ug/L		s			s				106-89-8	Chloropropylene, 1-Chloro-2,3-epoxypropane
Ethylbenzene	ug/L	300			700			30	k	100-41-4	Phenylethane
Glyphosate	ug/L	700			700					1071-83-6	Roundup,Glyphosate isopropylamine salt
Halomethanes	ug/L				100 / 80	a, k					Methanes, halo-
Heptachlor	ug/L	0.01			0.4					76-44-8	
Heptachlor epoxide	ug/L	0.01			0.2					1024-57-3	
Hexachlorobenzene	ug/L	1			1					118-74-1	PerchlorobenzeneHCB
Hexachlorocyclopentadiene	ug/L	50			50			8	k	77-47-4	HEX, HCCPD
Lindane (gamma-BHC)	ug/L	0.2			0.2					58-89-9	Lindane, gamma-Benzene hexachloride, gamma-Hexachlorocyclohexane
Methoxychlor	ug/L	30			40					72-43-5	
Methyl t-butyl ether (MtBE)	ug/L	13		5						1634-04-4	MtBE, 2-Methoxy-2-methylpropane, Methyl 1,1-dimethylethyl ether
Molinate	ug/L	20								2212-67-1	Ordram
Oxamyl	ug/L	50			200					23135-22-0	Vydate
Pentachlorophenol	ug/L	1			1					87-86-5	PCP, Penta
Picloram	ug/L	500			500					1918-02-1	Tordon
Polychlorinated biphenyls	ug/L	0.5			0.5					1336-36-3	PCBs
Simazine	ug/L	4			4					122-34-9	Princep
Styrene	ug/L	100			100			10	k	100-42-5	Vinylbenzene
2,3,7,8-TCDD (Dioxin)	ug/L	0.00003			0.00003					1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin, Dioxin
1,1,2,2-Tetrachloroethane	ug/L	1								79-34-5	
Tetrachloroethylene (PCE)	ug/L	5			5					127-18-4	Tetrachloroethene, Perchloroethylene, PCE
Thiobencarb	ug/L	70		1						28249-77-6	Benthiocarb, Bolero
Toluene	ug/L	150			1,000			40	k	108-88-3	Methylbenzene
Toxaphene	ug/L	3			3					8001-35-2	Camphechlor, Chlorocamphene
2,4,5-TP (Silvex)	ug/L	50			50					93-72-1	Silvex, 2 (2,4,5-Trichlorophenoxy) propionic acid
Trichloroacetic acid	ug/L	60	k, n		60	n, t				76-03-9	A haloacetic acid
1,2,4-Trichlorobenzene	ug/L	5			70					120-82-1	unsymmetrical-Trichlorobenzene
1,1,1-Trichloroethane	ug/L	200			200					71-55-6	1,1,1-TCA, Methyl chloroform
1,1,2-Trichloroethane	ug/L	5			5					79-00-5	1,1,2-TCA, Vinyl trichoride
Trichloroethylene (TCE)	ug/L	5			5					79-01-6	Trichloroethene, TCE
Trichlorofluoromethane	ug/L	150								75-69-4	Fluorotrichloromethane, Freon 11
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	1,200								76-13-1	Trichlorotrifluoroethane, Freon 113

Total trihalomethanes	ug/L		80					
Vinyl chloride	ug/L	0.5	2				75-01-4	VC, Chloroethene, Chloroethylene
Xylene(s)	ug/L	1,750	10,000	20	k		1330-20-7	o-Xylene, m-Xylene, p-Xylene

Source Data:

Adapted from Marshack, Jon B. August 2003. A Compilation of Water Quality Goals. Prepared for the California Environmental Protection Agency, Regional Water Quality Control Board.

References:

California Department of Health Services, California Code of Regulations, Title 22, Division 4, Chapter 15, Domestic Water Quality and Monitoring, *http://www.dhs.ca.gov/ps/ddwem/publications/Regulations/regulations_index.htm.*

California Department of Health Services, Division of Drinking Water and Environmental Management, *Drinking Water Standards* (16 May 2003), *http://www.dhs.ca.gov/ps/ddwem/chemicals/mcl/regextract.pdf.*

U.S. Environmental Protection Agency, Summer 2002. 2002 Edition of the Drinking Water Standards and Health Advisories. EPA 822-R-02-038. Washington, DC. *http://www.epa.gov/OGWDW/creg.htm*l

Notes for Table 2. California and Federal Drinking Water Standards (Maximum Contaminant Levels)

Note	Marshack	Notes
a	(19)	For total trihalomethanes (sum of bromoform, bromodichloromethane, chloroform and dibromochloromethane); based largely on technology and economics.
b	(30)	This limit has a range of values between the first and second numbers shown.
c	(66)	Measured as Cl. Federal limit effective 1/1/02 for surface water systems serving >10,000 people. Federal limit effective 1/1/04 for all other systems. Maximum residual disinfectant level and goal. Applies only if this disinfectant is used.
d	(67)	Measured as ClO_2. Federal limit effective 1/1/02 for surface water systems serving >10,000 people. Federal limit effective 1/1/04 for all other systems. Maximum residual disinfectant level and goal. Apply only if this disinfectant is used.
e	(72)	As NO_3; in addition, MCL for total nitrate plus nitrite = 10,000 ug/L (as N).
f	(73)	Recommended level; Upper level = 500 mg/L; Short-term level = 600 mg/L.
g	(74)	Recommended level; Upper level = 1600 umhos/cm; Short-term level = 2200 umhos/cm.
h	(75)	Recommended level; Upper level = 1000 mg/L; Short-term level = 1500 mg/L.
i	(77)	For 1,2- and 1-3-dichlorobenzenes.
j	(84)	Systems that use conventional or direct filtration may not exceed 1 NTU at any time or 0.3 NTU for 95th percentile value; stems that use other “alternative” filtration systems may not exceed 5 NTU at any time or 1 NTU for 95th percentile value.
k	(100)	Proposed; applies only to second value if two separate values are listed; applies to range if a range of values is listed.
l	(103)	As nitrogen (N); in addition, limit for total nitrate + nitrite = 10,000 ug/L (as N).
m	(105)	Treatment Technique: Not to exceed 0.05% monomer in polyacrylamide when dosed at 1 mg/L for drinking water treatment.
n	(106)	For five haloacetic acids (sum of monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid).
o	(109)	Optimal fluoride level and (range) vary with annual average of maximum daily air temperature; 50.0 to 53.7 degrees F - 1.2 (1.1 to 1.7) mg/L; 53.8 to 58.3 degrees F - 1.1 (1.0 to 1.7) mg/L; 58.4 to 63.8 degrees F - 1.0 (0.9 to 1.5) mg/L; 63.9 to 70.6 degrees F - 0.9 (0.8 to 1.4) mg/L; 70.7 to 79.2 degrees F - 0.8 (0.7 to 1.3) mg/L; 79.3 to 90.5 degrees F - 0.7 (0.6 to 1.2) mg/L.
p	(110)	Picocuries per liter; including Radium-226 but excluding Radon and Uranium.
q	(111)	MCL includes this “Action level” to be exceeded in no more than 10% of samples at the tap.
r	(137)	Expressed as free cyanide (as CN).
s	(145)	Treatment Technique: Not to exceed 0.01% residual when dosed at 20 mg/L for drinking water treatment.
t	(147)	Effective 1/1/2002 for surface water systems serving >10,000 people; effective 1/1/2004 for all other systems.
u	(148)	The sum of aldicarb, aldicarb sulfoxide and aldicarb sulfone should not exceed 7 ug/L because of similar mode of action. Administrative stay of the effective date.
v	(149)	Former 100 ug/L total trihalomethane MCL effective until 1/1/2004 for systems serving 10,000 people or less.
w	(171)	Intended to ensure that exposure above 4 millirem/yr does not occur.
x	(175)	Measured as Cl_2. Maximum residual disinfectant level.
y	(176)	Measured as ClO_2. Maximum residual disinfectant level.

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