APPENDIX E. STUDY OF TRANSFER, DEVELOPMENT, AND CONTINUED USE AND OPERATION OF THE KERN WATER BANK (REVISED)

Study of the Transfer, Development, and Continued Use and Operation of the Kern Water Bank (Revised)

Table of Contents

I. Introduction and Format

This Revised Appendix E updates the Appendix E in the DEIR. New, deleted, or changed text, figures, and tables are shown in the following colors and manner noted below:

1. *Text additions are shown in* blue underline *mode;*
2. *Text deletions are shown in* b~~lack strikeout~~ *mode.*
3. *New text/numbers inside an existing table is shown in* blue underline *mode.*
4. *New tables will show text/numbers in* blue *but without underlining for ease of reading. The new table will be numbered with a letter, as in* Table 3A *(this new table follows past Table 3);*
5. *New figures will be numbered with a letter and will have a* blue title, *as in* Figure 8A *(this figure follows past Figure 8);*
6. *New Endnotes are shown in* blue *and are identified with a letter, as in "*iv(a)*" (this new endnote follows iv).*

A. Overview of KFE Property in 1995

In the early 1980s, the Department began exploring the feasibility of developing a State Water Project (SWP) groundwater storage facility in Kern County, which it called the Kern Water Bank (KWB). As envisioned, the KWB would consist of a series of "elements," which would be geographically separate projects that would be operationally integrated. The largest of these elements, the Kern Fan Element (KFE), was to be developed first, followed by a number of local elements developed with several water districts in Kern County. After evaluating the feasibility of the KFE, in 1988, the Department purchased approximately 20,000 acres of land in the Kern Fan area from Tenneco West, Inc.

However, the Department encountered many legal, institutional, and political impediments to implementation of a groundwater storage facility on the KFE property. SWP contractors also expressed concerns regarding their ongoing costs for feasibility studies and ownership of the KFE property given their assessment of the likelihood of realizing a functional groundwater storage program. In 1993, uncertainties regarding the proposed groundwater storage facility ultimately convinced the Department to halt feasibility studies and design work on the project.[i] The uncertainties included proposed revisions of Delta water quality standards and measures to protect threatened and endangered species, which affected the SWP's ability to pump water from the Delta for recharge on the KFE property. Expected changes in arsenic standards for drinking water also raised questions regarding the ability of the project to meet water quality standards for pump-in to the California Aqueduct.[ii] In addition to environmental and water quality issues, the Department and KCWA could not reach agreement on measures to comply with Water Code Section 11258, which required approval of local agencies for development of the groundwater banks. Later, in response to the constraints on Delta pumping and these other uncertainties, the Department suspended activities on the KFE property. ~~concluded that these~~

~~constraints on Delta pumping made development of an SWP groundwater storage facility in the Kern Fan Element infeasible.~~[iii] In 1994, the potential of the Department's proposed KFE for SWP groundwater storage remained unrealized.

In 1994, the Department and representatives of the agricultural and urban contractors negotiated a set of principles known as the Monterey Agreement. As part of these principles, the parties agreed to the Department's sale or lease of the KFE property to designated SWP agricultural contractors, in exchange for the permanent retirement of 45,000 acre-feet (AF) of these contractors' Table A amount. The Monterey Amendment, which was the amendment to the SWP contractors' long-term water supply contracts that implemented the Monterey Agreement principles, provided for the State's transfer of ownership of the KFE property to Kern County Water Agency (KCWA), and then to the Kern Water Bank Authority (KWBA), for local agency development and use as a groundwater bank.

B. Purpose of Appendix E

The purpose of ~~this~~ the DEIR Appendix E report ~~is~~was to provide an independent study by the Department of the KWB, as required under the May 5, 2003 Settlement Agreement between the Planning and Conservation League et al., the Department, and SWP contractors.[iii(a)] Section III(F) of the Settlement Agreement requires the Department to prepare an independent study, and exercise "its judgment regarding the impacts related to the transfer, development, and operation of the KWB in light of the Kern Environmental Permits." The agreement also requires that the study "identify SWP and any non-SWP sources of water deliveries to KWB." To evaluate the impacts, the Department used the KFE property conditions and facilities that existed before the Department conveyed the KFE property to KCWA as the baseline for the evaluation.

This Revised Appendix E updates information through 2014 such as hydrology, Kern County water banking programs, and recent and planned KWB development and continued use and operation as a locally owned and operated groundwater banking and recovery project (KWB activities).

II. Methods

In DEIR Appendix E, ~~I~~information from three sources was used by the Department to evaluate the transfer, development, and operation of the KWB by the Kern Water Bank Authority (KWBA). The first source was the Annual Compliance reports for 1999 through 2005. These reports are prepared each year by the KWBA and submitted to the California Department of Fish and Game (CDFW~~G~~) and the U.S. Fish and Wildlife Service (USFWS), as required under their environmental permits, and were used in this study to determine what facilities were constructed, how the project is operated (recharge and extraction operation), identify vegetation, terrestrial and aquatic wildlife use of the site, and identify incidences of "take" in light of the Kern Environmental Permits. (On January 1, 2013, CDFG changed its name to the California Department of Fish and Wildlife (CDFW); this document retains the old name when used in activities prior to 2013.) The second source was staff from KCWA and KWBA, who were consulted to provide additional information on recharge and recovery activities of SWP and

non-SWP water at the KWB, and to evaluate where water could have been banked in Kern County in the absence of the KWB. The third source was personnel from CDFG and USFWS, who were contacted to determine if the resources agencies had any concerns with the development or operation of the KWB in light of the KWB environmental permits.

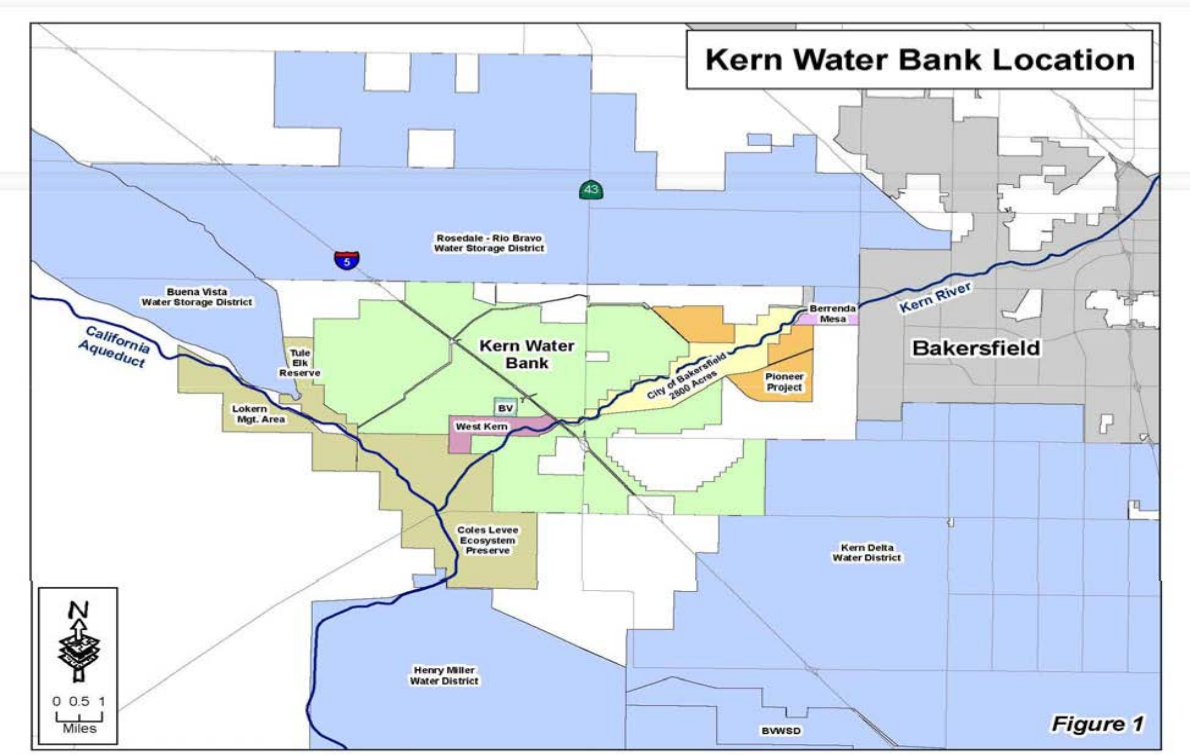
The Department is updating the information in this Revised Appendix E through 2014. The Department also is adding an analysis of additional potential impacts of the KWB activities, especially in the area of groundwater levels and groundwater quality. The methods used for the updated resources analyses are presented in Chapter 7, Environmental Analysis, of this Revised Environmental Impact Report (REIR).

III. Existing Conditions and Surroundings – 1995

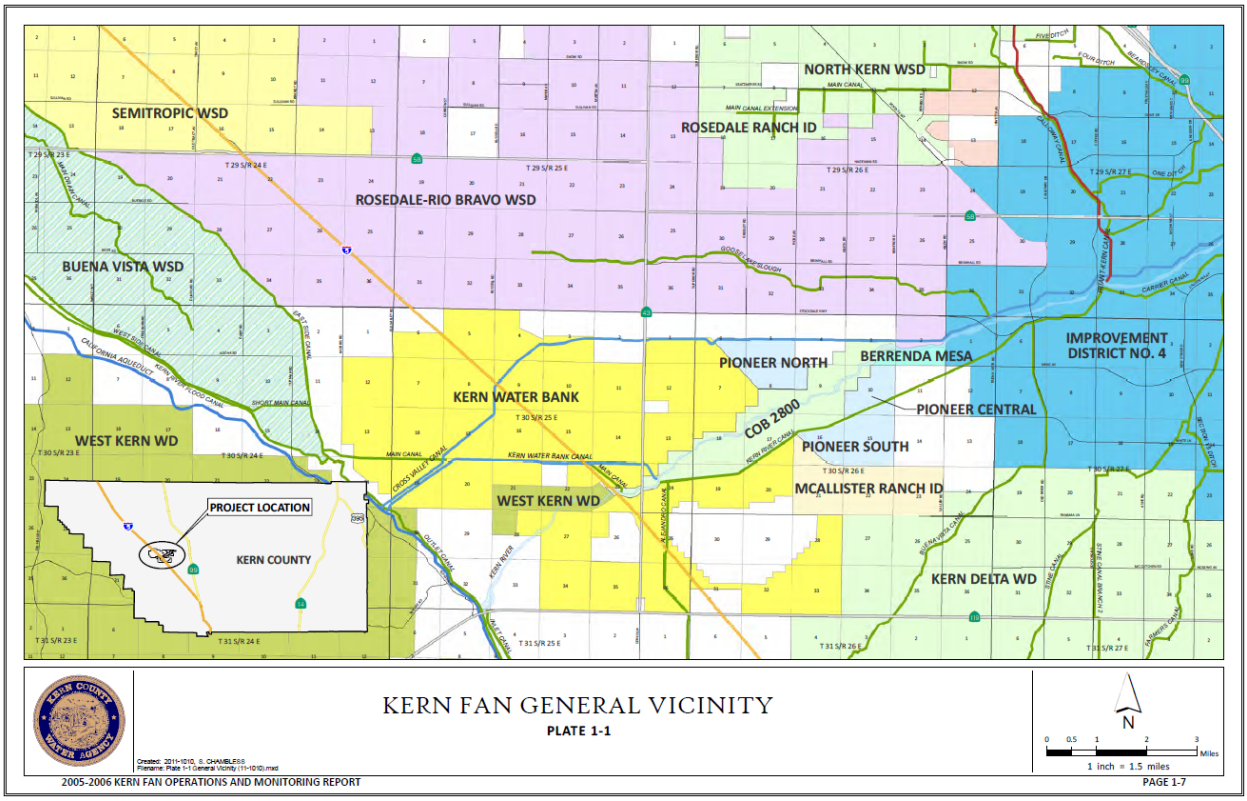
The KFE property[1] is located in Kern County, about 12 miles southwest of the City of Bakersfield (Figure 1). The property is situated between Taft Highway (State Route [SR] 119) to the south, Stockdale Highway to the north, Tupman and Morris Roads to the west, and South Allen Road to the east.

The Kern River and adjoining lands of the City of Bakersfield 2,800-Acre Groundwater Recharge Facility and West Kern Water District (WD) Groundwater Banking project divide the northern and southern portions of KWB Lands (Figure 1). A small portion of the Kern River also flows through the southwest corner of KWB Lands from northeast to southwest. The California Aqueduct is located adjacent to and west of the property. The KWB Canal and the Cross Valley, Main, Pioneer, River, Alejandro, and James Canals, and several unnamed ditches, traverse KWB Lands.

[1] The court in *PCL v. DWR* (2000) referred to the KFE property as the KWB in its decision. The KFE property consists of the approximately 20,000 acres acquired by the Department from Tenneco West, Inc. The property was acquired for the purposes of developing the KFE, one of a series of groundwater banking "elements" that together would constitute the KWB. As envisioned, the eight or so elements of the KWB would be geographically separate projects that would be operationally integrated. Therefore, the terms KFE and KWB are not interchangeable, and what is now called the KWB is only a portion of the KWB envisioned by the Department. For simplicity, this document will use the term KWB to refer to the groundwater bank developed by the KWBA on the former KFE property (referred to as "KWB Lands" after 1995), and the term KFE property to refer to the approximately 20,000 acres of land acquired by the Department.



~~It~~ The KWB Lands consist~~s~~ of approximately 20,000 acres of gently sloping land overlying the Kern River Alluvial Fan (Figure 1A). Surrounding lands are used primarily for agriculture, oil and gas production, habitat preserves, or other water banking programs. Prior to the development of the KWB, most of the land was used for agriculture, and irrigation water was provided by surface water deliveries by the former James-Pioneer Improvement District of North Kern Water District, and by groundwater pumping. Agricultural water supplies for lands surrounding the KWB are provided by Rosedale-Rio Bravo Water Storage District for most lands to the north, by Kern Delta Water District for lands to the southeast, by Henry Miller Water District for lands to the south, and by Buena Vista Water Storage District for lands to the northwest. The Tule Elk State Reserve, Coles Levee Ecosystem Preserve, and Lokern Management Area are located west and south of the KWB. The Buena Vista Aquatic Recreational Area is located to the south. KWB Lands also surround Kern County Raceway Park, located at Interstate 5 and Panama Lane. A solar energy farm is located near the southwest portion of KWB Lands.

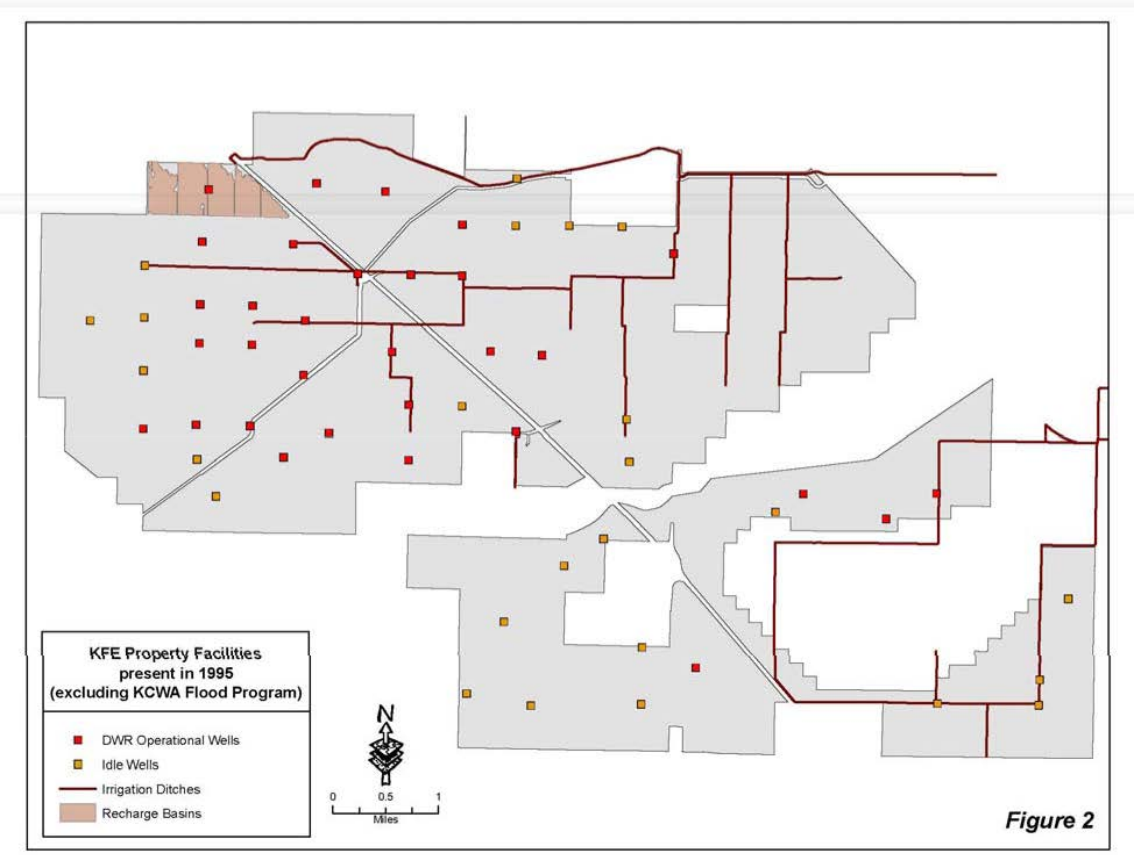


KCWA, 2005 KWB Lands within the Kern Fan Area Figure 1A

The KWB is one of several groundwater banks in Kern County. Other groundwater banks include: Berrenda Mesa Project (operational since 1983); City of Bakersfield 2,800 Acre Recharge Basin (operational since 1978); Pioneer Project, including Kern River Channel (operational since 1995); West Kern/Buena Vista (operational since 1978); Arvin-Edison Water Storage District (operational for groundwater banking for other districts since 1990); Semitropic Water Storage District (operational for groundwater banking for other districts since 1990), Kern Delta Water District (operational since 2003); Buena Vista Water Storage District (operational since 2003); Irvine Ranch Water District – Strand Ranch Integrated Banking Project (operational since 2013); and the Rosedale-Rio Bravo Water Storage District (Rosedale) Banking Program (operational since 2003) (Figure 1A). With the exception of the Arvin-Edison, Berrenda Mesa Project, Kern Delta, and Semitropic groundwater banks, all of the projects are located adjacent to the KWB on the Kern River Alluvial Fan. While KWB provisions allow for lower priority use by others (see Section V.B.4), such use has only been by KCWA member agencies and has been very limited in scope. The Arvin-Edison, Buena Vista, Kern Delta, Rosedale, and Semitropic banks allow participation by non-Kern County entities; the other banks mentioned above limit participation to Kern County entities (see REIR Section 10.1, Cumulative Environmental Impacts, for more detail on the surrounding water banks).

A. Existing KFE Property Facilities

The facilities that existed on the KFE property in early 1995 are shown in Figure 2.



1. Recharge

Tenneco constructed approximately 320 ~~300~~ acres of recharge ponds in the northwestern portion of the KFE property prior to its acquisition by the Department in 1988 *(Kern Water Bank First Stage Kern Fan Element Draft Supplemental Environmental Impact Report, December 1990, DWR)*. These ponds are known informally as the Stockdale Highway Ponds. The Department did not construct any recharge ponds on the KFE property during its ownership of the property.

2. Recovery

Sixty-five agricultural wells were present on the KFE property when it was acquired by the Department in 1988. During the Department's ownership of the property, it initiated a program of refurbishing some of these existing wells, so that it could recover water it had purchased from La Hacienda, Inc.[2] At the time the property was transferred to KCWA, 31 of the 65 existing wells were considered operable, although 3 of these were not connected to any conveyance facilities. The remaining 34 were idle wells in various states of disrepair.

[2] The purchase was of 98,000 acre-feet of stored Kern River water, which had originally been recharged at the City of Bakersfield's 2800 acre project. (KWB First Stage KFE Feasibility Report, December 1990)

3. Conveyance

At the time the Department acquired the KFE property in 1988, the property included a number of conveyance facilities that had been constructed primarily for the delivery of irrigation water for the agricultural activity occurring then and historically on the property. These facilities were not constructed for water bank operations of recharge and recovery, and many were not suitable for these purposes. An exception was the Pioneer Canal, which could have been used to deliver water for recharge to the existing approximately 320~~300~~ acres of Stockdale Highway Ponds. Other nearby facilities, including the Cross Valley Canal, the City of Bakersfield's Kern River Canal, and Buena Vista WSD's Alejandro Canal, could have been used to convey water recovered from the 31 operable wells on the KFE property. However, these facilities were owned by others and could only have been used for banking purposes when unused capacity was available. During the Department's ownership of the property, the Department constructed conveyance facilities of small capacity to convey water recovered from certain of the individual operable wells to these larger nearby conveyance facilities.

B. KCWA Flood Emergency Program

In 1995, KCWA requested and was granted the use of the KFE property for emergency spreading of water to mitigate projected flooding of agricultural lands due to high flows on the Kern and Kaweah Rivers. KCWA requested use of approximately 3,200 acres of the KFE property for the emergency delivery and controlled spreading of local floodwater flows. KCWA proposed spreading water from the Kern and Kaweah Rivers onto existing Kern County spreading basins (including KCWA's Pioneer Project, the City of Bakersfield's 2,800 acres, Berrenda Mesa Ponds, and Rosedale-Rio Bravo Ponds), and diverting the remaining flood flows (up to 500 cubic feet per second (cfs)) onto a portion of the Department's KFE property. KCWA proposed constructing up to 2,300 acres of recharge ponds on 3,200 acres of the property.

The Department conditioned its approval of KCWA's construction plans upon KCWA satisfaction of the endangered species acts requirements. In consultation with the USFWS and CDFG, KCWA performed biological surveys of the areas that it proposed to flood in order to avoid any threatened or endangered species, in compliance with federal and State endangered species acts. KCWA obtained endangered species agreements with USFWS and CDFG to develop 2,300 acres of spreading ponds. The Department added additional conservation conditions in a separate agreement. KCWA prepared a CEQA Negative Declaration and filed a Notice of Exemption for the project's CEQA compliance. Subsequently, the Department approved[3] a second request by KCWA to divert water onto an additional 1,800 acres of spreading ponds on an additional 5,000 acres of KFE land. The Department also agreed to extend its initial agreement with KCWA to March 31, 1997.[4]

As a result of these agreements, in 1995 KCWA constructed approximately 1,518 acres of recharge ponds on the initial 3,200 acres of KFE property, and approximately 1,516 acres of recharge ponds on the additional 5,000 acres of KFE land (Figure 3). Under the flood

[3] Letter, John J. Silveira, DWR to Thomas Clark, KCWA; June 2, 1995
[4] Letter, Robert G. Potter, DWR to Thomas Clark, KCWA; March 11, 1996

emergency program, about 230,000 AF of water was recharged in 1995 and about 144,000 AF in 1996.

C. Land Use

Prior to the Department's purchase of the KFE property in 1988, approximately 17,068 acres of the property was under extensive cultivation.[iv] The remaining property contained 1,515 acres of isolated sensitive native plant communities (valley saltbush scrub, Great Valley mesquite scrub and valley sacaton grassland) and 1,317 acres of non-native grassland, which had been leased for oil recovery facilities. No wetland habitat was present in the project area, except for the canals used to convey water for agricultural use.

A Memorandum of Understanding was signed between the Department and KCWA on March 25, 1987, that provided for the phase out of all agricultural production on the KFE property by the end of 1993. In fact, one of the tenants' leases was terminated in 1989. Then in 1991, at the peak of the drought, all the remaining tenant leases were terminated, and thereafter the agricultural lands were fallowed. The land use on the KFE property in 1995 is shown in Figure 4.

Before the KFE property was transferred to KCWA, the Department managed the KFE property by:

- performing demonstration studies and exploratory investigations for the potential development of the KFE property as a water banking facility; and
- controlling weeds, dust, trespassers, and vandalism.

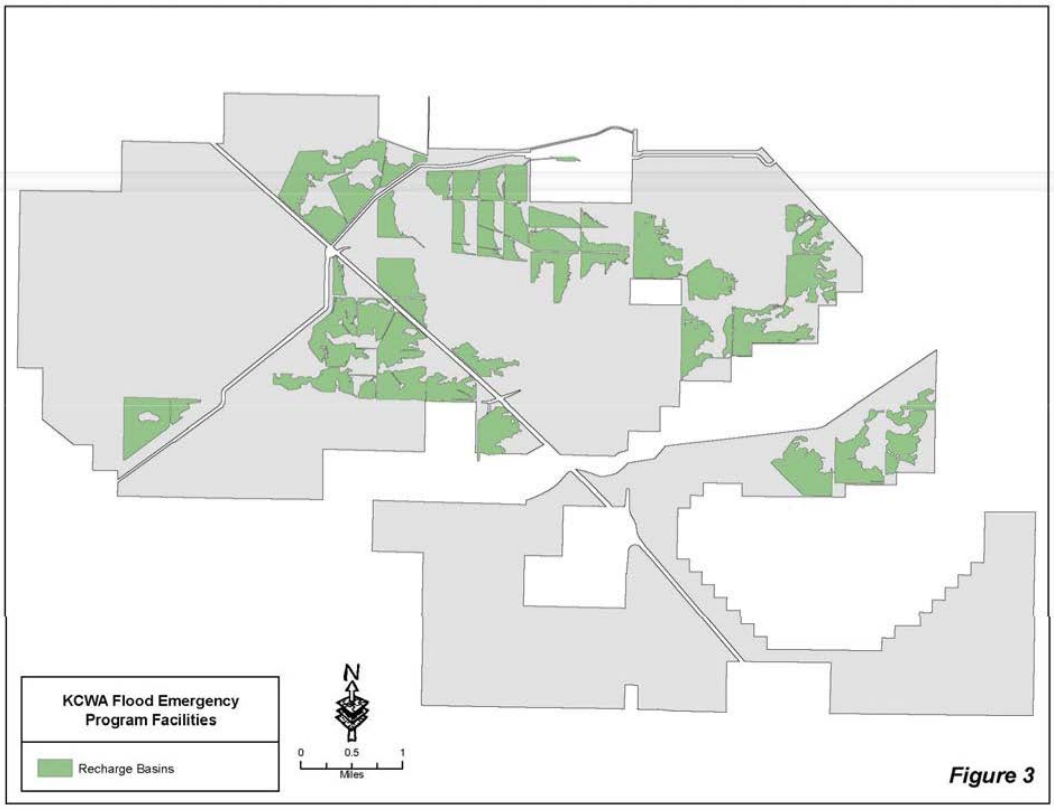


Figure 3

Figure 4

Several tenants with active oil and gas extraction wells, brine disposal wells, and oil storage tanks were also on the property. One oil and gas lease tenant, Grayson Services Inc., had a residence and an equipment repair and storage yard on the property. The Kern County Fire Department operated a firefighting training facility on a portion of the KFE property.

IV. Transfer of the KFE Property from the Department

By 1994, the potential of the Department's proposed KFE for SWP groundwater storage remained unrealized. As is described in more detail in Section I.A, by this time, the Department had suspended activities on the KFE property as a result of constraints on Delta pumping and a number of other uncertainties ~~made development of an SWP groundwater storage facility on the KFE property infeasible~~. In 1994, the Department and representatives of the agricultural and urban contractors negotiated a set of principles, subsequently implemented through the Monterey Amendment, that provided for the State's transfer of the KFE property to KCWA, and then to the KWBA, for local agency development and use as a groundwater bank, as discussed in more detail below.

A. Monterey Amendment

The Department deferred development efforts of the KFE in the early 1990s. Subsequently, the Monterey Amendment provided for the State's transfer of ownership of the KFE property to

KCWA for local agency development and use as a groundwater bank, in exchange for the permanent retirement of 45,000 AF of SWP Table A amount by KCWA and Dudley Ridge WD.

Article 52 of the Monterey Amendment states that:

a) The State shall convey to the Kern County Water Agency (KCWA) in accordance with the terms set forth in the agreement between the State of California Department of Water Resource and Kern County Water Agency entitled, "Agreement for the Exchange of the Kern Fan Element of the Kern Water Bank" (the Kern Water Bank Contract), the real and personal property described therein.

b) Subject to the approval of KCWA, other contractors may be provided access to and use the property conveyed to KCWA by the Kern Water Bank Contract for water storage and recovery. Fifty percent (50 %) of any project water remaining in storage on December 31, 1995, from the 1990 Berrenda Mesa Demonstration Program and the La Hacienda Water Purchase Program shall be transferred to KCWA pursuant to the Kern Water Bank Contract. The remaining fifty percent (50%) of any such water (approximately 42,828.5 AF) shall remain as project water and the State's recovery of such project water shall be pursuant to the provisions of a separate recovery contract. Any other Kern Water Bank demonstration program water shall remain as project water and the State's recovery of such water shall be pursuant to the provisions of the respective contracts for implementation of such demonstration programs.

Article 53(i) of the Monterey Amendment states, in part, that:

i) On January 1 following the year in which such Monterey Amendments take effect and continuing every year thereafter until the end of the project repayment period: (i) Kern County Water Agency's (KCWA) annual entitlement for agricultural use as currently designated in Table A-1 of its contract shall be decreased by 40,670 AF; (ii) Dudley Ridge Water District's (DRWD) annual entitlement as currently designated in Table A of its contract shall be decreased by 4,330 AF; and (iii) the State's prospective charges (including any adjustments for past costs) for the 45,000 AF of annual entitlements to be relinquished by KCWA and DRWD thereafter shall be deemed to be costs of project conservation facilities and included in the Delta Water Charge for all contractors in accordance with the provisions of Article 22.

In accordance with the Monterey Amendment, the Department conveyed the KFE property to KCWA in exchange for KCWA and DRWD permanently retiring a total of 45,000 AF of agricultural Table A amounts. On December 13, 1995, the same date the Department executed the Monterey Amendments of KCWA and DRWD, the Department executed the "Agreement for the Exchange of the Kern Fan Element of the Kern Water Bank" between the Department and KCWA. This agreement provided the specific terms and conditions for the transfer of the KFE property to KCWA.

B. Exchange Agreement between the Department and KCWA

The "Agreement for the Exchange of the Kern Fan Element of the Kern Water Bank" between the Department and KCWA was executed on December 13, 1995. This agreement provided for the transfer of the KFE acreage and its fixtures from the Department to KCWA in exchange for agricultural contractors' permanent reduction and retirement of 45,000 AF of their SWP Table A amount. The agreement transferred the property to KCWA and identified certain KCWA obligations, covenants, and agreements associated with the property, including KCWA assumption of responsibility for the Department's endangered species agreements, in total.

It was intended that KCWA would transfer the KFE property to a joint powers authority made up of those entities that had retired a portion of their Table A amounts. Therefore, the exchange agreement between the Department and KCWA included a provision that stated that the parties' agreed that KCWA could transfer all or a portion of the property and assign its rights and obligations to transferees who concurrently executed an agreement accepting the transfer and assignment and assumption of KCWA's obligations, covenants, and agreements.

C. Conveyance Agreement from KCWA to KWBA

Simultaneous with the December 13, 1995, execution of the exchange agreement between the Department and KCWA, KCWA executed an agreement between it and the Kern Water Bank Authority (KWBA). This agreement transferred the KFE property from KCWA to the KWBA[5]: to develop, operate, and maintain the KFE property as a local groundwater banking project, which they called the Kern Water Bank (KWB); to develop and improve the KWB for the importation, percolation and storage of water in underground aquifers for later extraction, transportation, and; for the beneficial use of Project Participants.[6] KWBA assumed control of the KFE property and prepared a plan for development of the property as a groundwater bank and an operating plan to bank available water from three sources – the Kern River, the Central Valley Project's (CVP) Friant-Kern Canal, and the SWP.

V. KWBA's Development of KWB

A. Environmental Documents and Permits

1. CEQA

A final programmatic EIR on the Monterey Agreement ("Monterey Agreement EIR") was issued in October 1995. The Monterey Agreement EIR describes, among other things, the environmental impacts of the development of a groundwater bank on the KFE property, including construction of banking facilities and operation of a groundwater bank. ~~The KWBA,~~

[5] The Kern Water Bank Authority is a joint power authority formed pursuant to California Government Code section 6500 et seq.

[6] The transfer of the KFE property from KCWA to KWBA was made possible by provisions specified in Section 3, subsection 3.3 (Immediate Reconveyance) of the Kern Water Bank Contract, dated December 13, 1995.

~~as a responsible agency, approved the Monterey Agreement EIR on October 30, 1995.~~ The principles of the Monterey Agreement were implemented through the Monterey Amendment. As described in Section IV above, upon execution of the Monterey Amendment, the Department transferred the KFE property to KCWA, which simultaneously transferred the property to the KWBA.

The KWBA prepared specific plans for the development and operation of a groundwater bank on the KFE property, referred to by the KWBA as the Kern Water Bank (KWB). The CEQA guidelines indicate that "subsequent activities in a program must be examined in the light of the programmatic EIR to determine whether an additional environmental document must be prepared." A subsequent EIR is only allowed if certain findings are made, which was not the case for the proposed KWB. Instead, an Initial Study (IS) and ~~a~~Addendum to the Monterey Agreement EIR (Appendix 7-6a) was prepared pursuant to §15164 of the guidelines. This addendum addressed the environmental issues related to development and construction of the KWB that had not been addressed in the programmatic EIR. The primary focus of the addendum was the Kern Water Bank Habitat Conservation Plan (HCP) and the Natural Community Conservation Plan (NCCP) (Appendix 7-7a), which primarily address the impacts of the project on endangered species. However, the addendum also addressed the impact on cultural resources, groundwater impacts on surrounding landowners, and mosquito abatement, among other things. The HCP/NCCP is discussed in more detail below.

After completion of the environmental analysis, and establishment of findings and appropriate mitigation measures, the KWBA concluded that the entire project, as revised by the mitigation measures, would have no significant effect on the environment. A Notice of Determination was filed July 4, 1996, and no legal challenge was filed.

2. CESA/ESA

a. Permits

KWBA negotiated with CDFG and USFWS for specific permits that would allow KWBA to construct, operate, and maintain the KWB. To allow for the management and operation of the KWB in accordance with the incidental take of endangered, threatened and certain other listed species, KWBA applied to the USFWS for two permits pursuant to the federal Endangered Species Act, and to the CDFG for two management authorizations pursuant to the California Endangered Species Act and the Natural Community Conservation Planning Act. One permit and one management authorization (the Project Permit/Authorization) is related to the KWB project. The other permit and management authorization (the Master Permit/Authorization) is related to a conservation bank to be used as potential mitigation for activities by third parties within designated areas of the Southern San Joaquin Valley. The conservation bank can be used to provide mitigation for the incidental take of listed species by qualified third parties for activities that take place within Kern County, the Allensworth area of Tulare County, and the Kettleman Hills area of Kings County. Both Permits and both Master Authorizations are for a period of 75 years. The agencies prepared a Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP), an implementation agreement (IA), and a federal environmental assessment (EA) as part of the permit/authorization process.

b. HCP/NCCP

To protect endangered species on the property, the KWBA, the USFWS, and the CDFG developed the HCP/NCCP to preserve and restore habitat for threatened, endangered, and protected species. The HCP/NCCP permits certain uses for the KFE property and designates general areas (referred to as "sectors") and acreages for those uses (Figure 5 and Table 1). KWBA prepared *Findings and Mitigation Measures, Implementation of the Kern Water Bank - Kern Water Bank Habitat Conservation Plan/Natural Community Conservation Plan* and filed a Notice of Determination with the State Clearinghouse on June 5, 1997 (SCH #1997107342). A Final Environmental Assessment for the issuance of an incidental take permit under Section 10(a)(1)(B) of the Endangered Species Act for KWB Lands was prepared by USFWS and dated October 2, 1997.

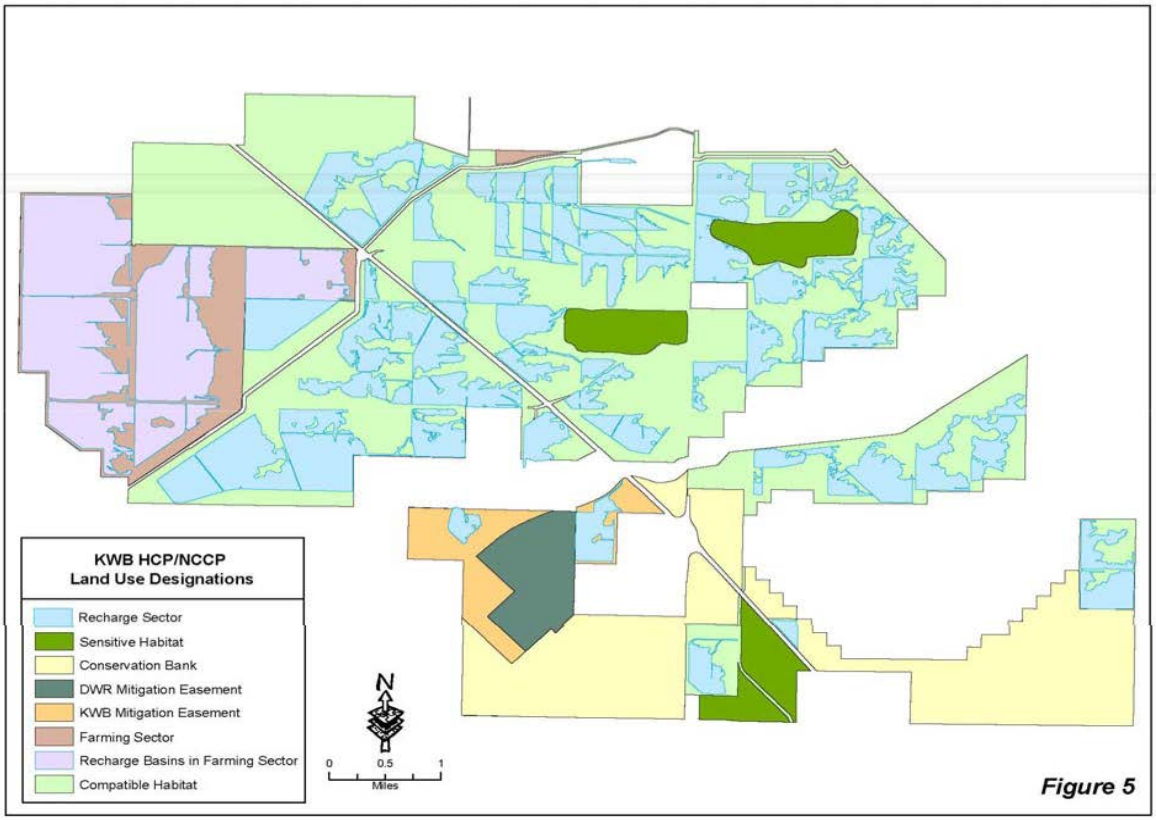


Figure 5

Table 1. HCP/NCCP Land Use Designations	
	AREA (In Acres)
Recharge Basins	5,900
Other Water Banking Facilities	481
Compatible Habitat	5,592
Sensitive Habitat	960
Department Mitigation Land	530
Farming (including recharge ponds)	3,170
Conservation Bank	3,267
TOTAL	19,900

One of the HCP/NCCP's primary management tools is its Vegetation Management Plan (Appendix 7-7c). The Plan incorporates an adaptive management approach to improve upland habitat for the threatened and endangered species that are found on the property. The program uses methods that are compatible with the water banking activities and economically feasible for a large-scale project. Since desert species prefer low-density vegetation, the primary method used to control vegetation has been grazing and burning. To control tumbleweeds (the largest problem), KWBA has timed grazing and burning activities to promote desired native plant growth and retard the growth of the tumbleweeds.

Water banking has also caused a resurgence in wetland habitat and the return of waterfowl to the area. By 2005, ~~To date,~~ more than 40 new species of birds had ~~have~~ been sighted on the KWB Lands~~KFE property~~, including the Caspian tern, the white-faced ibis, the double-crested cormorant, and the tri-colored blackbird. See Section 7.4, Terrestrial Biological Resources, for a discussion of new special-status species observed on KWB Lands through 2014.

The Implementation Agreement of the KWBA HCP/NCCP (Appendix 7-7a) requires the KWBA to prepare and submit an Annual Report to the USFWS and the CDFG that includes the following information from the previous year:

- A summary of all activities on the KWB, including construction, and operation and maintenance of water recharge and water extraction facilities;
- A summary of Take of Covered Species and Covered Habitat;
- A summary of mitigation measures implemented;
- Results of studies completed;
- Results from the implementation of monitoring programs;
- Results from the implementation of avoidance and minimization measures;
- A report regarding the status of the Species Viability Fund;
- A copy of the KWBA's financial report evidencing KWBA's ability to fund its affirmative obligations under the KWBA HCP/NCCP and the Implementation Agreement; and
- A certification from a responsible officer of the KWBA.

Exhibit H of the KWB HCP/NCCP (Appendix 7-7a) requires KWBA to meet the Minimization of Impacts Requirements during construction and repair activities. The following actions are specified in Exhibit H:

- The delineation of all construction zones;
- Oversight of all phases of the construction on a daily basis by KWBA inspectors;
- Compliance with minimum construction standards for canals;
- An orientation program for all KWBA employees and contractors that explains endangered species concerns, notification requirements for dead, injured, or entrapped listed animals, and on-going practices requirements (e.g. construction site review and traffic, food and dog control);
- Monitoring major construction activities by a qualified biologist; and

- Biological surveys to identify San Joaquin kit fox dens, burrows occupied by burrowing owls, and signs of the presence of fully-protected species.

Table 2 shows the amount of land disturbance that was estimated in the HCP/NCCP to accompany the construction of infrastructure on the KWB, and the amount of disturbance that has actually occurred. Land disturbance is tracked in all land use sectors on the KFE property but the Farming Sector.[7] Note that permanent water banking facilities occupy ~~only~~ 256 ~~258~~ acres in 2014.

B. Other Agreements and Restrictions

1. Statement of Principles – March 1995

A Statement of Principles (SOP) establishing several guidelines for a later agreement amongst the KWB participants on the establishment of a public agency to own, develop, operate and maintain the KWB project was agreed to on March 31, 1995. The key provisions of the SOP are:

- An allocation of the amount of ~~firm~~ SWP Table A amounts to be permanently retired by each of the participants, and a mechanism for other KCWA Member Units to participant in the KWB as the project moved forward;
  (Note: The allocations stated in the 1995 SOP were superseded by the joint powers agreement [October 1995] and are listed in Table 3.)
- A statement that the KWB's primary purpose is to augment water supplies for KWB participants;
- A statement that the proposed KWBA may use the property for secondary purposes that are not in conflict with the primary purpose of augmenting water supplies and that do not substantially diminish the ability to use the property for this primary purpose;
- A statement indicating the proposed public agency will be responsible for all KWB costs;
- The establishment of priorities for the use of the KWB by others;
- A statement that the KWB will be operated pursuant to the ~~pending~~ *Memorandum of Understanding Regarding Operation and Monitoring of the Kern Water Bank Groundwater Banking Program* (see V.B.3. below);
- A statement that the proposed public agency will construct, at its sole cost, a diversion and conveyance facility from the Kern River to the KWB, which will be jointly owned by KWCA and the public agency with a to-be-determined capacity for the Pioneer Project. Any recharge occurring on the Pioneer Project when only the public agency is delivering water from the diversion facility is described as being credited to the project;

[7] Land disturbance in the Farming Sector is not tracked since it was anticipated in the KWB HCP/NCCP to be disturbed from farming or other activities. In fact, with the exception of 45 acres ~~currently~~ that was farmed intermittently prior to 2005 for the CDFG for an annual Heritage Game Bird hunt, no farming has occurred in the Farming Sector. Instead, this acreage, some of which has been used for recharge ponds, has developed into exceptional upland and wetland habitat.

recharge occurring at any other time will be credited to KCWA or its designee up to a decided amount.

- A mechanism to establish agreements to share Cross Valley Canal capacity amongst other banking projects; and
- The establishment of covenants for the limitation on the future consumptive use of groundwater by the property and restrictions on the future sale, transfer, lease, etc., of the property as long as KCWA has determined that the property can be used economically for groundwater storage and recovery.

Table 2. Estimated versus actual land disturbance resulting from recharge/recovery facilities through December 2005 and December 2014.

	KWB HCP/NCCP Estimated Disturbance	Actual Disturbance (through 12/31/2005) (acres)	Actual Disturbance (through 12/31/2014) (acres)
Recharge Basins in Recharge Sector*	**5,900**	**4,699**	**4,998**
Permanent Water Banking Facilities			
Recovery Facilities			
Wells - Existing Hooked Up	28	14	14
Wells - Existing Not Hooked Up	38	6	6
Wells - Proposed New	66	21	21
Conveyance Facilities			
Proposed-Lined	87	0	0
Existing – Unlined	225	117	117
Supply/Recovery Canal	73	75	75
Pump Stations	12	2	3
Kern River Reverse Flow			
Earthwork (berms~~levees~~)	4	0	0
Pump Stations			
Kern River	10	0	0
City of Bakersfield	4	0	0
New Roads	0	23	23
Subtotal	**547**	**258**	**258**
Temporary Disturbed Areas			
Canal Construction	73	68	68
Recovery Wells	0	16	16
Pipelines – Proposed	218	144	144
Subtotal	**291**	**228**	**228**
Total	**6,738**	**5,185**	**5,484**
* Does not include 2,415 acres of recharge ponds located in the Farming Sector.			

Source: Kern Water Bank Authority. Annual Report, May1, 2006 and KWBA, May 2014.

2. Joint Powers Agreement – October 1995

The entities that permanently retired a portion of their SWP Table A amounts (i.e., SWP contractors KCWA and Dudley Ridge WD, and KCWA member agencies Semitropic WSD, Tejon-Castac WD, and Wheeler Ridge-Maricopa WSD, and Westside Mutual Water Company, LLC) formed a joint powers authority called the Kern Water Bank Authority on October 16, 1995, with the execution of a Joint Powers Agreement (JPA). The JPA:

- Created the KWBA and established its term, purpose and powers;
- Established the internal organization of the KWBA (i.e., governed by a Board of Directors);
- Established procedures for handling KWBA's finances;
- Described the KWBA's KWB project and established participant rights in the project directly proportional to the amount of Table A water each participant retired to acquire the project;
- Established the relationship between the KWBA and its participants (e.g., indemnities, withdrawals, etc.); and
- Established other procedures necessary to the operation of the KWBA (e.g., amendment procedures, dispute resolution procedures, etc.)

Table 3 lists the Table A amounts retired by each KWBA participants and their corresponding ownership allocations.

Table 3. Kern Water Bank Authority Participants

Participants	Table A Amount Retired (AF)	Allocation (%)
Dudley Ridge WD	4,330	9.62
Improvement District 4	4,330	9.62
Semitropic WSD	3,000	6.67
Tejon-Castac WD	900	2.00
Westside Mutual Water Co.[a]	21,625	48.06
Wheeler Ridge-Maricopa WSD	10,815	24.03
Total	45,000	100.00

a. Westside Mutual Water Co. was formed by a landowner that owned land within two KCWA member agencies, for the retirement of a portion of its Table A amounts. The landowner retired 15,335 AF of its Table A amount from Belridge WSD and 6,290 AF of its Table A amount from Lost Hills WD.

3. Operations and Monitoring MOU – October 1995

The KWBA is to operate~~s~~ the KWB under the requirements of the *Memorandum of Understanding Regarding Operation and Monitoring of the Kern Water Bank Groundwater Banking Program* (KWB MOU; Appendix 7-5a~~B~~). The KWB MOU specifies that the KWB "shall be operated to achieve the maximum water storage and withdrawal benefits for Project Participants consistent with avoiding, mitigating, or eliminating, to the greatest extent practicable, significant adverse impacts resulting from the Project." Negotiation and execution of the KWB MOU was a prerequisite of the KWBA Member Entities' agreement to retire the

45,000 AF of Table A amounts in exchange for the transfer of the KFE lands from the Department for the Member Entities' development of a water bank.

The 1995 KWB MOU states "consistent with the Project Description, the Project participants will make a good faith effort to meet the following objectives, which may or may not be met…" The KWB objectives include developing and operating the Project "so as to prevent, eliminate or mitigate significant adverse impacts." The MOU's recitals include, "Adjoining Entities and Project Participants desire that the design, operation and monitoring of the Project be conducted and coordinated in a manner to insure that the beneficial effects of the Project to the Project Participants are maximized but that the Project does not result in significant adverse impacts to water levels, water quality or land subsidence within the boundaries of Adjoining Entities, or otherwise interfere with the existing and ongoing programs of Adjoining Entities." A Monitoring Committee, comprised of one representative of each of the Adjoining Entities and one representative of each of the KWBA participants, has numerous functions specified in the 1995 KWB MOU including, to "Develop procedures, review data, and recommend Project operational criteria for the purpose of identifying, verifying, avoiding, eliminating or mitigating, to the extent practicable, the creation of significant imbalances or significant adverse impacts."

a. Impact Mitigation

The overall objective of the KWB MOU parties (KWBA, its Member Entities, and the districts surrounding the property [Adjoining Entities]) is that the "… design, operation and monitoring of the Project be conducted and coordinated in a manner to insure that the beneficial effects of the Project to the Project Participants [Member Entities] are maximized but that the Project does not result in significant adverse impacts to water levels, water quality or land subsidence within the boundaries of Adjoining Entitles." The adjoining entities include Buena Vista WSD, Rosedale-Rio Bravo WSD, Kern Delta WD, Henry Miller WD, and West Kern WD.

Some of the measures prescribed in the KWB MOU to protect water levels include:

1) spread out [extractions in the] recovery area;
2) provide buffer areas between recovery wells and neighboring overlying users;
3) limit the monthly, seasonal, and/or annual recovery rate;
4) provide sufficient recovery wells to allow rotation of use of recovery wells or the use of alternate wells;
5) provide adequate well spacing;
6) adjust pumping rates or terminate pumping to reduce impacts, if necessary;
7) impose time restrictions between recharge and extraction to allow for downward percolation of water to the aquifer; and
8) provide recharge of water that would otherwise not recharge the Kern Fan Basin.

Some of the measures prescribed in the KWB MOU to protect water quality include:

1) giving recharge priority to the best quality water available,
2) removing more salts than are recharged,

3) controlling the migration of poor quality water, and
4) extracting poorer quality groundwater where practicable (and where blending with ~~excellent~~ quality water from elsewhere in the project results in the water quality objectives of downstream users being met).

Other mitigation measures to prevent significant adverse impacts from occurring include but are not limited to the following. With consent of the affected overlying user:

- lower the pump bowls or deepen wells as necessary to restore groundwater extraction capability to such overlying user,
- provide alternative water supplies to such overlying user, and
- provide financial compensation to such overlying user.

b. Minimum Operating Criteria

The 1995 KWB MOU specifies minimum operating criteria for the KWB (Appendix 7-5a). Key sections related to potential environmental impacts are excerpted directly from the 1995 KWB MOU and presented below (headers have been added to assist the reader):

(1) **Water Quality**: The Monitoring Committee shall be notified prior to the recharge of potentially unacceptable water, such as "produced water" from oilfield operations, reclaimed water, or the like. The Monitoring Committee shall review the proposed recharge and make recommendations respecting the same as it deems appropriate. Where approval by the Regional Water Quality Control Board is required, the issuance of such approval by said Board shall satisfy this requirement.

(2) **Contaminated Areas**: Recharge may not occur in, on or near contaminated areas, nor may anyone spread in, on or near an adjoining area if the effect will be to mound water near enough to the contaminated area that the contaminants will be picked up and carried into the uncontaminated groundwater supply. When contaminated areas are identified within or adjacent to the Project, the KWBA and the Project Participants shall also:

a. participate with other groundwater pumpers to investigate the source of the contamination;
b. work with appropriate authorities to ensure that the entity or individual, if any, responsible for the contamination meets its responsibilities to remove the contamination and thereby return the Project Site to its full recharge and storage capacity;
c. operate the Project in cooperation with other groundwater pumpers to attempt to eliminate the migration of contaminated water toward or into usable water quality areas.

(3) **Natural Recharge**: Operators of projects within the Kern Fan Area will avoid operating recharge projects in a fashion so as to significantly diminish the natural, normal and unavoidable recharge of water native to the Kern Fan Area as it existed in a pre-project condition. If and to the extent this occurs as determined by the

Monitoring Committee, the parties will cooperate to provide equivalent recharge capacity to offset such impact.

(4) **Mitigation Credit**: The mitigation credit for fallowed Project land shall be .3 acre-feet per acre per year times the amount of fallowed land included in the Project Site in the year of calculation (which for the present approximately 19,890 acre Project Site is 5,967 AF/year (approximately 0.3 x 19,900 acres).

(5) **Consumptive Water Use**: The lands described in Exhibit A (19,883 acres) may be utilized for any purpose consistent with the Statement of Principles, by the KWBA provided, however, the use of said property shall not cause or contribute to overdraft of the groundwater basin. In this connection, any consumptive use of water on the Property which exceeds .3 acre-feet per acre (i.e., the mitigation credit) on an acre-by-acre basis shall be provided from supplemental sources that do not create or contribute to overdraft.

(12) **Adverse Impacts**: Recovery of banked water may not be allowed if not otherwise mitigated if it will result in significant adverse impacts to surrounding overlying users. "Adverse impacts" will be evaluated using data applicable in zones including the area which may be affected by the Project of approximately 5 miles in width from the boundaries of the Project as designated by the Monitoring Committee. In determining "adverse impacts," as provided at this paragraph and elsewhere in this MOU, consideration will be given to the benefits accrued over time during operation of the Project to landowners surrounding the Project Site including higher groundwater levels as a result of operation of the Project. In determining non-Project conditions versus Project conditions, credit toward mitigation of any otherwise adverse impacts shall be recognized to the extent of the 4% loss and 5% loss recognized under paragraphs 2.b(10)(b) and (c), for the mitigation credit recognized under paragraph 2.b.(4), if any, and to the extent of recharge on the Project Site for overdraft correction.

(13) **Interference**: To the extent that interference, other than insignificant interference, with the pumping lift of any existing active well as compared to non-Project conditions, is attributable to pumping of any wells on the Project Site, KWBA will either stop pumping as necessary to mitigate the interference or compensate the owner for such interference, or any combination thereof. The Monitoring Committee will establish the criteria necessary to determine if well interference, other than insignificant interference, is attributable to pumping of Project wells by conducting pumping tests of Project wells following the installation of monitoring wells (if not already completed) and considering hydrogeologic information.

(14) **Groundwater Impact Modeling**: The Kern Fan Groundwater Model, with input from the Project Participants and Adjoining Entities, and utilizing data from a comprehensive groundwater monitoring program, may be used by the Monitoring Committee as appropriate to estimate groundwater impacts of the Project.

c. Monitoring

As described above, In order to ensure that the above goals are met, the MOU provides for the establishment of a Monitoring Committee to oversee banking operations and the results of an extensive monitoring program. The committee is made up of several basin stakeholders including KCWA and all adjoining water districts. This committee has completed a number of tasks required by the MOU, including:

- Preparation of a monitoring plan;
- Specification of monitoring wells;
- Preparation of annual water balance studies and other interpretive studies of sources and uses of water within the project area and within adjoining water districts;
- Determination of the impacts of project operations on surrounding areas; and
- Development of criteria for identifying, verifying, avoiding, eliminating, or mitigating significant adverse impacts from project operations.

The Monitoring Committee may make recommendations to the KWBA and KWB participants, including without limitation recommendations for modifications in Project operations based upon evaluation(s) of data which indicate that excessive mounding or withdrawal is occurring or is likely to occur in an area of interest.

d. Loss Factors

The KWB MOU prescribes loss factors for banking operations. Evapotranspiration losses are assumed to be 6 percent of the gross amount of all water recharged. A study conducted by the KWBA using a methodology developed by the Department and KCWA for the KFE indicates actual losses by evapotranspiration will typically range from 2 percent to 4 percent. The 6 percent loss factor provides assurance that KWB banking operations will not recover more water than that actually recharged.

The KWB MOU provides that an additional 5 percent loss factor will apply to any sales of water to entities outside of Kern County. This additional water provides an overall benefit to the groundwater basin, and cannot be recovered for other uses.

In addition to these losses, 4 percent of the water recharged and stored in the KWB can be purchased by adjoining groundwater districts for overdraft correction purposes.

4. Covenants, Conditions, & Restrictions between KCWA and KWBA – December 1995

A declaration of covenants, conditions, and restrictions (CC&Rs) on the use of the KFE property was executed by the KWBA for the benefit of the KCWA on December 14, 1995, and subsequently recorded as a covenant running with the property. The CC&Rs provided for several of the provisions of the *Statement of Principles*, including:

- A limitation on consumptive use of groundwater by the KWB project of 0.3 AF/acre;

- Restrictions on the sale, transfer, lease, etc., of parts of the KFE property as long as KCWA has determined that the property can be used economically for groundwater storage and recovery,
- Restrictions on the use of any proceeds from approved KFE property sales, transfers, leases, etc.;
- Remedies for violations of the CC&Rs; and
- Priorities for the use of the KFE property.

The priorities for the use of the KWB Lands ~~KFE property~~ as described in the CC&Rs are as follows: 1st priority – KWBA Member Entities; 2nd priority – KCWA Basic Contract Member Units; 3rd priority – KCWA Non-Basic Contract Member Units; and 4th priority – Kern County entities. Any excess capacity beyond that needed for the first four priorities can be used by others under terms and conditions acceptable to KWBA and KCWA.

5. Limitations of Exports and Sales

All water transfers and exchanges from member districts of KCWA require the approval of KCWA. Current KCWA policy places limitations on the sale of banked SWP water. Department approval is required for conveyance of banked SWP water through SWP facilities. CVP contracts place limitations on potential sales of Friant-Kern CVP water. A place-of-use restriction requires the use of banked Friant-Kern groundwater to be within the CVP place of use. Consequently, these agreements and restrictions limit the classification of water that may be transferred to non-Kern County agencies.

6. Other Regulatory Permits and Approvals: 1997 – 2002

The list of additional key permits/agreements referenced in the 2003 Settlement Agreement which are associated with KWB activities is shown in Table 3A.

TABLE 3A

KEY KERN WATER BANK AUTHORITY AGREEMENTS AND PERMITS

AGREEMENT/PERMIT	DATE	OTHER PARTIES
Incidental Take Permit—PRT-828086	October 2, 1997	USFWS
Approval/Management Authorization pursuant to CESA for Implementation of KWB HCP/NCCP	October 2, 1997	CDFG (now California Department of Fish and Wildlife)
KWB HCP/NCCP Implementation Agreement and related agreements (e.g., Conservation Bank Agreement	October 2, 1997	USFWS; CDFG
Approval, Cultural Resources Assessment and Plan for the KWBA Project	January 1997	N/A
Approval of KWB Mosquito Abatement Program	October 26, 1995	Mosquito abatement districts
Service Contracts for Operations and Maintenance	1996–current	Numerous vendors
Grazing Leases (sheep and cattle)	1997–current	Various stockmen
Minor Amendment No. 1: Hunting/Research to the KWB HCP/NCCP and Implementation Agreement	June 30, 1998	USFWS; CDFG
State of California Standard Agreement for "Improving Wildlife Habitat for Doves" (annual contract)	1998–current	CDFG
Conservation Credit Certificates	1998–current	Conservation credit buyers
Construction and Service Contracts for Master Plan Construction Project—KWB Canal, Headworks, Aqueduct Turnout, New Wells, Well Rehabilitation, Pipelines	July 1999 through August 2002	Numerous contractors and vendors
KWB Canal and Buena Vista Main Canal Joint-Use Agreement	July 20, 1999	Buena Vista Water Storage District
Agreement for Grant of Easement	September 1999	State of California acting through the California Department of Parks and Recreation
Agreement for Construction, Operation, and Maintenance of the Kern Water Bank Turnout, a Permanent Turnout Within the California Aqueduct Right of Way	November 9, 1999	California Department of Water Resources
License Agreement for Kern River Canal Crossing	November 17, 1999	City of Bakersfield
Loan Contract No. E75002 Under the Safe, Clean, Reliable Water Supply Act Water Conservation and Groundwater Recharge Subaccount ($5,000,000)	March 2000	California Department of Water Resources, Division of Planning and Local Assistance
Reclamation Board Permit No. 17147-A GM Authorizing Construction of Pedestrian Bridge Across the Outlet Canal within the Kern River Designated Floodway	October 16, 2000	California Department of Water Resources
Reclamation Board Permit No. 16821 GM (Revised) Authorizing Construction of a 20-Foot-Wide Unlined Canal and Reinforced Concrete Gated Turnout Structure on the Right (North) Bank of the Designated Floodway and Install a 108-Inch Diameter, 700-Foot-Long, Reinforced Concrete Pipe Across (Under the Kern River)	February 26, 2001	California Department of Water Resources

Notes:
CDFG – California Department of Fish and Game; CESA = California Endangered Species Act; KWB HCP/NCCP = Kern Water Bank Habitat Conservation Plan/Natural Community Conservation Plan; KWB = Kern Water Bank; KWBA = Kern Water Bank Authority; USFWS = United States Fish and Wildlife Service
Source: CC&R Documents 1995; Exhibit 2 Settlement Agreement

In addition to the key agreements and permits listed in Table 3A, other approvals required for KWB activities may have included the following:

- *Kern County Environmental Health Services Department* - Permits and approvals associated with KWBA's remediation and closure of several hazardous material sites on KWB Lands.
- *KCWA* - Flowage easement across the Pioneer Property to the KWB Lands; agreements with Central Valley Canal (CVC) participants for the construction of turnouts from the CVC and/or the conversion of temporary use/long-term agreements, and use agreements for off-site portions of the Pioneer and James Canals.
- *City of Bakersfield* - Encroachment permit for the KWB Canal headworks and diversion from the Kern River and an encroachment permit and operating agreement for the conveyance through the City of Bakersfield 2,800-Acre Groundwater Recharge Facility to recharge ponds located south of the River Canal.
- *California Department of Transportation* - Encroachment permit for the KWB Canal crossing under Enos Lane.
- *Central Valley Regional Water Quality Control Board* - Stormwater general permit for construction activities and storm water pollution prevention plan.

Local permits and approvals necessary for routine maintenance activities include the following:

- *San Joaquin Valley Unified Air Pollution Control District* - Weed abatement burn permit to burn weeds on ditch bank and canals and ponding and berm banks (annual renewal).
- *Kern County Department of Agriculture* - Restricted-materials permit for use of regulated pesticides.

7. Interim Project Recovery Operations Plan for KWBA and Rosedale Projects – 2014

a. Overview

As a result of the *Rosedale v. DWR* lawsuit, KWBA and Rosedale have developed and implemented an Interim Project Recovery Operations Plan (Appendix 7-5b). The Interim Operations Plan became effective on September 5, 2014, and designates measures to be employed to "…prevent, eliminate or mitigate significant adverse impacts" resulting from KWB and Rosedale project operations. (Pioneer Project participants and Rosedale subsequently developed and implemented a similar plan which employs essentially the same measures to prevent, eliminate, or mitigate significant adverse impacts resulting from Pioneer Project and Rosedale Project operations.)

The KWB and Rosedale Banking Programs are to be operated pursuant to the Interim Operations Plan during the time this REIR is being prepared. The Interim Operations Plan establishes a Joint Operations Committee, separate from the Monitoring Committee, to regularly evaluate groundwater impacts as well as the With-Project versus Without-Project groundwater levels,

through the use of two groundwater models, taking into account projected recovery plans. The models are used to:

- forecast groundwater levels,
- forecast when With-Project water levels become deeper than Without-Project water levels,
- forecast any localized areas of concern and/or monitoring (i.e., AOCs), and
- identify domestic wells at risk of impact.

A condition is considered a negative project impact when the With-KWB water level is 45 feet deeper than the Without-KWB water level, as forecasted by model results. The Joint Operations Committee established a process to respond to and evaluate landowner claims associated with KWB and Rosedale operations. The Joint Operating Committee uses an average of the output from the KWBA (AMEC) Model and the Rosedale (Harder) Model for this effort, or based on the experience gained, it may select a mutually agreeable groundwater model capable of accurately predicting groundwater impacts of KWB and Rosedale operations. The Joint Operating Committee provides the status of groundwater conditions, pumping rates and volumes, and model projections to each entity to identify any developing problems, and facilitates discussions within any localized AOCs. Recovery in any calendar year shall not commence until the models have been run for the projected operations and the Joint Operating Committee has met to review the results.

The Interim Operations Plan also describes specific triggers and actions for wells within an identified AOC, which includes agricultural wells, domestic wells, and other landowner claims. The plan also includes provisions for how to handle landowner claims and disputes.

The Interim Operations Plan obligates KWBA and Rosedale to contribute funds to meet mitigation obligations in an action fund: $2 per acre-foot of recovered water from future project operations (actually pumped, not exchanged) until the Action Fund balances reaches $1.0 million. If the Action Fund balance drops below $500,000, contributions resume until the balance reaches $1.0 million again. KWBA was required to initially provide $250,000 for the Action Fund.

While the Interim Operations Plan is in effect, KWBA may repair or replace existing facilities, but may not take any action that would increase or augment its ability to recover water beyond its existing capacity (e.g., may not increase the horsepower of any well beyond that currently in place as of the date of the Interim Operations Plan). The three new wells to be constructed by KWBA as part of the Integrated Regional Water Management grant program shall be replacement wells that may not be constructed within 1.5 miles of Stockdale Highway, and are not subject to the horsepower limitations.

b. Impact Mitigation

The KWBA-Rosedale Interim Operations Plan and the Rosedale – Pioneer Project Plan each requires the formation of a Joint Operations Committee (JOC) that oversees the implementation of their respective plans, including the establishment of a process to respond to and evaluate landowner claims associated with project operations including prior (non-abandoned) 2010 landowner claims. For the sake of expediency and efficiency, the two separate JOCs have established a process whereby landowner claims are responded to and evaluated at joint meetings and in an otherwise coordinated manner (hereinafter referred to, collectively, as the "JOC").

At the outset of the implementation of the plans, the JOC sent letters to those who in or about 2010/2011 made claims of groundwater impacts to various local groundwater banks and landowners in areas of concern. These letters alerted them to the potential for groundwater level declines to affect their wells and that the groundwater bank participants may be able to provide funds to help alleviate those impacts. Since approximately December 31, 2015, the JOC has evaluated and responded to claims filed before the Interim Plan and has received about 21 new claims from 2015. Of the pre-Interim Plan claims, eight were processed for payment and eight were rejected. Of the 2015 claims filed after the Interim Plan, 13 have been processed for payment, six have been rejected, and three were pending as of December 31, 2015.

The JOC has authorized payments totaling approximately $447,800 as mitigation for the processed claims. These payments have been pro-rated based on the relative contribution of each of the projects toward an impact. The KWB share of these payments has been about 15%; the other projects' collective share (Rosedale and Pioneer) has been about 85%. The mitigation measures that have been funded have included the following improvements: providing a permanent connection to a municipal provider, lowering pumps in existing wells, and drilling deeper wells. These improvements provide for a more reliable water supply for the current and future droughts, meaning that future impacts are less likely to occur because wells particularly vulnerable to declining groundwater levels have already been permanently mitigated. The JOC has also paid for and provided emergency water for domestic uses while evaluating claims, where needed.

8. 2016 Long-Term Project Recovery Operations Plan Regarding the KWB

Consistent with the 1995 KWB MOU governing its banking project, KWBA has adopted a Long-Term Project Recovery Operations Plan Regarding Kern Water Bank Authority Project (2016 Long-Term Operations Plan)(Appendix 7-5c). This plan applies to neighboring landowners currently using groundwater for overlying uses from an agricultural supply or domestic well. It does not apply to new wells that are installed to unsuitable depths based on historic water level fluctuations.

Plan components include:

- Establishing a protocol for monitoring and reporting groundwater conditions to the KWBA Board of Directors and the public, including reporting groundwater levels monthly and regularly updating its groundwater model to actual conditions;

- Using the groundwater model as a tool to forecast groundwater levels and evaluate groundwater impacts resulting from KWB operations; and
- Establishing triggers and actions to mitigate and/or compensate for legitimate claims for KWB impacts to agricultural supply wells and domestic wells.

Rosedale has adopted a similar plan to prevent, eliminate, or mitigate potential impacts from its projects; the plan is part of its Stockdale Integrated Banking Project Draft EIR dated April 2015. KWBA expects that an agreement may be developed with Rosedale and the Pioneer Project for the coordinated implementation of long-term banking operations plans.

C. Facilities – 2014

1. Facilities Development Plans

KWBA's purpose for development of the KWB was to permit the delivery, percolation, and storage of water in aquifers for later extraction, conveyance, and use for the benefit of the project participants.[8] By the end of 2005, KWBA's construction plans for the KWB included the completion of a Master Plan, the repair and rehabilitation of existing wells under an energy conservation program funded in part by the State of California (SB 583), the expansion of the turnout and channel providing water to the W-4 pond, and the River Area Construction Project, as described in Table 4. Other recent activities include constructing fencing along the property perimeter and rehabilitating wells and replacing aging pipelines and proposed activities, including the construction of some new ponds, have been added to Table 4.

Table 4. KWBA Development Projects

Project	Years	Activity
KCWA Flood Emergency Program	1995	Construction of 3,034 acres of recharge ponds.
KWBA pond construction	1997	Construction of two emergency ponds (W-3 and W-4) totaling 1,013 acres, two berms approximately 7 miles long, associated structures, and piping (added 6,000 AF recharged from construction activities)
KWBA pond construction	1998-2002	Construction of 4,290 ~~4,080~~ acres of recharge ponds, 19 new basins, 28.5 miles of new berms, and structures and piping in 1998.
Conveyance Pipeline	2001	Construction of 2-mile-long Strand Pipeline.
Master Plan	1999-2002	Rehabilitation of 10 existing wells, installation of 31 new wells, installation of pipeline to the new wells, and the construction of the Kern Water Bank Canal, that connects the Kern River and the California Aqueduct.
SB 583 Pump Repair and Well Rehabilitation	2002-2003	Repair and/or rehabilitation of 10 existing wells pursuant to this program, including the removal of existing well pumping equipment, well-testing, well-casing rehabilitation of some wells, pump repair or replacement, and the

[8] The Kern Water Bank Infrastructure Development, the Kern Fan Monitoring Committee, and Groundwater conditions, Dec. 14, 2004, ~~Appendix A,~~ p. 2

Table 4. KWBA Development Projects		
Project	**Years**	**Activity**
Program		reassembly of the wells.
Expansion of the W-4 Pond Turnout and Channel	2003	Enlarged turnout structures and channel to the W-4 pond; included installation of additional weir boxes and the enlargement of the channel conveying water to the ponds.
River Area Construction Project	2004-2005	Construction of eight additional recovery wells, pipelines for these eight wells and an additional seven wells, a conveyance pipeline to route the recovered water from these 15 wells to the Kern Water Bank Canal, and a lift station (100 cfs capacity) to convey water for recharge purposes to River Area ponds.
Fencing	2005-2006	Constructed fencing along the perimeter of the property.
Well Replacement & Rehabilitation	2009, 2010	Replaced well 30S/25E-8J1 with 8J2. Rehabilitated wells 30S/24E-12H, 12R, 13C, and 13H. Constructed pipelines for the rehabilitated wells. Reconstructed pond C9.
Kern Water Bank Pipeline / Miscellaneous	2011	Replaced aging pipelines, improved the P-11 canal, installed piezometers, installed weir boxes, installed fencing along the KWB Canal, graveled roads, repaired well pumps, and installed telemetry links. Installed pipeline across the western portion of KWB Lands.
Well Replacement / Miscellaneous	2012	Drilled three replacement wells (30S/25E-9L2, 15L1, 18A2), installed weir boxes, installed fencing along the Kern Water Bank Canal, graveled roads, and repaired well pumps.
Well Pipelines and Miscellaneous	2013	Constructed pipelines for three replacement wells, installed barbed wire fencing in River area, installed weir boxes, graveled roads, and repaired well pumps.
Traveling Screen	2014	Installed a traveling trash rack screen at River Canal pipeline inlet.
Integrated Regional Water Management Program	2015-2016	Design and future construction of approximately 190 acres of recharge ponds, three wells, and associated facilities (e.g., recovery pipelines, pumps, and motors).
Master Plan (Full Buildout)	2017	Design and future construction of approximately 862 acres of recharge ponds
Source: The Kern Water Bank Authority, HCP/NCCP ~~2003~~ Annual Reports and ~~2004 2005~~ Management Plans, ~~May 1, 2004~~ and KWB Facility Master Plan, various years.		

2. Facilities Constructed through 2014

Since the transfer of the KFE property, KWBA has constructed recharge ponds, the Kern Water Bank Canal, extraction wells, and pipelines to convey recovered water from operational wells, and has rehabilitated some existing wells (Figure 6A). Figure 6 shows facilities constructed through 2005.

a. Recharge Ponds

In 1995, under the KCWA flood emergency program (see Section III.B) and prior to the formation of the KWBA, KCWA and the other future participants of the KWBA constructed approximately 3,034 acres of recharge ponds (Figure 3). From 1998 through 2002,~~2003~~, KWBA constructed an additional 4,290 ~~4,080~~ acres of recharge ponds, some of which overlapped earlier constructed ponds, for a total net pond area of 7,114 acres. An additional 70 acres of ponds were constructed in 2009 for a total pond area of 7,184 acres. Of this total, 4,998 ~~4,699~~ acres of the recharge ponds constructed are located within the Recharge Sector and 2,186 ~~2,415~~ acres within the Farming Sector. The ponds consist of low earthen berms~~levees~~ that pond water to depths of a few feet. This water percolates into the alluvial fan for recharge into the aquifer. Water flows between the ponds in small channels; operators control the flow with small weir boxes.

b. Recovery Wells

Sixty-five agricultural wells were present on the KFE property when it was acquired by the Department in 1988. At the time the property was transferred to KCWA, 31 of these wells were considered operable, although 3 of these were not connected to any conveyance facilities. The remaining 34 were idle wells in various states of disrepair.

KWBA has installed 44 ~~39~~ new wells in several phases to accommodate groundwater recovery. The first phase of 29 ~~31~~ wells and two replacement wells was completed in 2001. Eight additional wells were completed in early 2005, two wells were replaced in 2008-2009, and three more were replaced in 2013. KWBA also rehabilitated 14 ~~ten~~ existing wells and repaired an additional 13 wells. ~~As of December, 2006, a total of 79 wells are operable.~~ The construction of three additional replacement wells is under way. Once these wells are complete, a total of 88 wells will be operable (29 pre-transfer wells, 37 new wells, 10 replacement wells, and 12 rehabilitated wells). All KWB well pumps are electric.

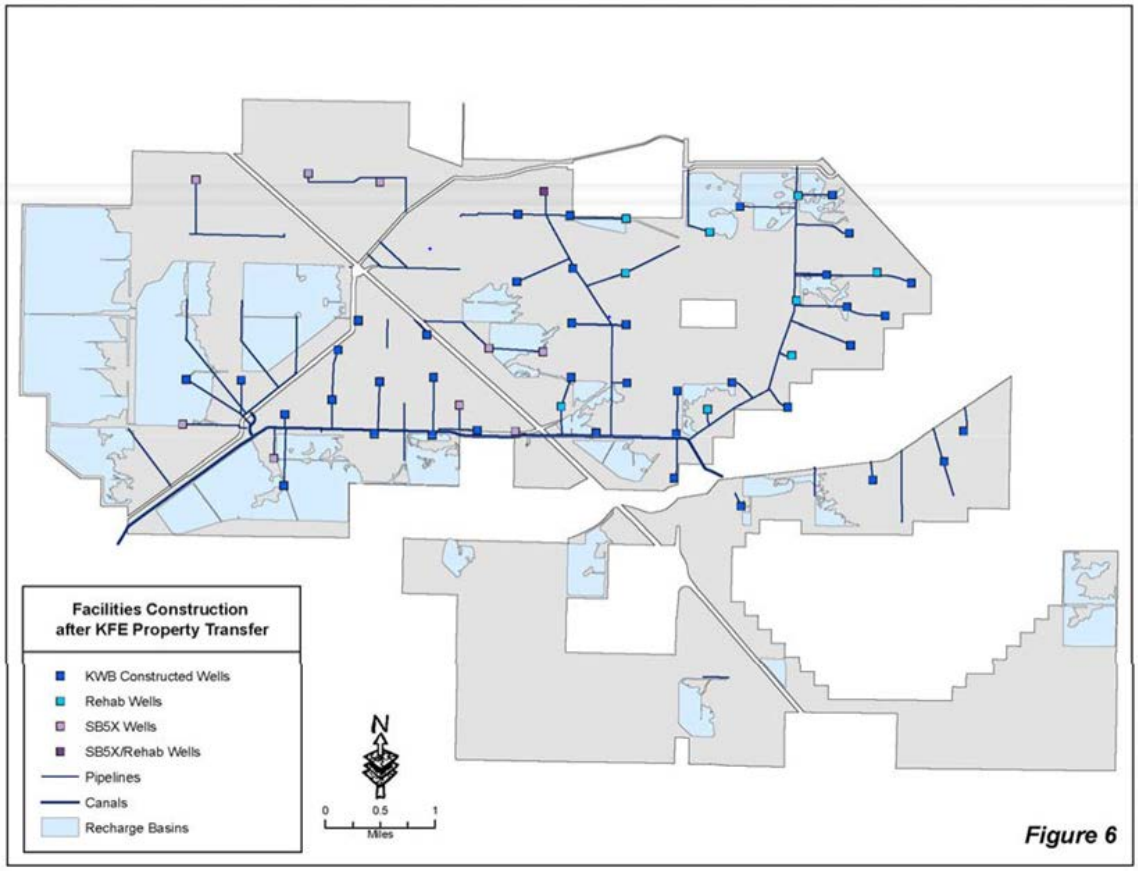


Figure 6

c. Conveyance Facilities

i. Primary Conveyance Facilities

The KWBA constructed the Kern Water Bank Canal from the Kern River to the California Aqueduct; the canal is approximately 6 miles long and 90 feet wide. Associated structures include headworks at the Kern River, a check structure, a 545 cfs pump station, and diversion facilities at the California Aqueduct. The canal is bi-directional and will receive or deliver about 800 cfs from or to the California Aqueduct or from the Kern River. The western reach of the canal is at the same elevation as the California Aqueduct; therefore, conveyance of water through the western reach does not require pumping energy. In addition to delivering water to and from the KWB, the canal can also deliver water for others (e.g., SWP water to West Kern WD recharge ponds, recovered water from the Pioneer Project to the California Aqueduct). KWBA began construction of the Kern Water Bank Canal in 1999 and completed the canal in about ~~October 2000~~January 2001.[9]

The KWBA installed small diameter (15" to 24") PVC pipelines to transport water recovered from extraction wells to existing canals or to large diameter (60") high-density polyethylene

[9] ~~The Kern Water Bank: Infrastructure Development, the Kern Fan Monitoring Committee, and Groundwater Conditions. December 14, 2004.~~

pipelines.

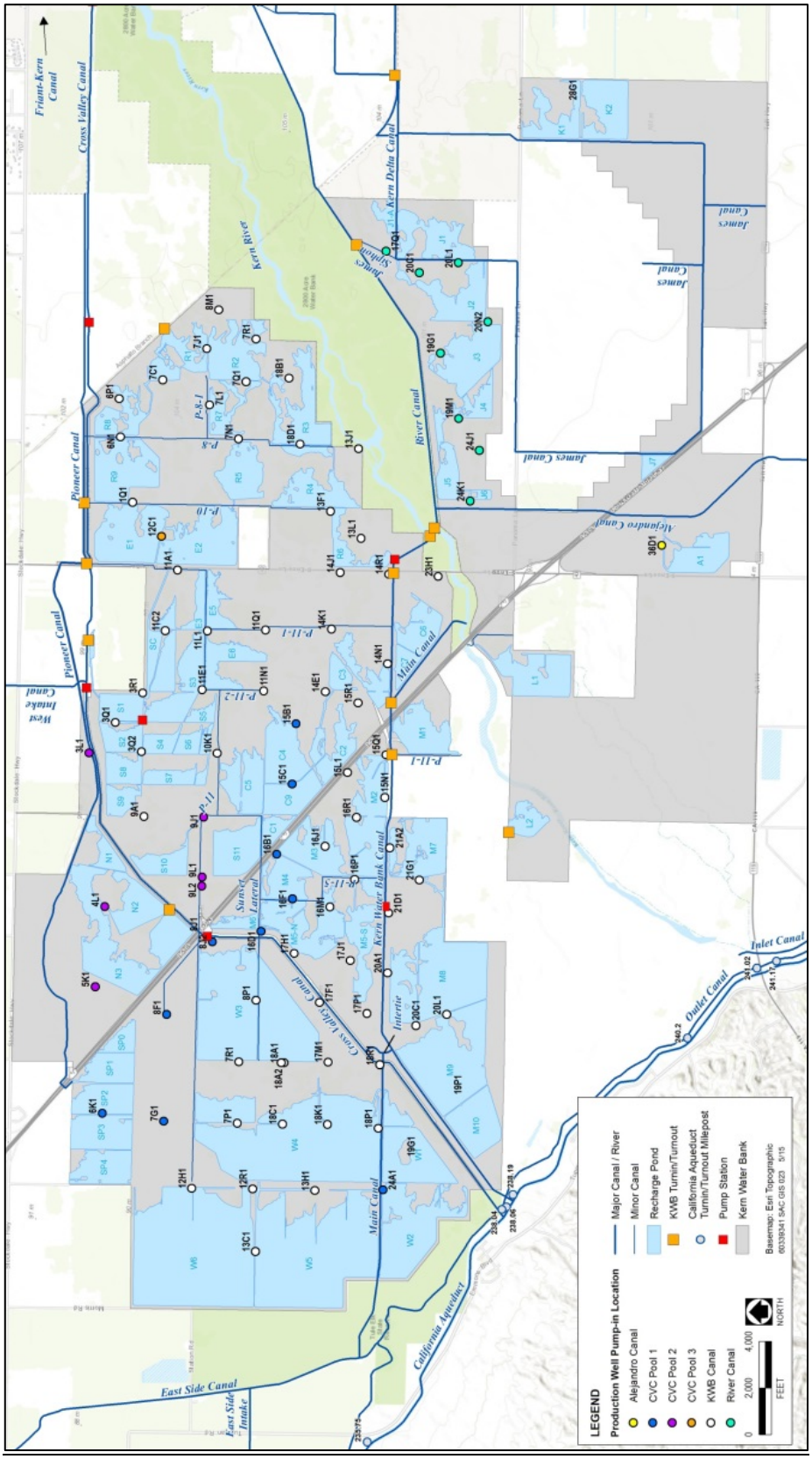
SWP water delivered to the KWB is delivered from the California Aqueduct to either the KWB Canal or CVC. This water is then typically delivered directly via turnouts from both of these canals to groups of recharge ponds (Figure 6B). If supplies are substantial enough, water may be delivered from the CVC to the Kern River channel or the River Canal to reach KWB ponds in the southeastern portion of the bank. The Kern River channel and River Canal are the primary facilities used to deliver Kern River and Friant-Kern Canal (FKC) water to the KWB.

Recovered water is delivered either directly or by exchange from the River Canal, KWB Canal, and/or CVC to the California Aqueduct. The CVC is bi-directional; therefore, recovered water pumped into to the CVC may be exchange delivered west to the California Aqueduct, depending on demands or delivered to the east for participant use or exchanged. The Alejandro Canal is used to deliver water to and from one pond and one well.

The Department measures all deliveries to and from the California Aqueduct at the KWB Canal and CVC. KCWA measures all direct deliveries from the CVC to the KWB. KCWA, the City of Bakersfield, and/or BVWSD measure all other deliveries (e.g., the Kern River Channel and River Canal). All of these agencies reconcile delivery data where responsibilities are tiered (e.g., the Department and KCWA for the water to/from the California Aqueduct, or KCWA/City of Bakersfield/BVWSD for Kern River water).

ii. Secondary Conveyance Facilities

Secondary conveyance facilities include the Pioneer Project, the Pioneer and James Canals, and several former irrigation ditches (Figure 6A). Water to portions of the easternmost KWB Lands are delivered from the Kern River through the Pioneer Project to the KWB. Kern River diversion structures exist at Basins 9 and 10 of the City of Bakersfield 2,800-Acre Groundwater Recharge Facility, which ultimately conveys water through the North Pioneer Property and then onto KWB Lands via a diversion structure in the Pioneer Project berm and underneath a railroad trestle. The Pioneer Canal delivers water across the northern portion of KWB Lands to select ponds in the northwestern most portion of the bank, the James Canal delivers water from the Pioneer Project to ponds in the southeastern most portion of the bank, and the irrigation ditches distribute water to select KWB ponds throughout the bank. Weir boxes control flows in these facilities, as well as all flow between ponds.



Source: KCWA, 2014, AECOM, 2015. Kern Water Bank Operations Facilities Map **Figure 6A**

D. Land Use

The KWBA utilizes the lands of the KWB ~~KFE property~~ for various purposes. The KWB Lands ~~KFE property is~~ are used primarily as a water recharge and recovery facility. Numerous recharge ponds, wells, conveyance facilities, etc. (see Facilities section above) have been constructed on the property and its land use "purposes" have not changed since 1995.

In 1997, the KWBA initiated vegetation and restoration programs. The goal of these programs is to protect existing and newly established sensitive habitats for long-term management. Exotic pest plant control is also an important long-term management activity. Annual mowing, livestock grazing (both cattle and sheep), and prescribed burning are all utilized for vegetation management. Limited applications of selective herbicides are used in most years to help control exotic pest plants.

~~On a limited basis, KWBA has planted various plant species based on the HCP/NCCP. Cottonwoods, willows, and grasses are examples of species planted to enhance percolation within the recharge basins and for wildlife habitat.~~The water banking activities have established habitat along the edges of recharge basins and earthen canals, where willows, cottonwoods, sedges, and other wetland vegetation have emerged. In retired farm areas that are returning to natural conditions, there is an increase in the number of species and individuals at the KWB, including listed species like Tipton kangaroo rats, and San Joaquin kit foxes.

Under the direction of CDFG, safflower was ~~is~~ farmed annually, usually around 70 acres, to enhance dove habitat and to be utilized in an annual dove hunt. In years with sufficient water, there was ~~is~~ also a CDFG sponsored waterfowl hunt on designated recharge ponds on the KWB Lands~~KFE property~~. Neither of these activities are current activities on the KWB Lands.

Various oil and gas companies maintain use of parcels on the KWB Lands~~KFE property~~ to exercise their mineral rights on the property. Since 1996, several oil company-related construction projects have occurred. For example, Chevron Pipeline Company in 1998 removed 44,227 feet of pipeline, of which 27,000 was on the KWB Lands~~KFE property~~. Various companies enter the KWB Lands~~KFE property~~ regularly to conduct maintenance-related surveys of their equipment and to ensure environmental compliance. If environmental issues are observed by the KWBA related to any oil or gas facilities, the representative companies are contacted immediately to ensure proper action.

As part of the monitoring undertaken by the KWBA in compliance with the HCP/NCCP, annual reports are issued summarizing land use by wildlife, any environmental take related to activities on KWB Lands~~KFE property~~, and habitat and vegetation restoration efforts. There has been ~~only one~~ three occurrences of the take of an endangered species on the KWB Lands~~KFE property~~. In 1995 and 1996, three Tipton kangaroo rats were caught during trapping efforts and temporarily relocated during the construction of the Kern Water Bank Canal, then placed back in the area alive and well after the construction was complete.

1. Mitigation Lands

The HCP/NCCP establishes permanent mitigation lands on the KWB Lands (see Table 1). These lands include a DWR Mitigation Parcel of 530 acres, and a KWBA Mitigation Parcel of 635 acres (which is part of the Compatible Habitat acreage shown in Table 1). As part of the mitigation effort laid out in the HCP/NCCP, agencies and qualified third parties are allowed to purchase Conservation Credits for projects that may cause temporary or permanent disturbance to lands that includes much of the San Joaquin Valley portions of Kern, Kings, and Tulare counties. For more information on this process, refer to the "Conservation Bank Agreement" included in Volume II of the HCP/NCCP.[10] As of 2013, 1,266 of the one-acre 3,267 credits have been sold.[iv(c)]

E. Proposed Facilities (2015 – 2030)

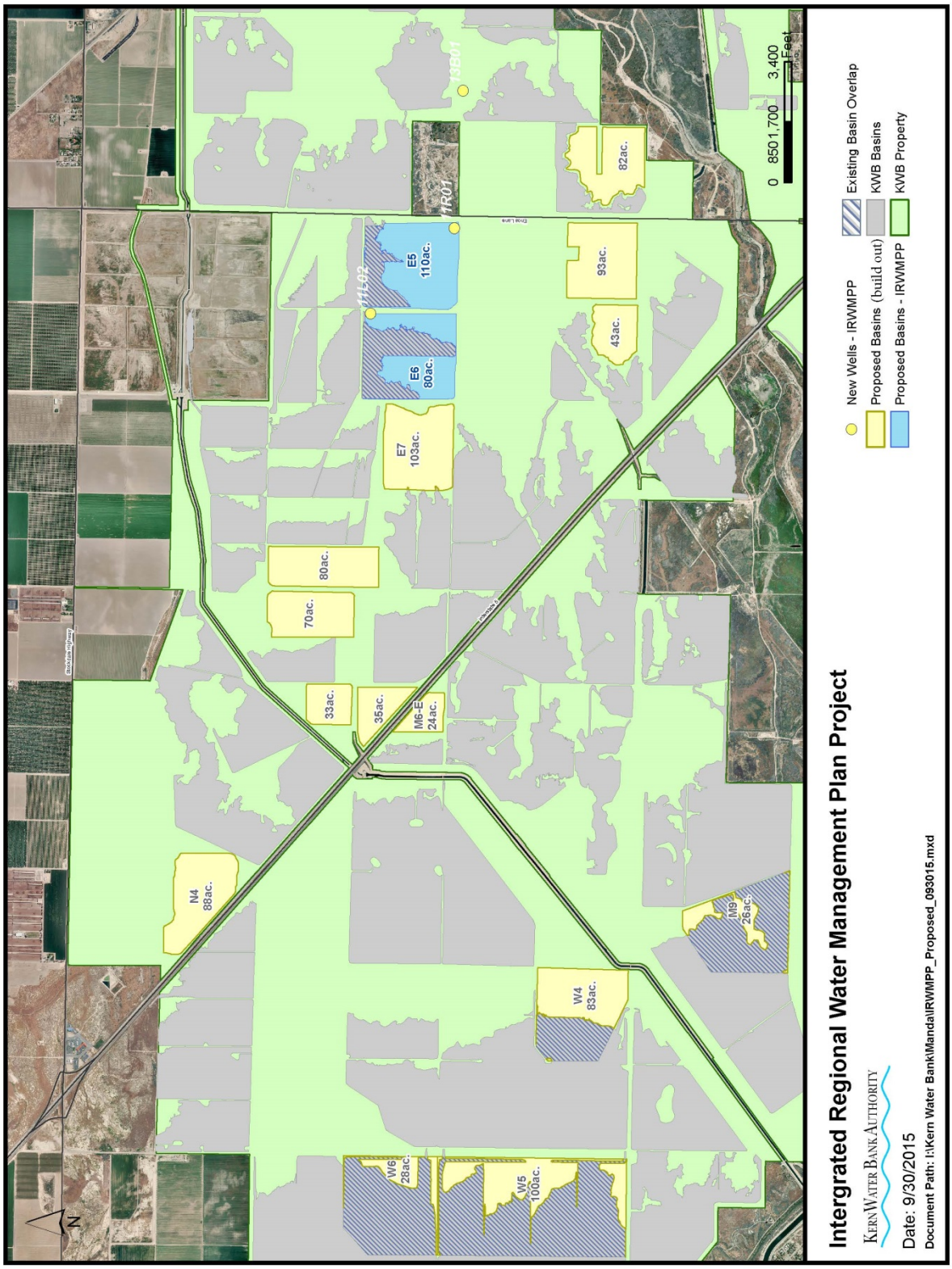
Near-term future KWB activities include construction of approximately 190 acres of recharge ponds and three wells under the ongoing Integrated Regional Water Management (IRWM) program (Kern Water Bank Recharge and Recovery Project). Longer-term future construction of approximately 862 acres of additional recharge ponds and associated facilities is anticipated as part of full build-out (see Figure 6B). In addition to the new recharge ponds, wells, and associated facilities, other potential ground-disturbing activities could include: fencing, constructing replacement recovery wells, installing and replacing pipeline, and installing weir boxes. Maintenance of existing and new basins, wells, and ancillary facilities would also take place. The IRWM program ponds have been sited. The locations of additional ponds are approximate but consistent with the KWB HCP/NCCP requirements; final locations and areas will be determined as these facilities are designed.

KWBA has also issued a Notice of Preparation in 2012 for the proposed Kern Water Bank Conservation and Storage Project, which would use existing facilities to divert available unappropriated water from the Kern River to increase reliability and enhance the dry-year water supply of KWB participants through storage in the KWB.

No new water conveyance facilities to convey KWB-recovered water are anticipated to be constructed by KWB participants; KWB participants have facilities in place to convey and exchange recovered water.

A KWB Short-Term Storage Program has been proposed which would provide a joint use facility on KWB Lands for KWB participants, and also provide a second priority use for other KCWA member units. The program would consist of lift stations, turnouts, gates, and earth work necessary to temporarily store and return water to the California Aqueduct. It is estimated that approximately 5,000 AF could be stored and returned every 5 years, providing a new water supply to KWB participants. Although the proposed program was submitted for funding in response to the Tulare Lake Basin portion of the Kern County Integrated WRMP, project development and CEQA compliance has not been initiated and funding has not been received.

[10] More information on this process is contained in the "Conservation Bank Agreement" included in Volume II of the HCP/NCCP, on file with the Department.



Source: KCWA, 2014, AECOM, 2015.

Future Recharge Ponds

Figure 6B

VI. KWBA's KWB Operations

A. Overview of Kern County Water ~~Operations~~Sources and Water Management

This section provides an overview of water sources ~~general water operations~~ within Kern County and an overview of how water is exchanged, transferred, and accounted for among Kern County water districts. While other water districts' ~~these~~ operations are not directly related to the KWBA's KWB operations, this overview is intended to provide some background for general water operations within the county, and some context for how KWB operations fit within that complex water management system.

1. Water Sources

Kern County residents have historically used surface water primarily from three sources: the Kern River and other local streams, SWP, and CVP. The SWP delivers water from the north via the California Aqueduct. The CVP delivers water from the north via the California Aqueduct and Cross Valley Canal, and from the central Sierra via the Friant-Kern Canal. The Kern River system and other local streams drain the southern Sierra. Local conveyance facilities, including the Kern Water Bank Canal, Cross Valley Canal, and Pioneer Canal, can be used convey water from these primary sources to various parts of the KWB Lands~~KFE property~~.

a. Kern River and Other Local Streams

The Kern River has historically been a primary source of surface water to Kern County. North Kern WSD, Kern Delta WD, Buena Vista WSD, KCWA, and the City of Bakersfield are ~~the major~~ holders of Kern River surface water rights.

In most years, water users divert all Kern River flow downstream from its entrance to the valley, northeast of Bakersfield, and as a result the river channel through the KWB Lands~~KFE property~~ is typically dry. However, in extremely wet years, the Kern River Intertie diverts Kern River flows into the California Aqueduct to prevent downstream flooding. From 1978 through 2006 (the latest date of flood flows), approximately 1.5 million AF have flowed through the Kern River Intertie into the California Aqueduct. ~~Since 1978, over 1,000,000 AF of Kern River water has flowed through the Kern River-California Aqueduct Intertie. During the same period, an additional 430,000 AF of Kern River water bypassed the Intertie via the Kern River flood channel.~~ These flood flows have exceeded the available capacity of recharge facilities in Kern County since KCWA constructed the Intertie in 1977.

In very wet years the significant quantities of flood waters that otherwise would be diverted into the Intertie are available for recharge in the KWB Lands~~KFE~~ area. At other times, other pre-1914 appropriative water right holders can provide Kern River water for recharge in the KWB. Although these right holders are not partners in the KWB, KWBA participants may purchase Kern River water from them for storage in the KWB.

Water users can divert the flows of the Kaweah, Tule, and Kings Rivers stream groups on the east side of the San Joaquin Valley and convey the water via the Friant-Kern Canal to its terminus.

From the terminus, water users can release the water into the Kern River channel or through various connections into the Cross Valley Canal. As with Kern River water, pre-1914 appropriative water right holders can provide Kaweah, Tule, and Kings Rivers water for recharge in the KWB. Although these right holders are not partners in the KWB, KWBA participants may purchase water from them for storage in the KWB. The availability of this water depends on runoff, upstream reservoir storage capacity, in-river uses, irrigation demand, and FKC capacity. Historically, if not diverted into the FKC, these waters would have eventually flooded the Tulare Lake bed (located north of the Kern River).

b. SWP

The SWP is a large source of non-local water for Kern County. As of 2014, KCWA has a SWP Table A amount of 982,730 ~~998,730~~ AF. Thirteen Kern County member agencies contract for this water from KCWA, and KCWA has retained a portion for itself and its Improvement District No. 4 (Table 5). Dudley Ridge WD, an SWP contractor located in Kings County, ~~currently~~ has a SWP Table A amount of 45,350 AF for the year 2014~~57,343 AF~~.

Table 5. KCWA Member Units That Hold Contracts With KCWA to Receive SWP Table A Water

Agency	Contractual Table A Amount (AF)
Belridge WSD	121,508
Berrenda Mesa WD	92,600 ~~108,600~~
Buena Vista WSD	21,300
Cawelo WD	38,200
Henry Miller WD	35,500
KCWA	8,000
Kern Delta WD	25,500
Lost Hills WD	119,110
Improvement District No. 4	82,946
Rosedale-Rio Bravo WSD	29,900
Semitropic WSD	155,000
Tehachapi-Cummings County WD	19,300
Tejon-Castac WD	5,278
West Kern WD	31,500
Wheeler Ridge-Maricopa WSD	197,088
Total	**982,730 ~~998,730~~**

Source: KCWA, **2014**~~2006~~.

KCWA and Dudley Ridge WD can recharge SWP Table A and Article 21 water when they have SWP water in excess of their immediate in-district demands (for more on these two water types, see Monterey Plus FEIR Chapters 13 and 14). They can also transfer or exchange water with other agencies to increase or reduce their water supplies in a year, or participate in arrangements that change the year of water deliveries.

c. CVP

CVP contractors in Kern County may receive water via the Friant-Kern Canal or the Cross Valley Canal, either directly or by exchange or transfer according to contract provisions with Reclamation.[11] Arvin-Edison WSD, Delano-Earlimart ID, Shafter-Wasco ID, and Southern San Joaquin MUD have Friant Division long-term contracts with USBR.

Reclamation's contracts with Friant-Kern contractors include a two-class system of water allocation. Municipal and industrial (M&I) and agricultural water users who have limited access to good-quality groundwater have Class 1 contracts, which are based on a firm water supply. Reclamation delivers the Friant-Kern's first 800 TAF of annual water supply under Class 1 contracts.[12] Class 2 water is a supplemental supply; Reclamation delivers Class 2 water directly for agricultural use or for groundwater recharge, and these are areas that generally experience groundwater overdraft.

In addition to Class 1 and Class 2 water deliveries, Reclamation delivers water that would otherwise be released for flood control purposes. Section 215 of the Reclamation Reform Act of 1982 authorizes the delivery of unstorable irrigation water that would be released in accordance with flood control criteria or unmanaged flood flows. Reclamation's delivery of Section 215 water has enabled contractors to recharge more water for groundwater replenishment than could otherwise be supported with only Class 1 and Class 2 contract deliveries.
In addition to the Class 1, Class 2, and conjunctive management aspects of Friant Division operations, some districts often arrange annual water transfers with other districts. These transfers provide opportunities to improve water management within the Friant service area. In wet years, districts that have water surplus to their needs can transfer water to other districts with the ability to recharge groundwater. Conversely, in dry years, districts that store water can return water to districts with little or no groundwater supply; these arrangements provide an informal groundwater banking program within the Friant Division.

KWBA participants do not have long term contracts for CVP water, but have purchased Section 215 and other flood waters from the CVP system through temporary contracts with Reclamation.

2. Water Management Exchanges and Landowner Transfers

Water transfers and exchanges have historically been and continue to be a regular part of water management in the San Joaquin Valley. Transfers are one-way transactions, where water from one agency is transferred to another, with no future return of that water. For KCWA, transfers with another agency are typically "landowner transfers," where a landowner that owns land within both KCWA and another agency's service area wants to transfer the water available to it from one agency for use on its land in the other agency's service area. Exchanges are two-way transactions, where water from one agency or source is delivered to another agency, in exchange for the return of a specified quantity of water. An exchange may involve a change in

[11] While CVP Contract water can be delivered to the KWB through the Cross Valley Canal, no such deliveries were ~~are not considered further in this study because, to date, no excess water has been~~ made available from 1996 through 2005 for KWB recharge from this source.
[12] USBR and DWR, 2003, Upper San Joaquin River Basin Storage Investigation, Phase 1 Investigation Report.

the timing of delivery of water (e.g., water from one agency is delivered to another, in exchange for water from the other agency delivered later that year or in a following year), or a change in the source of water delivered (e.g., water from a source available to one agency is delivered to another, in exchange for water from a different source). These transactions can provide a number of benefits, including improved water management, reduced costs for water delivery, and/or improved water quality.

3. Water Sales

Table 6 gives an account of water sales by KCWA member agencies and other entities within Kern County ~~to the Environmental Water Account (EWA)~~ in the years 2000 and 2001. The Environmental Water Account (EWA) accounted for almost 50% of KWB participant sales during that period (see Monterey Plus DEIR Section 6.3.2 for more detail on the EWA). The table gives the SWP water exchange total for both 2000 and 2001, lists the seller and their amount (in AF), the type of water banked, which facility or agency banked the water, and the date the water was released to the EWA. EWA sales continued for most years between 2000 and 2007, but ceased at the end of 2007 due to an expiration of the EWA Operating Principles Agreement among the five State and federal agencies. Figure 9A and Table 9A show the amounts of water that KWB participants sold to the EWA program through 2007. Similar quantities were sold in 2002, 2003, and 2007, with lesser amounts sold in 2004 and 2005. These sales were a significant portion ~~are representative examples of the types~~ of the water sales that occurred from the KWB ~~Kern County groundwater banks~~ from 1996 through 2007.

Other KWB participant water sales include water that went to agricultural entities within the San Joaquin Valley, a wildlife refuge, and a power plant located within Kern County. In addition to these types of sales, 4 percent of the water recharged and stored at the KWB can be purchased by adjoining groundwater districts within Kern County for overdraft correction purposes (see Table 9A).

Total water sales during 1995-2014 totaled approximately 592,000 AF (Table 9A Rows 14-18). Sales were significantly reduced after 2007 due to the end of the EWA program and participant usage due to drier water years, and for the future are expected to stay at the same level or lower. During 2008-2014, a total of 72,500 AF of KWB water was sold (Table 9A). Of that amount, the KWB participants sold 10,750 AF (15%) to San Joaquin Valley agriculture entities, 19,850 AF (27%) to a power plant in Kern County, and 41,900 AF (58%) to KWB adjoining water districts for overdraft protection.

KWB participant water sales and transfers to non-KWBA members outside of Kern County occur infrequently; from 2009 through 2014, there were no out-of-county sales (Table 9A, Row 15). Sales outside of Kern County are evaluated on a case-by-case basis first by KCWA and typically have restrictions that limit these transactions.

Table 6. Sales by Kern County Entities to the Environmental Water Account in 2000 and 2001				
Seller	**Amount (AF)**	**Banked Groundwater Type**	**Groundwater Banking Facility or Agency**	**Date Water Released to EWA**
2000 SWP Table A Allocation Exchange Water Purchased and Delivered in 2000				
Kern Water Bank Participants	31,555	Friant-Kern Flood	KWB	7/00
Kern Water Bank Participants	40,725	Kern River Flood	KWB	8/00
2000 SWP Carryover Table A Allocation Exchange Water Purchased and Delivered in 2001				
Arvin-Edison	10,000	Friant-Kern Flood	Arvin-Edison WSD	3/01
Rosedale Rio Bravo	19,036	Friant-Kern Flood	Rosedale Rio Bravo WSD	3/01
Westside Mutual Water Co.	15,000	SWP Table A Allocation	KWB	3/01
2000 SWP Exchange Subtotal			**116,316**	
2000 SWP Table A Allocation Exchange Water Purchased and Delivered in 2001				
KCWA for Nickel Family LLC[1]	10,000	Kern River Flood	Pioneer Project	5/01
KCWA/ID 4	10,000	Kern River Flood	KWB	6/01
Buena Vista/ Rosedale/ West Kern	20,218	SWP Table A Allocation	Buena Vista WSD	5/01
Buena Vista/ Rosedale/ West Kern	1,000	SWP Table A Allocation	Buena Vista WSD	5/01
Buena Vista/ Rosedale/ West Kern	2,500	SWP Table A Allocation	Buena Vista WSD	7/01
Semitropic WSD	10,767	SWP Table A Allocation	KWB	10/01
Semitropic/ Tulare ID	4,233	Friant-Kern[2]	Semitropic WSD	11/01
Westside Mutual/Tejon Castaic	21,000	SWP Table A Allocation	KWB	10/01
Cawelo WD	5,000	SWP Table A Allocation	KWB[3]	11/01
2001 SWP Exchange Subtotal			**84,718**	
2000 & 2001 Total			**201,034**	

[1] The Nickel Family LLC is a private company primarily invested in farming. Nickel was the owner of a pre-1914 Kern River Water Right, referred to as the Lower River Water Rights. KCWA recently purchased the Lower River Rights from Nickel, and as part of the deal, Nickel is supplied with 10,000 AF of water per year by KCWA. Nickel banks this water in KCWA's portion of the Pioneer Project.

[2] Tulare ID delivered non-CVP water to Semitropic WSD via a Friant-Kern exchange.

[3] Westside Mutual pumped its KWB account in exchange for a like amount of Cawelo's 2800-acre account that was assigned to Belridge on behalf of Westside Mutual.

Source: KCWA 2002

[NOTE: This table is not updated due to the ending of the EWA program in 2007. Table 9 presents EWA information through 2005. See Table 9A for recharge and recovery data through 2014.]

B. KWB Banking Operations

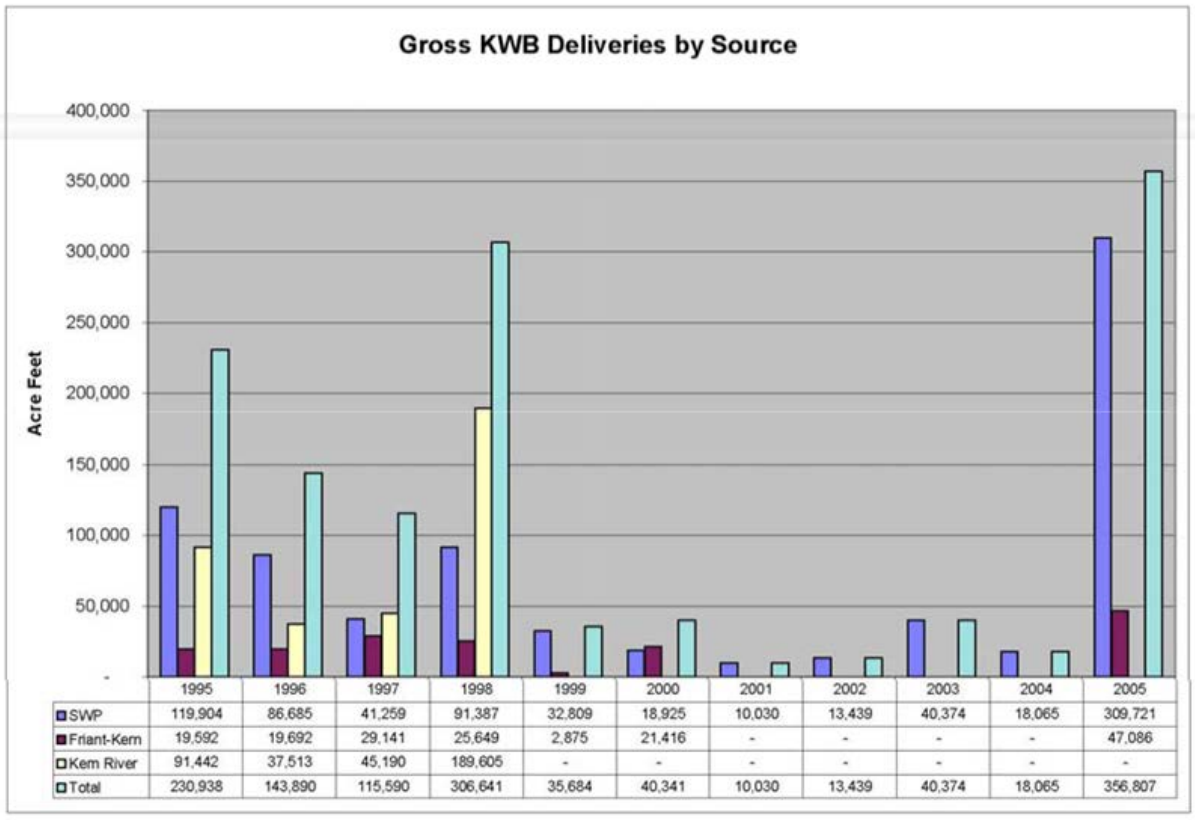
This paragraph describes the use of Tables 9 and Table 9A within this Revised Appendix E. In the DEIR Appendix E, Table 9 was used to generate Figures 7, 8, 9, 12, and 13. These figures are retained here as a representation of historical operations during 1996-2005. New Figures 7A, 8A, 9A, 12A, and 13A rely on updated operations data from Table 9A for the period 1996-2014.

It is important to explain here the reconciliation of water data by KWBA and KCWA within a year and even after several years. While Tables 9 and 9A may have some numbers that are different in years 1996-2005, the magnitude of water recharged and recovered is the same. For Figures 7 and 7A, for example, the magnitude of SWP water delivered to the KWB is comparable.

1. Recharge Operations

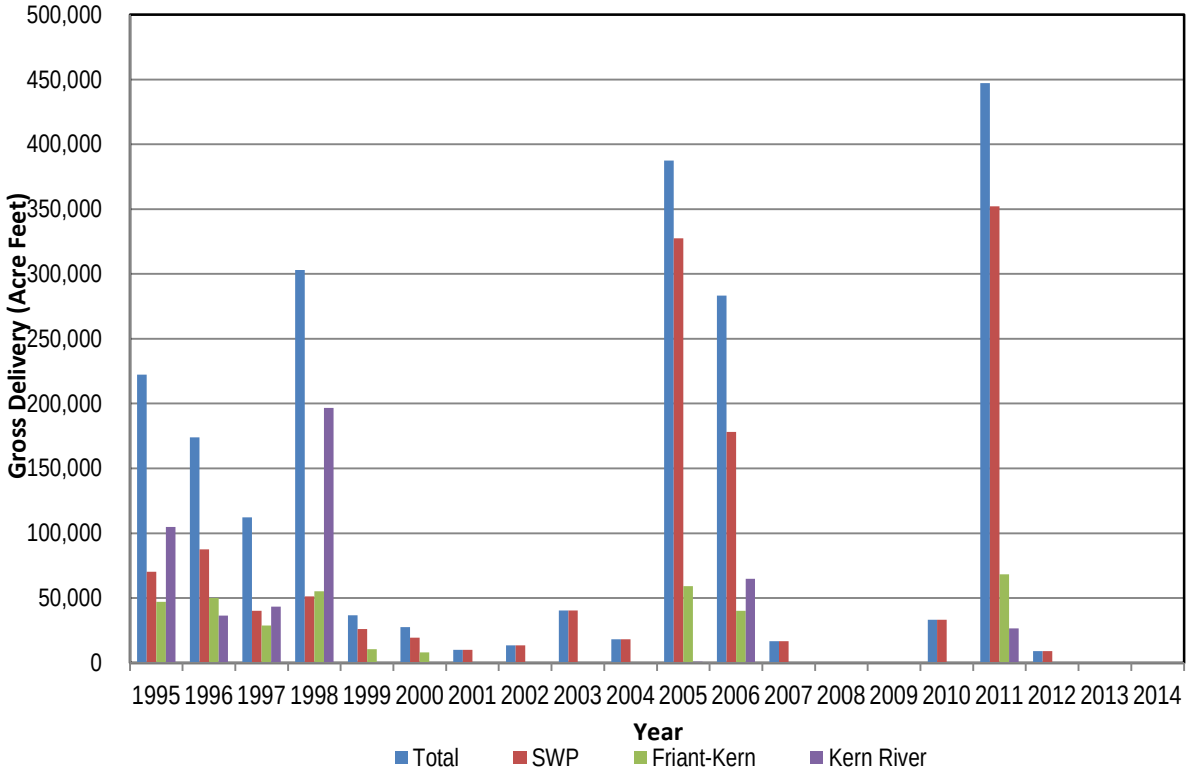
The recharge ponds are designed into several systems, consisting of a chain of basins that are interconnected by canals. Within each chain, which may change from time to time, the water flows from basin to basin through an interbasin structure which controls the water level in the preceding basin and the flow rate to the next basin in the chain. To the extent possible to prevent impacts on nesting birds, the basins are kept at a constant level during March through July, except for the basins at the end of a chain which are used to accommodate fluctuating flows.

From 1995 through 2005, KWBA delivered approximately 1.3 million AF of water for recharge. Most of this recharge occurred during 1995-1998 and 2005 (see Figure 7). From 1995 through 2014, approximately 2.1 million AF of water was delivered to the KWB for recharge. Most of this recharge occurred during 1995-1998, 2005-2006, and 2011 (Figure 7A). As would be expected, the volumes of water available for recharge are dependent upon California's annual water conditions. Table 7 shows the annual variability of statewide precipitation, Tulare Lake regional precipitation, SWP allocations, and CVP allocations from 1995 through 2014.



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
SWP	119,904	86,685	41,259	91,387	32,809	18,925	10,030	13,439	40,374	18,065	309,721
Friant-Kern	19,592	19,692	29,141	25,649	2,875	21,416	-	-	-	-	47,086
Kern River	91,442	37,513	45,190	189,605	-	-	-	-	-	-	-
Total	230,938	143,890	115,590	306,641	35,684	40,341	10,030	13,439	40,374	18,065	356,807

Figure 7



***Source*: KWBA, 2015.** **Gross KWB Deliveries by Source** **FIGURE 7A**

Table 7. California Water Conditions Data Relevant to Kern County					
Year	**State-wide Precipitation (% of average)**	**Tulare Lake Hydrolog. Region Precipitation**	**SWP Allocation (% of Table A request)**	**CVP Friant-Kern Allocation (Class 1/ Class 2)**	**Kern River Flows[13] (AF)**
1995	165	165	100	100/100	1,240,895
1996	115	105	100	100/58	953,127
1997	125	130	100	100/60	1,160,099
1998	170	190	100	100/10	1,533,906
1999	95	80	100	100/20	410,403
2000	100	95	90	100/17	465,213
2001	75	60	39	100/5	495,616
2002	75	80	70	100/8	350,547
2003	111	108	90	100/5	457,176
2004	88	66	65	100/8	421,423
2005	139	132	90	100/Uncontrolled	1,089,497
2006	136	129	100	100/Uncontrolled	1,043,819
2007	65	54	60	65/0	274,070
2008	80	79	35	100/5	502,431
2009	81	78	40	77/18	456,813
2010	108	114	50	100/15	794,932
2011	135	152	80	100/20	1,395,025
2012	7	75	65	50/0	383,394
2013	79	59	35	62/0	220,172
2014	56	48	5	0/0	177,552

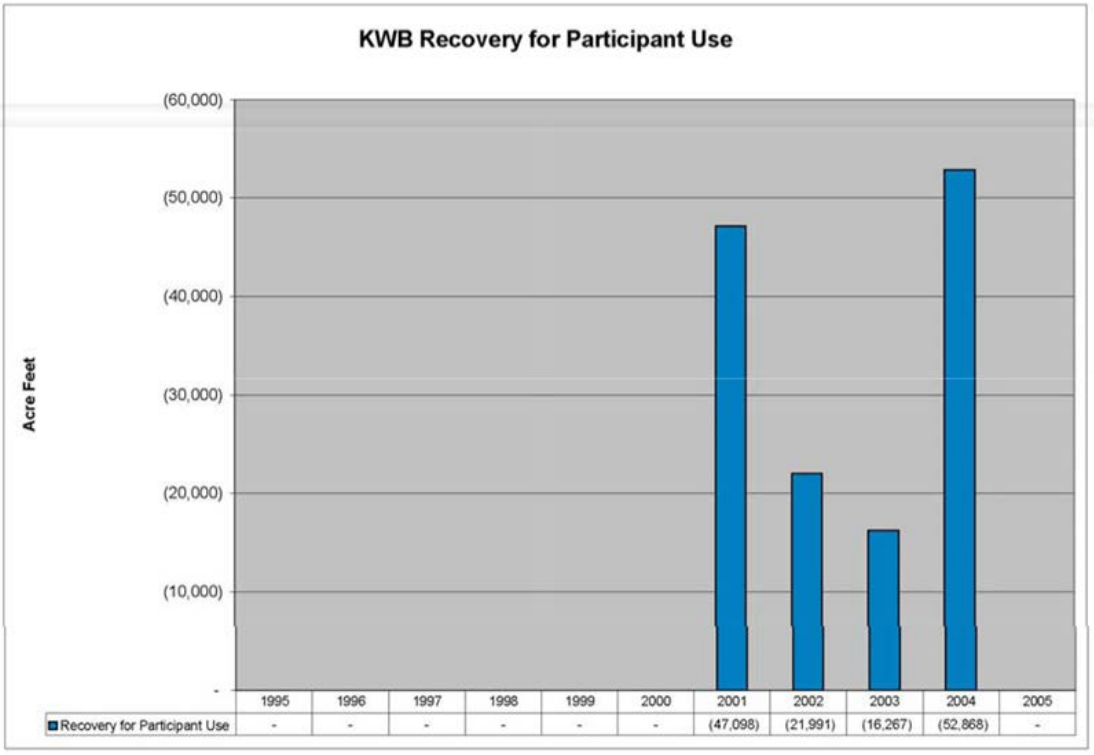
Source: DWR: CDEC, USBR (http://www.usbr.gov/mp/cvo/vungvari/water_allocations_historical.pdf)

Table 8 provides a summary of gross deliveries for recharge by source, as of December 31, 2005. Sixty percent of the deliveries were SWP water, 27 percent were Kern River water, and 13 percent were Friant-Kern water. Table 8A recharge percentages from 1995 through 2014 are relatively similar.

Table 8. Gross Deliveries for Recharge by Source 1995 Through December			
SWP (AF)	**Friant - Kern (AF)**	**Kern River (AF)**	**Total (AF)**
782,598	165,451	363,750	1,311,799
60%	13%	27%	na

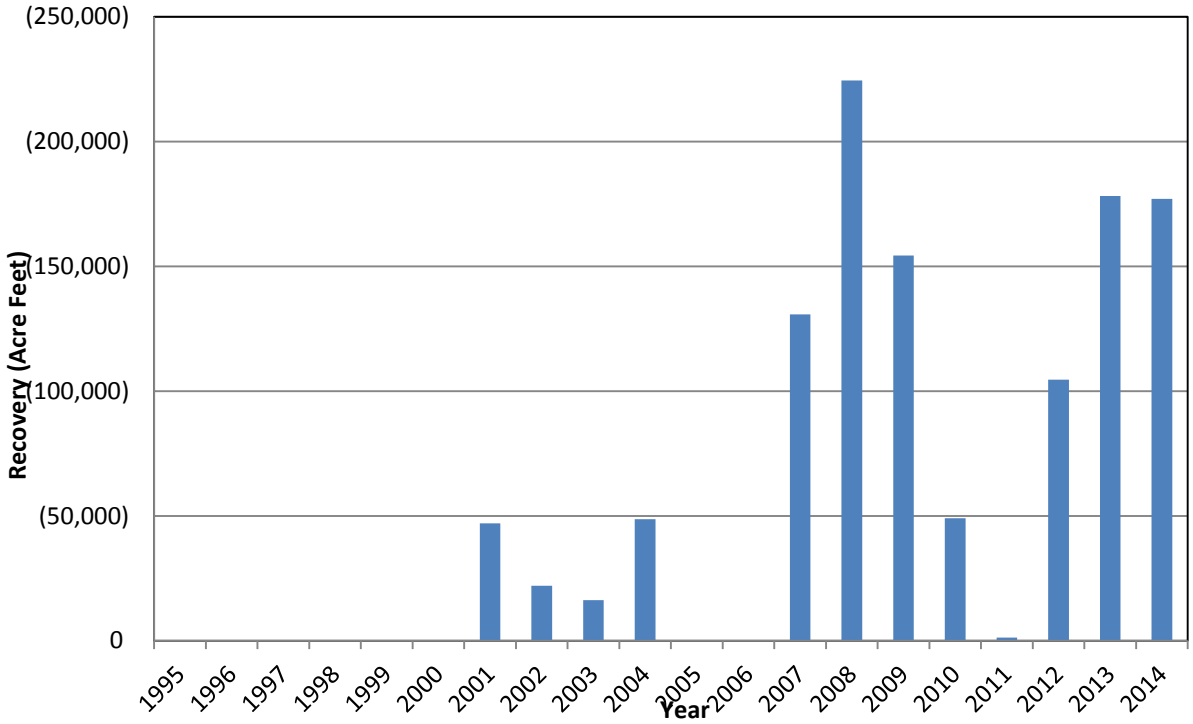
Table 8A. Gross Deliveries for Recharge by Source 1995 through December 2014			
SWP (AF)	**Friant - Kern (AF)**	**Kern River (AF)**	**Total (AF)**
1,292,956	367,382	474,100	2,134,438
61%	17%	22%	na

[13] Kern River downstream of Lake Isabella (Source: CDEC)

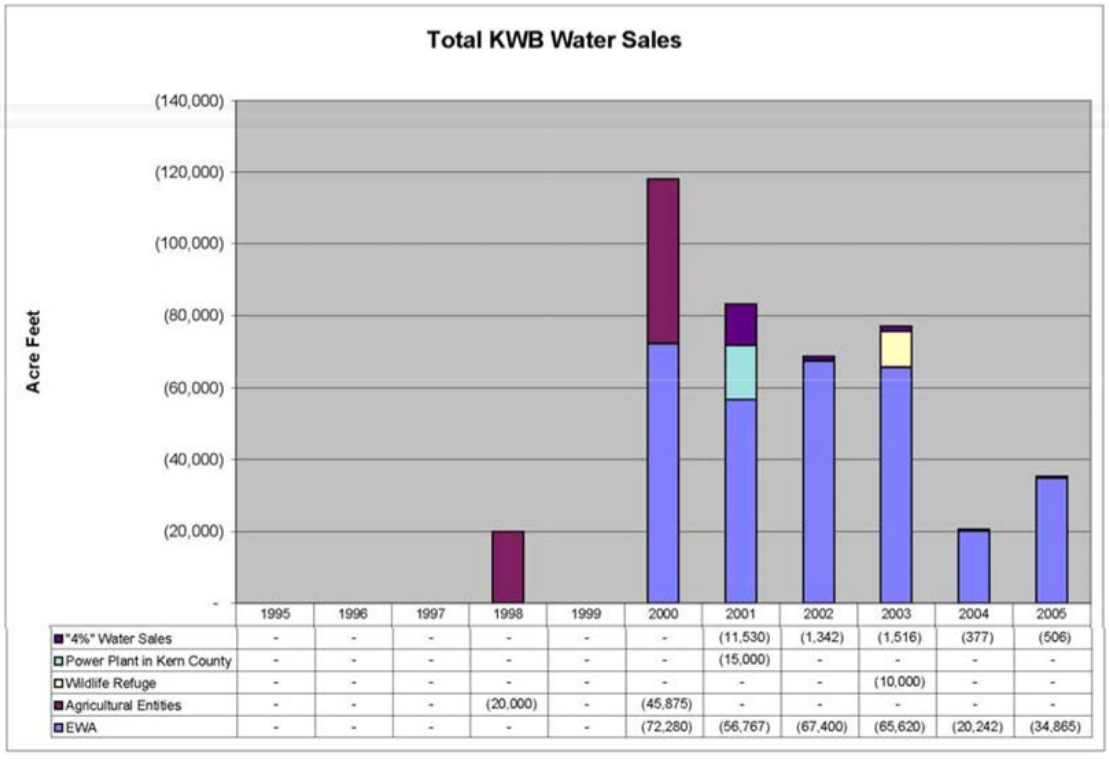


Data from Table 9, row 8. Includes Recovery by Pumping for Participant Use and Recovery by Exchange for Participant Use.
See Figure 9 for further explanation for Recovery by Exchange for Participant Use.

Figure 8



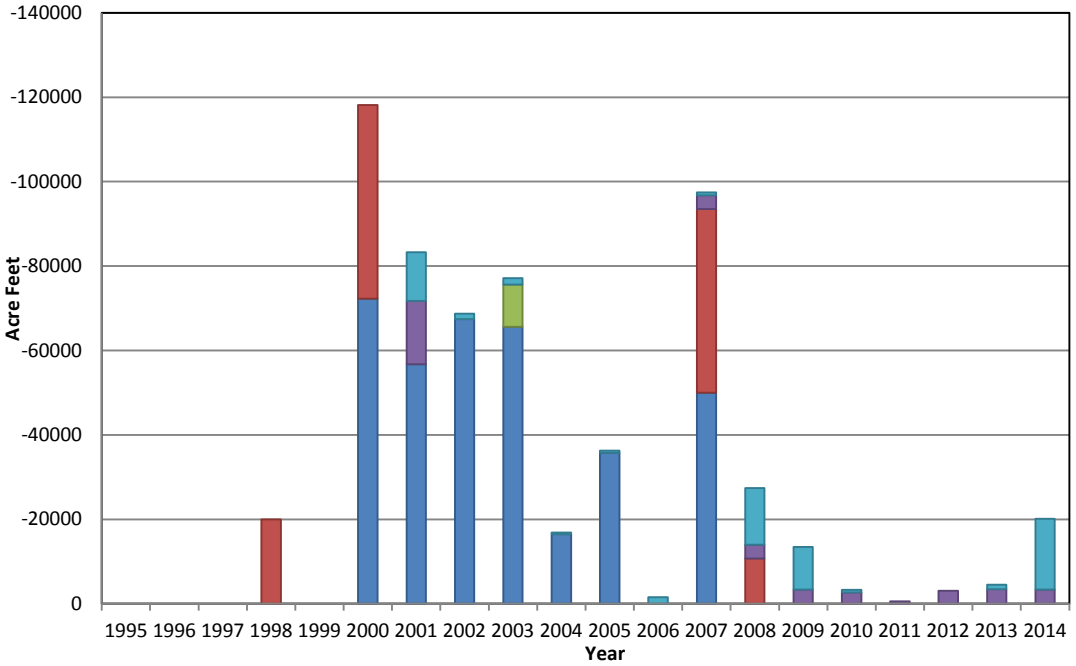
Source: KWBA**, 2015.** **Kern Water Bank Recovery for Participant Use** **FIGURE 8A**



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
"4%" Water Sales	-	-	-	-	-	-	(11,530)	(1,342)	(1,516)	(377)	(506)
Power Plant in Kern County	-	-	-	-	-	-	(15,000)	-	-	-	-
Wildlife Refuge	-	-	-	-	-	-	-	-	(10,000)	-	-
Agricultural Entities	-	-	-	(20,000)	-	(45,875)	-	-	-	-	-
EWA	-	-	-	-	-	(72,280)	(56,767)	(67,400)	(65,620)	(20,242)	(34,865)

Data from Table 9, rows 14 through 18. Includes Recovery by Exchange for Water Sales.
See Figure 11 for further explanation of Recovery by Exchange for Water Sales.

Figure 9



***Source*: KWBA, 2015.** **Total KWB Participant Water Sales** FIGURE **9A**

Water delivered to recharge ponds is subject to losses by evapotranspiration. As prescribed in the KWB MOU, 6 percent evapotranspiration losses are deducted from all gross deliveries to KWB recharge ponds to determine the net amount of these deliveries that is recharged and stored. Annual gross deliveries for recharge and net recharge after losses are shown in Tables 9 and 9A, rows 1 and 2. Other changes to storage accounts, including miscellaneous acquisitions of stored water and exchanges between KWB participants, are shown in rows 3 and 4.

2. Recovery Operations

Water stored in the KWB has been recovered by the KWB participants either for their direct use or for sale to others. From 1995 through 2005, recovery for participant use totaled 138,224 AF. All of this water was recovered during the dry years from 2001 through 2004 (see Figure 8).

During this same 1995 through 2005 period, water sales totaled 423,320 AF. About three quarters of these sales were to the EWA, with the remaining sales to:

- agricultural entities within the San Joaquin Valley,
- a wildlife refuge,
- a power plant located within Kern County,
- and the "4%" water made available to adjoining water districts for overdraft correction pursuant to the KWB MOU (see Figure 9).

All of these sales occurred in 1998 and 2000 through 2005. Total water sales during 1995-2014 totaled approximately 600,000 AF and were mainly attributable to the EWA program. Sales in 2006-2007 were approximately 100,000 AF. Sales were significantly reduced after 2007 due to the end of the EWA program and participant usage due to drier water years (Table 9A, Figure 9A).

From 1995 through 2014, recovery for KWB participant use totaled approximately 1,153,500 AF (Figure 8A). A total of 1,141,200 AF was recovered by pumping during dry years 2001-2004, 2007-2010, and 2012-2014. The remaining recovery consisted of almost 11,000 AF for exchange during dry years and 1,250 AF for transfer as a water sale in 2011.

Water stored in the KWB can be recovered by one of two mechanisms, 1) recovery by pumping or, 2) recovery by exchange. Recovery by pumping entails the physical pumping of water from the aquifer using the KWB's groundwater wells. This type of recovery occurred in the dry years of 2001 through 2004. From 1995 through 2005, a total of 204,639 AF was recovered by pumping. Of this total, 132,099 AF was recovered for participant use and 72,540 AF for water sale (see Table 9, rows 6 and 9). From 1995 through 2014, approximately 1,341,200 AF was recovered by pumping. Of this total, 1,141,200 AF was recovered for participant use and 200,000 AF for water sale (Table 9A).

Stored water can also be recovered by exchange. For example, West Kern WD, which operates a separate banking project adjacent to the KWB, may need to recharge water at times when KWB participants need to recover water. Rather than recharge and recover water at the same time in

adjacent projects, West Kern WD's surface water is made available for KWB participant use, and a like amount of KWB stored water is shifted in the groundwater storage accounts from the KWB to West Kern WD. KWBA and West Kern WD entered into an agreement in 2013 that updates a previous 2003 agreement, with the objectives of improving water security for both KWBA and West Kern WD, protecting water quality, and monitoring and mitigating potential threats to water supplies (Appendix 7-5d). iv(f)

Such exchanges may also occur between KWB participants. These exchanges reduce energy consumption and costs to both parties. From 1995 through 2005, a total of 326,634 AF was recovered by exchange. Of this total, 6,125 AF was recovered for participant use and 320,509 AF for water sales (see Table 9, rows 7 and 10). From 1995 through 2014, a total of 336,154 AF was recovered by exchange. Of this total, 10,981 AF was recovered for participant use and 325,173 AF for water sales (see Table 9A, rows 7 and 10).

3. Water Exchanges

The KWBA participants also use ~~Operational~~ exchanges ~~may be used~~ to increase the efficiency of both recharge and recovery operations. These exchanges can occur at two levels. The first would be a local exchange within Kern County coordinated entirely by KCWA. For example, one of the KWB participants might have Kern River water available to it at the same time that a participant in one of the adjacent Kern Fan banking projects has SWP water available to it. In this situation, the SWP water would be delivered to western banking facilities (e.g., the KWB) to reduce energy consumption costs, and the Kern River water would be delivered to eastern banking facilities (e.g., the Berrenda Mesa Project). However, the water recharged at the KWB would be accounted for as Kern River water, as if the exchange did not occur.

The second level of exchange that can occur uses facilities outside of Kern County, and typically requires the approval of the Department and/or Reclamation. For example, one of the KWBA participants might exchange its SWP Table A water for a like amount of CVP water available to a CVP contractor, such as Westlands Water District (WWD). In this situation, the Department would deliver the SWP Table A water to WWD via Reach 7 of the California Aqueduct in Kings County for use within the SWP service area, and Reclamation would deliver a like amount of CVP water to KCWA via the Friant-Kern Canal for recharge in Kern County banking facilities. As in the case of the local exchange described above, the water would be accounted for as if the exchange did not occur, or in this example, as SWP water.

4. Storage Accounting

The KCWA oversees all water transactions in Kern County and provides important water accounting for the banking projects in the Kern Fan area. An accounting of KWB storage activities from 1995 through 2005 is shown in Table 9, and from 1995 through 2014 in Table 9A. The tables show~~s~~:

- Additions to Storage
  - Gross deliveries for recharge
  - Net amount recharged, after 6 percent evapotranspiration losses
  - Acquisitions (e.g., the portion of the Hacienda Program water transferred to KCWA as part of the KFE property transfer)
  - Exchanges between KWB participants

- Recovery for Participant Use
  - Recovered by pumping
  - Recovered by exchange (see Figure 10 for an explanation of the accounting for this type of exchange)
    - Volume of water recovered by transfer (e.g., in 2011, a groundwater transfer for sale of 1,250 AF was made from Westside Mutual Water Company to West Kern WD)

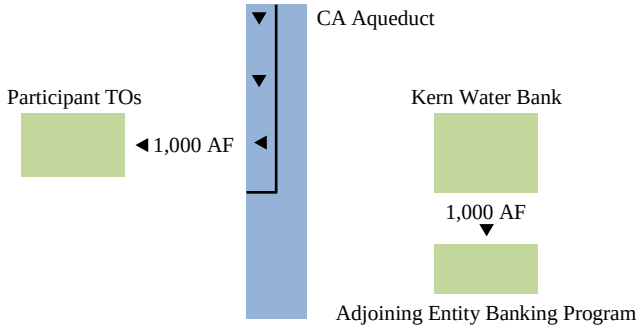
- Water Sales (a 5% loss is applied to out-of-county sales)
  - Categorized by method of recovery
    - Recovered by pumping
    - Recovered by exchange (see Figure 11 for an explanation of the accounting for this type of exchange)
    - Placed in trust (15,000 AF of stored water placed in trust for use by a power plant located within the service area of KWBA participant Wheeler Ridge-Maricopa WSD)
    - "4%" water sales (4 percent of stored water made available for purchase by water districts adjoining the KWB, for overdraft correction pursuant to the KWB MOU)
  - Categorized by use
    - EWA (program ended in 2007)
    - Agricultural entities in San Joaquin Valley
    - Wildlife refuge
    - Power plant located in Kern County (25,000 AF of contract water, plus 15,000 AF of stored water placed in trust)
    - "4%" water sales
  - Losses for water sales (5 percent losses are applied to all sales of water leaving Kern County, for the overall benefit of the groundwater basin pursuant to the KWB MOU)
  - Total storage reduction for sales (recovery by pumping for water sale, plus water placed in trust, plus"4%" water sales, plus losses for water sales)

The KWB storage balance is the net of additions to storage, minus recovery for participant use and total reductions for sales. These KWB activities and total storage balances are shown on an annual and cumulative basis in Figures 12 and 13, respectively. As of December 31, 2005, the KWB participants had a total cumulative balance of 1,050,778 AF of water stored in the KWB. As of December 31, 2014, the cumulative balance was approximately 573,000 AF.

Recovery by Exchange for Participant Use

Recovery by exchange for participant use is used to deliver water at times when a KWB participant wishes to recover water from the KWB at the same time an adjoining entity with a groundwater banking program has SWP water available in the California Aqueduct that it otherwise would have recharged. The exchange allows the delivery to occur without incurring energy costs or wear and tear on equipment. In the example shown below, 1,000 AF of water from an adjoining entity is physically delivered to the KWB participant's turn-outs. The 1,000 AF of water is deducted from the KWB participant's previously recharged supply and the adjoining entity's groundwater account is credited with 1,000 AF of water.

Physical Delivery and Accounting



Net KWB Account Change is -1,000 AF

Figure 10

Recovery by Exchange for Water Sale

Recovery by exchange for water sale is used to deliver water at times when a KWB participant wishes to recover an exportable water supply from the KWB for sale to another entity, at the same time it has SWP water available in the California Aqueduct that it would have otherwise recharged. The exchange allows the delivery to occur without incurring energy costs or wear and tear on equipment. In the example below, 1,000 AF of water is physically delivered to the EWA in San Luis Reservoir. The KWB MOU prescribes a 5% loss to the groundwater basin for sales leaving Kern County. Therefore, in this example, a 5% loss of 50 AF is applied. For accounting purposes, 1,000 AF of water is deducted from the KWB Participant's previously recharged exportable supply for "delivery" to San Luis Reservoir, 50 AF is deducted from the KWB Participant's account for the 5% loss factor, and 1,000 AF is added to the KWB Participant's account as stored SWP water. In Tables 9 and 9A, the amount exchanged is shown as Recovery by Exchange for Water Sale (row 10), and for sales of water leaving Kern County, the 5% reduction for losses is shown as Losses for Sales (row 20).

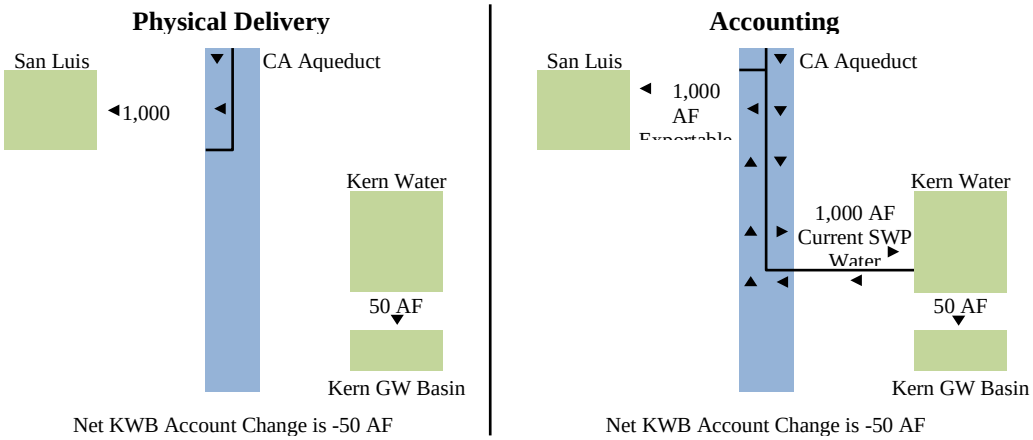
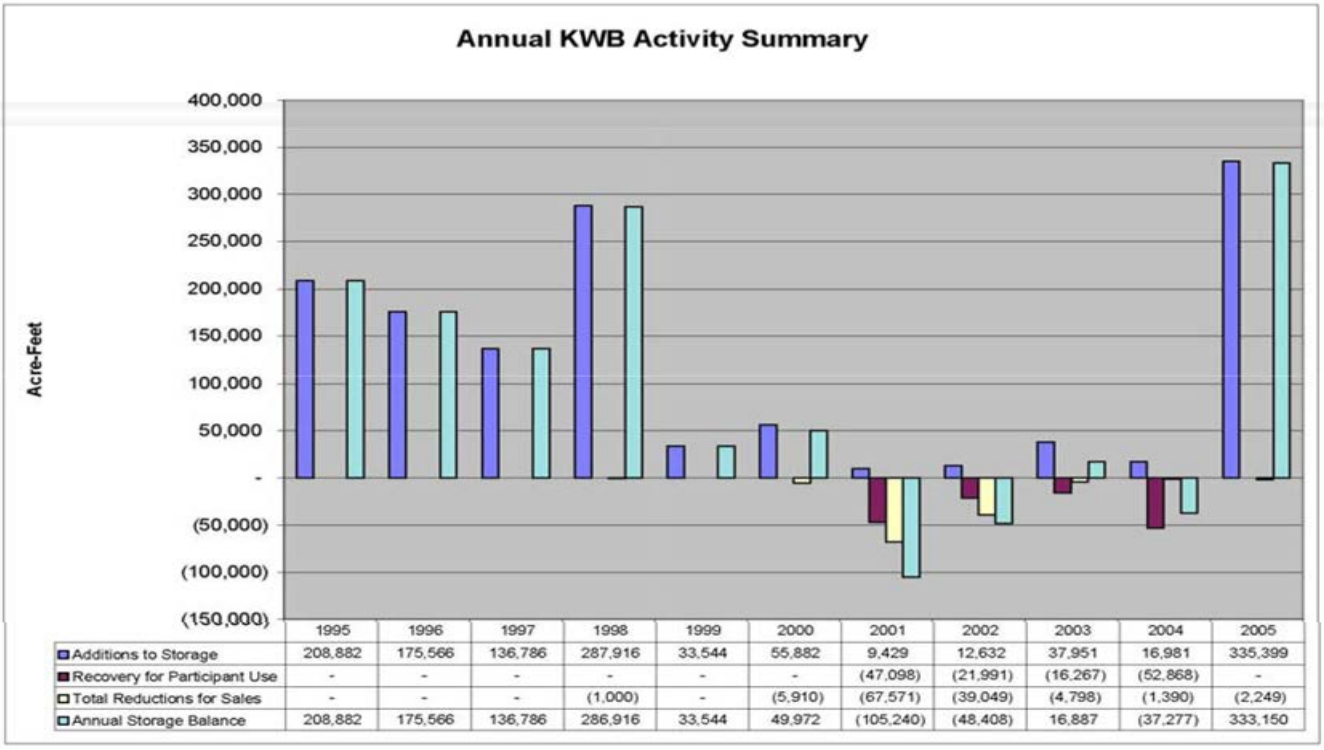


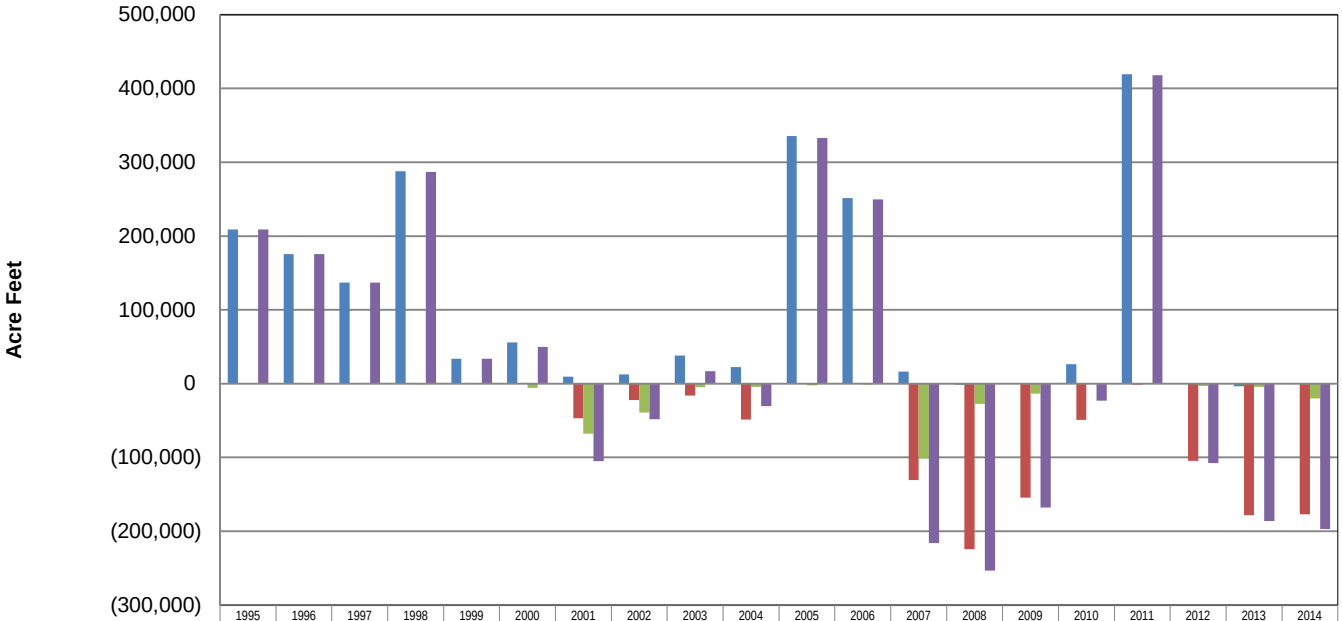
Figure 11



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Additions to Storage	208,882	175,566	136,786	287,916	33,544	55,882	9,429	12,632	37,951	16,981	335,399
Recovery for Participant Use	-	-	-	-	-	-	(47,098)	(21,991)	(16,267)	(52,868)	-
Total Reductions for Sales	-	-	-	(1,000)	-	(5,910)	(67,571)	(39,049)	(4,798)	(1,390)	(2,249)
Annual Storage Balance	208,882	175,566	136,786	286,916	33,544	49,972	(105,240)	(48,408)	16,887	(37,277)	333,150

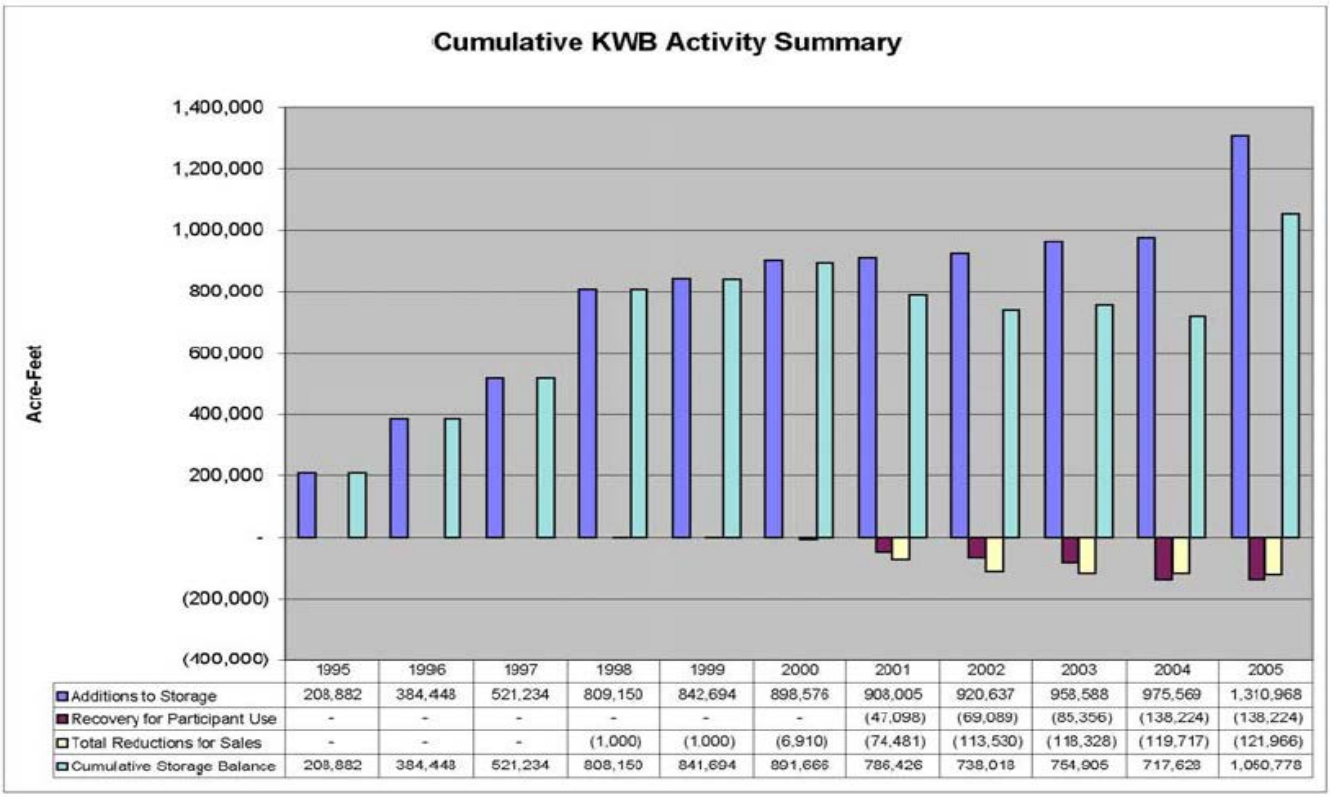
Data from Table 9, row 5, 8, 21, and 22.

Figure 12



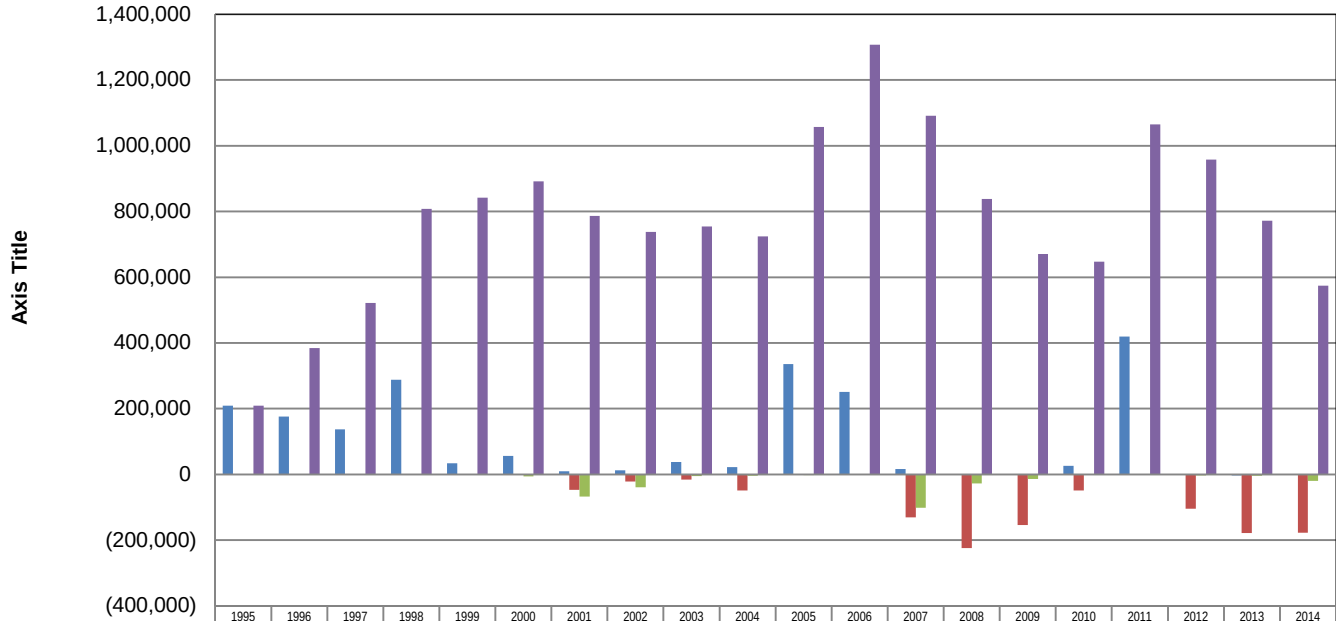
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Additions to Storage	208,882	175,566	136,786	287,916	33,544	55,882	9,429	12,632	37,951	22,652	335,399	251,384	16,245	(1,257)	0	26,554	419,220	0	(3,358)	0
Recovery for Participant Use	0	0	0	0	0	0	(47,098)	(21,991)	(16,267)	(48,725)	0	0	(130,763)	(224,480)	(154,299)	(49,141)	(1,250)	(104,531)	(178,217)	(176,967)
Total Reductions for Sales	0	0	0	(1,000)	0	(5,908)	(67,571)	(39,062)	(4,798)	(4,310)	(2,293)	(1,517)	(101,584)	(27,434)	(13,460)	(599)	0	(3,043)	(4,539)	(20,133)
Annual Storage Balance	208,882	175,566	136,786	286,916	33,544	49,974	(105,240)	(48,421)	16,886	(30,383)	333,106	249,867	(216,102)	(253,171)	(167,759)	(23,186)	417,970	(107,574)	(186,114)	(197,100)

***Source*: KWBA, 2015.** **Annual KWB Activity Summary (1995-2014)** **FIGURE 12A**



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Additions to Storage	208,882	384,448	521,234	809,150	842,694	898,576	908,005	920,637	958,588	975,569	1,310,968
Recovery for Participant Use	-	-	-	-	-	-	(47,098)	(69,089)	(85,356)	(138,224)	(138,224)
Total Reductions for Sales	-	-	-	(1,000)	(1,000)	(6,910)	(74,481)	(113,530)	(118,328)	(119,717)	(121,966)
Cumulative Storage Balance	208,882	384,448	521,234	808,150	841,694	891,666	786,426	738,018	754,905	717,628	1,050,778

Figure 13



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Additions to Storage	208,882	175,566	136,786	287,916	33,544	55,882	9,429	12,632	37,951	22,652	335,399	251,384	16,245	(1,257)	0	26,554	419,220	0	(3,358)	0
Recovery for Participant Use	0	0	0	0	0	0	(47,098)	(21,991)	(16,267)	(48,725)	0	0	(130,763)	(224,480)	(154,299)	(49,141)	(1,250)	(104,531)	(178,217)	(176,967)
Total Reductions for Sales	0	0	0	(1,000)	0	(5,908)	(67,571)	(39,062)	(4,798)	(4,310)	(2,293)	(1,517)	(101,584)	(27,434)	(13,460)	(599)	0	(3,043)	(4,539)	(20,133)
Cumulative Storage Balance	208,882	384,448	521,234	808,150	841,694	891,668	786,428	738,007	754,893	724,510	1,057,616	1,307,483	1,091,381	838,210	670,451	647,265	1,065,235	957,661	771,547	574,447

***Source*: KWBA, 2015.** **Cumulative KWB Activity Summary (1995-2014)** **FIGURE 13A**

Table 9.
KWB Account Summary

	Row	Formula	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004[9]	2005[9]	Totals
Additions to Storage														
Recharge														
Gross Deliveries	1		230,938	143,890	115,590	306,641	35,684	40,341	10,030	13,439	40,374	18,065	356,807	1,311,799
Net Recharge (after 6% losses)[1]	2	row 1 x .94	217,082	135,256	108,654	288,243	33,544	37,920	9,429	12,632	37,951	16,981	335,399	1,233,091
Acquisitions	3		-	49,518	28,359	-	-	-	-	-	-	-	-	77,877
Exchanges Between Participants[2]	4		(8,200)	(9,208)	(227)	(327)	-	17,962	-	-	-	-	-	-
Total Additions to Storage	5	rows 2 + 3 + 4	208,882	175,566	136,786	287,916	33,544	55,882	9,429	12,632	37,951	16,981	335,399	1,310,968
Recovery for Participant Use														
Recovery By Pumping for Participant Use[3]	6		-	-	-	-	-	-	(47,098)	(21,991)	(16,267)	(46,743)	-	(132,099)
Recovery By Exchange for Participant Use[4]	7		-	-	-	-	-	-	-	-	-	(6,125)	-	(6,125)
Total Recovery for Participant Use	8	rows 6 + 7	-	-	-	-	-	-	(47,098)	(21,991)	(16,267)	(52,868)		(138,224)
Water Sales														
Sales by Method														
Recovery By Pumping for Water Sale[3]	9		-	-	-	-	-	-	(38,203)	(34,337)	-	-	-	(72,540)
Recovery By Exchange for Water Sale[4]	10		-	-	-	(20,000)	-	(118,155)	(18,564)	(33,063)	(75,620)	(20,242)	(34,865)	(320,509)
Trust Accounts[5]	11		-	-	-	-	-	-	(15,000)	-	-	-	-	(15,000)
"4%" Water Sales[6]	12		-	-	-	-	-	-	(11,530)	(1,342)	(1,516)	(377)	(506)	(15,271)
Total Sales	13	sum rows 9 - 12	-	-	-	(20,000)	-	(118,155)	(83,297)	(68,742)	(77,136)	(20,619)	(35,371)	(423,320)
Sales by Use														
EWA	14		-	-	-	-	-	(72,280)	(56,767)	(67,400)	(65,620)	(20,242)	(34,865)	(317,174)
Agricultural Entities	15		-	-	-	(20,000)	-	(45,875)	-	-	-	-	-	(65,875)
Wildlife Refuge	16		-	-	-	-	-	-	-	-	(10,000)	-	-	(10,000)
Power Plant in Kern County[5]	17		-	-	-	-	-	-	(15,000)	-	-	-	-	(15,000)
"4%" Water Sales[6]	18		-	-	-	-	-	-	(11,530)	(1,342)	(1,516)	(377)	(506)	(15,271)
Total Sales	19	sum rows 14 - 18	-	-	-	(20,000)		(118,155)	(83,297)	(68,742)	(77,136)	(20,619)	(35,371)	(423,320)
Losses for Sales[7]	20	out-of-co sales x .05	-	-	-	(1,000)	-	(5,910)	(2,838)	(3,370)	(3,282)	(1,013)	(1,743)	(19,156)
Total KWB Storage Reduction for Sales[8]	21	rows 9 + 11 + 12 + 20	-	-	-	(1,000)	-	(5,910)	(67,571)	(39,049)	(4,798)	(1,390)	(2,249)	(121,966)
KWB Storage Balance														
Annual Storage Balance	22	rows 5 + 8 + 21	208,882	175,566	136,786	286,916	33,544	49,972	(105,240)	(48,408)	16,887	(37,277)	333,150	1,050,778
Cumulative Storage Balance	23	row 23$_{8}$ + row 22$_{t}$	208,882	384,448	521,234	808,150	841,694	891,666	786,426	738,018	754,905	717,628	1,050,778	

1 Net Recharge is the amount of Gross Deliveries stored after deducting 6% for evapotranspiration losses. 2 Exchanges between KWB participants using existing KWB storage accounts. Note that there in no net change to KWB storage resulting from these exchanges. 3 Recovery By Pumping is stored water recovered by physically pumping it from wells. 4 Recovery By Exchange is stored water recovered by exchange with surface water available at the same time. See Figures 9 and 11 for further explanation. 5 Stored water placed in Trust for use by a power plant located within the service area of KCWA member agency Wheeler Ridge-Maricopa WSD. 6 "4%" Water Sales is 4% of stored water made available for purchase by water districts adjoining the KWB for overdraft correction, pursuant to the KWB MOU. 7 Losses for Sales are losses of 5% applied to all sales of water leaving Kern County, pursuant to the KWB MOU. 8 9 Data for 2004 and 2005 are preliminary and subject to minor revision. Total KWB Storage Reduction for Sales is Recovery By Pumping for Water Sale + Trust Account + "4%" Water Sales + Losses for Sales. Recovery By Exchange for Water Sale is not included in this total because it is an exchange with surface water supplies and so does not result in physical storage reductions (see Figure 11 for further explanation).

[NOTE: This Table 9 as shown in DEIR Appendix E is retained here as an historical table.]

Table 9A - KWB Account Summary

	Row	Formula	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Totals
Additions to Storage																							
RECHARGE																							
Gross Deliveries-Total	1		222,260	173,875	112,262	303,086	36,753	27,579	10,030	13,439	40,374	18,065	387,557	283,233	16,728			33,131	447,148	8,918			2,134,438
Net Recharge (after 6% losses)$_1$-Participants	2a		217,082	135,256	108,654	288,243	33,544	37,920	9,429	12,632	37,951	16,981	335,399	251,384	14,988			31,030	407,211				1,937,704
Net Recharge (after 6% losses)$_1$-Others$_2$	2b																		12,009				12,009
Net Recharge (after 6% losses)$_1$-Third Party$_3$	2c	rows (1-2a-2b) x 0.94	4,867	36,302	3,392	13,952	3,016	(9,721)	565	759	2,278	1,019	49,029	29,938	1,636	0	0	1,975	26,252	8,383			68,668
Acquisitions - Purchases	3			49,518	28,359							5,671											83,548
Exchanges Between Participants$_4$	4a		(8,200)	(9,208)	(227)	(327)		17,962							1,257	(1,257)		(4,476)	3,499				(977)
In Use, Exchanges or Transfer by Others$_2$	4b																		(3,499)		(3,358)		(6,857)
Total Additions to KWB Storage	5	rows **2a+2b+3+4a+4b**	208,882	175,566	136,786	287,916	33,544	55,882	9,429	12,632	37,951	22,652	335,399	251,384	16,245	(1,257)	0	26,554	419,220	0	(3,358)	0	2,025,427
Recovery for Participant Use																							
Recovery by Pumping for Participant Use$_5$	6								(47,098)	(21,991)	(16,267)	(42,600)			(130,763)	(224,044)	(152,621)	(46,185)		(104,531)	(178,217)	(176,967)	(1,141,284)
Recovery by Exchange for Water Sale$_6$	7											(6,125)				(436)	(1,678)	(2,956)	(1,250)				(12,445)
Total Recovery for Participant Use	8	**rows 6+7**	0	0	0	0	0	0	(47,098)	(21,991)	(16,267)	(48,725)	0	0	(130,763)	(224,480)	(154,299)	(49,141)	(1,250)	(104,531)	(178,217)	(176,967)	(1,153,729)
Water Sales																							
SALES BY METHOD																							
Recovery by Pumping for Water Sale$_5$	9								(38,203)	(34,337)		(3,109)			(96,777)	(14,018)	(3,406)			(3,043)	(3,478)	(3,364)	(199,735)
Recovery by Exchange for Water Sales$_6$	10					(20,000)		(118,155)	(18,564)	(33,063)	(75,620)	(13,368)	(35,734)					(2,706)	(588)				(317,798)
Trust Accounts$_7$	11								(15,000)														(15,000)
"4%" Water Sales$_8$	12								(11,530)	(1,355)	(1,516)	(377)	(506)	(1,517)	(679)	(13,416)	(10,054)	(599)			(1,061)	(16,769)	(59,379)
Total Sales	13	sum rows 9-12	0	0	0	(20,000)	0	(118,155)	(83,297)	(68,755)	(77,136)	(16,854)	(36,240)	(1,517)	(97,456)	(27,434)	(13,460)	(3,305)	(588)	(3,043)	(4,539)	(20,133)	(591,912)
SALES BY USE																							
EWA	14							(72,280)	(56,767)	(67,400)	(65,620)	(16,477)	(35,734)		(50,000)								(364,278)
Agriculture Entities	15					(20,000)		(45,875)							(43,507)	(10,750)							(120,132)
Wildlife Refuge	16										(10,000)												(10,000)
Power Plant in Kern County$_7$	17								(15,000)						(3,270)	(3,268)	(3,406)	(2,706)	(588)	(3,043)	(3,478)	(3,364)	(38,123)
"4%" Water Sales$_8$	18								(11,530)	(1,355)	(1,516)	(377)	(506)	(1,517)	(679)	(13,416)	(10,054)	(599)			(1,061)	(16,769)	(59,379)
Total Sales	19	sum rows 14-18	0	0	0	(20,000)	0	(118,155)	(83,297)	(68,755)	(77,136)	(16,854)	(36,240)	(1,517)	(97,456)	(27,434)	(13,460)	(3,305)	(588)	(3,043)	(4,539)	(20,133)	(591,912)
Losses for Sales$_9$	20	out-of-county sales x.05				(1,000)		(5,908)	(2,838)	(3,370)	(3,282)	(824)	(1,787)		(4,128)								(23,137)
Total KWB Storage Reduction for Sales$_{10}$	21	**rows 9+11+12+20**	0	0	0	(1,000)	0	(5,908)	(67,571)	(39,062)	(4,798)	(4,310)	(2,293)	(1,517)	(101,584)	(27,434)	(13,460)	(599)	0	(3,043)	(4,539)	(20,133)	(297,251)
KWB Storage Balance																							
Annual Storage Balance	22	**rows 5+8+21**	208,882	175,566	136,786	286,916	33,544	49,974	(105,240)	(48,421)	16,886	(30,383)	333,106	249,867	(216,102)	(253,171)	(167,759)	(23,186)	417,970	(107,574)	(186,114)	(197,100)	574,447
Cumulative Storage Balance	23	**row 23_0 + ow 22_1**	208,882	384,448	521,234	808,150	841,694	891,668	786,428	738,007	754,893	724,510	1,057,616	1,307,483	1,091,381	838,210	670,451	647,265	1,065,235	957,661	771,547	574,447	

Table 9A Notes:

1. Net Recharge is the amount of gross deliveries stored after deducting 6% for evapotranspiration losses.
2. Water recharged on KWB Lands for entities other than participants that is tracked within the KWB account.
3. Water recharged on KWB Lands for third parties that is not tracked within the KWB storage account.
4. Exchanges between KWB participants using existing KWB storage accounts. Note that there is no net change to KWB storage resulting from these exchanges.
5. Recovery by Pumping is stored water recovered by physically pumping it from wells.
6. Recovery by Exchange is stored water recovered by exchange with surface water available at the same time.
7. Stored water placed in Trust for use by a power plant located within the service area of KCWA participant Wheeler Ridge-Maricopa Water Storage District (WSD).
8. "4%" Water Sales is 4% of stored water made available for purchase by water districts adjoining the KWB for overdraft correction, pursuant to the 1995 KWB MOU.
9. Losses for Sales are losses of 5% applied to all sales of water leaving Kern County, pursuant to the 1995 KWB MOU.
10. Total KWB Storage Reduction for Sales is Recovery by Pumping for Water Sales + Trust Account + "4%" Water Sales + Losses for Sales. Recovery by Exchange for Water.

5. Operations Monitoring

As discussed in Section V.B.3, the KWB is operated under the requirements of the *Memorandum of Understanding Regarding Operation and Monitoring of the Kern Water Bank Groundwater Banking Program*, which provides for the establishment of an extensive monitoring program and a Monitoring Committee to oversee banking operations and the results of said monitoring. The committee is made up of several basin stakeholders including the KCWA and all adjoining water districts. The KWB is also operated and monitored in accordance with the Minimization of Impacts Requirements and other measures prescribed in the KWB HCP/NCCP and associated KWB Vegetation Management Plan (see Section V.A.2.b above and Appendices 7-7a and 7-7b, respectively). Pending resolution of the challenge to the Monterey Plus EIR, the KWB is operated in accordance with the Interim Operating Plan (see Section V.B.7 above and Appendix 7-5b),

a. Recharge and Recovery Monitoring

During times of recharge or recovery, KCWA operations and maintenance field personnel (on behalf of KWBA) travel to each water control structure or well to record flow, water levels, and other information, and periodically collect groundwater samples. Field personnel monitor and record flow in conveyance facilities and between ponds on a daily basis. Adjustments to weir boxes or gates are made as necessary to maintain efficient pond levels. During the pumping season, each well site is checked by a system operator on a regular basis for flow and electrical meter readings, for operation and maintenance checks on the well motor, pumps, and

electrical systems.[14] Maintenance issues (e.g. seeping berms) are reported as soon as they are discovered.

b. Groundwater Monitoring

KWBA has used extensive monitoring to establish baseline groundwater quality and ensure that groundwater problems are not developing. This monitoring consists of two elements: 1) the regular sampling of ~~50~~57 dedicated monitoring wells for several potential constituents of concern, and 2) the sampling of all recovery wells according to a Monitoring Schedule developed by the Department of Health Services (now Department of Public Health [DPH]).

The water quality sampling of the monitoring wells is mandated by the KWB MOU. Under this program, water levels are measured at least semiannually, and water samples are analyzed for several potential constituents of concern at least annually. The results of this monitoring are reported to and reviewed by the Monitoring Committee to ensure that ~~excellent~~ groundwater quality is maintained and that areas of known poor water quality remain unchanged or improved as a result of KWB operations.

The second element of groundwater monitoring includes sampling the recovery wells according to a DPH~~S~~ Title 22 Monitoring Schedule for wells providing water to municipal purveyors (KCWA, 1997). In addition to providing extensive information regarding groundwater quality, the results of this sampling are used to model expected changes in water quality in conveyance facilities receiving the recovered water.

c. Mitigation

As required as part of the 1995 KWB MOU (Appendix 7-5a), a Kern Fan Monitoring Committee was established to oversee banking operations and the results of said monitoring. The committee is made up of several Kern Fan Subbasin stakeholders including KWBA, KCWA, and all adjoining water districts (see Figure 1A).

A primary purpose of the Monitoring Committee is to evaluate groundwater information and determine if adverse impacts are likely to occur as a result of project operations. If the Monitoring Committee determines that adverse impacts are likely, then mitigation strategies are developed, as discussed in more detail in Section V.B.3. Through 2006, no~~No~~ mitigation measures had~~have~~ been determined necessary ~~to date~~.

On behalf of the Kern Fan Monitoring Committee, KCWA compiles monitoring data and reports hydrologic conditions, water supply, and groundwater banking activities within the Kern Fan into annual Kern Fan Monitoring Committee Area operations and monitoring reports.

Kern Fan water banking operations and monitoring program reports include annual and cumulative summaries of recharge and recovery banking and overdraft correction operations by project facility and participant, and surrounding areas. A summary of the recharge spreading

[14] Kern Water Bank Authority, *Kern Water Bank Master Plan & Economic Analysis*, April 1998.

program deliveries by physical source, location, and participant are provided. Bank facilities/locations included in the report are Berrenda Mesa, Pioneer, City of Bakersfield 2,800-Acre Groundwater Recharge Facility, KWB, Poso Creek (downstream of the FKC crossing), and the Kern River channel (recharge area located between Manor Street and the Stockdale Bridge).

The reports also include hydrograph data and interpretive studies with maps displaying areas of facilities utilization, groundwater quality, surface elevation, flow direction, and water level changes. An annual water balance estimate and analysis is also provided. Water quality sampling data and evaluations of water quality constituents and areas of concern, salt balance ratios for the recharge and recovered water supplies, and water quality for pump-in blending operations are also included.

As mentioned in previous Section V.B.8, KWBA and Rosedale have developed an Interim Joint Operations Plan to monitor groundwater conditions in the project areas (Appendix 7-5b). Projected changes in water levels that may result from project operations are predicted with groundwater models, and under certain conditions mitigation measures may be considered.

C. Maintenance and Other Operations

1. Water Operations Facilities Management

The KWB HCP allows the KWBA to install, construct, repair, maintain, and operate water recharge, water recovery, and water conveyance facilities within the Recharge Basin Sector and the Other Water Banking Facilities Sector of the KWB. The management of these facilities is described in Annual Management Plans submitted to the wildlife agencies. These plans ensure that management activities comply with the HCP/NCCP's primary management tool, the Vegetation Management Plan, as well as the Minimization of Impacts Requirements, and other measures prescribed by the HCP (see Section V.A.2.b.). Management activities vary from year to year depending on annual rainfall and the extent of recharge/recovery operations.

Typical vegetation management activities include grazing, burning, and mowing in conformance with the KWB HCP/NCCP Vegetation Management Plan, the application of herbicides with hand sprayers at wells and gate structures, road grading, and fence repair. Vegetation along roads, berms, and canals is typically mowed once a year after nesting seasons. Tumbleweeds that have accumulated in ditches may be burned under permit from the San Joaquin Valley Air Pollution Control District. Aerial spraying of herbicides to rid stands of cattails in recharge ponds was conducted on a limited basis in 2006 and 2011. The cattails greatly increase pond evapotranspiration and can encourage mosquito populations.

Other maintenance activities include clearing trash racks of debris and clearing fence lines of vegetation. Minor berm repairs are occasionally required during recharge programs. These repairs entail rebuilding a short portion of the berm with a backhoe.

a. Recharge Ponds and Canals

Various recharge pond and canal maintenance activities are necessary for the continued operations of the KWB. These activities include vegetation management within the facilities, including grazing, mowing, and burning; aquatic weed management; vector and pest control; and removal of aquatic weeds and silt when interfering with recharge and conveyance activities.[15] After windstorms, tumbleweeds will accumulate in the KWB Canal. These are removed primarily with backhoes.

Silt removal from canals is performed by excavators, backhoes, or loaders. According to KWBA, silt removal has not been required since 1995.[16] However, silt removal from the recharge ponds may be necessary in the future.

During periods of recharge, maintenance of aquatic vegetation and algae blooms within canals, ditches, and recharge ponds is also necessary. Aquatic vegetation was especially problematic in 2008 in the eastern reach of the KWB Canal. Excess vegetation was removed by dragging a chain along the canal bottom and removing the vegetation with backhoes. Shortly thereafter, carp from the adjacent Kern River Canal entered the eastern reach of the canal, and aquatic vegetation problems subsided.

i. Mosquito Abatement Program

Westside and Kern Mosquito and Vector Control Districts (VCD) have maintained an active mosquito abatement program in coordination with KWBA. The 1997 Monterey Initial Study and Addendum includes implementation of a Mosquito Abatement Plan (Appendix 7-6a). The Plan includes several measures defined below to minimize mosquito-borne diseases (italicized text in parentheses has been added to indicate any necessary modifications to the original measures to better meet the Plan's objectives):

- A. KWBA will notify staff of the Mosquito Vector Districts of planned use of recharge basins.

- B. KWBA will implement a water edge road construction pilot program to determine whether KWBA can successfully give Mosquito Vector District spray vehicles access to the recharge basins. If the pilot program is successful, KWBA will build further water edge roads as mutually agreed between KWBA and the Mosquito Vector District staff. If the program is unsuccessful, KWBA and Mosquito Vector District staff will develop an alternative program. *(The water edge road construction program would have had significant impacts on wildlife, particularly breeding water birds. In lieu of this measure, KWBA has and will mow brush as needed and where consistent with KWB HCP/NCCP minimization measures to provide access to Vector Control District staff. KWBA has and will also focus grazing, burning, and mowing, as allowed in the KWB HCP/NCCP Vegetation Management Plan, in dry pond bottoms to eliminate excess vegetation to help*

[15] Kern Water Bank Authority. *Kern Water Bank Master Plan & Economic Analysis*, April 1988.
[16] Kern Water Bank Authority. Response to May 7, 2015 Information request.

minimize breeding areas for mosquitoes when the ponds are refilled [see F. below]).

- C. Ponding in certain sections will be phased out. In these sections, KWBA will cycle the spreading process to keep water moving. *(Temporary or informal ponding has been eliminated and all recharge now occurs in permanent constructed ponds.)*

- D. KWBA will develop a mosquito fish breeding program in conjunction with Mosquito Vector District staff. *(Design of a special pond for a mosquito fish breeding program was determined to be infeasible. KWBA has alternatively from time to time purchased mosquito fish from outside vendors as necessary and when available for stocking in recharge ponds and will continue to do so.)*

- E. Roads on the KWB will be kept in a reasonable condition to allow the districts access to the KWB.

- F. KWBA will include district staff in adaptive management planning to review the success of mosquito control techniques and to develop improved mosquito control techniques.

The approach for mosquito abatement on KWB Lands is driven by recharge and recovery operations. During periods of recovery when no water is present in the recharge ponds, abatement activity is focused primarily on vegetation management (i.e., removal of roadside ditch vegetation, and cattle and sheep grazing) to diminish suitable mosquito habitat. During periods of recharge when water is present in the ponds, active management strategies are implemented in coordination with VCD personnel to reduce mosquito populations and prevent breeding. Recharge activities occurred intermittently from 1995 to 2007 and then in 2010 and 2011. Between 2005 and 2011, adaptive management strategies involved spraying recharge ponds by truck/helicopter; using mosquito fish in the ponds; and managing vegetation, including the development of a pilot program to reduce potential breeding habitat, including high-density cattails, tules, and aquatic vegetation.

ii. KWB HCP/NCCP Waterbird Management Plan

The KWB HCP/NCCP Waterbird Management Plan is an adaptive management plan that suggests strategies to provide for waterbird habitat, nesting, and hunting opportunities during recharge periods where there is operational flexibility on KWB Lands (Appendix 7-7d). The management plan consists of four key components: monitoring and assessing the population trends of on-site waterbirds, enhancing waterbird habitat, minimizing impacts on waterbirds from KWB operations and maintenance, and providing hunting programs compatible with KWB operations. The management strategy also includes annual breeding bird surveys to proactively minimize operations and maintenance impacts near these sites. A hunting program is operated in collaboration with CDFW and USFWS and includes both public and private hunting opportunities.

By flooding ponds during recharge activities, temporary wetland systems of varying depths are created that provide suitable habitat for a wide range of waterbirds, including waterfowl (e.g., geese and ducks) and shorebird species (e.g., rails, coots, and sandpipers).

The KWB HCP/NCCP Waterbird Management Plan includes the following measures: identify preferential nesting habitat, limit herbicide and pesticide use as feasible (or postpone until after the nesting season), limit new construction during nesting season as feasible, and maintain adequate water levels during the nesting season.

Waterbirds that use KWB Lands may be susceptible to various avian bird diseases. The most common diseases that waterbirds are likely to contract on KWB Lands include salmonella, avian cholera, and botulism. The KWB HCP/NCCP Waterbird Management Plan includes the following measures to reduce the risk of exposure of waterbirds to disease: provide CDFW with access to recharge evaluation for habitat evaluation; monitor the recharge basins for sick and/or dead birds; discourage buildup of dead and rotting vegetation; and plan management activities on adjacent waterbird habitats to beneficially affect waterbirds.

b. Pump Stations and Water Wells

During times of recharge or recovery, field personnel travel to each water control structure or well to record flow and other information. During the pumping season, each well site is checked by a system operator on a regular basis to check flow and electrical meter readings; conduct operation and maintenance checks on the well motor, pumps, and electrical systems; and periodically collect groundwater quality samples. Water well pumps require periodic operational tests during non-pumping years to ensure operational ability. Weed control using herbicides or mechanical methods around existing pump stations, utilities, and control structures is necessary for fire protection and inspection purposes. Identified water-well maintenance procedures in the event of a well malfunction include the procedures outlined in Table 9B.

c. Roads, Berms, and Fencing

Ongoing maintenance activities for roads, berms, and fences can include: clearing vegetation; grading roads, berms, canal side slopes, and canal bottoms; mowing vegetation in canals; repairing and replacing weak sections of berms; controlling erosion and completing repairs; and repairing and replacing fences. Needed maintenance is identified through routine facility inspections by KWBA staff.

There are more than 75 miles of roadways on KWB Lands that provide access to berms and canals for operational inspection and management. Road maintenance activities include annual gravel placement and mowing, and biannual road grading and vegetation management to increase cover on roadways to minimize costs for grading and erosion. Some roadway improvements and widening have also occurred.

Table 9B

Typical Pump Stations and Water-Well Maintenance

Item	Equipment	Nature of Work	Frequency
Motor repair or replacement	Maintenance truck and crane	Remove motor and transport to shop	Every three to five pumping seasons
Pump repair	Pump service rig, crane, and maintenance truck	Remove pump and column pipe from well, then service and reinstall them	Every three to five pumping seasons
Miscellaneous site work	Motor grader, water truck, backhoe, pickup truck	Remove vegetation and conduct well pad inspections	Annually
Electrical repair	Maintenance truck	Clean electrical panels and switch gear and replace components	Quarterly during pumping season

Source: KWBA, 1998 – Kern Water Bank, Master Plan and Economic Analysis

Specific vegetation removal from roadways, turnouts, interpond structures, road crossings, and water conveyance control structures is achieved by burning, motor grading, mowing, and herbicides/manual weed removal. Canal maintenance has also included installing riprap on berms to minimize the rate of erosion. Mowing typically occurs in the late spring during dry hot weather after soil moisture has decreased and before vegetation enters seed production.

Minor pond berm repairs are occasionally required during periods of recharge. These repairs entail rebuilding a short portion of the berm with a backhoe. Maintenance of unregulated berm slopes, canal side banks, and roadways has required an adaptive management approach to curtail various nuisances. Pests like ground squirrels, rodents, and wild pigs are known to tunnel intoberms and roadways, causing minor water seepage. Other measures include controlled use of rodenticides in accordance with the KWB HCP/NCCP and applicable regulations.

2. Land Maintenance

The primary tool for managing the habitat and fauna of the Kern Water Bank is the HCP/NCCP's Vegetation Management Plan, with the primary goal being the minimization of tumbleweed and other noxious non-native plant growth (primarily salt cedar). This in turn encourages native plant growth and the continued conversion of water bank lands into exceptional upland, riparian, and alkali flat habitats. The tools provided in the Vegetation Management Plan include burning, grazing, disking, mowing, and herbicide application.

From 1996 through 1999, tumbleweeds were primarily controlled with burning. In 2003, tumbleweeds were primarily controlled with cattle and sheep grazing programs. Other management programs include burning in ditches and chopping old tumbleweed drifts. Chopping removes the dense cover of the drifts and allows for the reestablishment of grasses and

forbs which compete with the tumbleweeds. Tumbleweeds may be burned under a permit from the San Joaquin Valley Air Pollution Control District that is renewed annually. Active burning also occurred on the property from 1999 to 2003 and from 2008 to 2013.

Salt cedar is controlled with herbicide spraying at various locations on an as-needed basis in accordance with best management practices and State and county regulations. Hand sprayers are used around wells and gate structures. Aerial spraying of herbicides onto stands of cattails in recharge ponds was conducted on a limited basis in 2006 and 2011, as they can encourage mosquito populations. Between 2011 and 2013, yellow star-thistle proliferation required manual hand removal and subsequent burning.

Sheep and cattle grazing has occurred throughout the property, depending on yearly need and management direction, between 1997 and 2013. Vegetation along roads, berms, and canals is typically mowed once a year after nesting seasons.

3. Habitat Restoration and Enhancement

The creation of the KWB has~~is~~ resulted~~ing~~ in the reestablishment and preservation of ~~exceptional~~ wetland and upland habitat that existed historically throughout much of the southwestern San Joaquin Valley. About 17,000 of the approximately 20,000 acres that comprised the KFE property were farmed intensively prior to 1991. Now, the water conservation activities of the KWB are re-creating ~~intermittent wetland habitat such as~~ habitat along the recharge ponds, where marsh-like environments are established during recharge periods and create ideal habitat for waterfowl, shorebirds, raptors, and other native and migrating birds and encouraging native grasses and plants that help to promote the threatened and endangered species associated with this area.

Willows, cottonwoods, sedges, and other wetland vegetation are reemerging, and the recharge basins and basin edges are providing nesting and foraging habitat for waterfowl and other birds. Through 2014, ~~To date,~~ more than 66 ~~40~~ species of waterfowl have been sighted on KWB Lands ~~KFE property~~, including Caspian terns, the white-faced ibis, double-crested cormorants, Barrow's goldeneye, purple martin, and white pelicans.[iv(d)]

Recharge activities only occur on about one third of KWB Lands~~KFE property~~; upland habitat is becoming reestablished on the remaining two thirds of the property. Vegetation management in these areas is focusing on regenerating native grasses and plants that help to promote the threatened and endangered species associated with this area. This upland habitat is supporting large populations of raptors, kangaroo rats, rabbits, badgers, bobcats, and coyotes. Of particular importance are the populations of Tipton kangaroo rats, burrowing owls, and tri-colored blackbirds. On occasion, San Joaquin kit fox has been observed on KWB Lands. Studies have suggested that the abundance of coyotes, a predator of the kit fox, may be suppressing kit fox populations.[iv(e)]

While not directly improving any particular habitat, KWBA has installed several wildlife water stations (or guzzlers) for small animals and birds throughout KWB Lands that provide a source of water during years of lean rainfall or limited recharge activity. Several electrical-service pole

distribution transformers have been refitted with more bird-friendly transformer boxes to accommodate nesting birds. Other activities carried out on KWB Lands that have provided habitat enhancement include trash cleanup and toxic material cleanup. These maintenance activities have occurred on an as-needed basis determined annually.

4. Clean-up of Areas of Environmental Concern

The following paragraphs describe areas of environmental concern discussed up to 2007. An update to impacts related to hazardous materials and sites is found in Sections 7.2, Water Quality, and 7.11, Hazards and Hazardous Materials.

A *Preliminary Environmental Assessment* report prepared by Luft Environmental Consultants in October 1995 identified "Areas of Potential Environmental Concern" (APECs) on the KFE property. All of the APECs which are KWBAs' responsibility have been cleaned up, remediated and/or closed. These include:

- *Buena Vista Ranch Headquarters and the HSST Ranch Headquarters:* The pesticides in soil identified at the Buena Vista Ranch Headquarters and the HSST Ranch Headquarters, each an APEC, were remediated by the Kern Water Bank Authority. The scope of the clean-up involved excavating contaminated soil and treating it in a thermal- desorption unit. The Department of Toxic Substances Control certified that the remedial activities were complete in 2001 and that the land could be used for all uses, including the "intended purpose of maintaining a groundwater resource bank."

- *S&M Farms, Tumbleweed Farms, Red Dirt, Two Tanks:* No significant environmental issues were identified at these sites. The trash at S&M farms and the two tanks have been removed.

- *Underground Storage Tanks:* The Kern Water Bank Authority has also removed two underground storage tanks (USTs) not identified in previous environmental reports. The USTs were uncovered at the Buena Vista Ranch Headquarters on April 30, 1999, and removed May 7, 1999 under a Kern County Environmental Health Services Department permit. No soil contamination was detected beneath the USTs, and the county has indicated the tank closure is complete with no further action necessary.

The balance of the APECs identified in the Luft Report are not the responsibility of KWBA. However, KWBA is tracking these issues and coordinating with the appropriate regulatory agency where appropriate. For example, KWBA has been discussing potential impacts at the former Uhler Fire Training Facility with both Kern County and the Regional Water Quality Control Board. (All of the facilities at this site have been removed, and Kern County is in the process of developing a bid to have soil and groundwater at the site assessed.) KWBA is also actively tracking assessment and clean-up activities associated with the former Wait-Midway Pipeline and the Strand Oil Field.

D. HCP/NCCP Mitigation and Monitoring

The HCP/NCCP requires the KWBA to be responsible for establishing, maintaining, and enhancing habitat preserves, carrying out site-specific mitigation measures and for monitoring and reporting the results of management activities to the USFWS and CDFG in Annual Reports. KWBA compiles the annual report with input from professional biologists and botanists.

1. Monitoring Compliance

Annual biological monitoring is performed on KWB Lands in accordance with the Minimization of Impacts Requirements (see Attachment H in Appendix 7-7a) and other measures prescribed by the KWB HCP/NCCP Vegetation Management Plan (see Appendix 7-7c). The purpose of the surveys is to assist in determining the success of the KWB Vegetation Management Plan, including the reestablishment of habitat along the recharge ponds, where marsh-like environments are established along the Pacific Flyway and upland habitats that support various special-status species. Annual survey results assist with determining the need for adaptive management. Rare-plant surveys are performed at least every other year. Annual surveys are conducted for San Joaquin kit fox and Tipton kangaroo rat. Surveys also include assessment of potential sensitive-species predators and the presence of nesting and foraging habitat for waterfowl.

Monitoring is undertaken by KWBA in compliance with the KWB HCP/NCCP. Annual reports are issued summarizing land use by wildlife, any environmental take related to activities on KWB Lands, and habitat and vegetation restoration efforts.

As described previously, willows, cottonwoods, sedges, and other intermittent wetland vegetation have reemerged along the edges of the recharge basins and earthen canals on KWB Lands that have been found to provide nesting, breeding, and foraging habitat for waterfowl, shorebirds, raptors, and other native and migrating birds. A noticeable increase in the habitat value for upland species found on the property has also been identified.

From 1999 through ~~2005~~2014, with the assistance of wildlife biologists and the cooperation of the USFWS and CDFG, KWBA staff ~~have~~ spent many hours in the field observing, photographing, trapping, and enumerating wildlife to document any instances of "take", either through construction activities or KWB operations. These monitoring activities are, in part, prescribed in the HCP. For example, populations of the San Joaquin Kit fox are surveyed with a nighttime spotlighting program, and Tipton Kangaroo rat populations are surveyed with trapping grids. Other surveys are conducted voluntarily (e.g., waterfowl and tumbleweeds). The only instance of "take" ever reported was the temporary relocation of live Tipton kangaroo rats during the construction of the Kern Water Bank Canal headworks. The kangaroo rats were successfully reintroduced to the area after construction was completed.

2. Mitigation Measures

The HCP prescribes various mitigation measures for construction and repair activities (see Section V.A.2.b.). According to the KWB's annual reports, these measures were adhered to as required.

VII. Alternatives for Recharge at KWB

This section is not repeated here since it was part of the water supply management practices analysis pursuant to Article 56 of the Monterey Amendment, as presented in DEIR Appendix E and in FEIR Chapter 15. Furthermore, the Court ordered the Department to evaluate the transfer, development, and continued use and operation of the KWB rather than evaluate project alternatives, which was already conducted in the DEIR; the Court found the Monterey Plus EIR alternatives to be adequate.

VIII. Effects of KWB Development and Operations

This section is not repeated here because REIR Chapter 7 replaces Section VIII in its entirety.

IX. Summary

This section is not repeated here because REIR Chapter 7 replaces Section IX in its entirety.

References

i California Department of Water Resources, Bulletin 132-93:11-12, 1995.

ii Draft DWR memo dated October 6, 1993.

iii California Department of Water Resources, Bulletin 132-94;26, 1996.

iii(a) Department of Water Resources, Draft Environmental Impact Report, Monterey Amendment to the State Water Project Contracts (Including Kern Water Bank Transfer) and Associated Actions as Part of a Settlement Agreement (Monterey Plus) Volume II.

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iv(d) Kern Water Bank Authority. 2014 (May). *Kern Water Bank Authority Habitat Conservation Plan/Natural Community Conservation Plan, 2013 Compliance Report and 2014 Management Plan*. Bakersfield, CA.

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