Kern Water Bank Authority Conservation and Storage Project Environmental Impact Report

Prepared for:

Kern Water Bank Authority

Prepared by:

ICF

SCH #2012021041

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KERN WATER BANK AUTHORITY CONSERVATION AND STORAGE PROJECT ENVIRONMENTAL IMPACT REPORT

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Acronyms and Abbreviations

µg/l	micrograms per liter
µmhos/cm	micromhos per centimeter
2014 Writ	peremptory writ of mandate in November 2014
AB	Assembly Bill
AB 32	Assembly Bill 32
Adjoining Entities	Buena Vista Water Storage District, Rosedale-Rio Bravo Water Storage District, Kern Delta Water District, Henry Miller Water District, and West Kern Water District
AF	acre-feet
AFY	acre-feet per year
Alquist-Priolo Act	Alquist-Priolo Earthquake Fault Zoning Act
ALUP	airport land use plan
ARB	California Air Resources Board
BA	biological assessment
basin plans	water quality control plans
BAU	business as usual
BMPs	best management practices
BPSs	best performance standards
BVLS	Buena Vista Lake shrew
C_2H_3Cl	vinyl chloride
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAL FIRE	California Department of Forestry and Fire Protection
Cal-IPC	California Invasive Plant Council
CalRecycle	California Department of Conservation
CBSC	California Building Standards Code
CCAA	California Clean Air Act
CCAs	Community Choice Aggregations
CCR	California Code of Regulations
CD1	*Central Delta Water Agency v. DWR,* Case No. 34-2010-80000561
CEC	California Energy Commission
Central Valley Water Board	Central Valley Regional Water Quality Control Board
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CFGC	California Fish and Game Code
cfs	cubic feet per second
CFS	*Center for Food Safety v. DWR*, Case No. 34-2016-80002649

CGS	California Geological Survey
CMPs	conservation management practices
CNDDB	California Natural Diversity Database
CNPPA	California Native Plant Protection Act
CNPS	California Native Plant Society
CO	carbon monoxide
Corps	U.S. Army Corps of Engineers
Court	Sacramento County Superior Court
CPUC	California Public Utilities Commission
CSA	County Service Area
CTR	California Toxics Rule
CVP	Central Valley Project
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
D-1196	State Water Rights Board Decision 1196
db	decibels
dB[A]	A-weighted decibels
DEIR	Draft Environmental Impact Report
Delta	Sacramento-San Joaquin River Delta
DFW	California Department of Fish and Wildlife
DO	dissolved oxygen
DPSs	distinct population segments
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EOs	Executive Orders
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESPs	energy service providers
ESRP	Endangered Species Recovery Program
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
Flood Policy	Policy Re-Utilization of Isabella Lake Reservoir Flood Releases
FMMP	Farmland Mapping and Monitoring Program
FR	Federal Register
g	acceleration of gravity
GAMAQI	Guide for Assessing and Mitigating Air Quality Impacts
GHG	greenhouse gas
GSAs	groundwater sustainability agencies
GSPs	Groundwater Sustainability Plans

H_2S	hydrogen sulfide
HCP	Habitat Conservation Plan
HCP/NCCP	Habitat Conservation Plan/Natural Community Conservation Plan
I-5	Interstate 5
ID4	Kern County Water Agency Improvement District No. 4
IEPR	Integrated Energy Policy Report
Interim Plan	*Interim Project Recovery Operations Plan Regarding Kern Water Bank Authority (KWB) and Rosedale-Rio Bravo Water Storage District (Rosedale) Projects*
Intertie	California Aqueduct through the Kern River Intertie
IOUs	investor-owned utilities
IPCC	Intergovernmental Panel on Climate Change
IS	Initial Study
ITP	incidental take permit
Joint Plan	*Project Recovery Operations Plan Regarding Pioneer Project, Rosedale-Rio Bravo Water Storage District, and Kern Water Bank Authority Projects*
JPA	Joint Powers Authority
KCWA	Kern County Water Agency
Kern COG	Kern Council of Governments
Kern Delta	Kern Delta Water District
Kern IRWMP	Kern Integrated Regional Water Management Plan
KWB	Kern Water Bank
KWB HCP/NCCP	Kern Water Bank Habitat Conservation Plan/Natural Community Conservation Plan
KWB MOU	Memorandum of Understanding Regarding Operation and Monitoring of the Kern Water Bank Groundwater Banking Program
KWBA	Kern Water Bank Authority
KWBA member agencies	Dudley Ridge Water District, Kern County Water Agency Semitropic Water Storage District, Tejon-Castac Water District, Westside Mutual Water Company, and Wheeler Ridge-Maricopa Water Storage District
KWBA Participating Members	Dudley Ridge Water District; Semitropic Water Storage District; Tejon-Castac Water District; Westside Mutual Water Company; and Wheeler Ridge-Maricopa Water Storage District
L_{dn}	day-night noise levels
LRA	Local Responsibility Area

M&I	municipal and industrial
MAF	million acre-feet
MCLs	maximum contaminant levels
msl	mean sea level
MW	megawatts
NAAQS	National Ambient Air Quality Standards
NCCP	Natural Community Conservation Plan
NCCP	Natural Community Conservation Planning
NGOs	nongovernmental organizations
NMFS	National Marine Fisheries Service
NO	nitric oxide
NO_2	nitrogen dioxide
NOD	Notice of Determination
NOP	Notice of Preparation
NO_X	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NTR	National Toxics Rule
Outlet Canal	Buena Vista Water Storage District Outlet Canal
PFCs	perfluorinated carbons
PG&E	Pacific Gas & Electric
PM	particulate matter
PM10	particulate matter less than or equal to 10 microns in diameter
PM2.5	particulate matter less than or equal to 2.5 microns in diameter
POU	place of use
pphm	parts per hundred million
ppm	parts per million
project	Kern Water Bank Conservation and Storage Project
regional water boards	nine regional water quality control boards
REIR	Monterey Plus Revised EIR
ROG	reactive organic gases
Rosedale	*Rosedale-Rio Bravo Water Storage District*
RPS	Renewables Portfolio Standard
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act,
SIP	state implementation plan
SIP	state implementation plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District

SO_2	sulfur dioxide
SO_4	sulfate particles
State Water Board	State Water Resources Control Board
study area	biological study area
SWP	State Water Project
SWRCB	California State Water Resources Control Board
TACs	toxic air contaminants
TCMs	traffic control measures
TDS	total dissolved solids
TMDL	total maximum daily load
Tulare Lake Basin Plan	Water Quality Control Plan for the Tulare Lake Basin
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UWMP	Urban Water Management Plan
VFHCP	Kern County Valley Floor Habitat Conservation Plan
VOC	volatile organic compound
WDRs	waste discharge requirements
WEAP	Worker Environmental Awareness Program
WMD	Waste Management Department

ES.1 Project Background

The natural flow of the Kern River has been apportioned among various water users pursuant to a series of court decisions and agreements including, but not limited to, the following: (1) the California Supreme Court decision in *Lux v. Haggin* (1886) 69 Cal. 255; (2) the 1888 Miller-Haggin Agreement (and the 1930, 1955, and 1964 amendments thereto); (3) the 1900 decree of the Kern County Superior Court in *Farmers Canal Company, et al. v. J.R. Simmons, et al*., Case No. 1901; (4) the 1962 Kern River Water Rights and Storage Agreement; and (5) the Lake Isabella Recreation Pool Agreement. These decisions and agreements are generally administered by the Kern River Watermaster.

Pursuant to the 1962 Kern River Water Rights and Storage Agreement, the Kern River Watermaster prepares records of Kern River flows, storage, and releases from Isabella Reservoir. Since at least 1986, the Kern River Watermaster has implemented a Policy Re-Utilization of Isabella Reservoir Flood Releases (Flood Policy). The Flood Policy has been implemented pursuant to the agreement and consent of other water right holders on the Kern River. The Flood Policy provides that during periods in which (1) abnormal flow is being released from Isabella Reservoir by order of the U.S. Army Corps of Engineers (USACE), and (2) such flow is entering into the California Aqueduct through the Kern River Intertie (Intertie):

> [w]ater will be made available to any person, interest or group in Kern County who wish to divert that water, up to the amount of water flowing into the Intertie, provided such interest, person or group acknowledges their desire to divert said water by executing an "Order" which shall include, among other things, a description of the point they wish to divert such flow, the rate of flow they wish to divert and provide a schedule such that the request may be honored by the operating Kern River entity. This policy is without prejudice to the rights of any of the Parties.

In recent years, Kern Water Bank Authority (KWBA), a Joint Powers Authority (JPA), has diverted and utilized Kern River flood flows for the purposes of groundwater recharge in accordance with the Flood Policy and under the direction and control of the Kern River Watermaster. KWBA members include Dudley Ridge Water District, Kern County Water Agency on behalf of its Improvement District 4, Semitropic Water Storage District, Tejon-Castac Water District, Westside Mutual Water Company, and Wheeler Ridge-Maricopa Water Storage District. KWBA members have also purchased Kern River supplies from Kern River water right holders.

Legal proceedings between 1996 and 2007 reviewed and considered questions regarding the extent of appropriative Kern River water rights held by the Kern Delta Water District (Kern Delta), a Kern River water right holder. As a result of those proceedings, California courts concluded that Kern Delta had "forfeited" a significant portion of its pre-1914 appropriative Kern River water rights due to non-use. Following the conclusion of those proceedings in 2007, the California State Water Resources Control Board (State Water Board) began proceedings to revisit the Kern River fully appropriated stream status. The Kern River was formally designated as a river with fully

appropriated status by the State Water Board in 1989 (Order 89-25).[1]. In February 2010, the State Water Board issued an order removing the fully appropriated status for the Kern River, finding that Kern River flood water that enters the California Aqueduct is available for appropriation.[2]

In September 2007, and as a result of the aforementioned court decisions regarding forfeited water on the Kern River and in anticipation of the State Water Board's possible revision of the Kern River's fully appropriated status, the KWBA, on behalf of five of its six member entities (Dudley Ridge Water District, Semitropic Water Storage District, Tejon-Castac Water District, Westside Mutual Water Company, and Wheeler Ridge-Maricopa Water Storage District [the KWBA participating members]), filed a water right application (Application 31676) with the State Water Board to appropriate up to 500,000 acre-feet per year (AFY) of water from the Kern River to the Kern Water Bank (KWB) for irrigation, municipal and industrial (M&I) use, for underground storage, and for fish and wildlife habitat enhancement.

Following the above proceedings, the State of California entered one of the longest and driest periods on record (2011–2016). The period served to highlight the importance of diverting and storing water in years of high water to provide additional certainty and reliability in multi-dry years. As a consequence, this project has taken on greater urgency, as the KWB seeks to achieve greater reliability for existing water demands by diverting water in very high years, when flood waters have historically passed through the system or flooded downstream farmlands.

ES.1.1 Purpose and Scope of the EIR

KWBA, as the lead agency, has prepared this Environmental Impact Report (EIR) to provide the public, responsible agencies, and trustee agencies with information about the potential environmental effects of diverting up to 500,000 AFY of Kern River floodwater in certain high water years when excess flood waters are available for recharge and storage using existing facilities within the KWB as part of the Kern Water Bank Conservation and Storage Project (project). The water diverted will serve to provide greater certainty and reliability in multi-dry years for ongoing irrigation, municipal, and industrial uses that rely on the Kern Water Bank. This EIR analyzes potential environmental effects of the project on air quality, biological resources, geology and seismicity, hydrology and water quality, and utilities and service systems, as well as the project's potential contribution to greenhouse gas emissions. This EIR does not consider the appropriation of the Kern Delta forfeited water (i.e., the water that is the focus of the City of Bakersfield's Kern River Flow and Municipal Water Program Environmental Impact Report).

ES.1.2 EIR Process

CEQA does not require formal hearings at any stage of the environmental review process (State CEQA Guidelines § 15202[a]). However, it does encourage "wide public involvement, formal and informal…in order to receive and evaluate public reactions to environmental issues" (State CEQA Guidelines §

[1] Order 89-25 cited State Water Rights Board Decision 1196 (D-1196), issued on October 29, 1964, as the basis for including the Kern River on the Declaration. D-1196 concluded that the applicants had failed to show "that there is unappropriated water available" in the Kern River watershed.

[2] The EIR does not consider the appropriation of the Kern Delta forfeited water (i.e., the water that is the focus of the City of Bakersfield's Kern River Flow and Municipal Water Program Final Environmental Impact Report). The State Water Board has not yet determined whether the Kern Delta water, or other Kern River water, is unappropriated.

15201) and requires the lead agency to afford the public the opportunity to provide comments. In February 2012, KWBA issued a Notice of Preparation (NOP) of an EIR, informing agencies and the general public that an EIR was being prepared and inviting comments on the scope and content of the document during the 30-day public review period. The NOP also requested participation at a public scoping meeting held on February 28, 2012. Appendix A includes the NOP as delivered to responsible agencies and interested parties, and comment letters received on the NOP.

KWBA has prepared an EIR incorporating public and agency responses to the NOP. Like the NOP, the draft EIR is being circulated for review and comment by appropriate agencies, as well as organizations and individuals who have requested notification. In accordance with Section 15205(d) of the CEQA Guidelines, KWBA has scheduled a 45-day public review period for the draft EIR, ending on February 26, 2018, at 5:00 p.m. Within that 45-day period, KWBA will hold one public meeting to request comments on the draft EIR, at the following time and place:

January 31, 2018
2:00 p.m.

Kern Water Bank Authority
1620 Mill Rock Way, Suite 500
Bakersfield, CA 93311

This EIR is available for review at the KWBA website (http://www.kwb.org/). Copies will also be available for viewing during normal business hours (8:30 a.m. to 5:00 p.m.), Monday through Friday, at the Kern Water Bank Authority office, 1620 Mill Rock Way, Suite 500, Bakersfield, California. Comments on the EIR may be submitted to KWBA in writing at Kern Water Bank Authority, 1620 Mill Rock Way, Suite 500 Bakersfield, CA 93311, to the attention of Jon Parker, or electronically at jparker@kwb.org.

Following the close of the public review period for the draft EIR, KWBA will consider the comments it receives. KWBA will prepare a final EIR, incorporating all comments received during the public comment period. As required by CEQA (§ 21092.5), the final EIR, including written responses to the comments submitted by public agencies, will be available at least 10 days prior to certification. KWBA will consider the EIR and the project, as well as the entire administrative record, in making its decision on the project.

ES.2 Description of the Project

The project is to divert up to 500,000 AFY from the Kern River for recharge and storage within the KWB through existing diversion works and recharge facilities located on the KWB property (Figure ES-1). The stored water would ultimately serve to provide greater certainty and reliability for irrigation, municipal, and industrial uses in multi- year droughts. The 500,000 AFY is considered an upper limit assuming Kern River water is available for a full year at appropriate flow rates. Diversion of 500,000 AF of Kern River floodwater would be a rare occurrence because in normal years, flows are insufficient. KWB diversions under the project would normally be much less. Based on analysis described in detail in Section 3.6, *Hydrology and Water Quality*, flood flows would be available for diversion in only about approximately 18% of years. The water stored within the KWB would ultimately be recovered using existing electric pumps and put to reasonable and beneficial uses—including primarily agricultural uses—by KWBA participating members. To fulfill the project,

KWBA is seeking to secure a permit and then a license for the full amount requested in Application 31676.

Application 31676 proposes to divert up to a maximum of 500,000 AFY to storage or directly at a rate of 10 cubic feet per second (cfs) for a total of 5,000 AFY for municipal use, 750 cfs for a total of 490,000 AFY for irrigation use, and 15 cfs for a total of 5,000 AFY for industrial use. Any water diverted directly would reduce the amount diverted to storage by the same amount. If approved this would allow for the appropriation of up to 500,000 AFY of water from the Kern River for municipal, industrial and irrigation uses and wildlife enhancement, and for groundwater storage and recovery for municipal, industrial, irrigation and water quality uses within the participating members' service areas.

The specific quantity of water available for diversion to the KWB in any given year would depend on annual and seasonal hydrologic and climatologic conditions, and would supplement water already received by KWBA participating members from the State Water Project (SWP) and the Central Valley Project (CVP) via the California Aqueduct, the CVP via the Friant-Kern Canal, and directly from the Kern River through purchases or transfers. The appropriation of water under this application would also supplement and permit water historically diverted from the Kern River to the KWB in above-normal water years when excess water has been made available for diversion to avoid additional flood risks downstream. If the State Water Board grants KWBA a water right permit to appropriate the requested amount, this water would remain in the Kern River channel for instream beneficial purposes until diverted generally west and downstream of the greater Bakersfield area.

ES.2.1 Alternatives

In addition to the project, this EIR evaluates the environmental effects of two alternatives to the project, including the No Project Alternative and a second alternative, the diversion of up to 375,000 acre-feet of flood flows per year.

Alternative 1—No Project Alternative

Under the No Project Alternative, KWBA would not divert unappropriated flood flows in the Kern River for groundwater recharge. Instead, the surplus water that is available in wet water years after existing water rights have been met would flow downstream and either (1) be diverted at the Intertie and conveyed downstream toward southern California via the California Aqueduct or (2) flood farmlands in the Tulare Lake Basin. KWBA would continue to buy water from other sources and recharge and recover that water consistent with the KWB's historical practices.

Alternative 2—Diversion of up to 375,000 Acre-Feet (75% of Request) of Flood Flows a Year

Under Alternative 2, KWBA would divert up to 375,000 acre-feet of unappropriated Kern River flood flows per year for groundwater recharge. This amount represents 75% of the total diversion requested under the project. In wet water years, after existing water rights have been met, any flood flows in excess of that amount would flow into the Intertie and be conveyed downstream toward southern California via the California Aqueduct or potentially flood farms within the Tulare Lake Basin. To supplement the smaller amount of diverted water, KWBA would continue to buy water, although a smaller quantity, from other sources and pump consistent with historic practices.

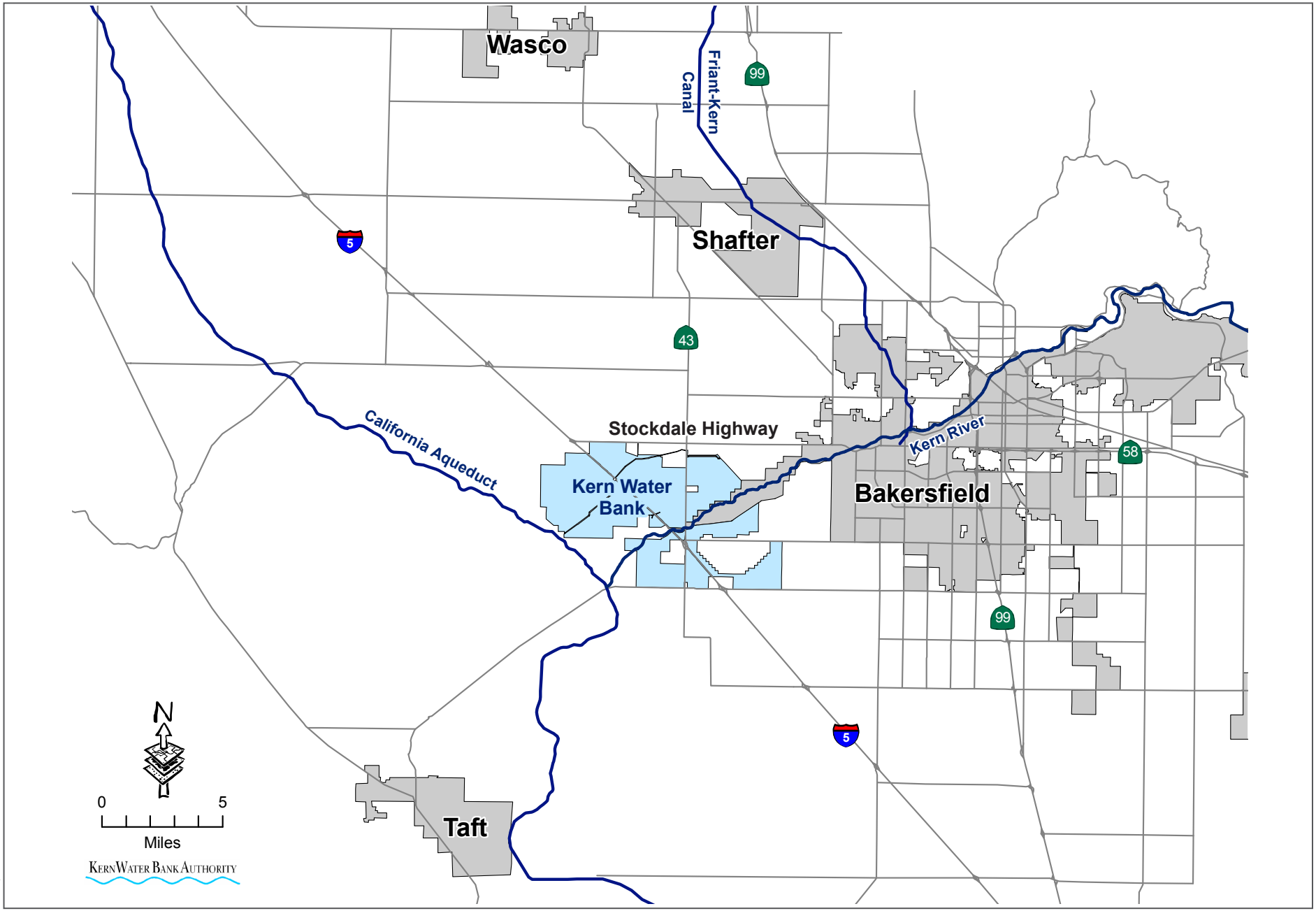

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Figure ES-1
Kern Water Bank Location

ES.2.2 Environmentally Superior Alternative

Section 15126.6 of the State CEQA Guidelines requires that an EIR identify an environmentally superior alternative among the alternatives that are evaluated. The environmentally superior alternative is typically the alternative that would be expected to generate the fewest adverse impacts. If the No Project Alternative is identified as environmentally superior, then CEQA requires that the EIR identify which of the other alternatives is environmentally superior.

Neither the project, the No Project Alternative, nor Alternative 2 has any significant, unmitigable impacts. Thus, the comparison of effects considers the relationship among varying degrees of less-than-significant impacts across the alternatives. The No Project Alternative would result in the greatest amount of water potentially reaching the Intertie and requiring SWP pumping. Compared to the project, Alternative 2 would also result in greater flows reaching the Intertie. Overall, the project would have the fewest environmental impacts compared to both the No Project Alternative and Alternative 2. Therefore, as described in Chapter 4, *Alternatives*, the project would be the environmentally superior alternative.

ES.3 Impacts and Mitigation Measures

This EIR discusses the project's potential environmental effects. Environmental topic areas and resources considered and dismissed from further consideration are distinguished from those considered in detail. Sections 3.2 through 3.7 provide comprehensive discussions of the regulatory and environmental setting for the resources affected by the project, and identify project impacts. Table ES-1, Summary of Impacts, summarizes the project's impacts.

ES.3.1 Impacts Found to be Less than Significant in the Initial Study and Dismissed from Further Consideration

In addition to the environmental impacts on the resources identified in this EIR, KWBA determined, through the preparation of an Initial Study, that implementation of the project would not result in potentially significant impacts to several resources and/or environmental categories. Specifically, through the Initial Study, KWBA determined that the project would have no impact, or less-than-significant impacts, on the following resources, which are therefore not analyzed in detail in this EIR.

- Aesthetics
- Agriculture and Forest Resources
- Cultural Resources
- Hazards and Hazardous Materials
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services

- Recreation
- Transportation and Traffic

Chapter 3.1, *Approach to Analysis*, of this EIR outlines the reasons for which each of these topics was dismissed from further consideration.

ES.3.2 Impacts Analyzed in the Environmental Impact Report

Chapter 3 of this EIR discusses the project's potential environmental effects in detail. Specifically, Sections 3.2 through 3.7 provide a full discussion of the regulatory and environmental setting, methodology, and project impacts. Table ES-1, Summary of Impacts, summarizes the project's impacts. Impacts associated with the following topics or resources are evaluated in detail in this EIR and are discussed further below.

- Air Quality
- Biological Resources
- Greenhouse Gases, Climate Change, and Energy
- Geology and Seismicity
- Hydrology and Water Quality
- Utilities and Service Systems

No Impact

Air Quality

Because there would be no construction of new facilities or substantial changes in KWB operations, the project would not conflict with or obstruct implementation of applicable air quality plans. Further, because there would be no expansion of pumping stations or other facilities, there would be no increase in emissions in any given year from project implementation and no resulting violation of air quality standards established by the San Joaquin Valley Air Pollution Control District (SJVAPCD).

Energy

Because there would be no expansion of pumping stations or other facilities, and there would be no substantial changes to recovery operations in any given year, the project would not require or result in the construction of new electrical facilities.

Geology and Seismicity

Maximum recovery volumes are not expected to change substantially in any given year under the project because no new recovery facilities would be constructed. Thus, the project is not expected to cause land subsidence as a result of groundwater pumping. Further, an extensometer located on the property, which has been monitored by the Department of Water Resources since the KWB began operations, has recorded no inelastic subsidence in the area.

Utilities and Service Systems

The project would not result in impacts on utilities and service systems because there would be no construction associated with the project, and there would be no substantial changes to operations that could affect wastewater management or stormwater drainage in the project area.

Less than Significant

The analysis of project impacts indicates that the project would have less-than-significant impacts on the following air quality, biological resources, geology and soils, and hydrology and water quality considerations.

Air Quality

The project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors), expose sensitive receptors to substantial pollutant concentrations, or create objectionable odors affecting a substantial number of people.

Biological Resources

The project is not expected to cause a substantial adverse effect, either directly or through habitat modifications, on a special-status species, on any riparian habitat or other sensitive natural community, or on state or federally protected wetlands through direct removal, filling, hydrological interruption, or other means. The project is not expected to interfere substantially with the movement of any native resident or migratory fish or wildlife species or impede the use of native wildlife nursery sites. In fact, following the development and operation of the KWB, some of the upland natural communities (e.g., grassland) have been reestablished and intermittent natural communities have been created. These natural communities existed throughout much of the San Joaquin Valley's history. During wet years, the KWB supports approximately 7,000 acres of aquatic or semiaquatic habitats (recharge ponds) along the Pacific Flyway and provides essential habitat for migrating waterbirds, raptors, and other migratory birds. The aquatic/semiaquatic habitats support a high diversity of species (66 species observed in fall/winter 2011–2012) and an abundance (approximately 35, 000 individuals) of wintering waterfowl (Appendix G). Upland habitat on the KWB has also increased substantially with more than 12,000 acres of grassland and scrub communities that support or have the potential to support special-status plant and wildlife species.

Geology and Seismicity

The project is not expected to result in significant impacts related to liquefaction or ground failure.

Greenhouse Gases, Climate Change, and Energy

There would be no direct or indirect increase in greenhouse gas (GHG) emissions as a result of the project because water diversions are accomplished by gravity (and without electricity), and there would be no construction of new facilities and no substantial operational changes relative to baseline operations in any given year. There would be no difference in operations relative to current KWB operations and, therefore, there would be no conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. The project would not develop land uses and

patterns that cause substantial wasteful, inefficient, and unnecessary consumption of energy that would result in an increased demand for energy.

Hydrology and Water Quality

The project is not expected to result in a lack of available water supply to serve the project from existing resources, substantially alter the existing drainage pattern of the site or area that would result in substantial erosion or siltation, or substantially increase the rate or amount of surface runoff that would result in flooding onsite or offsite.

Significant (Less than Significant with Mitigation)

The analysis of project impacts indicates that the project would not have significant impacts on any resources.

Significant and Unavoidable

The analysis of project impacts indicates that the project would not have significant and unavoidable impacts on any resources.

ES.3.3 Areas of Known Controversy and Issues to be Resolved

CEQA requires that the lead agency or agencies identify issues of known controversy that have been raised during the scoping process and throughout the development of the project. KWBA has considered these concerns in the development of the project. The following issues were identified during the NOP scoping period.

- Objections to the baseline conditions and project area definition.
- Objections to how and where unappropriated Kern River water is used.
- Objections to which entity or entities are currently using the water.
- Where, to what extent, and at what time of year water will water remain in the Kern River for instream beneficial purposes.
- Mosquito control at KWB recharge ponds.
- Kern River water supply reductions.
- Reduced groundwater recharge.
- Groundwater quality.
- Air quality and greenhouse gas impacts.
- Changes to agricultural land and land uses.
- Socioeconomic impacts.
- Economic impacts related to replacing reduced Kern River water supplies.
- Cultural resource impacts.
- Growth-inducing impacts.
- Mitigation of hydraulic impacts related to the accumulation of in-channel woody vegetation.

Table ES-1. Summary of Impacts of the Kern Water Bank Conservation and Storage Project

Impact	Level of Significance	Proposed Mitigation Measure(s)	Level of Significance after Mitigation
Air Quality			
Impact AQ-1: Conflict with or obstruct implementation of the applicable air quality plan	No impact	None required	Not applicable
Impact AQ-2: Violate any air quality standard or contribute substantially to an existing or projected air quality violation	No impact	None required	Not applicable
Impact AQ-3: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)	Less than significant	None required	Not applicable
Impact AQ-4: Expose sensitive receptors to substantial pollutant concentrations	Less than significant	None required	Not applicable
Impact AQ-5: Create objectionable odors affecting a substantial number of people	Less than significant	None required	Not applicable
Biological Resources			
Impact BIO-1: Cause a substantial adverse effect, either directly or through habitat modifications, on a special-status species	Less than significant	None required	Not applicable
Impact BIO-2: Cause a substantial adverse effect on any riparian habitat or other sensitive natural community	Less than significant	None required	Not applicable
Impact BIO-3: Cause a substantial adverse effect on state or federally protected wetlands through direct removal, filling, hydrological interruption, or other means	Less than significant	None required.	Not applicable
Impact BIO-4: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or impede the use of native wildlife nursery sites	No impact	None required	Not applicable
Impact BIO-5: Conflict with any local policies or ordinances protecting biological resources	No impact	None required	Not applicable
Impact BIO-6: Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan	No impact	None required	Not applicable
Greenhouse Gases, Climate Change, and Energy			
Impact CC-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment	No impact	None required	Not applicable
Impact CC-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs	No impact	None required	Not applicable
Impact E-1: Potentially require or result in the construction of new electrical facilities	No impact	None required	Not applicable

Impact	Level of Significance	Proposed Mitigation Measure(s)	Level of Significance after Mitigation
Impact E-2: Potentially develop land uses and patterns that cause substantial wasteful, inefficient, and unnecessary consumption of energy that would result in an increased demand for energy	Less than significant	None required	Not applicable
Geology and Soils			
Impact GEO-1: Expose people or structures to adverse effects associated with an increased risk of liquefaction and related ground failures as a result of elevated groundwater levels	Less than significant	None required	Not applicable
Impact GEO-2: Cause land subsidence as a result of groundwater overdraft	No impact	None required	Not applicable
Hydrology and Water Quality			
Impact HYDRO-1: Lack of available water supply to serve the project from existing resources	Less than significant	None required	Not applicable
Impact HYDRO-2: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge	Less than significant	None required	Not applicable
Impact HYDRO-2a: Raise groundwater levels sufficiently to substantially impact existing infrastructure (e.g., Cross Valley Canal)	Less than significant	None required	Not applicable
Impact HYDRO- 3: Substantially alter the existing drainage pattern of the site or area that would result in substantial erosion or siltation	Less than significant	None required	Not applicable
Impact HYDRO-4: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff that would result in flooding onsite or offsite	Less than significant	None required	Not applicable
Impact HYDRO-5: Substantially degrade water quality	No impact	None required	Not applicable
Utilities and Service Systems			
Impact UTIL-1: Conflict with wastewater treatment requirements of the applicable Regional Water Quality Control Board	No impact	None required	Not applicable
Impact UTIL-2: Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects	No impact	None required	Not applicable
Impact UTIL-3: Require or result in the construction of new stormwater drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects	No impact	None required	Not applicable
Impact UTIL-4: Result in a determination by the wastewater treatment provider, which serves or may serve the project, that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments	No impact	None required	Not applicable

Chapter 1
Introduction

1.1 Purpose of this Environmental Impact Report

This project Environmental Impact Report (EIR) satisfies the requirements of the California Environmental Quality Act (CEQA) and the State CEQA Guidelines (14 California Code of Regulations [CCR] 15000 et seq.) by identifying, evaluating, and disclosing environmental impacts and recommending mitigation measures related to the Kern Water Bank Conservation and Storage Project (project) and alternatives that are to be considered prior to project disapproval or approval. The primary purpose of an EIR is to identify and publicly disclose any significant environmental impacts that may result from implementation of a project and to identify feasible alternatives, mitigation measures, and modifications to the project that would reduce those impacts. An EIR is an informational document used in the planning and decision-making process. It is not the purpose of an EIR to recommend either approval or denial of a project.

1.2 Intended Uses of This EIR

CEQA requires that state and local government agencies consider the environmental consequences of projects over which they have discretionary authority. The Kern Water Bank Authority (KWBA) has determined that preparation and certification of an EIR to satisfy CEQA (Public Resources Code § 21000 et seq.) is required before approval of the project. KWBA is the lead agency under CEQA. KWBA has prepared this EIR to provide the public, responsible agencies, and trustee agencies with information about the potential environmental effects of the project.

State responsible and trustee agencies, such as the State Water Resources Control Board (State Water Board) may rely on the EIR to satisfy CEQA for their individual project approvals. Responsible agencies are those agencies subject to the jurisdiction of California that have a legal responsibility to approve a project. These agencies are required to rely on the lead agency's environmental document in acting on whatever aspect of the project requires their approval but must prepare and issue their own findings regarding the project approval (State CEQA Guidelines § 15096). Trustee agencies are those that have jurisdiction over certain resources held in trust for the people of California but do not necessarily have legal authority over approving or carrying out the project. Likely responsible and trustee agencies for the project are presented in Table 1-1. Each likely responsible and trustee agency was given an opportunity to comment during the scoping period.

Table 1-1. Likely Responsible and Trustee Agencies for the Project

Agency	Jurisdiction
San Joaquin Valley Air Pollution Control District	Air quality within the district
California Department of Fish and Wildlife	Fish and wildlife Native plants designated as Rare or Endangered Game refuges Ecological reserves
California Department of Water Resources	State Water Project
California State Lands Commission	State-owned "sovereign" lands
California State Water Resources Control Board	Water rights
Central Valley Regional Water Quality Control Board	Water quality and discharges to state waters (including wetlands)
Kern County	Land use within Kern County

1.3 Public Review and the CEQA Process

Following is a summary of the major steps in the CEQA environmental review process.

- **Notice of Preparation**. After deciding that an EIR is required, the lead agency files a Notice of Preparation (NOP) soliciting input on the EIR scope from the State Clearinghouse (i.e., state agencies), other concerned agencies, and parties previously requesting notice in writing. The NOP is posted in the County Clerk's office for 30 days. The NOP is typically accompanied by an Initial Study (IS); the IS identifies the issue areas for which a proposed project could potentially create significant environmental impacts. The NOP for the project was released on February 16, 2012, and a public scoping meeting was held on February 28, 2012 (Appendix A).
- **Draft EIR**. The draft EIR (DEIR) assesses potential environmental effects of a proposed project, as well as identifies mitigation measures and alternatives to the project that could reduce or avoid adverse environmental impacts.
- **Notice of Completion/Public Review**. A lead agency files a Notice of Completion with the State Clearinghouse when it completes a DEIR. The lead agency also places a Notice of Availability in the County Clerk's office for 30–45 days and sends a copy of the Notice to anyone who has requested receipt of the Notice in writing. Additionally, public notice of the DEIR availability is given through the following procedures: (a) publication in a newspaper of general circulation, and (b) direct mailing to owners and occupants of surrounding properties. The lead agency solicits public comment and responds in writing to all written comments received (Public Resources Code §§ 21104, 21253). The minimum public review period for a DEIR is 30 days. When a DEIR is sent to the State Clearinghouse for review, the public review period must be 45 days unless the State Clearinghouse approves a shorter period.
- **Final EIR**. A final EIR (FEIR) includes: (1) the DEIR; (2) copies of comments received during the public review; (3) a list of persons and entities commenting; and (4) responses to all written comments on the DEIR.

- **Certification of FEIR**. Prior to making a decision on a proposed project, the lead agency must certify that: (1) the FEIR has been completed in compliance with CEQA; (2) the FEIR was presented to the decision-making body of the lead agency; and the decision-making body reviewed and considered the information in the FEIR prior to approving a project; and (3) the FEIR reflects the lead agency's independent judgment and analysis.
- **Lead Agency Project Decision**. A lead agency may: (1) disapprove a project because of its significant environmental effects; (2) require changes to a project to reduce or avoid significant environmental effects; or (3) approve a project despite its significant effects, if the proper findings and, if necessary, a statement of overriding considerations, are adopted.
- **Findings/Statement of Overriding Considerations**. For each significant impact of the project identified in the FEIR, the lead or responsible agency must find, based on substantial evidence, that: (1) the project has been changed to avoid or substantially reduce the magnitude of the impact; (2) changes to the project are within another agency's jurisdiction and such changes have been or should be adopted; or (3) specific economic, social, or other considerations make the mitigation measures or project alternatives infeasible. If an agency approves a project with unavoidable significant environmental effects, it must prepare a written Statement of Overriding Considerations that sets forth the specific social, economic, or other reasons supporting the agency's decision.
- **Mitigation Monitoring/Reporting Program**. When an agency makes findings on significant effects identified in the FEIR, it must adopt a reporting or monitoring program for mitigation measures that were adopted or made conditions of project approval to mitigate significant effects.
- **Notice of Determination**. An agency files a Notice of Determination after deciding to approve a project for which an FEIR is prepared (State CEQA Guidelines § 15094).

1.4 Organization of This EIR

This EIR is organized into the following six chapters, and its format and content are designed to meet the requirements of CEQA.

- Chapter 1, *Introduction*, identifies the type and purpose of this EIR, discusses regulatory requirements, and describes the public review and CEQA process.
- Chapter 2, *Project Description*, describes the project, its background and existing conditions, the need for and objectives of the project, and how the lead and responsible agencies will use this EIR.
- Chapter 3, *Environmental Setting and Impact Analysis*, describes the approach to the impact analysis and then, for each resource area, describes the environmental setting and methods of analysis, analyzes the impacts associated with the project and its alternatives, and presents mitigation measures for those impacts that have been determined to be significant.
- Chapter 4, *Alternatives*, describes the alternatives development process and alternatives to the project, including the No Project Alternative; identifies the environmentally superior alternative; and compares the alternatives to the project.

- Chapter 5, *Other CEQA Considerations*, addresses the potential cumulative and growth-inducing impacts, including growth-related indirect impacts that may result from project changes to KWB diversion, recharge, and recovery activities, and summarizes any significant and unavoidable impacts of the project and its alternatives.
- Chapter 6, *List of Preparers*, identifies the individuals involved in preparing this EIR and their respective contributions.

Chapter 2
Project Description

2.1 Project Overview

KWBA is a Joint Powers Authority formed on October 16, 1995 under the Joint Exercise of Powers Act, California Government Code Section 6500 et seq. KWBA is a public entity that includes Dudley Ridge Water District, Kern County Water Agency (KCWA) on behalf of its Improvement District No. 4, Semitropic Water Storage District, Tejon-Castac Water District, Westside Mutual Water Company, and Wheeler Ridge-Maricopa Water Storage District (KWBA member entities). KWBA filed a water right application (Application 31676) in September 2007 with the State Water Resources Control Board (State Water Board) seeking a water right permit to allow for the appropriation and continued[1] beneficial use of water from the Kern River in order to increase reliability and enhance the dry-year water supply to KWBA's participating members[2] through storage in the Kern Water Bank (KWB).

This chapter describes in detail the KWB and the project to supplement and enhance existing water bank operations, including what has been requested in Application 31676: proposed diversion limitations, any changes in operating practices, and the proposed places and purposes of use of the water expected to be diverted under the application. The objectives of KWBA in securing an appropriative water right are also described in this chapter.

2.1.1 Project Background

2.1.1.1 Project Development

The KWB was developed by KWBA in response to wide fluctuations in California water supply and in the wake of a seven-year drought (1987–1994) during which State Water Project (SWP) agricultural contractors, including KCWA and its member units (some of which are KWBA members), experienced drastic cuts in their SWP water entitlements (now, Table A amounts) and severely diminished surface supplies. The water banking program was designed to bank surplus water in wet years for later recovery to supplement inconsistent surface water supplies and to provide a more stable, reliable, and sustainable source of water, particularly in dry years.

KWBA operations and/or use of the KWB lands are subject to the requirements of various agreements, including the *Memorandum of Understanding Regarding Operation and Monitoring of the Kern Water Bank Groundwater Banking Program* (KWB MOU), agreed upon and executed on October

[1] As described below, since the inception of the KWB over 20 years ago Kern River water not utilized by existing right holders has been stored in the KWB and beneficially used by its members; thus, the project would result in a State Water Board permit for the continuance of a pre-existing activity through use of existing facilities in contrast to an entirely new activity.

[2] Of the six KWBA member entities, five (the participating members) are included as part of Application 31676: Dudley Ridge Water District, Semitropic Water Storage District, Tejon-Castac Water District, Westside Mutual Water Company, and Wheeler Ridge-Maricopa Water Storage District. Kern County Water Agency on behalf of Improvement District 4 is not part of the application or the project.

26, 1995 by KWBA member entities and the districts that surround the KWB property—the Buena Vista Water Storage District, Rosedale-Rio Bravo Water Storage District, Kern Delta Water District, Henry Miller Water District, and West Kern Water District (Adjoining Entities) (Appendix B).

The overall objective of the KWB MOU parties (KWBA, its member entities, and the Adjoining Entities) is that the

> design, operation and monitoring of the Project [the KWB] be conducted and coordinated in a manner to insure that the beneficial effects of the Project to the Project Participants [KWBA 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 Entities.

The KWB MOU establishes a relationship between the groundwater basin stakeholders, provides for various measures to protect local water levels and water quality, and establishes the Kern Fan Monitoring Committee to oversee banking operations and review an extensive monitoring program.

Subsequently, KWBA obtained the required agreement and permits (including the "Kern Environmental Permits" as defined in Paragraph I.P. and Exhibit 2 of the May 2003 Settlement Agreement (Settlement Agreement) approved by the court in *PCL v. DWR*, Sacramento County Sup. Ct., Case No. 95CS03216, which include federal and state endangered species act permits and management authorizations, and related Habitat Conservation Plan/Natural Communities Conservation Plan Implementation Agreement), performed remediation, and invested over $49million on infrastructure and other improvements. In addition, KWBA member entities prior to the 2016-2017 water year had recharged approximately 2.3 million acre-feet (AF) of water and recovered for beneficial uses approximately 1.5 million AF of water, leaving 800,000 AF of water in storage for use in future years when available surface supplies are insufficient. All water costs, including those for recharge and recovery, are borne by KWBA member entities. Funding for major infrastructure projects includes commercial financing (a $27 million bond), a Proposition 204 loan ($5 million), a Proposition 13 grant ($3.4 million), and significant participant assessments and capital contributions of approximately $14 million. KWBA's member entities are solely responsible for the repayment of the bond and loans used to fund the improvements.

In March 2014, following challenges to the CEQA adequacy of the 2010 Monterey Plus Environmental Impact Report (EIR) by petitioners in *Central Delta Water Agency v. DWR,* Case No. 34-2010-80000561 (*CD1*) and petitioners in *Rosedale Rio-Bravo Water Storage Dist. v. DWR,* Case No. 34-2010-80000703 (*Rosedale*), the Sacramento County Superior Court (Court) found that the Monterey Plus EIR "fail[ed] to adequately describe, analyze, and (as appropriate) mitigate the potential impacts of the Project associated with the anticipated use and operation of the Kern Water Bank, particularly as to potential groundwater and water quality impacts." The Court issued a peremptory writ of mandate in November 2014 (2014 Writ) in both *CD1* and *Rosedale* that, among other things, (a) severed the use and operation of the KWB from the remainder of the Monterey Plus Project; (b) allows KWBA to continue use and operate the KWB lands as a water banking and recovery project until the writ is discharged, subject to the following conditions: (i) existing KWB operations shall be maintained, but not expanded; and (ii) the Kern Water Bank shall be subject to and operated in compliance with the Interim Operations Plan (Appendix E) and the existing Kern Environmental Permits; (c) required the California Department of Water Resources (DWR) to revise the Monterey Plus EIR's project description to include the development, use, and operation of the KWB as a water banking and recovery project, and to revise the Monterey Plus EIR as necessary to correct the CEQA error with respect to the analysis of the potential impacts associated with the transfer, development, use, and operation of the KWB as a water banking and recovery project; and (d) allowed DWR's May 2010 Monterey Plus Project decision as it related to the KWB's use and

operation to remain in place pending preparation of an adequate EIR, all as more particularly provided in the 2014 Writ.

In response to the Court ruling and in accordance with Public Resources Code section 21168.9, DWR decertified the Monterey Plus EIR on December 11, 2014, and prepared the Monterey Plus Revised EIR (REIR) regarding the KWB. DWR, as lead agency, certified the REIR in September 2016. The REIR includes, as a mitigation measure approved by KWBA, a new *Long-Term Project Recovery Operations Plan Regarding Kern Water Bank Authority Project (2016)* (Appendix C). A new CEQA lawsuit challenging pursuant to a petition for writ of mandate the adequacy of the REIR was filed in Sacramento County Superior Court in *Center for Food Safety v. DWR*, Case No. 34-2016-80002649 (*CFS*). The Court set a hearing for August 18, 2017, to resolve all objections to the REIR raised by the *CFS* petitioners and to determine whether the 2014 Writ should be discharged in *CD1* and *Rosedale*. *Rosedale* petitioners subsequently entered into a stipulation with DWR, KWBA and all the other parties to that case, filed with the Court on or about May 3, 2017, which provides that the REIR satisfied the concerns raised by *Rosedale* petitioners' case and accordingly the 2014 Writ in the *Rosedale* matter shall be discharged. On October 2, 2017, the Court issued a Ruling on Submitted Matter that it shall deny *CFS's* petition and issue an order discharging the 2014 Writ, and on October 20, 2017, the Court entered judgment in *CFS* denying the petition and orders in *Rosedale* and *CD1* discharging the2014 Writ.[3] Other than certain data or operating parameters in the Long-Term Operations Plan, this EIR is not intended to tier from DWR's Monterey Plus EIR or its 2016 REIR. Further, this EIR relies on actual conditions and historical operations for purposes of setting the environmental baseline for analysis. Consequently, this EIR is a standalone EIR that evaluates all physical changes in the environment that might occur as a result of this project and the State Water Board's approval of KWBA's appropriative water right Application 31676.

2.1.1.2 Habitat Conservation

The KWB also serves the purpose of plant and wildlife habitat conservation. In addition to the KWB MOU, the KWB operates under a Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) that provides for specific uses for the property through the year 2072. In addition to 5,900 acres dedicated to routine recharge activities, these uses include 960 acres of Sensitive Habitat, which is set aside for endangered species, 5,592 acres of Compatible Habitat, which can be used for recharge, conveyance, and recovery of water, the 3,267-acre Conservation Bank, which provides mitigation for other properties, 530 acres preserved and managed as mitigation for DWR projects, and a 3,170-acre Farming Sector which may also include recharge ponds. The Farming Sector has not been farmed, but rather used in the same manner as Compatible Habitat. The HCP/NCCP provides for the commercial development of 490 acres adjacent to Interstate Highway 5 (I-5), contingent on amendment of the HCP/NCCP, but as part of the Settlement Agreement KWBA has committed not to develop this acreage.

2.1.1.3 Water Sources

KWBA principally receives water from the following three sources: the State Water Project (SWP), the Central Valley Project (CVP), and the Kern River. The SWP delivers water from the north via the

[3] The 2014 Writ did not set aside any approvals; however, that and other rulings of the Court in *CD1* are being challenged by *CD1* petitioners in their pending appeal in the Third Appellate District (Case No. C078249). No party filed an appeal in *Rosedale*. The 2014 Writ provides that the *Interim Operations Plan* (Appendix E) is only applicable as a condition of KWB use and operations until discharge of the 2014 Writ. (2014 Writ, ¶ 6, p. 3.)

California Aqueduct. The CVP delivers water from the north via the California Aqueduct and from the central Sierra Nevada via the Friant-Kern Canal. The Kern River system (and other local streams) drain from the southern Sierra Nevada. Local conveyance facilities, including the Kern Water Bank Canal, Kern River Canal, Cross Valley Canal, and Pioneer Canal, are used to convey water from these primary sources to various parts of the KWB.

KWBA members all have contracts for SWP water either directly or through KCWA or its member units. These SWP supplies include Table A water, which is the contracted amount, and Article 21 water, which is surplus unregulated water typically available in wetter years. Table A water deliveries vary based on the annual SWP allocation, which has ranged from 0% to 100% for agricultural contractors. Article 21 water is available in addition to Table A water when there is excess water in the SWP system. Article 21 deliveries are unscheduled, interruptible, and cannot be stored in the SWP system. In addition to SWP supplies, KWBA member entities have historically acquired CVP water through short-term programs with the Bureau of Reclamation and Kern River water either through purchases from existing rights holders (primarily the City of Bakersfield) or through agreements with the Kern River Watermaster for floodwaters. In general, these Kern River floodwaters would have otherwise flowed to the Kern River–California Aqueduct Intertie (Intertie) and been lost to Kern County or have flooded productive agricultural lands. Additional details regarding KWB facilities and operations are further outlined in Section 2.2, *Existing KWB Conditions*.

Kern River supplies (both purchases and floodwater) currently account for approximately 24% of water diverted to the KWB. KWBA is one of the furthest downstream diverters from the Kern River, so any water KWBA takes flows through the City of Bakersfield and stays instream until diverted at its diversion points west of Bakersfield.

2.1.1.4 Kern River Water Right Status

The State Water Board has historically considered the Kern River system fully appropriated throughout the year from Buena Vista Sink upstream, including all tributaries where hydraulic continuity exists in Kern County. The Kern River system was included in the original Fully Appropriated Stream Declaration adopted by State Water Board Order WR 89-25, and it remained listed on the revised Declaration adopted by State Water Board Orders WR 91-07 and WR 98-08. In *North Kern Water Storage District v. Kern Delta Water District* (2007) (147 Cal.App.4th 555 [54 Cal.Rptr.3d 578]) (North Kern Decision) the Fifth District Court of Appeal ruled that there was a partial forfeiture of Kern Delta Water District's (Kern Delta) pre-1914 water rights on the Kern River. However, the 2007 ruling did not determine if the forfeited water fell to any other Kern River rights holders. Therefore, the ruling left unanswered the water right status of the Kern River.

Six applications have been filed with the State Water Board to appropriate water from the Kern River, some of which seek rights to water forfeited under the North Kern Decision. These applicants are as follows.

- North Kern Water Storage District and City of Shafter's application (Application 31673) proposes to directly divert at a rate of 1,850 cubic feet per second (cfs). The maximum combined amount of direct use and surface and underground storage is 500,000 acre-feet per year (AFY). The application lists irrigation, groundwater replenishment, municipal, industrial, domestic, and other uses of the water.

- The City of Bakersfield's application (Application 31674) which proposes a combined direct diversion and surface and underground storage of 90,000 AFY for irrigation, domestic, municipal, recreation, industrial, fish and wildlife enhancement, and water quality uses.
- Buena Vista Water Storage District's application (Application 31675) proposes to collect a maximum of 520,000 AFY in surface and underground storage and to directly divert a maximum amount of 180,000 AFY for the purpose of irrigation.
- The Kern Water Bank Authority's application (Application 31676) proposes to divert up to 500,000 AFY for irrigation, municipal, and industrial uses and fish and wildlife enhancement.
- Kern County Water Agency's application (Application 31677) proposes combined direct diversion and surface and underground storage of 2,279,000 AFY for municipal and irrigation uses and aquifer storage.
- Rosedale Rio Bravo Water Storage District's application (Application 31819) proposes to divert 65,750 AFY by direct diversion and storage for municipal use.

The State Water Board held a hearing in October 2009 regarding the fully appropriated status of the Kern River. In February 2010, it issued an order (2010–0010) that concluded

> the Declaration of Fully Appropriated Streams, as adopted by State Water Board Orders WR 89-25, WR 91-07, and WR 98-08, should be revised to allow for processing the applications to appropriate water from the Kern River in accordance with the provisions of the Water Code and other applicable law.

The State Water Board did not base its decision on the forfeited Kern Delta water, but rather on the board's own interpretation that flood waters delivered to the Intertie are by definition unappropriated. The issue of whether Kern Delta's partial forfeitures of its pre-1914 water rights resulted in rendering additional Kern River waters subject to appropriation (in addition to the unappropriated flood waters) will be decided as the State Water Board processes the applications.

2.1.2 Project Location

2.1.2.1 Regional Setting

The Kern County portion of the southern San Joaquin Valley encompasses approximately 8,132 square miles. This portion of the valley is surrounded by the Greenhorn Mountains and Sierra Nevada to the east, the Tehachapi and San Emigdio Mountains to the south, and the Temblor Range to the west. The principal native water source is the Kern River, which originates in the Sierra Nevada to the east and north of the Greenhorn Mountains. Minor streams include Poso, San Emigdio, and Caliente Creeks. Imported water sources are very important to the region and include the SWP and the CVP. Most of the region is used for irrigated agriculture. The most significant crop types include almonds, grapes, citrus, carrots, pistachios, hay and alfalfa, cherries, and cotton. Principle cities include Bakersfield, Shafter, Wasco, Delano, and Arvin.

The Kern River flows from the southern Sierra Nevada through the Greenhorn Mountains to the floor of the San Joaquin Valley. Historically, during times of high flow, the river would flow to the south to Kern and Buena Vista Lakes, and then to the north to Tulare Lake. During extremely wet years, Tulare Lake would then overflow into the San Joaquin River. Today, the river follows a course though Bakersfield and essentially terminates at the Intertie. (A more detailed discussion of the Kern River is presented in Section 3.6, *Hydrology and Water Quality*.)

2.1.2.2 Project Area

The KWB is located at the downstream reach of the Kern River, about 12 miles southwest of the City of Bakersfield in Kern County and east of the California Aqueduct in the southern San Joaquin Valley. As illustrated in Figure 2-1, the KWB is generally located at the western limit of Bakersfield and midway between the cities of Shafter and Taft. Figure 2-2 shows that the KWB is located between Taft Highway (State Route 119) to the south, Stockdale Highway to the north, Tupman Road and the California Aqueduct to the west, and Heath Road to the east. Interstate Highway 5 (I-5) bisects the KWB in a northwest to southeast direction.

2.1.2.3 Study Area

The study area for purposes of the environmental analysis in this EIR depends upon the nature and type of resource topic being analyzed. The study area for some impacts is the same as the KWB project area (the KWB facilities and physical boundary). For other impacts, the study area includes the participating members' service areas or the appropriate watershed or air basin (for example, the air quality analysis in Section 3.2, *Air Quality Resources*, focuses on the San Joaquin Valley Air Basin [SJVAB]). Each resource-specific study area is defined in its respective resource analysis section of this EIR.

2.1.3 Proposed Project

The project is to directly divert up to 500,000 AF of water per year from the Kern River for recharge and storage within the KWB through existing diversion works and recharge facilities located on the KWB lands, and/or to deliver water directly to KWBA's participating members' service areas via the KWB Canal or Cross Valley Canal (CVC). This EIR addresses the appropriation of high flow Kern River water that otherwise would have: (1) been diverted to the Intertie, (2) flooded farmlands, or (3) left Kern County. The EIR does not consider the appropriation of the Kern Delta forfeited water (i.e., the water that is the focus of the City of Bakersfield's *Kern River Flow and Municipal Water Program Final Environmental Impact Report*). The State Water Board has not yet determined whether the Kern Delta water, or other Kern River water, is unappropriated. KWBA may conduct additional CEQA review should the State Water Board (or other entities) decide that other Kern River Water is available for appropriation.

As discussed in Section 3.6, *Hydrology and Water Quality*, the 500,000 AF is considered an upper limit assuming Kern River water is available for a full year at sufficient flow rates. Diversion of 500,000 AF of Kern River floodwater is expected to be a rare occurrence. As indicated by the data provided in Section 2.2.2.1, *Recharge*, water diversions under the project would be much less, even in wet years, and unlikely to occur in normal and dry years. Based on analysis described in detail in Section 3.6, *Hydrology and Water Quality*, flood flows would be available for diversion in approximately 18% of years, as estimated based on historical hydrology. The water stored within the KWB would ultimately be recovered using existing electric pumps and put to reasonable and beneficial uses—primarily irrigation uses—by KWBA's participating members. KWBA is seeking to secure a permit and then a license from the State Water Board for the full amount requested in Application 31676 (Appendix D).

This EIR evaluates the environmental impacts of diversion of up to 500,000 AF of Kern River water for recharge, storage, and recovery for participating member entities' use.

Stockdale Highway

Heath Road

58

California Aqueduct

Tupman Road

5

119

Legend

- Highway 119
- Heath Road
- Tupman Road
- Stockdale Highway
- Interstate 5
- California Aqueduct
- Kern Water Bank Property

N

0 0.5 1

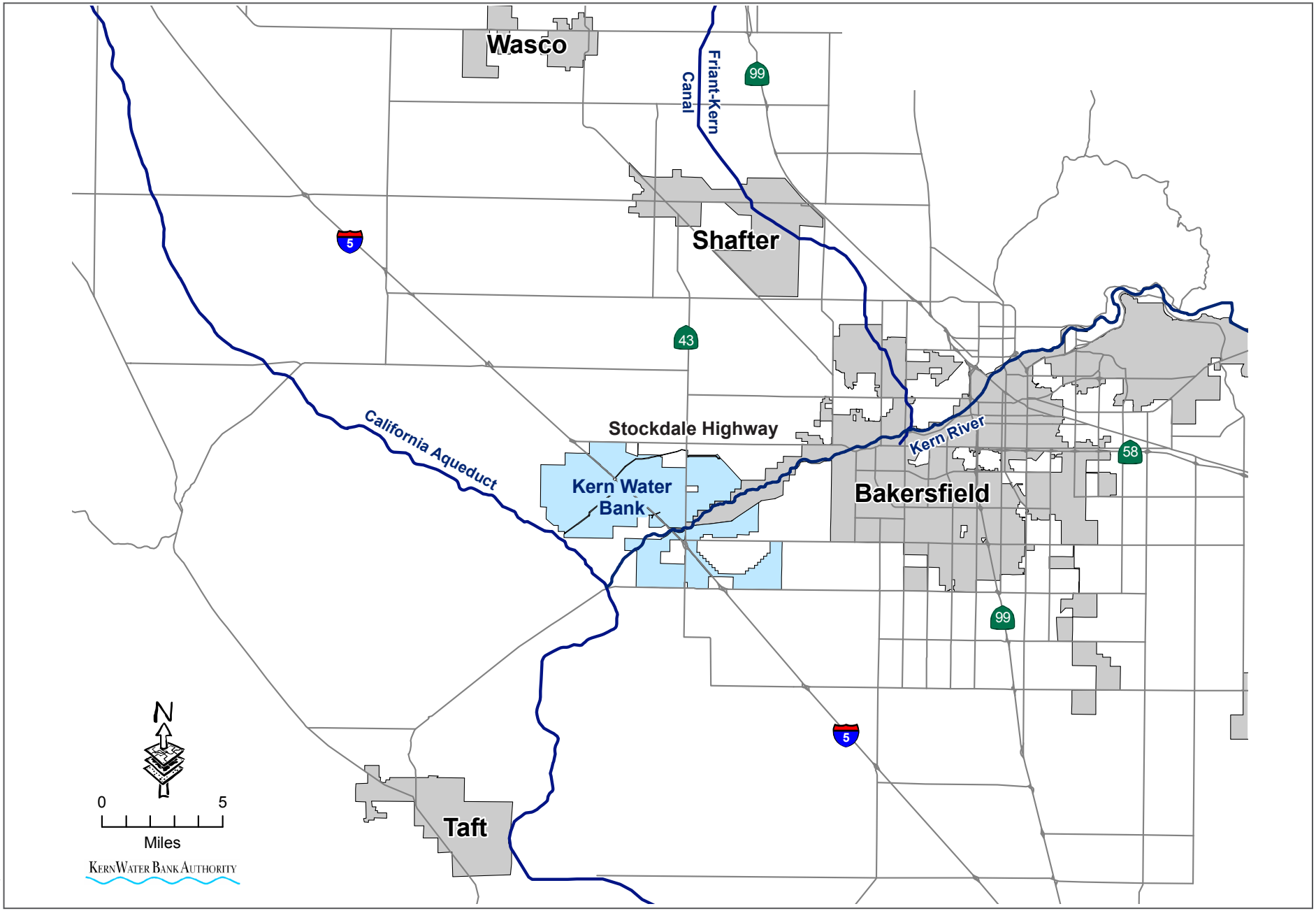
Miles

Source: KWBA 2012, USGS 2009

Path: K:\Projects_1\Kern_Water_Bank_Authority\00415_12_Water_Rights_EIR\mapdocs\Fig_2_1_Project_Site_20170921.mxd User: 19016; Date: 9/21/2017

ICF

Figure 2-1
Project Area and Vicinity



ICF Graphics...00415.12 (9-20-2017)

Figure 2-2
Kern Water Bank Location

2.1.3.1 California Water Rights and Water Right Process

California employs a dual system of surface water rights that recognizes both appropriative and riparian rights. An appropriative water right consists of the right to divert a specified quantity of water for a reasonable, beneficial use on lands that are not riparian (or contiguous) to the watercourse. Under the riparian doctrine, the owner of land contiguous to a watercourse has the right to the reasonable, beneficial use of the natural flow of water on his land. Riparian water may not be seasonally stored or used outside the watershed.

The State Water Board administers the state's statutory water right permit and license system, which applies to appropriations of water from surface streams and subterranean streams flowing through known and definite channels (Water Code § 1200). Since 1914, the permit and license system provides the exclusive means of acquiring a new appropriative water right (*Id*. § 1225).

In order to obtain a new appropriative water right, a person must file a water right application with the State Water Board to appropriate water and use it for a reasonable and beneficial use (Water Code §§ 100, 1252). In considering whether to approve a water right application, the State Water Board must consider the relative benefit to be derived from all beneficial uses of water concerned, including the preservation and enhancement of fish and wildlife, and uses protected in the relevant water quality control plan (*Id*. § 1257). The State Water Board must consider the project's potential environmental impacts and any feasible mitigation measures identified through the CEQA process. The State Water Board may impose terms and conditions that will best develop, conserve, and utilize in the public interest the water sought to be appropriated, protect fish and wildlife, and carry out water quality control plans (*Id*., §§ 1253, 1257, 1257.5, 1258).

All water right applications must provide sufficient information to allow the State Water Board to determine that there is water available for the project (Water Code § 1260). This includes showing that the project will not deprive higher priority water rights of the use of water under that right, as well as showing that the project will not harm public trust resources (such as fish, recreation, and navigation uses).

Following issuance of a water right permit, a permittee must diligently pursue construction of the project and the application of water to beneficial use. Once a permittee has completed the maximum beneficial use of water, the State Water Board issues a license, which is the final confirmation of the water right. If the permittee has not been able to make full beneficial use of the allotted water right during the permit period, the State Water Board has the authority to reduce the amount of water allowed by the permit when issuing the license.

2.1.3.2 Water Right Application 31676

Application 31676 proposes to directly divert surface waters at a rate of 10 cfs for 5,000 AFY for municipal use, 750 cfs for 490,000 AFY for irrigation use, and 15 cfs for 5,000 AFY for industrial use or divert up to 500,000 AFY for underground storage for municipal, industrial, irrigation, and water quality uses. If approved, this would allow for the appropriation of up to a total of 500,000 AFY of water from the Kern River. Any water directly diverted in a given year would reduce the quantity placed into storage by the same volume. The priority date of the water right would be September 26, 2007, the filing date of the application.

The requested amount of 500,000 AFY is the estimated maximum quantity of Kern River water that KWBA can physically divert and recharge in a given year. In prior wet years, there have been instances when more than 500,000 AFY was diverted into the Intertie to avoid downstream flooding. If the State Water Board grants KWBA a water right permit to appropriate the requested amount, this water will remain in the Kern River alluvial watershed for instream beneficial purposes until diverted generally west and downstream of the greater Bakersfield area.

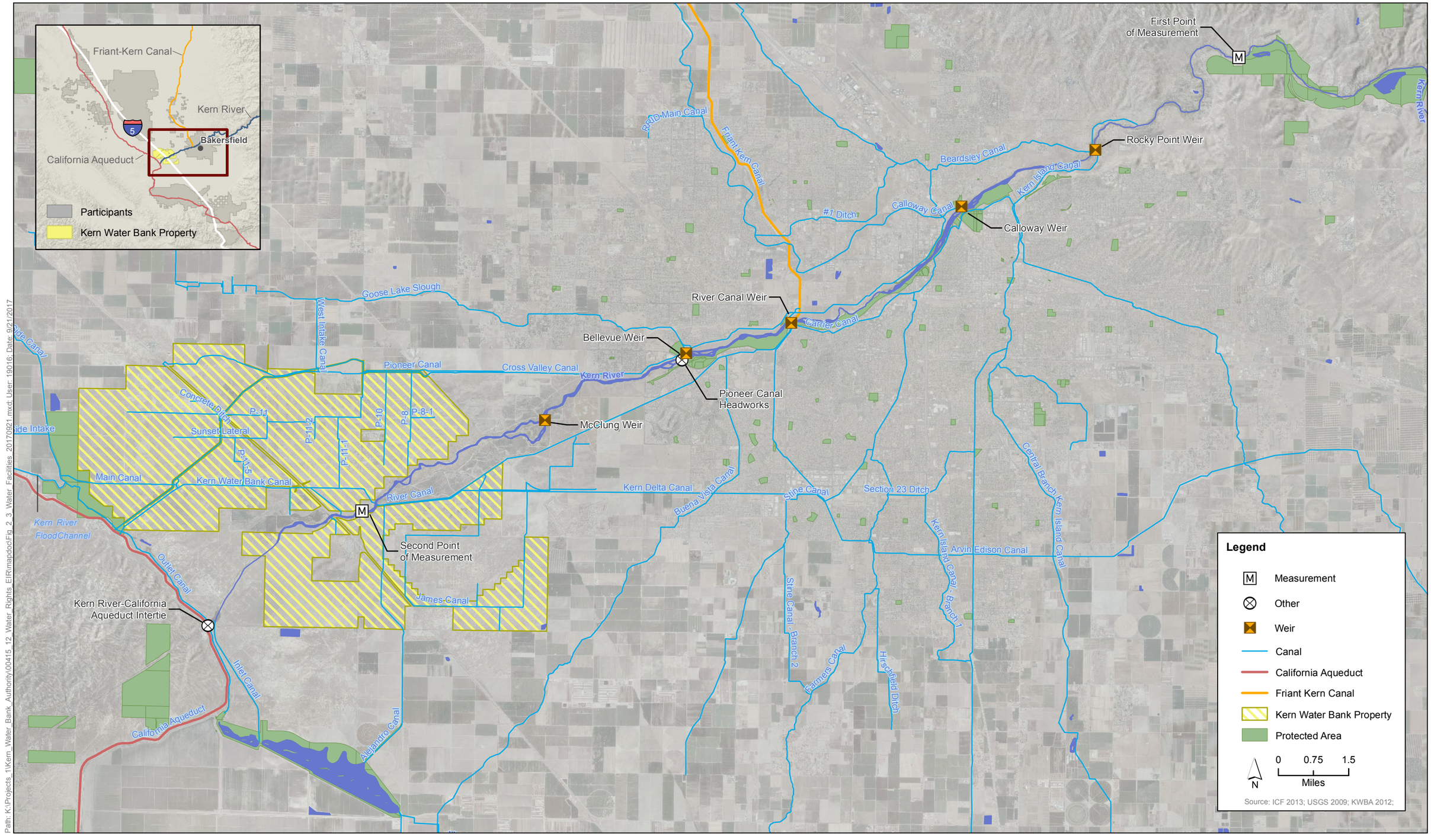
If the State Water Board approves the full appropriation requested in Application 31676, KWBA will have the right to divert and store water through its existing facilities, subject to any terms or conditions that the State Water Board imposes in the permit. The total water use on the place of use (POU) would not exceed the amount allowed under the permit. As discussed in detail below, the diversion amount that would be allowed under the permit would not necessarily represent an increase in annual diversions relative to diversions that have historically occurred in the project area.

Points of Diversion

The proposed points of diversion include existing impoundment structures and associated diversion structures along the Kern River. The impoundment structures (e.g., the River Canal Weir) followed by the diversion points related to that impoundment (e.g., the Kern River Canal East) are listed below and shown on Figures 2-3 and 2-4.

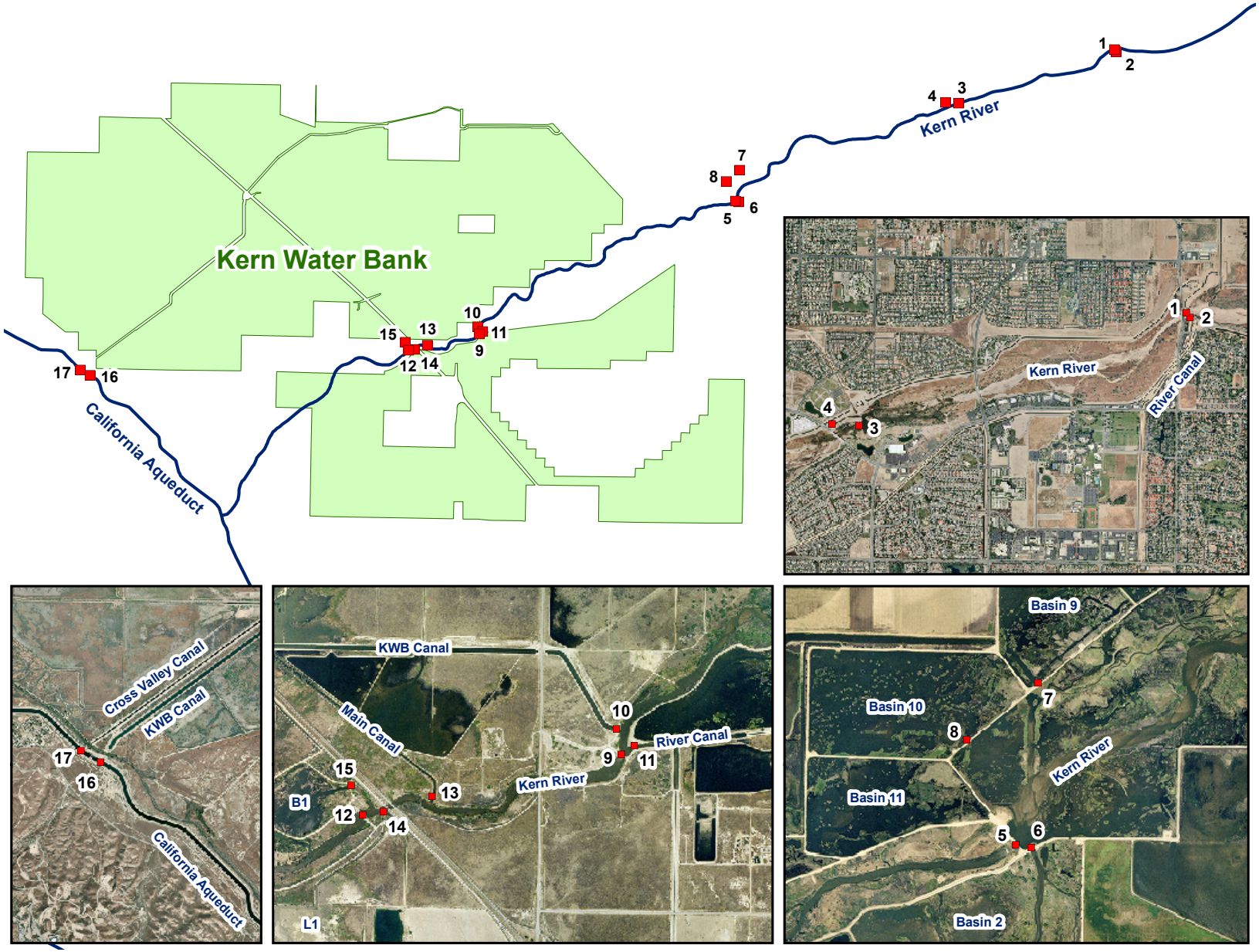
- River Canal Weir
  - Kern River Canal East (900 cfs)
- Bellevue Weir
  - Pioneer Canal Headworks (350 cfs)
- McClung Weir / City of Bakersfield Basin 1
  - City of Bakersfield Basin 2 (500 cfs)
  - City of Bakersfield Basin 9 (600 cfs)
  - City of Bakersfield Basin 10 (150 cfs)
- 2nd Point Diversion Weir
  - Kern Water Bank Canal (800 cfs)
  - Kern River Canal West (300 cfs)
- Sand Plug
  - Main Canal (250 cfs)
  - Kern Water Bank Basin L1 (40 cfs)
  - West Kern Basin 1 (200 cfs)

Most water diverted under the project would be delivered via the Kern Water Bank Canal, located near Enos Lane, and the City of Bakersfield's 2,800-acre recharge facility's Basin 9 and 10, which receive river water via McClung Weir and Basin 1. Basin 9 and 10 deliver water to the Pioneer Project and then in turn to the KWB. The Basin 9 and 10 capacities are 600 and 150 cfs, respectively. However, the maximum delivery to the KWB via these diversion points is limited to about 400 cfs.



Path: K:\Projects_1\Kern_Water_Bank_Authority\00415_12_Water_Rights_EIR\mapdoc\Fig_2_3_Water_Facilities_20170921.mxd User: 19016; Date: 9/21/2017

Figure 2-3
Key Water Resource Facilities on the Lower Kern River



Source: West Yost Associates, 2013.

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Figure 2-4
Kern Water Bank Points of Diversion

The Kern River Canal East, located at the River Canal Weir near Coffee Road, provides alternative conveyance for the river channel itself. This canal is used as an alternative or supplement if the City of Bakersfield requests that the river channel not be used. The Pioneer Canal Headworks, located at the Bellevue Weir near Stockdale Highway and at the western end of the Park at Riverwalk, can be used to deliver water to the Cross Valley Canal and then in turn to the KWB (up to 350 cfs). Deliveries via the Cross Valley Canal would be used as an alternative or supplement to Basin 9 and 10 deliveries. Basin 2 delivers water to the 2800 Acre recharge facility and the Pioneer Project and then in turn to the KWB (up to 150 cfs). The Kern River Canal West can be used as an alternative or supplement to the KWB Canal diversion point to deliver water to the Cross River Pipeline and into the KWB Canal. The Main Canal would be used as an alternative to the KWB Canal. KWB Basin L1 is a direct diversion to one KWB recharge pond. West Kern Basin 1 delivers up to 200 cfs into the West Kern Project and in turn the KWB can deliver 20 cfs into KWB pond L2.

Currently, all diversions from the Kern River are measured by the City of Bakersfield and/or Buena Vista Water Storage District (BVWSD). Recovered water is measured by the Department of Water Resources (DWR) if made through SWP facilities and KCWA if through the Cross Valley Canal. Under the project, these practices would continue.

Points of Rediversion

Kern River water can also be rediverted into the California Aqueduct via the KWB Canal and Cross Valley Canal, and then delivered either directly to KWBA participating members through California Aqueduct turnouts or by exchange (Figure 2-5). The ability to redivert water in this way can provide significant water conservation benefits by maximizing the beneficial uses of Kern River water, preventing potential flooding, and lowering energy usage necessary to deliver water to KWBA participating members.

Place of Use

The POU for the Kern River water considered in this document is throughout KWBA's participating members' service areas and lands in Kern and southernmost Kings Counties. The KWB POUs for the supplies identified in this EIR are shown in Figure 2-6. As stated in Application 31676, the POU will be in all or a portion of the below districts. These POUs include the service areas of water districts in which KWBA participating members and their water users have land holdings.

- Arvin-Edison Water Storage District
- Belridge Water Storage District
- Berrenda Mesa Water District
- Cawelo Water District
- Dudley Ridge Water District
- Kern-Tulare Water District
- Lost Hills Water District
- North Kern Water Storage District
- Semitropic Water Storage District (and a portion of the Kern River Channel/Jerry Slough/Goose Lake Bed area)

- Shafter-Wasco Irrigation District
- Southern San Joaquin Municipal Utilities District
- Tejon-Castac Water District (and a portion of the Castac and Los Alamos y Aqua Caliente Land Grants)
- Wheeler Ridge Maricopa Water Storage District (and portions of the Buena Vista Lake Bed area and Castac and El Tejon Land Grants)

Purpose of Use

As indicated in Application 31676, the purpose of use for the appropriated water would include groundwater storage for municipal, industrial, irrigation and water quality uses and direct diversion for municipal, industrial, and irrigation uses. Although the participating members' service areas support a wide variety of crops (e.g., alfalfa, cotton, fruits, grain/pasture, grapes, nursery, nuts, and vegetables), primarily in Kern County, high-value perennial tree crops predominate in the service areas. Stored water would provide valuable supplemental irrigation supplies during droughts and thereby potentially reduce pumping of native groundwater in KWBA members' service areas. A portion of the stored water would also be used for municipal and industrial uses; one of the participating members would supply developments in southern Kern County, and all of the member entities, including the participating members, would continue to provide a back-up supply to a power plant in southern Kern County.

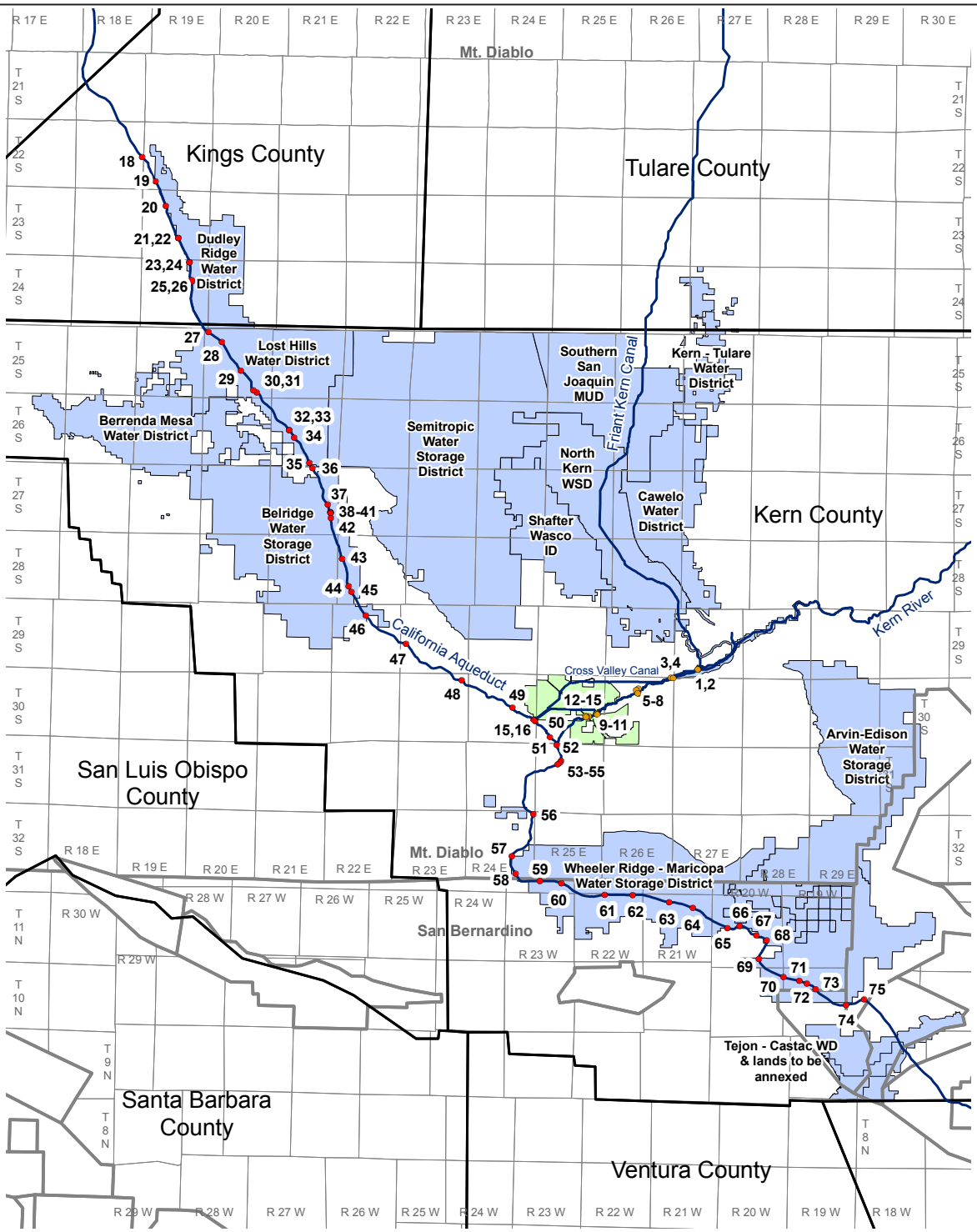
KWBA's application to appropriate indicates that surplus unappropriated Kern River water awarded to KWBA would be allowed to remain in the Kern River watercourse to support water quality and other instream beneficial purposes until diverted downstream and generally westerly of the greater Bakersfield area for recharge and storage within the KWB. Groundwater storage would also provide for the preservation and enhancement of wildlife. The recharge ponds provide exceptional intermittent wetland habitat along the Pacific Flyway, benefiting thousands of water birds and wetland dependent upland birds and wildlife.

As discussed above, Kern River water can also be rediverted into the California Aqueduct via the KWB Canal and Cross Valley Canal and then delivered either directly to KWBA participating members through California Aqueduct turnouts or by exchange (Figure 2-4). The purpose of use for these diversions would be the same: municipal, industrial, and irrigation uses. These rediversions would also provide instream benefits to vegetation and wildlife.

2.1.4 Project Need and Objectives

2.1.4.1 Project Need

The state experiences severe water management challenges during extended dry hydrology. California experienced dry years from 2007 to 2009 and a record drought from 2012 to 2016. These years also marked a period of unprecedented restrictions in SWP and CVP diversions from the Sacramento–San Joaquin River Delta (Delta) to protect listed fish species. The San Joaquin Valley region relies in large part on SWP supplies, which originate in northern California and are conveyed through the California Aqueduct from the Delta. Due to pumping restrictions imposed on the SWP, the need for additional water storage south of the Delta is widely recognized by all stakeholders in the state as a tool that will help to secure long-term water supplies.



Legend

- Point of Diversion
- Point of Rediversion
- River / Canal
- KWB Place of Use for the Supplies Considered in this EIR
- Kern Water Bank

NOTE: Deliveries to some areas by exchange.

N

KERN WATER BANK AUTHORITY

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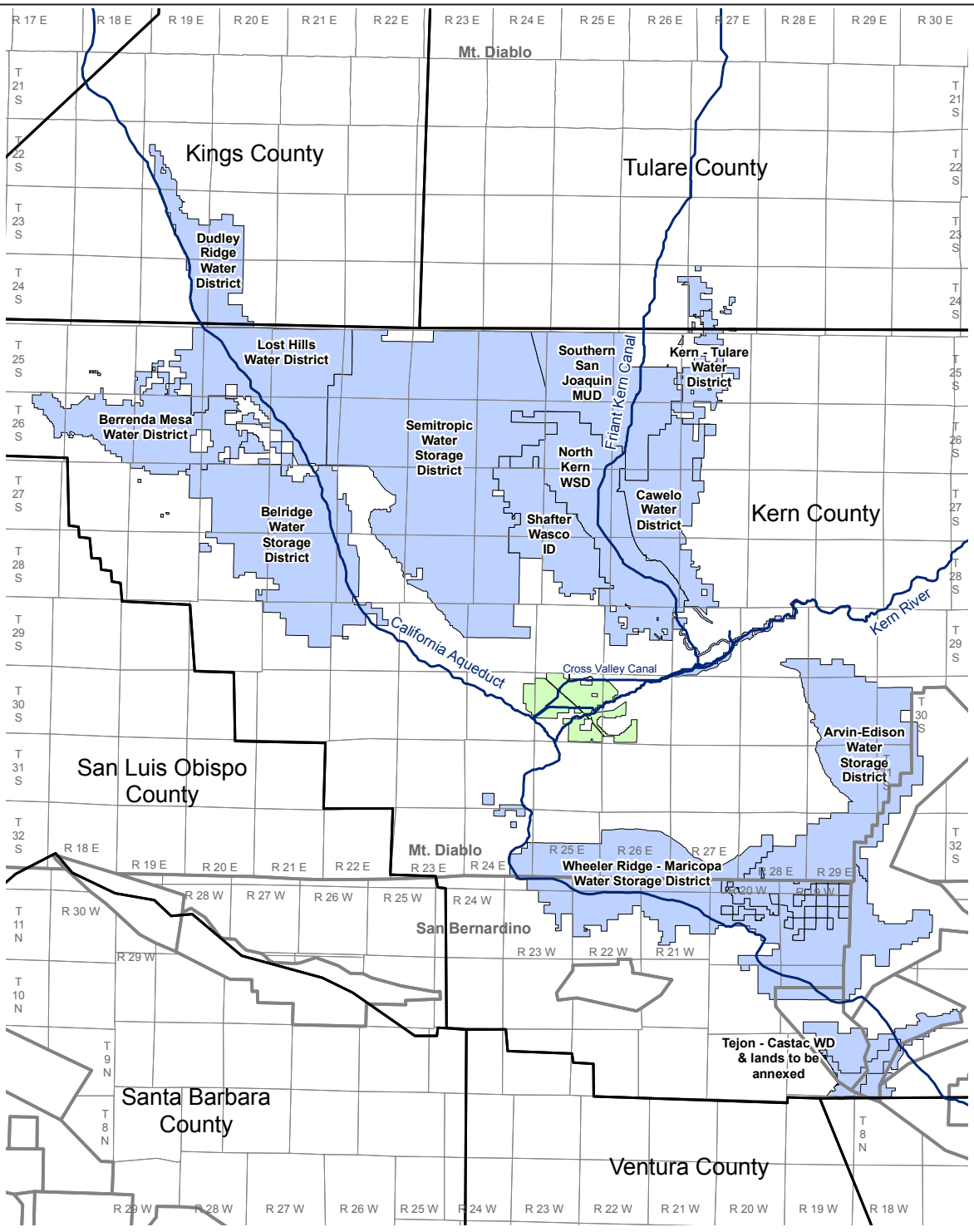
Figure 2-5
Kern Water Bank Points of Rediversion



Legend

- River / Canal
- KWB Place of Use for the Supplies Considered in this EIR
- Kern Water Bank

NOTE: Deliveries to some areas by exchange.

N

KERN WATER BANK AUTHORITY

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Figure 2-6
KWB Place of Use for the Supplies Considered in this EIR

2.1.4.2 Project Objectives

The objectives of the project are as follows.

- Secure water rights to unappropriated Kern River water in order to maximize use of the KWB's existing capabilities.
- Continue to allow Kern River water to be diverted to the KWB during times of excess Kern River flows for recharge and later recovery by KWBA.
- Enhance water supply reliability, particularly in dry years, to KWBA participating members through storage within the KWB.
- Enhance groundwater resources by maximizing the amount of water recharge and storage within the KWB in wet years.
- Maximize the beneficial uses of Kern River water, including irrigation, municipal, and industrial uses through both groundwater storage and direct deliveries to KWBA participating members, as well as in maintaining instream flows until those flows reach the KWB points of diversion.
- Preservation and enhancement of fish and wildlife resources, including rare and endangered species on the Kern Water Bank and upstream in the Kern River.
- Maintain and improve groundwater quality through recharge of high quality water from the Kern River.
- Reduce risks of Kern River flooding below the KWB's points of diversion during high flows.

Utilizing water from the Kern River would provide multiple benefits to KWBA's participating members and the region. Such benefits include increasing groundwater recharge, enhancing riverine and wetland ecology and habitats, improving water quality, and improving the aesthetic quality of the river and KWB. Kern River diversions would also be beneficial because they would provide an efficient, reliable, and environmentally sound water source for both municipal water supplies and hundreds of thousands of acres of essential crops, including fruits, vegetables, nuts, fiber, and livestock. Groundwater storage would also provide for the preservation and enhancement of wildlife. The recharge ponds provide intermittent wetland habitat along the Pacific Flyway, benefiting thousands of water birds and wetland-dependent upland birds and wildlife.

2.2 Existing KWB Conditions

2.2.1 Facilities

Existing KWB facilities include 75 shallow recharge basins, 88 recovery wells, 36 miles of pipeline, a 6-mile-long canal, and 3 pump stations. The recharge basins occupy approximately 7,500 acres and average 2 feet deep. They are constructed with low berms placed in downslope areas; the upslope portions of the basins are typically controlled by natural topography. This construction provides for very natural intermittent wetland and related aquatic habitats.

The KWB Canal was constructed to convey water both to the water bank ponds for recharge purposes and from the water bank wells for recovery purposes. The 90-foot-wide canal extends 6 miles from the Kern River on the east to the California Aqueduct on the west. The canal is bidirectional and can receive or deliver about 800 cfs from or to the California Aqueduct or from the

Kern River. The canal is not lined, and its 4:1 slopes provide ready access to water for the abundant wildlife present within the KWB.

The recovery wells are typically completed to a depth of about 750 feet and yield as much as 5,000 gallons per minute of water. They are distributed throughout the northern two-thirds of the KWB and typically spaced about one-third of a mile apart. The water recovered from the wells is delivered through 6 miles of large diameter (60 inch) and 30 miles of small diameter (18 to 36 inch) pipeline. All KWB pumps are electric.

With the exception of the recharge basins, which provide for intermittent wetland habitat, the other banking facilities only occupy about 230 acres of the KWB's 20,000 acres. The balance provides for exceptional upland habitat.

2.2.2 Water Operations

2.2.2.1 Recharge

Water delivered from the three water sources for the KWB—the SWP, CVP (including water from minor streams along the Friant-Kern Canal), and Kern River—is measured by and reconciled between DWR, the CVP, KCWA, City of Bakersfield, and/or Buena Vista Water Storage District. KCWA tracks recharge volumes, and they are reported in operations reports prepared by the Kern Fan Monitoring Committee (Section 2.2.3.2, *Groundwater Monitoring*).

Local conveyance facilities, including the Kern Water Bank Canal, Kern River Canal, Cross Valley Canal, and Pioneer Canal, are used to convey water from these primary sources to various parts of the KWB. Once on the KWB, water is delivered to recharge basins in small channels with operators controlling the flow with small weir boxes.

KWBA has delivered a cumulative total of approximately 2.5 million AF of water from all three sources for recharge on the water bank from 1995 to September 2017. Most of this recharge occurred from 1995 through 1998, 2005 through 2006, and in 2011 and 2017. This water is subject to losses by evapotranspiration. As described in the KWB MOU, 6% 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. Approximately 910,000 AF of water is currently stored within the KWB. Table 2-1 shows the amounts of water recharged on an annual basis from 1995 through September 2017 within the KWB.

KWB recharge operations are described in greater detail in Section 3.6, *Hydrology and Water Quality* under *Kern Water Bank Operations*.

As described in Section 3.3, *Biological Resources*, KWB recharge operations also provide significant environmental benefits, including the enhancement and preservation of habitat for threatened and endangered species, water birds, and other wildlife and vegetation communities.

Table 2-1. Total Recharge Deliveries by Kern Water Bank Authority (acre-feet)

	State Water Project[a]	Friant-Kern[b]	Kern River[c]
1995	70,329	47,035	104,896
1996	87,492	49,893	36,490
1997	40,049	28,806	43,407
1998	51,155	55,248	196,683
1999	26,011	10,563	179
2000	19,455	8,124	–
2001	10,030	–	–
2002	13,439	–	–
2003	40,374	–	–
2004	18,065	–	–
2005	327,418	59,239	900
2006	178,065	40,244	64,924
2007	16,728	–	–
2008	–	–	–
2009	–	–	–
2010	33,131	–	–
2011	352,297	68,230	26,621
2017 (Est. through September)[d]	246,000	1,600	216,000
Total	1,530,038	368,982	690,100

Source: Derived from Appendix L.

– = No recharge deliveries.

[a] Includes State Water Project Table A Amount, Article 21 water.

[b] Includes flood flows, additional water provided in accordance with Section 215 of the Reclamation Reform Act of 1982 (water resulting from an unusually large water supply not otherwise storable for CVP purposes),and other sources (derived from Appendix L).

[c] Includes flood flows, KWBA/City of Bakersfield miscellaneous,),and other sources (derived from Appendix L.

[d] No deliveries were made to the KWB in 2012 through 2016.

2.2.2.2 Recovery

Water stored within the KWB is recovered at the request of KWBA's member entities. Recovery operations are subject to the conditions specified in the KWB MOU (see Section 2.2.3.1.). Consistent with the KWBA MOU, and a similar MOU governing banking operations in the Rosedale-Rio Bravo Water Storage District (Rosedale), KWBA and Rosedale developed an *Interim Project Recovery Operations Plan Regarding Kern Water Bank Authority (KWB) and Rosedale-Rio Bravo Water Storage District (Rosedale) Projects* (Interim Plan) that designates measures to be employed to "prevent, eliminate or mitigate significant adverse impacts" resulting from cumulative recovery operations of KWBA and Rosedale projects subject to said MOUs (Appendix E). The Interim Plan was effective until the 2014 Writ was discharged in October, 2017. Subsequently, as a responsible agency, KWBA approved the Long-Term Operations Plan (Appendix C), which constitutes a required part of KWB operations.

Subsequently, KWBA entered into a joint plan, *Project Recovery Operations Plan Regarding Pioneer Project, Rosedale-Rio Bravo Water Storage District, and Kern Water Bank Authority Projects* (Joint Plan) (Appendix F). The Joint Plan also considers cumulative impacts from additional banking projects on the Kern Fan, and designates mitigation measures similar to those contained in the Long-Term KWB Plan. The recovery operations plans all include a joint committee that regularly monitors potential groundwater level impacts of banking project recovery operations on neighboring agricultural and domestic wells based on groundwater modeling and specified triggers for potential mitigation actions, with significant impacts being avoided, eliminated, or mitigated by implementing one or more corrective actions, including investigation of any claims and pump lowering, well replacement, and/or reduction or adjustment of banking project recovery operations, as appropriate. Water recovered by the KWB, including appropriated Kern River supplies, would continue to be subject to the MOU and all applicable recovery operations plans. This project is meant to increase reliability and long-term storage but does not propose to alter or otherwise increase annual recovery operations above historical levels.

From 1995 through 2016, approximately 1.5 MAF was pumped from the KWB. All of this water was recovered during portions of three dry periods which occurred from 2001 through 2004, 2007 through 2010, and 2012 through 2016.

2.2.2.3 Flood Control

In very wet years, the Intertie, constructed in 1977, diverts Kern River flows into the California Aqueduct to prevent downstream flooding. Prior to construction of the Intertie, Kern River flood flows were diverted through Buena Vista Water Storage District's Outlet Canal to the Kern River Flood Channel and into the Tulare Lake Basin, flooding farmland. Since 1978, over 1,000,000 AF of Kern River water has flowed through the Intertie. During the same period, 430,000 AF of Kern River water bypassed the Intertie via the Kern River Flood Channel to flood farmland in the Tulare Lake Basin, where a large volume of that water simply evaporated.

In very wet years, the significant quantities of flood waters that would otherwise be diverted into the Intertie or Kern River Flood Channel for flood control are available for recharge in Kern County. Since 1995, the KWBA members have recharged approximately 160,000 AF of Kern River flood water. During that same period, KWBA members have purchased approximately 457,000 AF of Kern River water surplus to Kern River rights holders' needs.

2.2.3 Monitoring

2.2.3.1 Kern Water Bank MOU

The KWB is operated under the requirements of the KWB MOU, as well as the requirements of applicable recovery operations plans described above. The KWB MOU provides for the establishment of an extensive monitoring program and a monitoring committee, the Kern Fan Monitoring Committee, to oversee banking operations and the results of said monitoring. The Kern Fan Monitoring Committee is made up of several basin stakeholders, including KCWA and all adjoining water districts.

Some of the measures prescribed in the KWB MOU to protect water levels include: (1) spread out 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.

The KWB MOU also prescribes measures to protect water quality, including: (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).

2.2.3.2 Groundwater Monitoring

KWBA conducts 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 57 dedicated monitoring wells for several potential constituents of concern, and (2) the sampling of all recovery wells. The monitoring wells are sampled according to a protocol developed by the Kern Fan Monitoring Committee. The results of this sampling are reported to the committee and documented in operations reports prepared by the committee. The recovery wells are sampled according to a monitoring schedule developed by the Department of Public Health. These results are provided to DWR and are used to meet the criteria established to deliver non-project water to the California Aqueduct.

Monitoring of groundwater levels is also conducted pursuant to the recovery operations plans described in Section 2.2.2.2, *Water Operations*.

2.2.4 Environmental Management

2.2.4.1 Habitat Conservation and Restoration

The creation of the KWB has resulted in the reestablishment and preservation of exceptional upland and intermittent wetland habitat that existed historically throughout much of the southwestern San Joaquin Valley. Prior to the development of Kern County's water infrastructure, much of the area was intermittently flooded by the Kern River and other minor streams. This flooding supported extensive wetlands, marshes, and Kern and Buena Vista Lakes, all along the Pacific Flyway. Numerous canals and Isabella Dam were constructed during the late nineteenth and twentieth centuries to capture and regulate waters for beneficial uses. However, this redirection also resulted in a reduction in wetland and marsh habitats by as much as 90%.

The KWB developed an HCP/NCCP with USFWS and the DFW that provides for the overall management of KWB lands with the stated purpose of

> accomplish[ing] both water conservation and environmental objectives. The primary water conservation objective is the storage of water in the aquifer during times of surplus for recovery during times of shortage. The primary environmental objective is to set aside large areas of the KWB for threatened, endangered, and sensitive species and to implement a program to protect and enhance the habitat.

Nearly 17,000 of the KWB's 20,000 acres were farmed prior to 1991. The implementation of the HCP/NCCP has resulted in the re-establishment of upland habitat throughout the property. This upland habitat supports large populations of raptors, Tipton kangaroo rats (*Dipodomys nitratoides*

nitratoides), burrowing owls (*Athene cunicularia hypugea*), and tri-colored blackbirds (*Agelaius tricolor*).

The water conservation activities of the KWB (and other banking projects in Kern County) are also re-establishing thousands of acres of intermittent wetland habitat in the region. Willows, cottonwoods, sedges, and other wetland vegetation are reemerging, and the recharge basins and basin edges are providing nesting and foraging habitat for migrating water birds and other wildlife dependent on aquatic or semi-aquatic habitats. Recharge operations on the KWB provide tremendous benefits to water birds. To date, more than 40 species of water birds have been sighted on the KWB property, including Caspian terns, white-faced ibis, double-crested cormorants, and white pelicans (Appendix G).

2.2.4.2 Land Management

The HCP/NCCP describes vegetation management and restoration practices for the long-term adaptive habitat management and enhancement of KWB lands. The priorities of the adaptive management program are protection of sensitive habitat areas and control of exotic pest plants. The primary tools of the program are livestock grazing, mowing, and burning. Other activities include the application of herbicides with hand sprayers at wells and gate structures, road grading, and fence repair. The HCP/NCCP also requires rare plant surveys and monitoring of San Joaquin kit fox and Tipton kangaroo rat populations. KWBA voluntarily completes additional monitoring and survey programs, including ornithological studies and the development of an observation monitoring grid. Compliance with HCP/NCCP requirements is documented in annual reports submitted to the wildlife agencies. These reports also include a management plan for the upcoming year.

2.3 Agency Use of this EIR

2.3.1 Consideration of Project Approval

Section 15124(d) of the State CEQA Guidelines requires that an EIR contain a statement briefly describing the intended uses of the EIR. This EIR has been prepared to analyze the potential environmental impacts of implementing the project. This EIR will be used by KWBA and its Board of Directors, as the lead agency, to evaluate environmental impacts of the project and to decide whether to carry out the project. This EIR will also be used by responsible agencies to consider the project's environmental effects and how or whether to approve permits associated with implementation of the project. Upon completion and certification of this EIR, KWBA may proceed to consider whether to carry out the project. KWBA will use this document to make written findings and decisions, adopt a Statement of Overriding Considerations, if necessary, and file a Notice of Determination (NOD). Responsible agencies must make their own findings for each significant effect of the project.

2.3.2 Existing Permits and Agreements

KWBA currently operates the KWB in compliance with a number of federal and state permits and agreements. These include authorizations from the U.S. Fish and Wildlife Service (USFWS), DWR,

and the California Department of Fish and Wildlife (DFW). Specifically, these permits and agreements include the following.

- *Kern Water Bank Habitat Conservation Plan/Natural Community Conservation Plan*
- *Memorandum of Understanding Regarding Operation and Monitoring of the Kern Water Bank Groundwater Banking Program, and Applicable Recovery Operations Plans*
- USFWS incidental take permit
- DFW management authorization

2.3.3 Anticipated Permits, Approvals, and Regulatory or Consultation Requirements

In addition to lead agency use of this EIR, regulatory agencies may rely on this document, in whole or in part, for the renewal and/or re-issuance of regulatory permits for the project.

Implementation of the project would not require any new construction of facilities or change in current operations. The only permit required for the project would be a permit from the State Water Board to allow for the appropriation of unappropriated high flows from surface water sources, granting approval to divert water for direct diversion to storage for municipal, industrial, and irrigation uses.

KWBA has consulted with other trustee agencies as required by CEQA. These agencies, through consultations during the EIR and water rights process, will provide input related to appropriate areas of responsibility and any proposed mitigations and/or conditions on the water rights permit.

2.4 Cumulative Scenario

State CEQA Guidelines require that the cumulative impacts of a project be addressed in an EIR when the cumulative impacts are expected to be significant and when the project's incremental effect is cumulatively considerable (State CEQA Guidelines 15130[a]). If an environmental effect is not cumulatively considerable, a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable (Id.). Cumulative impacts are impacts on the environment that result from the incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions (State CEQA Guidelines 15355[b]). Such impacts can result from individually minor but collectively significant actions taking place over time.

The project involves the continued diversion of flow from the Kern River. The project would not require new construction and would involve only minor modifications to current and historical operations that are part of the environmental baseline. The project further contemplates an appropriative right to significant diversions of surface waters. However, those diversions have historically occurred and are proposed to occur only in high water years when DWR might otherwise operate the Intertie to capture excess flood flows. As such, the cumulative context (i.e., the range of project types and locations that could affect the same resources affected by the project) is relatively limited, though it includes past, present, and reasonably foreseeable future projects or actions. Section 5.1.2, *Approach to Cumulative Impact Analysis*, discusses the methodology in greater detail.

2.5 References

California Department of Water Resources. 2016. *Monterey Plus Revised Environmental Impact Report.* Available: http://www.water.ca.gov/environmentalservices/montereyplusrevisedeir.cfm.

Insight Environmental Consultants. 2015. *Focused Air Quality Analysis: Agricultural-Related Emissions with the Kern Water Bank Service Area*.

Chapter 3
Environmental Setting and Impact Analysis

3.1 Approach to Analysis

3.1.1 Resources Dismissed from Further Analysis

The analysis in the February 2012 IS (Appendix A) concluded the project would result in either no impact or impacts that are less than significant for the following topics: Aesthetics, Agricultural and Forestry Resources, Cultural Resources, Hazards and Hazardous Materials, Land Use and Planning, Mineral Resources, Noise, Population and Housing, Public Services, Recreation, and Transportation and Traffic. No comments were received on the NOP (Appendix A) or during agency scoping meetings that indicated these topics should be addressed further in this EIR.

3.1.1.1 Aesthetics

No state- or locally-designated scenic routes or scenic resources are present near the Kern Water Bank (KWB). In addition, the existing facilities are visually consistent with the local landscape, which is comprised of agricultural uses, waterways, and groundwater recharge facilities. Therefore, the Kern Water Bank Conservation and Storage Project's (project's) diversion and recovery of additional Kern River flood flows into the existing ponds would not affect any scenic resources or vista. There would be no impact.

3.1.1.2 Agricultural and Forestry Resources

The project would be located entirely within the existing KWB and would use existing facilities. The California Department of Conservation's Farmland Mapping and Monitoring Program (FMMP) identifies most lands within the KWB as Grazing lands and Nonagricultural and Natural Vegetation lands on the 2014 Kern County Important Farmland Map. The FMMP does not identify any Prime Farmland or Unique Farmland within the KWB (California Department of Conservation 2016); however, a small portion of the project area contains some land designated as Farmland of Statewide Importance.

Kern County applies a zoning designation of A- Exclusive Agriculture to KWB lands (Kern County 2017b). The KWB is not under Williamson Act contract and does not conflict with existing agricultural zoning or Williamson Act contracts. Further, the project area does not include forest land or timberland, and it is not zoned for forestry or timberland uses. With the exception of the designation of 3,170 acres of KWB lands by the KWB Habitat Conservation Plan/Natural Communities Conservation Plan (HCP/NCCP) as a Farming Sector where future farming activities could occur, the KWB acreage has not been farmed since 1991.

Because the project would use existing KWB facilities to divert Kern River water into the existing KWB recharge ponds for recharge and recovery, it represents a continuation of existing water banking activities on the project site and would potentially improve the reliability of the agricultural water supply for existing KWB participants rather than convert agricultural land to non-agricultural use, affect Williamson Act contracts, or conflict with existing agricultural or timberland use or zoning. There would be no impact.

Section 5.2, *Growth-Inducing Impacts*, includes a discussion of the project's relationship to the ongoing shift in agricultural land uses from field crops to perennial crops within the KWBA member participants' service areas.

3.1.1.3 Cultural Resources

No historical resources are present within the project site. Archaeological investigations completed for the KWB HCP/NCCP recorded archaeological sites within or near KWB lands (Kern Water Bank Authority 1997). However, the project would rely entirely on the operation of existing KWB facilities and does not propose construction of any new facilities or otherwise involve any ground-disturbing activities. As such, the project would not cause a substantial adverse change in significance of a historical resource or have any impact on historical, archaeological, or paleontological resources or human remains. There would be no impact.

3.1.1.4 Hazards and Hazardous Materials

The project consists of the diversion, recharge, and recovery of Kern River flood water, when available, using existing facilities. No construction activities are included in the project. As such, the project would not involve the routine transport, use, or disposal of hazardous materials and would not create a significant hazard to the public or the environment. There would be no impact.

The nearest school, Tupman Elementary School, is approximately 0.5 mile southwest of the KWB's southwestern boundary, and no other schools are proposed within 0.25 mile of the KWB. Because there are no existing or planned schools within 0.25 mile of the project site and because the project would not emit or handle hazardous materials, substances, or waste, there would be no impact on schools.

The project would not be located on a site that is included on a list of hazardous materials sites pursuant to Government Code Section 65962.5 and would therefore not create a significant hazard to the public or the environment. There would be no impact.

The nearest airport, Meadows Field Airport in the city of Bakersfield, is approximately 11 miles northeast of the KWB. The nearest private airstrip, Joe Gottlieb Field, is 2.3 miles northeast of the KWB; the airstrip is not in operation. Because the project would not be within 2 miles of a public use airport or in the vicinity of a private air strip, it would not result in a safety hazard for people working in the project area. There would be no impact.

The KWB lands are owned by the Kern Water Bank Authority; the public is allowed to use or access the facility with the Authority's permission and supervision. Further, there are no adopted emergency response plans or emergency evacuation plans currently in place as they are not needed. As such, there would be no impact on any emergency response or emergency evacuation plan.

Wildland fire protection is the responsibility of either the state, the local government, or the federal government. The KWB is within a Local Responsibility Area (LRA). LRAs include incorporated cities, cultivated agriculture lands, and portions of the desert and typically receive fire protection from city fire departments, fire protection districts, counties, and the California Department of Forestry and Fire Protection (CAL FIRE) under contract to local governments. In accordance with State law, CAL FIRE identifies Fire Hazard Zones based on the severity of fire hazard that is expected to prevail there. CAL FIRE classifies most KWB lands as unzoned (unclassified fire hazard), and some small areas as moderate fire hazard severity zones (California Department of Forestry and Fire Protection

2007). The KWB contains many acres of recharge ponds and few aboveground structures, limited to Interstate 5 (I-5), the Cross Valley Canal, third-party oil-field facilities, and pumping equipment. Because the project would add water to those recharge ponds and would not add or modify any facilities or other infrastructure, the project would not expose people or structures to fire risk. There would be no impact related to wildland fire hazards.

3.1.1.5 Land Use and Planning

The KWB is in a rural area surrounded by largely agricultural uses, with residential communities one or more miles to the northeast, east, and southwest. No new facilities are proposed as part of the project, and it would not divide any established community. There would be no impact.

The *Kern County General Plan* designates the majority of the project area as Intensive Agriculture, with a Flood Hazard overlay; the existing land use of the KWB would not change under the project and is consistent with the County's Miscellaneous Use category, which includes water storage or groundwater recharge facilities, and is, therefore, an allowed use within the Intensive Agriculture zone according to the Kern County Zoning Ordinance (Kern County 2004, 2017a). The KWB HCP/NCCP applies to use of the project area, and allows water banking uses on about 12,000 acres of the KWB project area. The project would request appropriation of additional Kern River water when available and would not change the area of recharge basins or conflict with the adopted HCP/NCCP. The project's relationship to the HCP/NCCP is described in greater detail in Section 3.3, *Biological Resources*. Overall, project activities would comply with the project area's land use and zoning designations, as well as the KWB HCP/NCCP, because current uses of the project result from implementation of the project. There would be no impact.

3.1.1.6 Mineral Resources

Although the KWB is not located in an area of significant mineral resources (i.e., aggregate resources) as identified by the California Geological Survey (2009), oil and natural gas wells are located in and near the KWB (Division of Oil, Gas and Geothermal Resources 2017). However, the proposed diversion, recharge, and recovery of Kern River flood water using existing facilities would not alter the infrastructure of the basins or canals and would not interfere with the extraction of oil or natural gas. Therefore, the project would not affect or result in the loss of availability of these oil and natural gas resources. There would be no impact.

3.1.1.7 Noise

No new facilities would be constructed as part of the project. The Noise Element of the *Kern County General Plan* requires that commercial or industrial uses not subject noise-sensitive receptors, defined as residential areas, schools, convalescent and acute-care hospitals, parks and recreational areas, and churches, to average day-night noise levels (L_{dn}) above 65 decibels (dB) L_{dn} in exterior areas and interior noise levels above 45 dB L_{dn} (Kern County 2004). Existing electric pumps with estimated noise levels of 68 to 72 A-weighted decibels (dB[A]) at 50 feet would continue to be used when needed for recovery activities, which are ongoing within the KWB. This ambient noise level is generally below the ambient noise generated by I-5 and other roadway traffic in the project area. Further, noise associated with pumping would not affect sensitive receptors because the pumps are located in remote areas over 500 feet from the nearest homes and businesses. Noise levels at sensitive receptors would remain below established standards. In addition, because the project would not require any construction or

ground-disturbing activities, it would not expose people to the generation of excessive groundborne vibration or groundborne noise levels. There would be no impact.

The project would not involve any construction activities and would use existing KWB facilities. As such, there will be no introduction of new stationary noise sources and no increase in peak noise levels. Existing electric pumps may be used at times for the project. These activities would not result in a substantial increase in temporary or periodic noise levels or the permanent ambient noise level of the area. There would be no impact.

The nearest airport subject to an airport land use plan (ALUP), Meadows Field Airport in the city of Bakersfield, is approximately 11 miles northeast of the KWB. The nearest private airstrip, Joe Gottlieb Field, is 2.3 miles northeast of the KWB, and the airstrip is not in operation. Because the project would not be within 2 miles of a public use airport, in the vicinity of an operating private airstrip, or in an area subject to an ALUP, it would not result in a safety hazard for people working in the project area. There would be no impact.

3.1.1.8 Population and Housing

The project would not directly induce population growth as no construction or expansion is proposed. No indirect effects associated with extension of infrastructure would result as the project would not cause the extension of roads or other infrastructure. The project could indirectly induce population growth through increased availability of banked groundwater; however, water stored within the KWB by the participating members is used primarily for agricultural irrigation in existing areas, and not for urban use. In addition, the project is intended to increase water reliability for existing agricultural uses and existing populations rather than to accommodate increased water use or urban growth. Section 5.2, *Growth-Inducing Impacts*, provides further discussion of potential indirect effects of the Kern River water considered in this document on population growth in the KWB's POU areas, as identified in Chapter 2, *Project Description*.

The project would not displace any housing units or people as the water bank facility already exists, and no expansion or construction is proposed. There would be no impact.

3.1.1.9 Public Services

Project activities would not increase the number of people or structures in the area, and would therefore not substantially change or result in a need for additional fire or police protection, schools, parks, or other public facilities (see also Section 3.1.1.4). There would be no impact.

3.1.1.10 Recreation

Several recreational facilities are located in the project vicinity, including the Kern County Raceway Park, Tule Elk State Reserve, Kern River Parkway, and Buena Vista Aquatic Recreational Area. In addition, and in accordance with the KWB HCP/NCCP, public and private hunting activities, birdwatching, water education, and organized nature hikes take place within the KWB. However, because neither existing operations nor the project's diversion, recharge, and recovery operations affect the area's population or use of recreational facilities, the project would not affect the use of neighborhood or regional parks. Further, the project represents a continuation of existing uses within the KWB and would, therefore, not affect or increase demand for ongoing hunting, birdwatching, water education, and organized nature hike activities. In addition, because the project would not include new

recreational facilities or require the construction or expansion of existing facilities, there would be no associated physical effect on the environment. There would be no impact.

3.1.1.11 Transportation and Traffic

Because most of the KWB's vehicle traffic is associated with maintenance activities and is limited to the project area's internal roadway system, KWB operations do not generate substantial traffic on public roadways. No changes in maintenance activities are proposed. Consequently, the project would not result in any conflict with applicable circulation plans, ordinances, or policies, congestion management program, or other standards. There would be no impact.

No new facilities and no construction or ground-disturbing activities are proposed as part of the project; therefore, the project would have no effect on air traffic patterns nor result in any safety risks associated with air traffic, increase hazards because of a design feature, or result in inadequate emergency access. There would be no impact.

3.1.2 Resources Addressed in this EIR

The *Environmental Setting and Impact Analysis* section of this EIR (Chapter 3) describes the regulatory and environmental setting, impacts, and any mitigation measures identified, if necessary, for *Air Quality* (Section 3.2), *Biological Resources* (Section 3.3), *Climate Change* (Section 3.4), *Geology and Seismicity* (Section 3.5), *Hydrology and Water Quality* (Section 3.6), and *Utilities and Service Systems* (Section 3.7).

3.1.3 Overview of Approach to Impact Analysis

An EIR discloses and analyzes the environmental effects of a project, indicates ways to reduce or avoid potential environmental damage resulting from the project, and identifies project alternatives. The purpose of this EIR is to provide the public and decision makers with an objective analysis; it does not recommend either approval or denial of the project. The analysis provides information on environmental consequences of the project to aid in the decision-making process.

3.1.3.1 Format

Each resource section in this EIR is divided into five subsections: Regulatory Setting; Environmental Setting; Methods; Significance Criteria; and Impacts and Mitigation Measures.

Each resource section in this EIR begins with a description of the project's regulatory setting and an environmental setting as it pertains to that particular resource. The regulatory setting discussion presents pertinent laws, ordinances, regulations, and standards that are relevant to implementing the project. The environmental setting provides a point of reference for assessing the environmental impacts of the project and alternatives. The setting discussion addresses the conditions that exist prior to implementation of the project. These existing conditions establish the baseline by which environmental impacts of the project and alternatives are measured.

The EIR includes as much detail as possible to maximize information available for public review and avoid and/or minimize the need for future environmental documentation. The methods section for each resource describes the methods used to evaluate impacts. Such methods may include studying information gathered from utility/service providers, referring to available literature/reference documents, and consulting with potentially affected agencies. In addition, several technical studies

were prepared, reviewed, and incorporated into this EIR. Each resource section discusses in greater detail the exact methodology used in the analysis of that resource.

Significance criteria are used to determine if the impact of the project, when evaluated against the environmental baseline, could result in a significant environmental impact under CEQA. Under State CEQA Guidelines Section 15064(b),

> the determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data. An iron-clad definition of significant effect is not always possible because the significance of an activity may vary with the setting.

Thus, the significance criteria are specific to each resource and are explained in the resource sections. The significance criteria are intended to provide a clear demarcation between a less-than-significant impact and a significant impact.

The impacts and mitigation section for each resource includes a description of the methods used to evaluate impacts, presents the determination of all impacts found to be significant, and provides data and analysis to support that conclusion. In accordance with the requirements of CEQA, the EIR addresses all potential impacts that arise as a direct or indirect result of the project. In addition, the EIR must address all impacts that may be considered to be individually insignificant but whose contribution to the cumulative impact on a resource is considerable when viewed in light of similar impacts from past, present, and reasonably foreseeable future projects. For all impacts found to be significant, KWBA must list feasible measures to mitigate impacts to a less-than significant level, when such measures are available.

3.1.3.2 Environmental Setting

The Kern County portion of the southern San Joaquin Valley encompasses approximately 8,132 square miles. This portion of the valley is surrounded by the Greenhorn Mountains and Sierra Nevada to the east, the Tehachapi and San Emigdio Mountains to the south, and the Temblor Range to the west. A more detailed discussion of the geology of this area is provided in Section 3.5, *Geology and Seismicity*.

The KWB is located at the downstream reach of the Kern River, about 12 miles southwest of the city of Bakersfield in Kern County and east of the California Aqueduct in the southern San Joaquin Valley. It is very close to the intersection of the SWP's California Aqueduct and the Cross Valley Canal (which connects the federal Friant-Kern Canal with the California Aqueduct through Bakersfield). The KWB receives water from three sources: the SWP, the CVP, and the Kern River. The Kern River is the southernmost river in the San Joaquin Valley. It begins in the Sierra Nevada on the eastern side of Tulare County and ends on the west side of Kern County where it is mainly diverted for local water supplies. A more detailed discussion of the Kern River is presented in Section 3.6, *Hydrology and Water Quality*.

The Kern River and KWB recharge ponds and associated ditches provide aquatic, semi-aquatic, and riparian habitats. The terrestrial natural communities in the study area are mesquite savannah, saltbush scrub, valley sacaton scrub, annual grassland, and riparian habitats. For further discussion of the habitat and biological resources in the project area, please refer to Section 3.3, *Biological Resources*.

The project is located in western Kern County within the southern end of the San Joaquin Valley Air Basin (SJVAB). In spite of the naturally low capacity for air pollution created by the unique geography, topography, and meteorology of the Central Valley, air quality has significantly improved in the San Joaquin Valley (San Joaquin Valley Air Pollution Control District 2013). A more detailed discussion of the criteria air pollutants of concern in the SJVAB is presented in Section 3.2, *Air Quality*.

3.1.3.3 Baseline Conditions

In CEQA impact analyses, potential project impacts are assessed against environmental baseline conditions. An EIR must include a description of the physical environmental conditions in the vicinity of the project as they exist at the time the NOP is published. This environmental setting will normally constitute the baseline conditions by which the lead agency determines whether an impact is significant. By definition, if a project results in no significant adverse changes in environmental baseline conditions, then there will be no significant impact requiring mitigation under CEQA.

KWBA issued a NOP for this project in February 2012. Thus, the environmental setting at that time constitutes the baseline physical conditions against which impacts of the project will be evaluated. However, as part of identifying the baseline conditions for the project, KWBA also has considerable discretion to consider KWB's historical operations as part of the existing environmental baseline setting:

> Neither CEQA nor the CEQA Guidelines mandates a uniform, inflexible rule for determination of the existing conditions baseline. . . . [T]he date for establishing baseline cannot be a rigid one. Environmental conditions may vary from year to year and in some cases it is necessary to consider conditions over a range of time periods. . . . A temporary lull or spike in operations that happens to occur at the time environmental review for a new project begins should not depress or elevate the baseline . . . .[1]

The KWB has operated since 1995. Through February 2012, annual recharge volumes from all sources of water have been as high as 447,000 AF, monthly volumes have reached 57,000 AF, and mean monthly diversion rates have reached 960 cfs (see Table 2-1 in Chapter 2, *Project Description,* and Table 3.6-5 in Section 3.6, *Hydrology and Water Quality*). Maximum annual diversions from the Kern River have exceeded 196,000 AF (155,948 AF of purchases and 80,735 AF of floodwater). Recharge operations have continued for a maximum of 25 months.

Under the project, the diversion of Kern River water may marginally increase the amount of water recharged in a given year or replace surface water supplies from other sources without increasing the amount of water recharged in a given year. Onsite recharge operations would not change substantially over baseline conditions under the project because no new recharge facilities would be constructed. However, increases in the banking of Kern River water may have other environmental effects, as described in the resource sections of this chapter.

Since 1995 and through February 2012, the KWB's annual recovery volumes have reached a maximum of 227,000 AF, and the monthly maximum recovery has reached over 26,000 AF at an average flow rate of 425 cfs. During the KWB's peak period, recovery operations continued for 37

[1] *Communities for a Better Env't. v. South Coast Quality Mgmt. District* (2010) 48 Cal.4th 310, 327-328 (CBE); *North County Advocates v. City of Carlsbad* (2015) 241 Cal.App.4th 94, 101-106 (shopping center's historical full occupancy); *San Francisco Baykeeper, Inc. v. California State Lands Commission* (2015) 242 Cal.App.4th 202, 217-219 (five-year average of historical annual mining volumes).

months from March 2007 through May 2010, with the exception of a 1-month shutdown for canal maintenance. The total water recovered during that time was over 650,000 AF. At the end of this extended recovery period, the KWBA member agencies still had 635,000 AF of water in storage.

Under the project, maximum recovery volumes during an extended 3-year drought in any single year or month are not expected to change substantially because no new recovery facilities would be constructed. KWBA member agencies have also historically maintained a significant surplus groundwater balance. It is conceivable that during an extreme drought of many years, the banking and storage of Kern River water under the project may result in the ability of the KWB to extend its normal operations, such that additional recovery would not exceed banked quantities nor exceed historical annual operations. Where appropriate, impacts from such operations are evaluated in the resource sections of this chapter.

The variable nature of KWB operations from year to year are such that examining the hydrologic and water quality impacts under a single operational scenario would not convey an appropriate or accurate picture of the impacts of the project on this resource area. Therefore, as explained in more detail in Section 3.6, *Hydrology and Water Quality,* under *CEQA Baseline*, two baseline conditions are utilized in the analysis of this resource in order to show the full range of impacts. Other resource sections are not as sharply variable; therefore, the analysis of these resources is able to capture the impacts of the project against a single baseline.

3.1.4 References

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3.2 Air Quality

3.2.1 Existing Conditions

3.2.1.1 Regulatory Setting

Air quality regulation in the United States is governed by the federal Clean Air Act (CAA). In addition to being subject to requirements of the CAA, air quality in California is also governed by more stringent regulations under the California Clean Air Act (CCAA). At the federal level, the CAA is administered by the U.S. Environmental Protection Agency (EPA). In California, the CCAA is administered by California Air Resources Board (ARB) and by air districts at regional and local levels. The CAA and CCAA set overall air quality standards that are achieved by various rules and regulations at the regional and local level. This section describes relevant federal, state, regional, and local regulations applicable to the project.

Federal

Clean Air Act

The CAA was first enacted in 1963 and has been amended numerous times in subsequent years (1965, 1967, 1970, 1977, and 1990). The CAA establishes federal air quality standards, known as National Ambient Air Quality Standards (NAAQS), for six criteria pollutants and specifies future dates for achieving compliance. The CAA also mandates that the state submit and implement a state implementation plan (SIP) for local areas not meeting those standards. The plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 amendments to the CAA identify specific emission-reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones. Table 3.2-1 shows the NAAQS currently in effect for each criteria pollutant, as well as the California ambient air quality standards (CAAQS) (discussed under *State*, below).

Table 3.2-1. Federal and State Ambient Air Quality Standards

Criteria Pollutant	Average Time	California Standards	National Standards[a]	
			Primary	Secondary
Ozone	1-hour	0.09 ppm	None[b]	None[b]
	8–hour	0.070 ppm	0.070 ppm	0.070 ppm
Particulate Matter (PM10)	24-hour	50 μg/m^3	150 μg/m^3	150 μg/m^3
	Annual mean	20 μg/m^3	None	None
Fine Particulate Matter (PM2.5)	24-hour	None	35 μg/m^3	35 μg/m^3
	Annual mean	12 μg/m^3	12.0 μg/m^3	15 μg/m^3
Carbon Monoxide	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	None
Nitrogen Dioxide	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	None
Sulfur Dioxide[c]	Annual mean	None	0.030 ppm	None
	24-hour	0.04 ppm	0.014 ppm	None
	3-hour	None	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	None
Lead	30-day average	1.5 μg/m^3	None	None
	Calendar quarter	None	1.5 μg/m^3	1.5 μg/m^3
	3-month average	None	0.15 μg/m^3	0.15 μg/m^3
Sulfates	24-hour	25 μg/m^3	None	None
Visibility Reducing Particles	8-hour	–[d]	None	None
Hydrogen Sulfide	1-hour	0.03 ppm	None	None
Vinyl Chloride	24-hour	0.01 ppm	None	None

Source: California Air Resources Board 2016a.

ppm = parts per million.

μg/m^3 = micrograms per cubic meter.

[a] National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.

[b] The federal 1-hour standard of 12 parts per hundred million was in effect from 1979 through June 15, 2005. The revoked standard is referenced because it was employed for such a long period and is a benchmark for state implementation plans.

[c] The annual and 24-hour National Ambient Air Quality Standards for Sulfur Dioxide only apply for 1 year after designation of the new 1-hour standard to those areas that were previously in nonattainment for 24-hour and annual National Ambient Air Quality Standards.

[d] California Ambient Air Quality Standards for visibility-reducing particles is defined by an extinction coefficient of 0.23 per kilometer—visibility of 10 miles or more due to particles when relative humidity is less than 70%.

State

California Clean Air Act

In 1988, the state legislature adopted the CCAA, which established a statewide air pollution control program. The CCAA requires all air districts in the state to endeavor to meet the CAAQS by the earliest practical date. Unlike the CAA, the CCAA does not set precise attainment deadlines. Instead, the CCAA establishes increasingly stringent requirements for areas that will require more time to achieve the standards. CAAQS are generally more stringent than the NAAQS and incorporate additional standards for sulfates, hydrogen sulfide, visibility-reducing particles, and vinyl chloride. The CAAQS and NAAQS are shown in Table 3.2-1.

ARB and local air districts bear responsibility for achieving California's air quality standards, which are to be achieved through district-level air quality management plans incorporated into the SIP. In California, the Environmental Protection Agency (EPA) has delegated authority to prepare SIPs to ARB, which, in turn, has delegated that authority to individual air districts. ARB traditionally has established state air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving SIPs.

The CCAA substantially adds to the authority and responsibilities of air districts. The CCAA designates air districts as lead air quality planning agencies, requires them to prepare air quality plans, and grants them authority to implement transportation control measures. The CCAA also emphasizes the control of "indirect and area-wide sources" of air pollutant emissions. The CCAA gives local air pollution control districts explicit authority to regulate indirect sources of air pollution and to establish traffic control measures (TCMs).

Local

Air District Oversight

The San Joaquin Valley Air Pollution Control District (SJVAPCD) has local air quality jurisdiction over western Kern County and seven other counties within the San Joaquin Valley: Merced, Kings, Fresno, Madera, Tulare, Stanislaus, and San Joaquin. SJVAPCD is responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws. At the local level, SJVAPCD's responsibilities include overseeing stationary source emissions, approving air quality construction permits, maintaining emissions inventories, maintaining air quality stations, and overseeing agricultural burning permits. The district manages air quality through land use and development planning and decision making.

The air district is also responsible for reviewing air quality-related sections of environmental documents prepared pursuant to CEQA. SJVAPCD's recommended CEQA thresholds for air quality are outlined in its 2015 *Guidance for Assessing and Mitigating Air Quality Impacts* (San Joaquin Valley Air Pollution Control District 2015).

Air Quality Plans

Pursuant to the CCAA, SJVAPCD has adopted attainment plans to address ozone, particulate matter (PM), and CO in the San Joaquin Valley Air Basin (SJVAB). To reduce CO emissions, the district adopted the 2004 *California State Implementation Plan for Carbon Monoxide*.

The pollutants of greatest concern within the SJVAB, however, are ozone and PM. SJVAPCD manages these pollutants through a long-term planning process that forecasts emissions and future concentrations on the basis of changes in source activity, regulatory programs, and meteorological conditions. Air quality plans adopted by SJVPACD are updated triennially to reflect the changing population, economic, land use, and transportation conditions in the San Joaquin Valley. Local transportation planning agencies (e.g., Kern Council of Governments [Kern COG]) and ARB provide the information needed to predict future on-road mobile source emissions that are used in the air quality planning process.

SJVAPCD 2016 Ozone Plan

The 2016 Ozone Plan, adopted June 16, 2016, contains a comprehensive list of regulatory and incentive-based measures to reduce ozone-forming compounds—volatile organic compound (VOC) and nitrogen oxide (NO_X) emissions within the SJVAB by 37% (San Joaquin Valley Air Pollution Control District 2016:6-11). These reductions are based on past successful efforts in the San Joaquin Valley, including comprehensive stationary and mobile source control strategies, which have already reduced ozone precursor emissions by nearly 16% since 1990. Proposed regulatory measures for mobile and stationary sources would reduce VOC and NO_X emissions by approximately 12% and 61% by 2031, respectively (San Joaquin Valley Air Pollution Control District 2016:2-11, 4-12, 6-11)

SJAVPCD's comprehensive attainment strategy includes regulatory actions; policy and legislative activities; and public outreach, education, and communication. Additional measures requiring technology advancement or new incentive funding will also be adopted and implemented as expeditiously as they become available. As this plan is implemented, the ambient ozone concentrations are forecast to decrease over time in all areas of the San Joaquin Valley.

SJVAPCD 2016 and 2007 Particulate Matter Plans

SJVAPCD's 2016 PM2.5 Moderate Area Plan was adopted on September 15, 2016 and includes strategies to reduce PM2.5 emissions throughout the SJVAB. The plan includes comprehensive emission inventories; a reasonable further progress demonstration and quantitative milestones; an assessment of reasonably available control measures and technologies, plus additional reasonable measures; motor vehicle transportation conformity budgets reflecting latest planning assumptions; and identification of contingency measures if the air district fails to meet reduction milestones. ARB staff is currently in the process of conducting several workshops in the San Joaquin Valley to assess opportunities for further PM2.5 emission reductions from stationary and mobile sources. As of March 2017, the 2016 PM2.5 Moderate Area Plan has not been approved by ARB. (California Air Resources Board 2017a).

SJVAPCD's 2007 *PM10 Maintenance Plan and Request for Redesignation* was adopted on September 20, 2007 and includes strategies to reduce PM10 emissions throughout the SJVAB. Emissions inventories developed by ARB for the SJVAPCD's 2007 plan reflect reductions achieved by state measures through the end of December, 2006. EPA approved SJVAPCD's 2007 plan on November 12, 2008

SJVAPCD Regulation IX, Rule 9510

On December 15, 2005, SJVAPCD adopted Rule 9510, Indirect Source Review. This rule fulfills the district's emission reduction commitments in the PM10 and Ozone Maintenance Plans by requiring

the reduction of emissions from the construction and operation of development projects through onsite measures and design features. However, SJVAPCD Rule 9510 requirements and related fees do not apply to the project, as the project would not involve the construction of any land use developments subject to Rule 9510.

SJVAPCD Regulation II, Rules 2010–2550

SJVAPCD has adopted Regulation II (Rules 2010–2550) to reduce emissions throughout the San Joaquin Valley. Regulation II (Rules 2010–2550) is a set of permitting requirements that apply within the SJVAB. SJVAPCD regulations require any person who plans to construct, alter, replace, or operate any "source operation" which may emit or may reduce emissions of air contaminants, to obtain an authority to construct or a permit to operate from the district. Source operation refers to:

> [the] last operation preceding the emission of any air contaminant, which … [r]esults in the separation of the air contaminant from the process materials or in the conversion of the process materials into air contaminants, as in the case of combustion of fuels; and … [i]s any operation, article, machine, equipment or other contrivance (Rule 1020, § 3.46).

Construction-related regulations would not apply to the project because there would be no construction activities under project conditions. Further, the operation-related permitting regulations would not apply to the project because KWB operations do not constitute source operation.

SJVAPCD Regulation IV, Rule 4550

On August 19, 2004, SJAPCD re-adopted Rule 4550, Conservation Management Practices. This rule limits fugitive dust emissions (PM10 and PM2.5) from agricultural operation sites and requires agricultural operation sites to implement a minimum number of conservation management practices (CMPs). Examples of CMPs include reducing or eliminating the need to disturb soil, protecting soil from wind, modifying equipment or processes to physically produce less dust, applying dust suppressants, and planting tree crops such as trees and vines. Rule 4550 requires growers with 100 or more contiguous acres to complete a CMP plan and to implement the applicable CMPs as detailed in the plan.

Kern County General Plan

Adopted in 2009, the Kern County General Plan includes objectives to ensure the protection of environmental resources and the development of adequate infrastructure with an emphasis on addressing air quality issues. Policies include the consideration of air quality implications in approval of major projects to minimize air quality degradation; implementation of fugitive dust control measures to support local air district objectives; and ongoing coordination with the local air district toward air quality attainment with federal, state, and local standards (Kern County 2009).

3.2.1.2 Environmental Setting

Study Area

The study area for air quality is in the western region of Kern County within the jurisdiction of SJVAPCD in the SJVAB. Emissions generated from projects typically result from construction or proposed operational activities. Depending on the amount released into the local atmosphere, criteria pollutants resulting from a project could affect local air quality and public health. The study

area for air quality impacts is generally limited to the regional or local air district, as that is the usually the physical area that might be affected by the project or cumulative emissions of air pollutants. Ambient air quality is affected by climatological conditions, topography, and the types and amounts of pollutants emitted. The following discussion describes relevant characteristics of the SJVAB, describes key pollutants of concern, summarizes existing ambient pollutant concentrations, and identifies sensitive receptors.

Climate and Atmospheric Conditions

The SJVAB contains all of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, and Tulare Counties, as well as the western portion of Kern County. Climate within the SJVAB is characterized by sparse rainfall, which occurs mainly in winter. Summers are hot and dry. Summertime maximum temperatures often exceed 100 degrees Fahrenheit.

Climate is modified by topography. The bowl-shaped topography inhibits movement of pollutants out of the San Joaquin Valley and creates climatic conditions that are particularly conducive to air pollution formation. Wind speed and direction play an important role in dispersion and transport of air pollutants. Wind at the surface and aloft can disperse pollution by mixing and by transporting the pollution to other locations. Two significant diurnal wind cycles that occur frequently in the San Joaquin Valley are the sea breeze and mountain-valley upslope and drainage flows. The sea breeze can accentuate the northwest wind flow, especially on summer afternoons. Nighttime drainage flows can accentuate the southeast movement of air down the valley.

The vertical dispersion of air pollutants in the San Joaquin Valley can be limited by persistent temperature inversions. Air temperature in the lowest layer of the atmosphere typically decreases with altitude. A reversal of this atmospheric state, where the air temperature increases with height, is termed an *inversion*. The height of the base of the inversion is known as the *mixing height*. This is the level to which pollutants can mix vertically. Mixing of air is minimized above and below the inversion base. The inversion base represents an abrupt density change where little air movement occurs.

Inversion layers are significant in determining pollutant concentrations. Concentration levels can be related to the amount of mixing space below the inversion. Temperature inversions that occur on the summer days are usually encountered 2,000 to 2,500 feet above the valley floor. In winter months, overnight inversions occur 500 to 1,500 feet above the valley floor (San Joaquin Valley Air Pollution Control District 2015).

Pollutants of Concern

Criteria Pollutants

As described in Section 3.2.1.1, *Regulatory Setting*, the federal and state governments have established NAAQS and CAAQS, respectively, for six criteria pollutants: ozone, lead, CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and PM, which consists of PM less than or equal to 10 microns in diameter (PM10) and PM less than or equal to 2.5 microns in diameter (PM2.5). Ozone and NO_2 are considered regional pollutants because they (or their precursors) affect air quality on a regional scale. Pollutants such as CO, SO_2, and lead are considered local pollutants that tend to accumulate in the air locally.

The primary pollutants of concern in the project area are ozone (including NO_X and ROG), CO, and PM.

Ozone, or smog, is a photochemical oxidant that is formed when reactive organic gases (ROGs), volatile organic compounds (VOCs), and NO_X (both byproducts of the internal combustion engine) react with sunlight. Ozone poses a health threat to those who already suffer from respiratory diseases as well as to healthy people. Additionally, ozone has been tied to crop damage, typically in the form of stunted growth and premature death. Ozone can also act as a corrosive, resulting in property damage such as the degradation of rubber products.

Reactive Organic Gases and Volatile Organic Compounds are compounds made up primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicle usage is the major source of hydrocarbons. Other sources of ROGs and VOCs are emissions associated with the use of paints and solvents, the application of asphalt paving, oil refineries, and the use of household consumer products such as aerosols. Adverse effects on human health are not caused directly by ROGs and VOCs but rather by reactions of ROGs and VOCs to form secondary pollutants such as ozone.

Nitrogen Oxides serve as integral participants in the process of photochemical smog production. The two major forms of NO_X are nitric oxide (NO) and NO_2. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO_2 is a reddish-brown irritating gas formed by the combination of NO and oxygen. NO_X acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens.

Carbon Monoxide is a colorless, odorless, toxic gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. The primary adverse health effect associated with CO is interference with normal oxygen transfer to the blood, which may result in tissue oxygen deprivation.

Particulate Matter consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Two forms of fine particulates are now recognized—inhalable coarse particles, or PM10, and inhalable fine particles, or PM2.5. Particulate discharge into the atmosphere results primarily from industrial, agricultural, construction, and transportation activities. However, wind on arid landscapes also contributes substantially to local particulate loading. Both PM10 and PM2.5 may adversely affect the human respiratory system, especially in people who are naturally sensitive or susceptible to breathing problems.

Toxic Air Contaminants

Although NAAQS and CAAQS have been established for criteria pollutants, no ambient standards exist for toxic air contaminants (TACs). Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or because of their acute or chronic health risks. For TACs that are known or suspected carcinogens, ARB has consistently found that there are no levels or thresholds below which exposure is risk-free. Individual TACs vary greatly in the risks they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. TACs are identified and their toxicity is studied by the California Office of Environmental Health Hazard Assessment. The Toxic Air Contaminant Identification and Control Act (AB 1807, Tanner 1983) created California's program to reduce exposure to air toxics.

Air toxics are generated by a number of sources, including: stationary sources, such as dry cleaners, gas stations, auto body shops, and combustion sources; mobile sources, such as diesel trucks, ships, and trains; and area sources, such as farms, landfills, and construction sites. Adverse health effects of

TACs can be carcinogenic (cancer-causing), short-term (acute) noncarcinogenic, and long-term (chronic) noncarcinogenic. Direct exposure to these pollutants has been shown to cause cancer, birth defects, damage to the brain and nervous system, and respiratory disorders.

San Joaquin Valley Fever

Although not considered a criteria pollutant, the San Joaquin Valley fever (also known as Coccidioidomycosis), an infectious disease caused by the fungus *Coccidioides immitis* commonly found in the San Joaquin Valley, is transmitted through the air and poses a significant health risk to local residents. San Joaquin Valley fever, also known as valley fever, desert fever, or Cocci infection, is caused by inhalation of *Coccidioides immitis* spores that have become airborne when dry, dusty soil or dirt is disturbed by wind, construction, farming, or other activities.

The valley fever fungus tends to be found at the base of hillsides in virgin, undisturbed soil. It usually grows in the top few inches of soil, but can grow down to 12 inches. The fungus does not survive well in highly populated areas because there is not usually enough undisturbed soil for the fungus to grow. The fungus is not likely to be found in soil that has been or is being cultivated and fertilized because human-made fertilizers, such as ammonium sulfate, enhance the growth of the natural microbial competitors of the *Coccidioides* fungus.

After the fungal spores settle in the lungs, they change into a multicellular structure called a spherule. Valley Fever symptoms generally occur within 2 to 3 weeks of exposure. Approximately 60% of Valley Fever cases are mild and display flu-like symptoms or no symptoms at all. Of those who are exposed and seek medical treatment, the most common symptoms are fatigue, cough, chest pain, fever, rash, headache, and joint aches.

Valley fever infection is most frequent during summers that follow a rainy winter or spring, especially after wind and dust storms. Valley fever infection is common only in arid and semiarid areas of the western hemisphere. In the United States, it is mostly found from southern California to southern Texas.

The highest incidence rates of valley fever in Kern County have occurred in the areas of northeast Bakersfield, Lamont-Arvin, Taft, and Edwards Air Force Base. Most new residents to the San Joaquin Valley have never been exposed to valley fever, and consequently are particularly susceptible to the infection. Many longtime residents of the area have at some time been exposed to the fungus, become infected, and have recovered, and are thus immune.

Kern Water Bank Authority Worker Environmental Awareness Program

As part of KWBA's agreement with DWR to operate the KWB, KWBA has agreed to incorporate into its standard operating procedures a comprehensive Worker Environmental Awareness Program (WEAP) that would include protocols and training for responding to and handling hazardous materials and hazardous waste management, emergency preparedness, release reporting, and response requirements, including those related to valley fever. In addition, KWBA has agreed to ensure that all workers at risk of inhaling dust would be provided masks with filters designed to trap spores of the size of valley fever fungus (Kern Water Bank Authority 2016).

Existing Air Quality Conditions

Existing air quality conditions in the study area can be characterized in terms of federal and state air quality standards by monitoring data collected in the region. EPA and ARB maintain an extensive network of monitoring stations throughout California. Table 3.2-2 presents pollutant concentrations measured at the nearest monitoring stations to the KWB, the Bakersfield–California Avenue and Bakersfield–Municipal Airport monitoring stations. For all ozone, NO_2, and PM, the air quality monitoring station closest to the project area is the California Avenue monitoring station in Bakersfield, approximately 6 miles east of pumping plant 4. For CO, the closest monitoring station is the Municipal Airport monitoring station, approximately 6 miles southeast of the easternmost section of the River Canal. The data represent air quality monitoring for the last 3 years for which a complete dataset is available (2013–2016). As shown in Table 3.2-2, the California Avenue monitoring station has detected numerous violations of the ozone and PM NAAQS and CAAQS. No violations of CO or NO_2 NAAQS and CAAQS were reported during the monitoring period at the California Avenue and Municipal Airport monitoring stations.

Table 3.2-2. Ambient Air Quality Monitoring Data from the Bakersfield–California (ARB 15255) and Bakersfield–Municipal Airport (ARB 15258) Monitoring Stations (2014–2016)

Pollutant Standards	2014	2015	2016
Ozone (O_3)			
Bakersfield–California Avenue Monitoring Station			
Maximum 1-hour concentration (ppm)	0.102	0.104	0.092
Maximum 8-hour concentration (ppm)	0.093	0.097	0.085
Number of days standard exceeded[a]			
CAAQS 1-hour (>0.09 ppm)	3	6	0
CAAQS 8-hour (>0.070 ppm)	39	54	63
NAAQS 8-hour (>0.070 ppm)	36	52	60
Carbon Monoxide (CO)			
Bakersfield–Municipal Airport Monitoring Station			
Maximum 1-hour concentration (ppm)	1.9	1.6	–
Maximum 8-hour concentration (ppm)	1.2	1.0	–
Number of days standard exceeded[a]			
NAAQS 1-hour (≥35 ppm)	0	0	–
NAAQS 8-hour (≥9 ppm)	0	0	–
CAAQS 8-hour (≥9.0 ppm)	0	0	–[f]
Nitrogen Dioxide (NO_2)			
Bakersfield–California Avenue Monitoring Station			
State maximum 1-hour concentration (ppm)	0.060	0.054	0.058
State second-highest 1-hour concentration (ppm)	0.058	0.052	0.055
Annual average concentration (ppm)	0.015	0.011	0.012
Number of days standard exceeded			
CAAQS 1-hour (0.18 ppm)	0	0	0

Pollutant Standards	2014	2015	2016
Particulate Matter (PM10)			
Bakersfield–California Avenue Monitoring Station			
National[b] maximum 24-hour concentration (μg/m³)	430.1	104.7	90.9
National[b] second-highest 24-hour concentration (μg/m³)	80.9	97.7	79.9
State[c] maximum 24-hour concentration (μg/m³)	419.5	103.6	92.2
State[c] second-highest 24-hour concentration (μg/m³)	82.7	99.6	80.6
National annual average concentration (μg/m³)	55.9	44.5	41.2
State annual average concentration (μg/m³)[d]	–	44.1	40.9
Number of days standard exceeded[a]			
NAAQS 24-hour (>150 μg/m³)[e]	–	0	0
CAAQS 24-hour (>50 μg/m³)[e]	–	121.4	121.4
Particulate Matter (PM2.5)			
Bakersfield–California Avenue Monitoring Station			
National[b] maximum 24-hour concentration (μg/m³)	101.9	107.8	66.4
National[b] second-highest 24-hour concentration (μg/m³)	96.1	88.9	63.6
State[c] maximum 24-hour concentration (μg/m³)	101.9	111.9	66.4
State[c] second-highest 24-hour concentration (μg/m³)	96.7	92.0	63.6
National annual average concentration (μg/m³)	18.5	16.2	14.2
State annual average concentration (μg/m³)[d]	18.6	16.6	14.5
Number of days standard exceeded[a]			
NAAQS 24-hour (>35 μg/m³)[e]	37	29	23
Sulfur Dioxide (SO_2)			
No data available			

Source: California Air Resources Board 2016a, 2017b; U.S. Environmental Protection Agency 2017a.
CAAQS = California ambient air quality standards.
NAAQS = national ambient air quality standards.
ppm = parts per million.
μg/m³ = micrograms per cubic meter.
– = no data available.

[a] An exceedance is not necessarily a violation.
[b] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.
[c] State statistics are based on local conditions data. In addition, state statistics are based on California-approved samplers.
[d] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
[e] Mathematical estimate of how many days' concentrations would have been measured as higher than the level of the standard had each day been monitored. Values have been truncated.

Attainment Status

Local monitoring data (Table 3.2-2) are used to designate areas as nonattainment, maintenance, attainment, or unclassified for the NAAQS and CAAQS (discussed in Section 3.2.1.1, *Regulatory Setting*). The four attainment status designations are further defined below.

- Nonattainment—assigned to areas where monitored pollutant concentrations consistently violate the standard in question.
- Maintenance—assigned to areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard.
- Attainment—assigned to areas where pollutant concentrations meet the standard in question over a designated period of time.
- Unclassified—assigned to areas were data are insufficient to determine whether a pollutant is violating the standard in question.

Table 3.2-3 summarizes the attainment status of the Kern County with regard to the NAAQS and CAAQS.

Table 3.2-3. Federal and State Attainment Status for Kern County

Criteria Pollutant	Federal Designation	State Designation
O_3 (1-hour)	Nonattainment (P)	Nonattainment
O_3 (8-hour)	Extreme Nonattainment (P)	Nonattainment
CO	Maintenance (P)	Attainment
PM10	Serious Maintenance (P)	Nonattainment
PM2.5	Moderate Attainment	Nonattainment
NO_2	Unclassified	Attainment
SO_2	Unclassified	Attainment
Lead	Unclassified	Attainment
Sulfates	(No federal standard)	Attainment
Hydrogen Sulfide	(No federal standard)	Unclassified
Visibility	(No federal standard)	Unclassified

Sources: California Air Resources Board 2016b; U.S. Environmental Protection Agency 2017b.
O_3 = ozone.
CO = carbon monoxide.
PM2.5 = particulate matter less than or equal to 2.5 microns.
PM10 = particulate matter less than or equal to 10 microns.
NO_2 = nitrogen oxide.
SO_2 = sulfur dioxide.
P = portions of the County.

Sensitive Receptors in the Study Area

SJVAPCD identifies a sensitive receptor as a location where children, senior citizens, or sick persons are present and where there is a reasonable expectation of continuous human exposure to pollutants according to the averaging period for ambient air quality standards, such as 24-hour, 8-hour, or 1-hour periods. Examples of sensitive receptors include residences, hospitals, and schools. Industrial and commercial uses are not considered sensitive receptors. The study area encompasses a mix of agricultural and natural preservation areas with few sensitive receptors nearby. Because all pumps in the project area are electrically operated, no point-source emissions from the study area are expected that would affect sensitive receptors.

Current Agricultural Activities and Emissions in the Kern Water Bank Service Area

Participating members within the KWB service area support a wide variety of crops (e.g., alfalfa, cotton, fruits, grain/pasture, grapes, nursery, nuts, and vegetables) on more than 750,000 acres of land. However, high-value permanent tree crops (citrus, etc.) predominate in the service area (Kern County Department of Agriculture and Measurement Standards 2016). These agricultural activities generate various types of emissions from land preparation, harvesting, mobile agricultural equipment, agricultural burning, windblown dust from agricultural land, paved and unpaved roads, and other sources. Table 3.2-4 and 3.2-5 present 1995 and 2015 emissions from on-farm agricultural activities in the KWB service area. Turnover in equipment fleets, introduction of new equipment, increasingly stringent emissions standards, SJVAPCD rules, and changing commodity markets in the county have resulted in emission reductions that are anticipated to continue into the future (Insight Environmental Consultants Inc. 2015).

Table 3.2-4. 2005 Emissions from On-Farm Agricultural Activities in Kern Water Bank Participants' Service Areas (tons)

Emissions Source	ROG	NO_X	CO	SO_X	PM10	PM2.5
Agricultural Land Preparation	–	–	–	–	541.8	120.3
Agricultural Harvest Operations	–	–	–	–	529.2	117.5
Agricultural Equipment	186.9	1,253.3	559.7	0.7	70.7	65.1
Total Emissions	186.9	1,253.3	559.7	0.7	1,141.7	302.9

Source: Insight Environmental Consultants Inc. 2015.
ROG = reactive organic gases.
NO_X = nitrogen oxides.
CO = carbon monoxide.
SO_X = sulfur oxides.
PM10 = particulate matter less than or equal to 10 microns.
PM2.5 = particulate matter less than or equal to 2.5 microns.

Table 3.2-5. 2015 Emissions from On-Farm Agricultural Activities in Kern Water Bank Participants' Service Areas (tons)

Emissions Source	ROG	NO_X	CO	SO_X	PM10	PM2.5
Agricultural Land Preparation	–	–	–	–	173.7	38.6
Agricultural Harvest Operations	–	–	–	–	834.9	185.3
Agricultural Equipment	109.4	65.1	396.4	0.1	46.4	42.7
Total Emissions	109.4	665.1	396.4	0.1	1,055.0	266.6

Source: Insight Environmental Consultants Inc. 2015.
ROG = reactive organic gases.
NO_X = nitrogen oxides.
CO = carbon monoxide.
SO_X = sulfur oxides.
PM10 = particulate matter less than or equal to 10 microns.
PM2.5 = particulate matter less than or equal to 2.5 microns.

3.2.2 Impact Analysis

3.2.2.1 Methods

The key air quality impacts were identified and evaluated based on the environmental characteristics of the project area and the magnitude, intensity, and duration of activities related to the operation of the project. A qualitative assessment of the air quality impacts from operation of the project was developed since project operations are not anticipated to change substantially from baseline conditions.

Air quality assessment guidelines provided by the Kern County in their *Guidelines for Preparing an Air Quality Assessment for Use in Environmental Impact Reports* were considered during the development of this impact analysis; however, many of the guidelines were not applicable due to there being no planned construction or operational changes under the project (Kern County 2006).

No construction is planned for the project; therefore, no air quality impacts related to construction are expected, and this topic is not discussed further.

3.2.2.2 Significance Criteria

The thresholds for determining the significance of impacts pertaining to air quality in this analysis are based on the State CEQA Guidelines Appendix G (14 CCR § 15000 et seq.). For this analysis, the project would be considered to have a significant impact on air quality if it would result in any of the following conditions.

- Conflict with or obstruct implementation of the applicable air quality plan.
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).
- Expose sensitive receptors to substantial pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.

A cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area under federal or state air quality standards also typically constitutes a significant impact.

According to the State CEQA Guidelines, the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make significance determinations for potential impacts on environmental resources.

Current local air district pollutant thresholds for the study area are found on the SJVAPCD website (http://www.valleyair.org) and in the *Guidance for Assessing and Mitigating Air Quality Impacts* (San Joaquin Valley Air Pollution Control District 2015).

3.2.2.3 Impacts and Mitigation Measures

Impact AQ-1: Conflict with or obstruct implementation of the applicable air quality plan (No impact)

Impact AQ-2: Violate any air quality standard or contribute substantially to an existing or projected air quality violation (No impact)

Impact AQ-3: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors) (Less than significant)

Impact AQ-4: Expose sensitive receptors to substantial pollutant concentrations (Less than significant)

Impact AQ-5: Create objectionable odors affecting a substantial number of people (Less than significant)

No direct or indirect air quality impacts are expected from the project because of the absence of construction or annual operational changes between the project and baseline conditions. Under the project, the State Water Board would allow up to 500,000 AFY of water from the Kern River to be diverted to the KWB to increase reliability and enhance the dry-year and multi-dry-year water supplies to KWBA's participating members.[1] The baseline maximum diversion is defined by the historical maximum diversion to KWB, which was 447,148 AFY in 2011. The project would not necessitate changes to current pumping operations or require construction or modification of pumps and other facilities or structures.

No air quality impacts are expected as a result of project diversion methods. Under baseline conditions, all water derived from the Kern River is diverted to the KWB by gravity. No pumps or other equipment are used to facilitate this diversion that would otherwise create offsite emissions from electricity generation. Under the project, no additional pumps or equipment would be needed to accommodate the maximum potential diversion of 500,000 AFY. The Kern River water would be diverted to the KWB through the same waterways as under baseline conditions, and diversions would continue to be gravity driven. Consequently, no emissions are expected from water diversion under the project.[2]

Further, no air quality impacts are expected from the operation of pumps and lift stations for recovery operations related to the project. KWBA owns and operates pumps and lift stations used to recover water from storage for the purpose of fulfilling water demand. Under the project, the KWB may store a greater volume of water, but recovery is not expected to exceed baseline conditions in any given year, which include the maximum amount of water actually recovered over an extended drought, in a single year and in any single month, with existing recovery facilities (Section 3.1.3.3). At most, with additional storage volumes, recovery facilities might be allowed to operate for longer

[1] According to the KWBA, 500,000 acre-feet per year is the maximum volume of water that it can physically divert and recharge within the KWB in the wettest years and under ideal conditions.

[2] It is anticipated that, at times, Kern River diversions would be made in lieu of deliveries from the SWP, actually eliminating offsite emissions from electricity generation.

periods—i.e., added months or years—during extended droughts. But because no expansion of pumping stations or other facilities is proposed or expected, there would be no significant increase in offsite criteria air pollutant emissions from electricity generation or in the number of employee work trips or associated increases in mobile-source emissions in any given year. Therefore, no air quality impacts are expected from recovery operations or other related sources.

Because the project does not include new construction or changes in operations, the project is not expected to result in any new or increased criteria air pollutant emissions that would exceed any thresholds of significance criteria stated in the State CEQA Guidelines or established by SJVAPCD. The project, however, would enhance KWB participating members' water supply reliability through additional storage within the KWB. The enhanced water supply reliability could potentially contribute to the conversion of additional land for agricultural operations or changes in crop types or amounts, potentially resulting in new and/or changed indirect criteria air pollutant emissions that could exceed established and adopted thresholds of significance criteria. Any new and/or changed agricultural activities would affect agricultural-related emissions resulting from land preparation, harvesting, mobile agricultural equipment, agricultural burning, windblown dust from agricultural land, paved and unpaved roads, and other sources. However, any such indirect impacts are speculative, and it is not feasible to quantify the impacts of any such changes. Furthermore, as described above, in Section 3.2.1.2*, Environmental Setting*, agriculturally-related criteria air pollutant emissions are expected decline into the future, and current federal and state regulations and SJVAPCD rules and incentive programs are expected to continue to reduce emissions. Therefore, indirect air quality impacts related to increased water supply reliability in the KWB service area are anticipated to be less-than-significant.

The project would not involve new construction or a change in operations. Therefore, the project would result in less-than-significant valley fever-related impacts. Though not required to mitigate impacts, the implementation of KWBA's WEAP would further ensure that these impacts remain less-than-significant.

No mitigation measures are required because the project is expected to result in less-than-significant impacts on air quality.

3.2.3 References

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3.3 Biological Resources

3.3.1 Existing Conditions

3.3.1.1 Regulatory Setting

Federal

Federal Endangered Species Act

The Federal Endangered Species Act (ESA) protects fish and wildlife species and their habitats that have been identified by the National Marine Fisheries Service (NMFS) or USFWS as threatened or endangered. *Endangered* refers to species, subspecies, or distinct population segments (DPSs) that are in danger of extinction through all or a significant portion of their range. *Threatened* refers to species, subspecies, or DPSs that are likely to become endangered in the near future.

ESA is administered by USFWS and NMFS. In general, NMFS is responsible for protection of listed marine species and anadromous fish, and USFWS is responsible for other listed species. Provisions of Sections 7, 9, and 10 of ESA are relevant to this project and are summarized below.

Section 9: Prohibitions

Section 9 of ESA prohibits the take of any fish or wildlife species listed under ESA as endangered. *Take*, as defined by ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct." *Harm* is defined as "any act that kills or injures the species, including significant habitat modification." Take of threatened species also is prohibited under Section 9 unless otherwise authorized by federal regulations. The take prohibition for listed plants is more limited than for listed fish and wildlife. Under Section 9(a)(2)(B) of ESA, endangered plants are protected from "removal, reduction to possession, and malicious damage or destruction" in areas that are under federal jurisdiction. Section 9(a)(2)(B) of ESA also provides protection to plants from removal, cutting, digging up, damage, or destruction where the action takes place in violation of any state law or regulation or in violation of a state criminal trespass law. Thus, ESA does not prohibit the incidental take of federally listed plants on private or other nonfederal lands unless the action requires federal authorization or is in violation of state law.

There are several federally listed species that are known or have the potential to occur within the project study area, including San Joaquin kit fox, Tipton kangaroo rat, Buena Vista Lake shrew, blunt-nosed leopard lizard, and San Joaquin woolly-threads. There are two methods for obtaining authorization for incidental take of listed species. For projects that involve federal actions, the federal action agency can obtain an incidental take statement under Section 7 of ESA. For projects that lack a federal nexus, the project proponent can obtain an incidental take permit (ITP) under Section 10. Methods for obtaining incidental take authorization are discussed below in more detail.

Section 7: Authorization Process for Federal Actions

Section 7 of ESA requires federal agencies to consult with USFWS or NMFS on any action they propose to conduct, permit, or fund to ensure that the proposed action will not jeopardize the continued existence of an endangered or threatened species or destroy or adversely modify

designated critical habitat. *Critical habitat* under ESA includes those specific areas within the geographic area occupied by a species that contain biological features essential to the conservation of the species and that may require special management considerations, as well as those specific areas outside the geographical area occupied by the species that are determined to be essential for the conservation of the species.

If a proposed action may affect a listed species or designated critical habitat, the lead agency is required to prepare a biological assessment (BA) that evaluates the nature and severity of the expected effect. In response, USFWS or NMFS issues a biological opinion (BO) with one of the following determinations.

- May jeopardize the continued existence of one or more listed species (jeopardy finding) or result in the destruction or adverse modification of critical habitat (adverse modification finding).
- Will not jeopardize the continued existence of any listed species (no jeopardy finding) or result in adverse modification of critical habitat (no adverse modification finding).

The incidental take statement accompanying the BO may stipulate mandatory "reasonable and prudent measures" to minimize take of listed species. The incidental take statement may also identify discretionary conservation recommendations to minimize or avoid adverse effects of the proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

Section 10: Habitat Conservation Plans

In cases where federal land, funding, or authorization is not required for an action by a nonfederal entity, the "take" of listed fish and wildlife species can be permitted by USFWS and/or NMFS under Section 10 of ESA. Private landowners, corporations, state agencies, local agencies, and other nonfederal entities must obtain a Section 10(a)(1)(B) ITP for take of federally listed fish and wildlife species "that is incidental to, but not the purpose of, otherwise lawful activities."

The KWB and existing water banking activities are authorized under Section 10 of ESA through implementation of the approved KWB Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP), which is described in more detail below under local regulations. Portions of the Kern River outside the KWB are not covered by the KWB HCP/NCCP. Effects on federally listed fish and wildlife that are not covered by or occur outside of the KWB HCP/NCCP plan area, if any, must be addressed through a separate ESA process, either under Section 7 or Section 10.

Clean Water Act

The Clean Water Act (CWA) was enacted as an amendment to the Federal Water Pollution Control Act of 1972, which outlined the basic structure for regulating discharges of pollutants to waters of the United States. The CWA serves as the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. The CWA is implemented by the EPA and the U.S. Army Corps of Engineers (USACE).

The CWA empowers EPA to set national water quality standards and effluent limitations and includes programs addressing both point-source and nonpoint-source pollution. Point-source pollution is pollution that originates or enters surface waters at a single, discrete location, such as an outfall structure or an excavation or construction site. Nonpoint-source pollution originates over a

broader area and includes urban contaminants in stormwater runoff and sediment loading from upstream areas. The CWA operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit; permit review is the CWA's primary regulatory tool. No discharge to federally regulated waters is proposed by the project; therefore, no permits under the CWA are anticipated.

State

California Environmental Quality Act

CEQA is the regulatory framework by which California public agencies identify and mitigate significant environmental impacts. A project normally has a significant environmental impact on biological resources if it substantially affects a rare or endangered species or the habitat of that species, substantially interferes with the movement of resident or migratory fish or wildlife, or substantially diminishes habitat for fish, wildlife, or plants. The State CEQA Guidelines define rare, threatened, and endangered species as those listed under ESA and the California Endangered Species Act (CESA) and any other species that meet the criteria of the resource agencies or local agencies (e.g., species of special concern, as designated by DFW). The State CEQA Guidelines state that the lead agency preparing an EIR must consult with DFW concerning project impacts on species listed as endangered or threatened. This EIR is being prepared for the project in compliance with CEQA.

California Endangered Species Act

The California Fish and Game Commission implemented CESA in 1984. The act prohibits the take of state-listed endangered and threatened species. *Take* is defined under the California Fish and Game Code (CFGC) (more narrowly than under ESA) as any action or attempt to "hunt, pursue, catch, capture, or kill." Section 2090 of CESA requires state agencies to comply with endangered species protection and recovery and promote conservation of these species. DFW administers the act and authorizes take of state-listed species (except for fully protected species) through Section 2081 agreements (incidental take permit) if the following criteria are met.

- Authorized take must be incidental to an otherwise lawful activity.
- Impacts of the authorized take are minimized and fully mitigated.
- The measures required to minimize and fully mitigate the impacts of the authorized take are:
    - roughly proportional in extent to the impact of the taking on the species;
    - maintain the applicant's objectives to the greatest extent possible;
    - are capable of successful implementation; and
    - adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with and the effectiveness of the measures.
- Issuance of the permit will not jeopardize the continued existence of a state-listed species.

Several state-listed species are known or have the potential to occur within the study area, including San Joaquin kit fox, Nelson's antelope squirrel, blunt-nosed leopard lizard, and Tipton kangaroo rat. These species are addressed below under *Special-Status Species* under Section 3.3.1.2, *Environmental Setting*.

California Fish and Game Code

CFGC sections that are relevant to the project are discussed below.

Protection of Birds and Raptors

Section 3503 of the CFGC prohibits the killing of birds and/or the destruction of bird nests. Section 3503.5 prohibits the killing of raptor species and/or the destruction of raptor nests. Typical violations include destruction of active bird and raptor nests as a result of tree removal, and failure of nesting attempts (loss of eggs and/or young) as a result of disturbance of nesting pairs caused by nearby human activity. The project, including both operation and reclamation activities, has the potential to adversely affect birds and raptors protected under the CFGC.

Fully Protected Species

The CFGC provides protection from take for a variety of species, referred to as fully protected species. Section 5050 lists protected amphibians and reptiles. Section 5515 prohibits take of fully protected fish species. Section 3511 prohibits take of fully protected bird species. Fully protected mammals are protected under Section 4700. The CFGC defines take as "hunt, pursue, catch, capture, or kill or attempt to hunt, pursue, catch, capture, or kill." Except for take related to scientific research or incidental take authorized as part of an approved Natural Communities Conservation Plan (NCCP), take of fully protected species is prohibited. Fully protected species that could occur in the study area include blunt-nosed leopard lizard and white-tailed kite.

Streambed Alteration Agreements

DFW has jurisdictional authority over rivers, streams, and lakes under Sections 1600–1607. DFW has the authority to regulate all work under the jurisdiction of the State of California that would substantially divert, obstruct, or change the natural flow of a river, stream, or lake; substantially change the bed, channel, or bank of a river, stream, or lake; or use material from a streambed.

In practice, DFW marks its jurisdictional limit at the top of the stream or lake bank, or the outer edge of the riparian vegetation, where present, and sometimes attempts to extend its jurisdiction to the edge of the 100-year floodplain. Because riparian habitats do not always support wetland hydrology or hydric soils, wetland boundaries, as defined by CWA Section 404, sometimes include only portions of the riparian habitat along a river, stream, or lake. Therefore, jurisdictional boundaries under Section 1600 may encompass a greater area than those regulated under CWA Section 404.

Before any person, business, state or local government agency, or public utility proposes an activity that will substantially divert or obstruct the natural flow of any river, stream or lake or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, that person or entity must notify DFW. If DFW determines that the activity may substantially adversely affect fish and wildlife resources, a Streambed Alteration Agreement is prepared. The Agreement, in turn, may include reasonable conditions necessary to protect the streambed resources.

Natural Communities Conservation Planning Act

California's Natural Community Conservation Planning (NCCP) Act (California Fish and Game Code, Section 2800 et seq.) was enacted to implement broad-based planning that balances appropriate development and growth with conservation of wildlife and habitat. Pursuant to the Act, local, state, and federal agencies are encouraged to prepare NCCPs to provide comprehensive management and

conservation of multiple species and their habitats under a single plan, rather than through preparation of numerous individual plans on a project-by-project basis. The NCCP Act is broader in its orientation and objectives than ESA and CESA, and preparation of an NCCP is voluntary. The primary objective of the NCCP program is to conserve natural communities at the ecosystem scale while accommodating compatible land use. To be approved by DFW, an NCCP must provide for the conservation of species and protection and management of natural communities in perpetuity within the area covered by permits. Conservation is defined by the NCCP Act and the CFGC as actions that result in the delisting of state-listed species. Thus, NCCPs must contribute to the recovery of state-listed species or prevent the listing of nonlisted species rather than just mitigate the effects of covered activities. This recovery standard is one of the major differences between an NCCP and an HCP prepared to satisfy ESA or CESA.

An active NCCP program is currently being implemented for the KWB property through the KWB HCP/NCCP and is described in more detail below.

Local

Kern County General Plan

The following policies regarding threatened and endangered species are included in the General Provisions section in the Land Use, Open Space, and Conservation Element of the Kern County General Plan. Although not directly applicable to the project,[1] these policies are included for evaluation purposes.

- *GOAL GP-1*: Ensure that the County can accommodate anticipated future growth and development while maintaining a safe and healthful environment and a prosperous economy by preserving valuable natural resources, guiding development away from hazardous areas, and assuring the provision of adequate public services.
    - *Policy GP 1.10.5-27*: Threatened or endangered plant and wildlife species should be protected in accordance with state and federal laws.
    - *Policy GP 1.10.5-28*: The County should work closely with state and federal agencies to assure that discretionary projects avoid or minimize impacts to fish, wildlife, and botanical resources.
    - *Policy GP 1.10.5-29*: The County will seek cooperative efforts with local, State, and federal agencies to protect listed threatened and endangered plant and wildlife species through the use of conservation plans and other methods promoting management and conservation of habitat lands.
    - *Policy GP 1.10.5-30*: The County will promote public awareness of endangered species laws to help educate property owners and the development community of local, state, and federal programs concerning endangered species conservation issues.

[1] Pursuant to Section 53091(e) of the Government Code, "[z]oning ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water."

- *Policy GP 1.10.5-32*: Riparian areas will be managed in accordance with USACE, and DFG (now DFW) rules and regulations to enhance the drainage, flood control, biological, recreational, and other beneficial uses while acknowledging existing land use patterns.
- *Policy GP 1.10.10-65*: Oak woodlands and large oak trees shall be protected where possible and incorporated into project developments.
- *Policy GP 1.10.10-66*: Promote the conservation of oak tree woodlands for their environmental value and scenic beauty.

Kern Water Bank Habitat Conservation Plan/Natural Community Conservation Plan

The *Kern Water Bank Habitat Conservation Plan/Natural Community Conservation Plan* (KWB HCP/NCCP) was executed in 1997 by and among USFWS, DFG, and KWBA, a joint powers authority, for a 75-year term (Kern Water Bank Authority 1997). The KWB HCP/NCCP encompasses the entire 20,500-acre KWBA property and serves two primary purposes: water banking and wildlife preservation. It provides for specific uses for the property through the year 2072. These uses include 5,900 acres for routine recharge activities; 3,267 acres for conservation; 3,170 acres for farming; 960 acres for preservation of sensitive habitat for listed plants; and the remaining acreage for water bank facilities. The land allotted for agriculture has not been farmed, but rather used in the same manner as compatible habitat. Open areas between the recharge basins of the KWB were designed to provide habitat and wildlife movement (Kern Water Bank Authority 1997).

The primary areas within the KWB HCP/NCCP area that pertain to biological resources are compatible habitat, sensitive habitat, intermittent wetland habitat, California Department of Water Resources (DWR) conservation easement, and a conservation bank. Compatible habitat consists of approximately 5,592 acres, most of which are fallow agricultural lands that have been vegetated by grassland species and provide upland habitat for species such as San Joaquin kit fox. Sensitive habitat consists of three areas of remnant native saltbush and valley sink scrub that encompass approximately 960 acres and provide habitat for species such as San Joaquin kit fox, Tipton kangaroo rat, blunt-nosed leopard lizard, San Joaquin woolly-threads (*Monolopia congdonii*), and Hoover's woolly-star (*Eriastrum hooveri*). Intermittent wetland habitat identified in the KWB HCP/NCCP consists of approximately 5,900 acres of fallow recharge basins potentially suitable for species such as western pond turtle and Buena Vista lake shrew. The DWR conservation easement encompasses approximately 530 acres and was set aside to mitigate projects implemented by DWR. The conservation bank consists of approximately 3,267 acres of habitat known to be occupied or having the potential to be occupied by special-status species.

The covered activities are listed below.

- Construction, maintenance, and operation of water recovery, conveyance, and recharge facilities.
- Construction and operation of buildings and storage facilities.
- Construction and maintenance of fences and access roads.
- Flood prevention.
- Farming in areas designated for farming.
- Habitat management, including vegetation management, habitat enhancement, establishment and maintenance of waterfowl and upland habitat, and predator and rodent control.

- Educational activities and research.
- Recreational and public health activities.
- Weed control.
- Access for emergency response, fire protection, and fire training.
- Mitigation for third party activities through the conservation bank.
- Commercial development subject to site plan and on-site mitigation approval by USFWS and DFW (although KWBA has since committed to not undertaking commercial development on the KWB).

The KWB HCP/NCCP allows incidental take of 161 covered species, including 117 wildlife species and 44 plant species. The covered species are divided into two groups based on their rarity, preferred habitats, and likelihood of establishment within the KWB. The covered species that are known to occur within the KWB are discussed below under *Special-Status Species*. The KWB HCP/NCCP will continue to cover activities within the KWB, including recharge and recovery activities. Water diversions that impact species and habitats occurring outside the KWB boundary (i.e., along the Kern River) are not covered by the KWB HCP/NCCP.

Proposed Kern County Valley Floor Habitat Conservation Plan

The Kern County Valley Floor Habitat Conservation Plan (VFHCP) is being developed by the Kern County Planning Department, in cooperation with the California Division of Oil and Gas, Independent Oil Producers Association, Kern County Building Association, Kern County Farm Bureau, Western States Petroleum Association, Audubon Society, U.S. Bureau of Land Management - Bakersfield, Cattlemen's Association, DFW, The Nature Conservancy, and USFWS. The VFHCP has not yet been adopted. Its purpose is to streamline the permitting process for oil and gas development while also planning for long-term conservation of endangered species. The draft VFHCP includes a plan for development activities in the valley floor to obtain Section 10(a) and DFW Section 2081 take permits for listed species and to provide consistency among agencies. The VFHCP will employ an ecosystem-based planning approach rather than species-by-species management. The ecosystem-based planning approach will involve habitat credits with the free trade of habitat, mitigation fees, and take avoidance measures. The plan as presently proposed will apply to all of Kern County below the 2,000-foot contour line and on the valley floor, with the exception of areas covered by an existing HCP, and will cover 14 plant species and 11 animal species which are known to occur within the Program Area (Kern County Planning Department 2006). The VFHCP notes that "areas with current protected status already contribute, and will continue to contribute, to the conservation of VFHCP Covered Species" and their acreages are not included in the VFHCP (Kern County Planning Department 2006). Because it has an existing HCP and is specifically excluded from the VFHCP's incidental take coverage, the KWB HCP/NCCP Area will not be covered under the VFHCP. Because the VFHCP is not yet an "adopted Habitat Conservation Plan," it need not be evaluated under Section IV(f) of Appendix G to the CEQA Guidelines. Nevertheless, it is described and considered in this EIR for informational purposes.

3.3.1.2 Environmental Setting

The following sources of information were reviewed to describe existing physical and biological resources in the study area and surrounding project region.

- California Natural Diversity Database (CNDDB) query for special-status species occurrence records for the U.S. Geological Survey (USGS) Stevens and Tupman 7.5-minute quadrangles in the project vicinity (Appendix H).
- USFWS list of endangered, threatened, and candidate species for the Stevens and Tupman USGS quadrangles that overlap with the study area.
- A list from the California Native Plant Society's (CNPS's) 2013 online Inventory of Rare and Endangered Plants for the USGS 7.5-minute quadrangles in the project vicinity (Appendix I).
- The California Invasive Plant Council's (Cal-IPC's) 2006 California Invasive Plant Inventory.
- Kern County General Plan (Kern County Planning Department 2009).
- KWB HCP/NCCP (Kern Water Bank Authority 1997).
- KWB HCP/NCCP 2011 Compliance Report and 2012 Management Plan (Kern Water Bank Authority 2012).
- Proposed Rule for designation of revised Critical Habitat for the Buena Vista Lake shrew (77FR40705).
- Buena Vista Lake Ornate Shrew (*Sorex ornatus relictus*) 5-Year Review (U.S. Fish and Wildlife Service 2011).
- Published and unpublished documents and reports pertaining to the study area.

Biological Resources Study Area

For the purposes of this EIR, the biological resources study area (study area) consists of the KWBA property and its existing facilities encompassing approximately 20,500 acres. In order to assess potential indirect impacts to biological resources outside the property boundaries, the study area also includes portions of the Kern River and associated riparian habitat south of the first KWB point of diversion (Figures 3.3-1 and 3.6-12). This portion of the Kern River is included in the study area because the project has a potential to affect the timing and quantity of water flowing through this area which could result in impacts to existing vegetation and habitat.

Physical Conditions

The study area is located in western Kern County, east of the California Aqueduct and about 20 miles west of Bakersfield and 10 miles south of Buttonwillow. I-5 and the Kern River both bisect the study area (Figure 3.3-1). Within the study area, the KWBA property comprises approximately 20,500 aces of gently sloping land overlying the Kern River Alluvial Fan. Prior to development of the KWB beginning in 1995, approximately 17,000 of the 20,000 acres were intensively farmed, which had removed the majority of historic natural communities.

The remaining approximately 3,000 acres of the KWBA property pre-1995 contained remnant natural communities such as saltbush scrub, mesquite scrub, valley sacaton grassland, and annual grassland. The only aquatic resources present on the KWBA property prior to water recharge activities were canals and ditches used for irrigation. Within the study area, the KWB now contains KWBA facilities (e.g., recharge basins, wells, canals), access roads, and the remnant natural communities listed above.

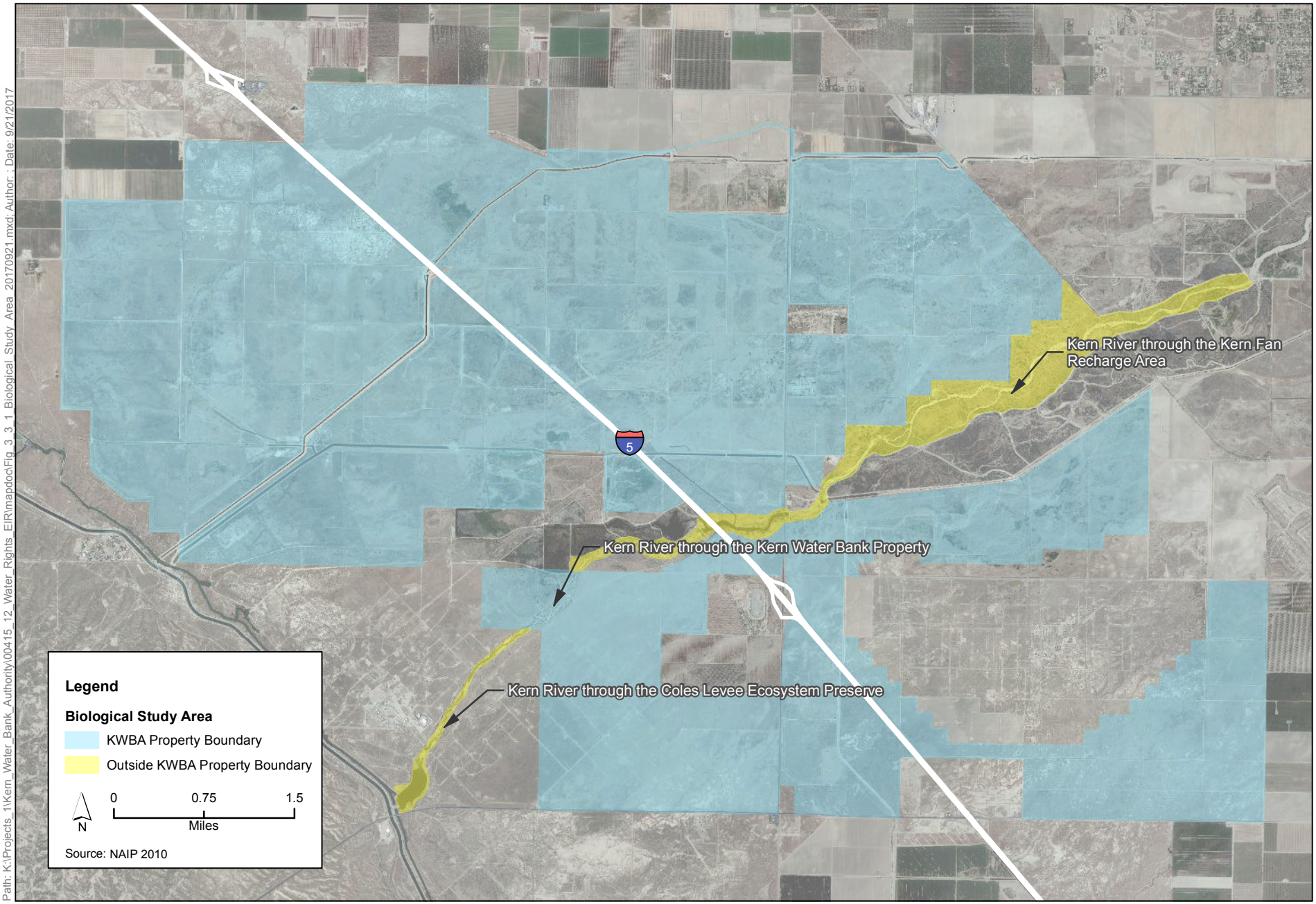

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Figure 3.3-1
Biological Study Area

Following the development and operation of the KWB, some of the upland natural communities (i.e., grassland) have been reestablished and intermittent natural communities have been created. These natural communities existed historically throughout much of the San Joaquin Valley. During wet years, the KWB supports approximately 7,500 acres of aquatic or semi-aquatic habitats (recharge ponds) along the Pacific Flyway and provides essential habitat for migrating waterbirds, raptors, and other migratory birds. The aquatic/semiaquatic habitats support a high species diversity (66 species observed in fall/winter 2011/2012) and abundance (estimated at up to 35, 000 individuals) of wintering waterfowl (Appendix G). Upland habitat on the KWB has also increased substantially with more than 12,000 acres of grassland and scrub communities that support or have the potential to support special-status plant and wildlife species.

As mentioned above, the Kern River portion of the study area focuses on the Kern River corridor southwest of the First Point of Measurement. This area supports both aquatic and upland riparian habitats. Representative photographs of the Kern River portion of the study area are provided in Appendix J, Photographs 6 through 8.

Aquatic Resources

Aquatic resources within the study area include the Kern River and recharge ponds. These resources are described below.

Kern River

The main surface water feature in the Kern County Subbasin is the Kern River. The Kern River and its watershed are noted for their range of geographic and topographic conditions. The high elevations of the upper Kern River watershed typically collect a deep snowpack that supports Kern River flows. Annual river flows are lowest in the late summer and fall and greatest in the late spring and early summer following melting of the Sierra Nevada snowpack. The climate and hydrology of the Kern River and its watershed are also noted for their high degree of annual and seasonal variability.

Before European settlement the Kern River flowed to Kern and Buena Vista Lakes and extensive wetland complexes. During wet periods, the lakes overflowed to Tulare Lake to the north, which itself overflowed into the San Joaquin River watershed. Under present day conditions, water users divert a majority of Kern River flow downstream from its entrance to the valley, northeast of Bakersfield, and as a result the river channel through the KWBA property is typically dry except during very wet years.

The KWBA property has historically been subject to periodic flooding from the Kern River, and is able to absorb water at an extremely high rate, retaining it in underground aquifers. The land was used for cattle grazing in the 1800s and early 1900s, and then crop production from the 1930s until 1991. It was also explored for gas and oil resulting in numerous wells and pipelines.

Within the study area, the dominant vegetation community along the Kern River is remnant Fremont cottonwood forest (described below under *Riparian Habitats*). This community type becomes less common downstream within the study area due to decreasing flows from water being diverted out of the river. Other vegetation communities along the Kern River include mesquite thickets on raised areas outside the river channel and willow thickets on sandbars within the river channel. Also present are dense thickets of the nonnative tamarisk within and along the river channel in dryer areas, particularly in the 1 to 2 mile section of river upstream from the Intertie.

During the March 2013 botanical surveys, mulefat thickets were infrequently encountered within the river channel and along some depositional banks. Creeping rye grass turfs occur as dense stands of grasses under and in association with some of the larger cottonwood trees that are present outside the river channel (Appendix J).

Recharge Ponds and Canals

Recharge ponds and associated canals (including the KWB Canal) and ditches in the study area are periodically flooded by KWB, resulting in aquatic, semi-aquatic, and riparian habitats. These areas primarily occur in the northern portion of the study area north of the Kern River. Vegetation monitoring at eight established locations during 2011 indicated that the vegetative composition of this habitat consisted of a mixture of upland, wetland, and riparian species (South Valley Biology Consulting LLC 2012). Representative species observed were Goodding's black willow, Baltic rush (*Juncus balticus*), red brome, curly dock (*Rumex crispus*), wild rye, common spike rush (*Eleocharis macrostachya*), Bermudagrass (*Cynodon dactylon*), rattail fescue, field mustard (*Hirschfeldia incana*), small-flowered fiddleneck (*Amsinckia menziesii*), cocklebur (*Xanthium strumarium*), and redstem filaree (*Erodium cicutarium*). During years in which these areas are flooded, wetland vegetation is predominant, but in years when the areas are not flooded, upland vegetation is predominant.

Terrestrial Natural Communities

The terrestrial natural communities in the study area are mesquite savannah, saltbush scrub, valley sacaton scrub, annual grassland, and riparian habitats. All of these communities except annual grassland are designated as sensitive natural communities by the CNDDB (California Department of Fish and Wildlife 2013).

Mesquite Savannah

Mesquite savannah in the study area is an open, shrub-dominated community characterized by the presence of honey mesquite (*Prosopis glandulosa* var. *torreyana*) and valley saltbush (*Atriplex polycarpa*). Other species present in this community include red brome (*Bromus madritensis*) and pale-leaf golden bush (*Isocoma acradenia* var. *bracteosa*).

Saltbush Scrub

Saltbush scrub in the study area is dominated by valley saltbush and spiny saltbush (*Atriplex spinifera*). Other species present in this community include pale-leaf golden bush, alkali heath (*Frankenia salina*), common tarweed (*Centromadia pungens*), bird's-eye gilia (*Gilia tricolor*), filaree (*Erodium* spp.), and fescue (*Festuca* spp.).

Valley Sacaton Scrub

Valley sacaton scrub in the study area is a native bunchgrass-dominated community that is characterized by the present of alkali sacaton (*Sporobolus airoides*). Other species present in this community are saltgrass (*Distichlis spicata*) and alkali barley (*Hordeum depressum*).

Annual Grassland

Annual grassland habitat occurs throughout the study area but is concentrated in the southern portion of the KWB south of the Kern River. This habitat is dominated by nonnative annual grasses such as red brome, soft chess (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), foxtail barley

(*Hordeum murinum* spp. *leporinum*), wild oats (*Avena* spp.), Italian ryegrass (*Festuca perennis*), and rattail fescue (*Festuca myuros*). Forbs present in this community are fiddleneck (*Amsinckia* spp.), peppergrass (*Lepidium* spp.), tarplant (*Centromadia* spp.), bur-clover (*Medicago polymorpha*), and lupine (*Lupinus* spp.). Annual grasses also occupy recharge basins during dry years when very little surface water is diverted into the KWB.

Riparian Habitats

Riparian habitats in the study area consist of remnant Fremont cottonwood forest and riparian scrub with variable density along the Kern River and within many recharge ponds when water is present for extended periods of time. Where present, the dominant tree species are Fremont cottonwood (*Populus fremontii*) and Goodding's black willow (*Salix gooddingii*). Along the Kern River, riparian habitat is patchy and is in a state of decline due to infrequent water flows. Vegetation is widely spaced and consists of older, mature trees that are able to persist by reaching groundwater (Appendix J). Other species present in this community are honey mesquite, mulefat (*Baccharis salicifolia*), stinging nettle (*Urtica dioica*), wild rye (*Elymus triticoides*), and narrow-leaved milkweed (*Asclepias fascicularis*).

Because Kern River flows are highly regulated by Isabella Dam and upstream diversions, the frequency and volume of flood flows has been reduced since at least 1953, and during many years the Kern River is dry (Section 3.6, *Hydrology and Water Quality*). Species that are largely dependent on flood flows and a gradually declining water table in spring and summer to establish seedlings on the floodplain, such as Goodding's black willow and Fremont cottonwood (Stromberg et al. 1991; Shafroth et al. 1998) are no longer found to be regenerating and persisting to maturity along the Kern River within the study area (Jones pers. comm. 2013a). Regulated rivers in the western United States frequently no longer support the reproduction of these species (Fenner et al. 1985). These riparian species are still found along the Kern River in the study area, largely as phreatophytes, plants that are tapping into deep groundwater. Examination of historical aerial photographs has shown that these species have expanded in the riparian zone of the Kern River over the last decade.

Special-Status Species

Special-status species are plants, animals, and fish that are legally protected under the ESA), the CESA, or other regulations, as well as species that are considered sufficiently rare by the scientific community to qualify for such listing. Special-status plants, animals, and fish fall into the following categories:

- Species listed or proposed for listing as threatened or endangered under ESA (50 CFR 17.11 [listed animals], 50 CFR 17.12 [listed plants], and various notices in the *Federal Register* [FR] [proposed species]).
- Species that are candidates for possible future listing as threatened or endangered under ESA (76 FR 66370, October 26, 2011).
- Species listed or proposed for listing by the State of California as threatened or endangered under CESA (14 CCR 670.5).
- Species that meet the definitions of rare or endangered under CEQA (CEQA Guidelines § 15380).
- Plants listed as rare under the California Native Plant Protection Act (CNPPA) (California Fish and Game Code 1900 et seq.).

- Plants considered by DFW and CNPS to be "rare, threatened, or endangered in California" (Rare Plant Ranks 1B and 2; California Department of Fish and Game 2010; California Native Plant Society 2013).
- Plants identified by DFW and CNPS about which more information is needed to determine their status, and plants of limited distribution (Rare Plant Ranks 3 and 4, California Department of Fish and Game 2010; California Native Plant Society 2013), which may be included as special-status species on the basis of local significance or recent biological information.
- Animal species of special concern to the DFW (Shuford 2008 [birds]; Williams 1986 [mammals]; and Jennings and Hayes 1994 [amphibians and reptiles]).
- Animals fully protected in California (California Fish and Game Code 3511 [birds], 4700 [mammals], 5050 [amphibians and reptiles], and 5515 [fish]).

Appendix G lists the scientific and common names, status, habitat, and potential for occurrence for the special-status species known to occur in the vicinity of the study area.

Special-Status Fish Species

The KWB HCP/NCCP covers two special-status fish species, the Kern brook lamprey (*Lampetra hubbsi*) and the Kern River rainbow trout (*Oncorhynchus mykiss gilberti*). The KWB HCP/NCCP identifies these species as relatively unlikely to be listed or become established at the KWB during the life of the KWB HCP/NCCP take permit, but covers them in the event that any take may occur.

Kern Brook Lamprey

The Kern brook lamprey, a species whose principal habitats are the silty backwaters of large foothill rivers between 100 and 1,100 feet in elevation, is a California species of high concern (Moyle et al. 2015). The species is not known to occur in the Kern River and is limited to six isolated populations in the lower Kaweah, Kings, Merced, and San Joaquin Rivers, and in the Kings River above Pine Flat Reservoir and the San Joaquin River between Millerton Reservoir and Redinger Dam. Its larval form (ammocoete) prefers to remain buried in a sand/mud substrate with water temperatures below 77 degrees Fahrenheit, a type of habitat present in the siphons of the Friant-Kern Canal, a KWB water source, where the Kern brook lamprey was first discovered; adult Kern brook lamprey require coarser gravel-rubble substrate, and likely cool water temperatures, for spawning. Because the presence of suitable spawning habitat in the Friant-Kern Canal is unlikely, ammocoetes entrained there would not contribute to the species' persistence (Moyle et al. 2015). The species is not known to occur in the Kern River.

Kern River Rainbow Trout

The Kern River rainbow trout, a California species of critical concern, is a golden trout subspecies that is similar to coastal rainbow trout and is endemic to the Kern River and its tributaries in Tulare County (Moyle et al. 2015). Although the subspecies was once widely distributed in the Kern River system, current populations are limited to a handful of Kern River tributary streams and mainstem Kern River reaches 10 miles or more upstream of Lake Isabella and approximately 50 miles upstream of the KWB.

Although KWB recharge ponds and the nearby Friant-Kern Canal and Kern River potentially provide fish habitat, any fish entrained in the canal would not survive or spawn. The KWB recharge ponds are used intermittently and are often dry and, during many years, the lower Kern River channel is also dry. Thus, the study area does not currently provide permanent habitat to sustain fish species.

Special-Status Plants

Queries of the CNDDB, CNPS's online *Inventory of Rare and Endangered Plants*, and USFWS website identified 21 special-status plant species known to occur in the vicinity of the study area (Appendix K). All 21 species occur in habitats (i.e., saltbush scrub, riparian scrub, and grassland) that are known to occur in the study area. Seventeen of the 21 species listed in Appendix K are designated as covered plant species in the KWB HCP/NCCP.

According to the KWB HCP/NCCP and the associated 2011 Compliance Report, five special-status plants have been observed in the KWB portion of the study area: Horn's milk-vetch (*Astragalus hornii* var. *hornii*), San Joaquin woolly-threads (*Monolopia congdonii*), Hoover's woolly-star, recurved larkspur (*Delphinium recurvatum*), and slough thistle (*Cirsium crassicaule*) (Kern Water Bank Authority 2012). Botanical surveys were conducted within the Kern River portion of the study area on March 15 and 18, 2013 (Appendix J). The surveys coincided with the identification period for species with the potential to occur in habitats along the Kern River that could be affected by reduction in river flows (Appendix K). A brief discussion of these species and results of the 2013 botanical surveys is provided below.

Horn's Milk-Vetch

Horn's milk vetch, a California Rare Plant Rank 1B.1 species, is currently known in California from Inyo and Kern Counties and potentially Tulare County. Potential habitat for Horns' milk-vetch consists of the recharge basins, canals, and alkaline substrates in meadows, seeps, and playas. Within the KWB, this species was observed in 2009 and 2010 but not in 2011; however, specific location information is not available (Kern Water Bank Authority 2012). Incidental observations indicate that Horn's milk-vetch is relatively widespread in the basins and canals when they are dry (i.e., there is little or no recharge) (Kern Water Bank Authority 2012). This species is also known to occur in Buena Vista Slough. Horn's milk-vetch was not observed in the Kern River portion of the study area during the March 2013 botanical surveys that coincide with the bloom period of this species (Appendix J).

San Joaquin Woolly-Threads

San Joaquin woolly-threads is federally listed as endangered and is a California Rare Plant Rank 1B.2 species. This species is known in California from the Carrizo Plain and western San Joaquin Valley from San Benito County to Kern County. Potential habitat for San Joaquin woolly-threads in the study area consists of saltbush scrub, grasslands with sandy soils, and flats in alkaline or loamy soils. San Joaquin woolly-threads is a covered species under the KWB HCP/NCCP and three populations of the species have been previously documented within the sensitive habitat and compatible habitat areas of the KWB (Kern Water Bank Authority 2012). Additionally, one new occurrence was observed in 2013 during annual surveys conducted for this species within the KWB (Appendix J). San Joaquin woolly-threads was not observed in the Kern River portion of the study area during the March 2013 botanical surveys that coincide with the bloom period of this species (Appendix J). A nearby reference population was visited on March 13, 2013 to ensure that the species was in bloom and would be identifiable at the time of the March 15 and 18, 2013 surveys.

Hoover's Woolly-Star

Hoover's woolly-star, which has been delisted from federally threatened, is a California Rare Plant Rank 4.2 species and is known in California from the western side of San Joaquin Valley from San Benito County to Kern and Los Angeles Counties. Potential habitat for Hoover's woolly-star in the study area consists of saltbush scrub, grassland, and sparsely vegetated alkaline alluvial fans. Hoover's woolly-star occurs in many locations in the KWB portion of the study area and is a covered species under the KWB HCP/NCCP. The largest concentrations are located just south of the Ten Section Oil Field, and in the habitat areas north of Taft Highway and east of Enos Lane (Kern Water Bank Authority 2012). Hoover's woolly-star was not observed in the Kern River portion of the study area during the March 2013 botanical surveys that coincide with the bloom period of this species (Appendix J).

Recurved Larkspur

Recurved larkspur is a California Rare Plant Rank 1B.2 species and is currently known in California in the Central Valley from Sutter County to Kern County. Potential habitat for recurved larkspur in the study area consists of grassland in alkaline soils and saltbush scrub. Recurved larkspur is a covered species under the KWB HCP/NCCP and one population was previously documented within Section 36 of the KWB near a crude oil pipeline right-of-way west of the Alejandro Canal in an area designated as sensitive habitat (Kern Water Bank Authority 2012). Recurved larkspur was not observed in the Kern River portion of the study area during the March 2013 botanical surveys that coincide with the bloom period of this species (Appendix J).

Slough Thistle

Slough thistle is a California Rare Plant Rank 1B.1 species and is currently known in California from Kings, Kern, and San Joaquin Counties. Potential habitat for slough thistle in the study area consists of saltbush scrub, riparian scrub, and the banks of recharge basins and canals. Slough thistle is a covered species under the KWB HCP/NCCP and was observed approximately 20 years ago by DWR in Section 34, Township 30 South, Range 25 East; however, slough thistle has not been seen in recent years (Kern Water Bank Authority 1997, 2012). Slough thistle was not observed in the Kern River portion of the study area during the March 2013 botanical surveys that coincide with the bloom period of this species (Appendix J). A nearby reference population was visited on March 11, 2013 to ensure that the species was in bloom and would be identifiable at the time of the March 15, and 18, 2013 surveys.

California Satintail

California satintail (*Imperata brevifolia*) is a California Rare Plant Rank 2 species that occupies meadows, desert scrub, playas, and grassland habitats within the southern portion of the Central Valley from Madera County to Kern County. California satintail has not been previously documented within the KWB but potential habitat is present throughout the study area. California satintail was not observed in the Kern River portion of the study area during the March 2013 botanical surveys that coincide with the bloom period of this species (Appendix J).

Special-Status Wildlife

A review of existing information resulted in the identification of 20 special-status wildlife species with potential to occur in the vicinity of the study area (Appendix K). The following 20 special-status wildlife species have been previously documented (breeding or wintering) or have potential to

occur within the study area. Species that were identified prior to establishment of the KWB are denoted by a (*). All of these 20 species are identified as covered species under the KWB HCP/NCCP.

- Western spadefoot (*Spea hammondii*)
- California horned lizard (*Phrynosoma coronatum frontale*)
- Blunt-nosed leopard lizard (*Gambelia sila*)*[2]
- Pacific pond turtle (*Actinemys marmorata*)
- Loggerhead shrike (*Lanius ludovicianus*)
- California horned-lark (*Eremophila alpestris actia*)
- Tricolored blackbird (*Agelaius tricolor*)
- Yellow-headed blackbird (*Xanthocephalus xanthocephalus*)
- Burrowing owl (*Athene cunicularia hypugea*)
- Swainson's hawk (*Buteo swansoni*)
- Northern harrier (*Circus cyaneus*)
- White-tailed kite (*Elanus leucurus*)
- Black tern (*Chlidonias niger*)
- Brown pelican (*Pelecanus occidentalis*)
- Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*)*
- San Joaquin pocket mouse (*Perognathus inornatus inornatus*)*
- Nelson's antelope squirrel (*Ammospermophilus nelsoni)**
- San Joaquin kit fox (*Vulpes macrotis mutica*)*
- American badger (*Taxidea taxus*)*
- Buena Vista Lake shrew (*Sorex ornatus relictus*)

Appendix K provides the current legal status, distribution, habitat requirements, and location within the study area for each of the 20 species known or with potential to occur in the study area. For most of these species that occur within the KWBA property, the project will not alter existing habitat conditions or existing land management activities covered under the KWB HCP/NCCP. Changes in water flows through the Kern River portion of the study area could indirectly impact riparian and wetland vegetation and species that occur within that habitat, specifically the Buena Vista Lake shrew. A detailed description is provided below for the federally endangered Buena Vista Lake shrew based on the presence of suitable habitat and proposed critical habitat within the study area.

Buena Vista Lake Shrew

Prior to 1986, the Buena Vista Lake shrew (BVLS) had only been documented at Buena Vista Lake, where all of the suitable habitat for this species had been converted to residential and agricultural lands and the species was presumed to be extinct. Two new discoveries were made in 1986 and

[2] The only occurrence of this species was a remnant, translocated population that did not survive.

1992 at the now Kern Lake Preserve and the Kern National Wildlife Refuge, respectively. Between 1990 and 2010, surveys for BVLS were conducted at 21 sites throughout its range that supported high quality habitat for the species (U.S. Fish and Wildlife Service 2011). BVLS was confirmed at 8 of the 21 sites spanning a 70-mile stretch along the west side of the Tulare Basin. One of the 21 sites surveyed included riparian habitat suitable for BVLS along the Kern River at the KWB. The Endangered Species Recovery Program (ESRP) conducted surveys of this habitat in 2000 and 2005 and did not locate any BVLS (Williams and Harpster 2001; U.S. Fish and Wildlife Service 2011).

The BVLS has been restricted in its distribution since it was initially described by Grinnell in 1932 (Williams and Harpster 2001). Factors that limit the species distribution and population size are likely to include: a short lifespan (less than one year), limited reproduction potential (typically 1–2 litters of 4–6 young), high metabolic rate (required to eat more than own body weight per day), and restricted habitat requirements (wetland and riparian communities with a dense matted vegetation structure). Because the shrew is only known to occur in 8 isolated populations that are not contiguous with other suitable habitat areas, the BVLS is vulnerable to natural and human-made environmental impacts.

Essential habitat for the BVLS consists of riparian and wetland vegetation communities that support an abundance of leaf litter and dense herbaceous cover (U.S. Fish and Wildlife Service 2011) that provide adequate food, cover, and moisture (U.S. Fish and Wildlife Service 2012). A key habitat component for BVLS is moist soils that support a high diversity and abundance of invertebrate prey for the species. Areas that support an over story of willows or cottonwoods appear to be favored by BVLS but may not be an essential habitat feature (U.S. Fish and Wildlife Service 2012). Open water does not appear to be necessary for the survival of the shrew, but the availability of water contributes to improved vegetation structure and diversity, which in turn improves the availability of cover (U.S. Fish and Wildlife Service 2012). These habitat characteristics are also the primary constituent elements of critical habitat for the BVLS (U.S. Fish and Wildlife Service 2012).

By the early 1980s urban and agricultural development had reduced potential BVLS habitat to less than 5 percent of the historic habitat, which consisted primarily of marsh, riparian, and valley sink scrub habitats within the Tulare Basin (U.S. Fish and Wildlife Service 2011). Canals built to divert water for irrigation were designed for the sole purpose of water delivery. These features had steep walled banks, were maintained free of vegetation, and therefore did not support suitable riparian or wetland habitat elements for BVLS.

The Buena Vista Lake Shrew 5-Year Review report (U.S. Fish and Wildlife Service 2011) cites the absence of a dependable water supply to wetland and riparian areas across the Tulare Basin as a major contributor to habitat loss threatening the continued existence and recovery of the species. Other threats to the species and its habitat continue to be industrial and agricultural development, urbanization, and selenium toxicity (U.S. Fish and Wildlife Service 2011). The Kern River west of Bakersfield is one of several areas identified as potentially supporting BVLS; however, potential habitat in this area is restricted to small patches that are not likely to support a significant number of animals (U.S. Fish and Wildlife Service 2011). Based on the fragmentation of suitable habitat remaining in the Tulare Basin and the small territory size of the species (approximately 4,000 square feet) (U.S. Fish and Wildlife Service 2012), it is unlikely that existing disjunct populations will be reconnected to other areas of suitable habitat in the future (U.S. Fish and Wildlife Service 2011).

Buena Vista Lake Shrew Habitat within the Study Area

BVLS is known to occur within the study area, adjacent to the KWB within the City of Bakersfield's 2,800-acre recharge facility. BVLS is also known to occur nearby within the Coles Levee Ecosystem Preserve southwest of the KWB (Figure 3.3-2). This location is within final designated critical habitat along the Outlet Canal (Figure 3.3-2).

For purposes of evaluating potential impacts on potential BVLS habitat downstream from the project, the study area includes the KWB property but also extends along the Kern River and associated riparian habitat from diversion points 4 and 5 south to the California Aqueduct Intertie (Figure 3.3-1). Within the study area, potential habitat for BVLS is restricted to the Kern River and associated riparian and wetland habitats. Artificially created ponds on the KWB property hold water during times of high flow when water is diverted from the Kern River or other sources. These ponds could provide habitat for BVLS in optimal water years; however, the habitat conditions are variable and in dry years the ponds support only annual grassland habitat, which is not suitable for BVLS. Because the water source for KWB ponds is unreliable, essential habitat features for BVLS are not present during much of the year and often for multiple years in succession, and therefore are not expected to support BVLS.

The natural flow of the Kern River has been apportioned among various water users so that the lower portion of the Kern River through the study area typically remains dry for much if not all of the year, resulting in patchy riparian habitat with sparse understory.[3] During BVLS trapping efforts on the KWB property portion of the study area (Figure 3.3-1) in 2000, remnant riparian areas were primarily located near the main channel of the Kern River, generally within 550 feet of the shore (Williams and Harpster 2001). Similar to existing habitat conditions, these areas in 2000 were dominated by Fremont cottonwood, willows, stinging nettle, creeping wild rye, mulefat, and narrow-leaved milkweed. Southwest of the KWB property, the Kern River flows through the Coles Levee Ecosystem Preserve (Figure 3.3-1), which was observed to be highly degraded during trapping efforts there in 1999 (Williams and Harpster 2001). These trapping efforts were limited to a pond located along the Outlet Canal (outside the study area and unaffected by the project), in which BVLS were found (Williams and Harpster 2001); this BVLS occurrence falls within final designated critical habitat (Figure 3.3-2).

Prior to 2006, riparian habitat along the lower portion of the Kern River through the study area (south of I-5) probably did not provide essential habitat features for BVLS because there was not sufficient underbrush, grasses, and leaf litter to maintain soil moisture and provide an adequate prey base for BVLS (Jones pers. comm. 2012). Beginning in 2006, larger water releases from Lake Isabella allowed additional water to flow through the study area, including both the river channel and retained water within adjacent recharge ponds. However, water availability within the study area has remained inconsistent with dry riverbed conditions in years 2007, 2008, 2009, and most of 2010. Water once again flowed in this lower portion of the Kern River south of I-5 in late 2010 and early 2011, and then again in spring and summer of 2011. Overall, the last 3 years have shown an increase in the health and vigor of the riparian habitat along the Kern River throughout the study area (Jones pers. comm. 2012), likely the result of flow in 2010 and 2011. Cottonwood trees have begun producing more leaves and retaining their leaves later in the season, indicative of more water uptake by the trees. This in turn has resulted in accumulation of larger amounts of leaf litter which,

[3] Over the last 24 years, water flowed past second point to the Intertie and/or Outlet Weir in only 36 months.

combined with areas of dense creeping wild rye and rushes, provides suitable habitat conditions for BVLS (Jones pers. comm. 2012). Although there have been some noticeable improvements in the health of riparian habitat along this lower portion of the river, areas that could support BVLS still remain small and fragmented, and provide less than optimal conditions for BVLS (Jones pers. comm. 2013a).

The portion of the study area that occurs northeast of I-5 (Figure 3.3-2), is surrounded by existing water recharge basins on the City of Bakersfield's property and provides areas of high quality habitat supporting primary constituent elements for BVLS. The riparian habitat along the portion of the Kern River southwest of I-5 remains fragmented, as no new recruitment of riparian trees has been observed. The fragmented nature of the habitat and unreliable water source reduces the likelihood that BVLS occur in this area but their potential presence cannot be discounted since current habitat conditions provide areas of suitable microhabitat conditions (i.e., dense [more than 6 inches deep] layer of leaf litter or matted vegetation for cover and foraging).

3.3.2 Impact Analysis

3.3.2.1 Methods

The evaluation of impacts on biological resources was conducted by qualitatively comparing the baseline conditions to the conditions that are expected to result from the appropriation of additional water. To prepare for the analysis of the potential impacts of the project on special-status plants and wildlife, biologists reviewed existing resource information related to the study area to evaluate whether sensitive habitats and special-status species are known from or could occur in the study area.

Key impacts were identified and evaluated based on the environmental characteristics of the study area and the magnitude, intensity, and duration of activities related to the project implementation. Direct impacts are not anticipated because construction of new facilities is not proposed and operation of existing facilities would not change as a result of project implementation. The appropriation of additional water to the KWB could result in indirect impacts on biological resources through habitat alteration by changing the amount and duration of water flows within the Kern River (downstream of diversion points 4 and 5, Figure 3.6-12) and the amount of water piped to existing KWB retention ponds. For purposes of this analysis, impacts to BVLS were assessed qualitatively by determining how the project would affect riparian and wetland habitat and whether this affect would result in the loss or degradation of essential habitat components and primary constituent elements for BVLS.

3.3.2.2 Significance Criteria

For this analysis, an impact pertaining to biological resources was considered significant under CEQA if it would result in any of the following environmental effects, which are based on the 2012 State CEQA Guidelines Appendix G (14 CCR 15000 et seq.).

- Have a substantial adverse effect, either directly or through habitat modifications, including designated critical habitat, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by DFW or USFWS, including substantially reducing the number or restricting the range of an endangered, rare, or threatened species.

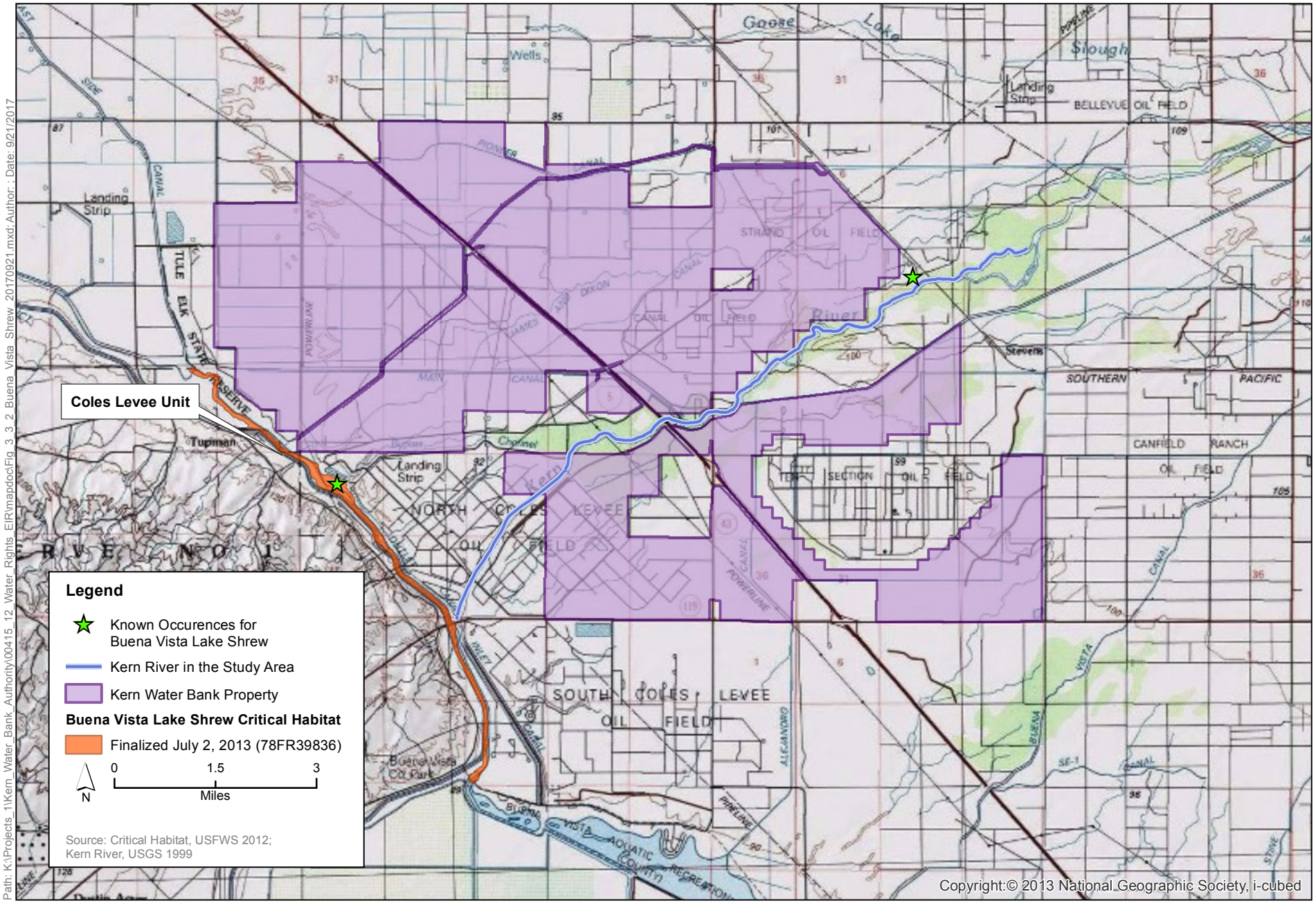

Figure 3.3-2
Final Critical Habitat and Known Occurences for Buena Vista Lake Shrew

- Have a substantial adverse effect on any sensitive natural community identified in local or regional plans, policies, or regulations, or by DFW or USFWS.
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA, including marsh, vernal pool, and coastal wetlands, through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Have a substantial adverse effect on fish communities or species protected by applicable environmental plans and goals.
- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

Aquatic habitat only exists sporadically within the study area because the reach of the Kern River in the study area remains dry except for flood flows during wet years. Permanent aquatic habitat for fish species on the Kern River occurs well above the study area. Further, the recharge ponds are often dry, providing no permanent fish habitat. The project, like all KWB activities, must comply with the KWB HCP/NCCP, which serves to protect habitats and species, including the two fish species described in Section 3.3.1.2, *Environmental Setting*. Because the project would not affect fish populations or their habitats, the potential for significant impacts on fish species is not addressed further.

3.3.2.3 Impacts and Mitigation Measures

Impact BIO-1: Cause a substantial adverse effect, either directly or through habitat modifications, on a special-status species (Less than significant)

Special-Status Wildlife

Overall, the project is not expected to result in direct impacts on special-status wildlife because no new construction or ground disturbing activities are proposed. Some common and special-status wildlife species, particularly water birds, would benefit from longer and more frequent ponding of recharge basins if additional water is diverted onto the KWB.

Of the 20 special-status wildlife species identified as occurring or potentially occurring within the study area (Appendix K), two (white-tailed kite and Swainson's hawk) could nest within large trees in the study area. Impact BIO-2 below describes the potential for hydrologic changes in the Kern River to affect riparian trees along the Kern River. Overall, the reduction of flood flows downstream from the KWB's northernmost diversion points 4 and 5 (Figure 3.6-12) is not expected to result in substantial adverse effects to riparian habitat along the Kern River, specifically cottonwood and willow trees. Riparian habitat may increase within recharge basins with additional water input. Therefore, the project would have no impact on nesting Swainson's hawk and white-tailed kite in the study area. Another 17 species listed in Appendix K would not be affected by changes in the Kern River hydrology because they are not dependent on this habitat for any portion of their lifecycle. One species, the Buena Vista Lake shrew, is known to occur along the Kern River and is dependent on mesic (moderately moist) habitat conditions supported to some degree by Kern River flows. This species is discussed in detail below.

Buena Vista Lake Shrew

Implementation of the project has the potential to affect hydrology of the Kern River downstream from the KWB's diversion points 4 and 5 (Figure 3.6-12) and affect the hydroperiod of onsite recharge basins. Changes in the amount and timing of highwater flows through the study area could affect soil moisture and existing riparian and wetland vegetation, which provides cover and supports insect prey for BVLS. For purposes of this analysis, impacts to BVLS were assessed qualitatively by determining how the project would affect riparian and wetland habitat and whether it would result in substantial adverse effects on essential habitat components and primary constituent elements for BVLS downstream of the project area. The following impact analysis evaluates impacts associated with the Kern River portion of the study area that could be affected by reduction in highwater flows. Any potential project impacts associated with an increase in water retention within recharge basins in the KWB portion of the study area would be covered under the KWB HCP/NCCP and are not addressed further in this document. Overall, increased ponding within recharge basins on the KWB could occasionally increase suitable habitat for the species; however, this beneficial impact would occur infrequently and would not support the year-round habitat that would be needed to sustain BVLS over the long term.

The eastern portion of the study area supports a known population of BVLS within the City of Bakersfield's 2,800-acre recharge facility (Figures 3.3-1 and 3.3-2). This habitat is not within an area of significant tree cover but does support dense wetland vegetation. As discussed in Section 3.6.2 of the *Hydrology and Water Quality* section of this EIR, there are three main diversion points associated with the project: the primary diversion point 6 (maximum 800 cfs) is just west and downstream of the City of Bakersfield's 2,800-acre recharge facility and two alternative diversion points 4 and 5 (maximum 400 cfs combined) are located upstream of the City of Bakersfield's 2,800-acre recharge facility and known BVLS population (Figures 3.6-12 and 3.3-2). Based on the proximity of suitable BVLS habitat to the City of Bakersfield's existing water recharge basins, current habitat conditions in this area are likely to be most dependent on current management actions associated with the recharge basins and less dependent on high flood flows. It is expected that diversion points 4 and 5 would only be used during extremely high water flows. During these types of events, there would likely be sufficient water in the river system to support both channel flow in this area and water diversion to adjacent recharge basins that provide a shallow groundwater table in this area. Therefore, the project is not expected to affect the known population of BVLS within the City of Bakersfield's 2,800-acre recharge facility.

Downstream of the primary diversion point 6 (Figure 3.6-12), habitat conditions are drier with fewer cottonwood trees and more mesquite (Jones pers. comm. 2013a). In this area, suitable habitat for BVLS becomes more fragmented and likely more dependent on trees such as cottonwoods and willows. The buildup of leaf litter and duff beneath these trees may provide cover and foraging opportunities for BVLS (Jones pers. comm. 2012). However, overall habitat conditions for BVLS in this stretch of river remain less than ideal (Jones pers. comm. 2013a). Based on an evaluation of project impacts on riparian habitat (discussed below under Impact BIO-2), changes in flood flows that would result from the project are not expected to cause a substantial adverse effect on the riparian vegetation (particularly the cover of willow and cottonwood trees) in the project reach of the Kern River because there is currently little to no riparian recruitment and existing vegetation is likely dependent on groundwater rather than flood flows. The lack of riparian recruitment within this lower reach of the river will in time result in the complete loss of cottonwoods and willows from this habitat. However, this outcome would result regardless of project implementation and is similar to the impact identified for the No Project Alternative, which represents baseline conditions.

Wetland vegetation within the study area that provides suitable habitat components for BVLS is dominated by creeping wild rye (Jones pers. comm. 2013b). The project is not expected to cause a substantial adverse effect on wetland vegetation along the floodplain because creeping wild rye is a facultative species and is not dependent on high flood flows. In addition, wetland vegetation within the study area appears to be maintained in large part by seepage and high groundwater from adjacent recharge ponds (Jones pers. comm. 2013b). Existing wetland vegetation that occurs along the river channel is likely to benefit from reduced flood flows associated with project implementation by reducing scour and vegetation removal. In addition, in-channel flows that support wetland vegetation would continue by means of existing water diversions to Buena Vista Water Storage District.

As the project is not expected to change flood flows through the Outlet Canal, it would not adversely affect occupied habitat along the Outlet Canal or primary constituent elements of designated critical habitat within the Coles Levee Unit downstream (Figure 3.3-2). Flows to the Outlet Canal and Kern River Flood Channel are almost entirely dependent on water deliveries made by the Buena Vista Water Storage District, which would not be affected by the project. As described in Section 3.6, *Hydrology and Water Quality*, and in Section 4.2.2 of the *Kern Water Bank Authority Water Availability Analysis* (Appendix L of this EIR), excess flood flows not diverted by other Kern River users are currently delivered to the California Aqueduct via the Intertie (Figure 3.6-3). Future flood flows would only be diverted to the Outlet Canal when the Intertie exceeds its flow capacity of 3,500 cfs, which would be extremely rare. Historically, the Intertie has never exceeded 3,374 cfs. Therefore, under the project, a reduction in flood flows to the Outlet Canal and Kern River Flood Channel would be extremely rare and would only occur in an abnormally wet year when water would be abundant throughout the region. Under these conditions, water availability would not be a limiting factor for downstream habitat.

Based on existing riparian and wetland habitat conditions and current water availability within the Kern River channel, changes in flood flows are not expected to result in a substantial adverse effect on potential habitat for the BVLS within the study area and would not result in adverse modification of designated critical habitat downstream of the study area. Therefore, the effect of the flood flow reduction on suitable BVLS habitat would be less than significant.

Special-Status Plants

Implementation of the project is not expected to result in direct impacts on special-status plants because no new construction or ground disturbing activities are proposed. However, changes in hydrology of the Kern River could indirectly affect special-status plants that rely on high water flows. Of the 21 special-status plants that are known or have the potential to occur in the study area (Appendix K), potential habitat exists within or along the Kern River for six of those species–Horn's milk vetch, Mexican mosquito fern, San Joaquin woolly-threads, Hoover's woolly star, slough thistle, and California satintail). Botanical surveys were conducted within the Kern River portion of the study area on March 15 and 18, 2013, which coincided with the identification period for these six species. No special-status plant species were identified during the March 2013 surveys and therefore special-status plants are not expected to be affected by the project (Appendix J).

No mitigation is required because the project is not expected to result in significant impacts on special-status wildlife or plants.

Impact BIO-2: Cause a substantial adverse effect on any riparian habitat or other sensitive natural community (Less than significant)

Riparian habitats, mesquite savannah, saltbush scrub, valley sacaton scrub in the study area represent sensitive natural communities. The mesquite savannah, saltbush scrub, and valley sacaton scrub would not be substantially adversely affected because no development of native habitat is required for the project and hydrologic changes within the Kern River would not directly or indirectly affect these habitats.

The reaches of the Kern River in the study area support only scattered patches or isolated individual riparian trees and shrubs, including, mule fat, narrow-leaved willow, Goodding's black willow and Fremont cottonwood. Riparian vegetation was historically likely denser, before the construction of Isabella Dam in 1953. Today, flow volumes are much reduced because of multiple diversions upstream of the study area (Section 3.6, *Hydrology and Water Quality*). Under baseline conditions, flood flows in the Kern River within the study area probably no longer support regeneration of Goodding's black willow and Fremont cottonwood to maturity (Jones pers. comm. 2013a). Existing trees of these species survive on groundwater, just as honey mesquite and narrow-leaved willow – species that reproduce vegetatively.

Flood flows under predicted project conditions will be reduced from flood flows occurring during baseline conditions (Section 3.6, *Hydrology and Water Quality*). However, channel flows down the Kern River within the study area will be maintained to continue deliveries to the Buena Vista Water Storage District. Reduction of flood flows under project conditions is not likely to affect survival and growth of the riparian vegetation, as they are likely dependent on groundwater. Increased water recharge within the KWB would temporarily increase the local groundwater table. Because the project is not expected to result in a net deficit in aquifer volumes, these temporary increases would result in an overall beneficial effect on groundwater recharge and local groundwater elevations (Section 3.6, *Hydrology and Water Quality*). Reduction in flood flow volume may reduce scour, which could reduce removal of riparian scrubs, such as mule fat, and herbaceous vegetation, such as creeping wild-rye, from the channel and floodplain. Existing riparian vegetation along the lower Kern River is likely dependent on groundwater. The effect of the flood flow reduction on riparian vegetation is therefore expected to be less than significant.

No mitigation is required because the project is not expected to result in significant impacts on riparian habitat or any other sensitive natural community.

Impact BIO-3: Cause a substantial adverse effect on state or federally protected wetlands through direct removal, filling, hydrological interruption, or other means (Less than significant)

Implementation of the project would in some years provide substantial amounts of additional water to recharge basins in the study area, which would be beneficial for large numbers of water birds and shore birds, and other species of birds and wildlife. Project operations would in some years reduce peak flows to the Kern River and associated riparian areas within the study area. These areas may in part qualify as waters of the United States or waters of the State under the jurisdiction of the U.S. Army Corps of Engineers or State and Regional Water Quality Control Boards. Reducing flows in the Kern River is not expected to affect riparian vegetation because existing habitat is likely dependent on groundwater or seepage from adjacent detention ponds (Jones pers. comm. 2013b) that would not be substantially reduced. In no event, however, will the project involve the placement of fill or discharge of any pollutants to waters of

the United States or the State. Overall, riparian wetland habitat and associated values would be enhanced by the project operations on the KWB; therefore, this impact would be less than significant.

No mitigation is required because the project is not expected to result in significant impacts on state or federally protected wetlands.

Impact BIO-4: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or impede the use of native wildlife nursery sites (No impact)

The project is not expected to interfere substantially with the movement of any native or migratory wildlife species. No new facilities are being constructed that would modify or interfere with the movement of native resident wildlife species; similarly, the increased banking of water would also not alter movement patterns of any species. Migratory waterbirds are expected to benefit from longer inundation periods with increased water diversions to existing recharge ponds. There are no remaining resident or migratory fish on the lower section of the Kern River, and therefore there will be no impact on these species.

No mitigation is required because the project is not expected to result in impacts on the movement of any native resident or migratory fish or wildlife species or impede the use of native wildlife nursery sites.

Impact BIO-5: Conflict with any local policies or ordinances protecting biological resources (No impact)

No development (i.e., construction of new facilities for recovery or recharge) of native habitats would be required for the project, and the increased banking of water would take place within the existing operational parameters of the KWB. As such, the project would not conflict with any local policies or ordinances protecting biological resources. Therefore, there would be no impact from the project.

No mitigation is required because the project is not expected to conflict with any local policies or ordinances protecting biological resources.

Impact BIO-6: Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan (No impact)

All KWB activities are subject to the requirements of the KWB HCP/NCCP, which advances the environmental objective of setting aside large areas of the KWB for the protection and enhancement of habitat for threatened, endangered, and sensitive species while meeting the conservation objective of storing water in the aquifer during times of surplus for recovery during times of shortage. KWBA is in compliance with the adopted KWB HCP/NCCP. The KWBA submits annual reports to USFWS and DFW that describe the previous year's activities and include a management plan for the upcoming year. These annual reports are intended to document the satisfaction of the requirements of the Implementation Agreement for the HCP/NCCP and the Conservation Bank Agreement, which requires annual reporting of Conservation Bank transactions. The management plan provides a detailed description of construction, maintenance, and repair of the infrastructure, management of habitat within the plan area, as well as information about adaptive management activities that will be enacted in the coming year. The project does not propose to add or modify any

existing infrastructure or otherwise alter the physical setting within the boundaries of the HCP/NCCP area. The diversion, recharge, and recovery of Kern River flood waters under the project would occur within existing KWB operational parameters. The project is consistent with the HCP/NCCP and other approved or contemplated conservation plans, and therefore will have no impact under this threshold of significance.

No mitigation is required because the project is not expected to conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

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3.4 Greenhouse Gases, Climate Change, and Energy

3.4.1 Existing Conditions

3.4.1.1 Regulatory Setting

Relevant regulatory agencies for greenhouse gas (GHG) emissions include the U.S. Environmental Protection Agency (EPA), California Air Resources Board (ARB), and San Joaquin Valley Air Pollution Control District (SJVAPCD). This section summarizes federal, state, regional, and local regulations related to GHGs, climate change, and energy that are applicable to the project.

Federal

There is no federal overarching law specifically related to climate change or the reduction of GHGs. Under the Obama Administration, the EPA developed regulations under the Clean Air Act (CAA) pursuant to the EPA's authority under the CAA. In *Coalition for Responsible Regulation, Inc., et al. v. EPA*, the United States Court of Appeals upheld the EPA's authority to regulate GHG emissions under the CAA. Foremost among recent developments have been the settlement agreements between the EPA, several states, and nongovernmental organizations (NGOs) to address GHG emissions from electric generating units and refineries; the U.S. Supreme Court's decision in *Massachusetts v. EPA;* and the EPA's "Endangerment Finding," "Cause or Contribute Finding," Mandatory Reporting Rule, and Clean Power Plan Final Rule. Under the Clean Power Plan, EPA issued regulations to control carbon dioxide (CO_2) emissions from new and existing coal-fired power plants. However, on February 9, 2016, the Supreme Court issued a stay of these regulations pending litigation. The fate of the proposed regulations is uncertain given the change in federal administrations in January 2017 and the pending deliberations in federal courts.

The Energy Policy Act of 2005 establishes a comprehensive, long-term federal energy policy and is implemented by the U.S. Department of Energy. The Energy Policy Act addresses energy production in the United States, including oil, gas, coal, and alternative forms of energy and energy efficiency and tax incentives. Energy efficiency and tax incentive programs include credits for the construction of new energy efficient homes, production or purchase of energy efficient appliances, and loan guarantees for entities that develop or use innovative technologies that avoid the production of GHGs. The federal government has also adopted the Energy and Independence Security Act of 2007 (EISA), which sets energy management requirements in several areas.

State

California has adopted statewide legislation addressing various aspects of GHG emissions reduction, climate change, and energy consumption. The legislation establishes a broad framework for the state's long-term GHG reduction program. The governor has also issued several executive orders related to the state's evolving climate change policy. Summaries of key policies, regulations, and legislation at the state levels that are relevant to the project are provided in the following sections.

State CEQA Guidelines

The State CEQA Guidelines require lead agencies to describe, calculate, or estimate the amount of GHG emissions that would result from a project and emphasize the necessity to determine potential climate change effects of the project and propose mitigation, as necessary. The State CEQA Guidelines confirm the discretion of lead agencies to determine appropriate significance thresholds but require the preparation of an EIR if "there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with adopted regulations or requirements" (§ 15064.4).

State CEQA Guidelines Section 15126.4 contains considerations that can help lead agencies form feasible mitigation measures involving the reduction of GHG emissions. Such feasible mitigation measures may include: measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency's decision; implementation of project features, project design, or other measures which are incorporated into the project to substantially reduce energy consumption or GHG emissions; offsite measures, including offsets that are not otherwise required to mitigate a project's emissions; and measures that sequester carbon or carbon-equivalent emissions.

CEQA and its Guidelines also include specific provisions governing review of energy consumption. Public Resources Code section 21100(b)(3) and Guidelines section 15126.4(c) require an EIR, when relevant, to include a statement concerning mitigation measures to reduce the wasteful, inefficient, and unnecessary consumption of energy. In turn, Appendix F, *Energy Conservation*, of the State CEQA Guidelines outlines energy impact possibilities and potential conservation measures designed to assist in the evaluation of potential energy impacts of proposed projects. Appendix F of the State CEQA Guidelines places "particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy," and further indicates this may result in an unavoidable adverse effect on energy conservation. Moreover, the State CEQA Guidelines state that significant energy impacts should be "considered in an EIR to the extent relevant and applicable to the project." Mitigation for potential significant energy impacts could include implementing a variety of strategies, including measures to reduce wasteful energy consumption and altering project siting to reduce energy consumption.

Senate Bill 1389 (2002) and California Integrated Energy Policy Report

Senate Bill (SB) 1389 requires the California Energy Commission (CEC) to develop an integrated energy plan for electricity, natural gas, and transportation fuels. The energy plan is to be updated biannually and support improvements to the California energy system that reduce air pollution, congestion, and wasteful energy use. The current Integrated Energy Policy Report (IEPR) was updated in 2016 and covers a broad range of topics, including environmental performance of the electricity generation system, landscape-scale planning, transportation fuel supply reliability, climate adaptation activities, and climate and sea level rise scenarios.

Executive Order S-3-05 (2005)

California Executive Order (EO) S-3-05 sets forth a series of target dates by which statewide emissions of GHGs need to be progressively reduced, as follows: by 2010, reduce GHG emissions to 2000 levels (approximately 457 million metric tons of carbon dioxide equivalent [CO_2e]); by 2020, reduce emissions to 1990 levels (approximately 427 million metric tons CO_2e); and by 2050, reduce emissions to 80 percent below 1990 levels (approximately 85 million metric tons CO_2e). Executive

orders are binding only on state agencies. Accordingly, California EO S-03-05 will guide state agencies' efforts to control and regulate GHG emissions, but will have no direct binding effect on local government or private actions.

Assembly Bill 32 (2006) and California Climate Change Scoping Plan (2008/2014)

In 2006, the California legislature passed Assembly Bill 32 (AB 32) (California Health and Safety Code Division 25.5, §§ 38500 et seq.), also known as the California Global Warming Solutions Act. AB 32 requires ARB to implement emission limits, regulations, and other feasible and cost-effective measures such that statewide GHG emissions are reduced to 1990 levels by 2020.

Pursuant to AB 32, ARB adopted the Climate Change Scoping Plan (Scoping Plan) in December 2008, which outlines measures for meeting the 2020 GHG emissions reduction limits. The Scoping Plan must be updated every 5 years to evaluate AB 32 policies and ensure that California is on track to achieve the 2020 GHG emissions reduction goal. In 2014, ARB released the First Update to the Climate Change Scoping Plan (First Update), which builds upon the initial scoping plan with new strategies and recommendations. The First Update identifies opportunities to leverage existing and new funds and drive GHG emissions reductions through strategic planning and targeted low-carbon investments. This update defines ARB's climate change priorities for the next 5 years and sets the groundwork for reaching the long-term goals set forth in California EO S-3-05. The First Update highlights California's progress toward meeting the near-term 2020 GHG emissions reduction goals in the initial scoping plan. It also evaluates actions to align the state's longer-term GHG emissions reduction strategies with other state policy priorities for water, waste, natural resources, clean energy, transportation, and land use. The *Proposed 2017 Climate Change Scoping Plan Update* was recently released on January 20, 2017 for public review and comment. The *Proposed 2017 Climate Change Scoping Plan Update* proposes to build upon programs under the 2014 Scoping Plan to achieve emission targets set forth by Senate Bill (SB) 32 described below.

Senate Bill X7-7 (Chapter 4, Statutes of 2009)

Senate Bill (SB) X7-7 (Chapter 4, Statutes of 2009), the Water Conservation Act of 2009, establishes an overall goal of reducing statewide per capita urban water use by 20% by December 31, 2020 (with an interim goal of at least 10% by December 31, 2015). Reducing water use results in a reduction in energy demand that would otherwise be used to transport and treat water before delivery to the consumer.

Senate Bills 1078/107 and Senate Bill X1-2 (2011)—Renewables Portfolio Standard

SBs 1078 and 107, California's Renewables Portfolio Standard (RPS), obligates investor-owned utilities (IOUs), energy service providers (ESPs), and Community Choice Aggregations (CCAs) to procure an additional 1% of retail sales per year from eligible renewable sources until 20% is reached, no later than 2010. The California Public Utilities Commission (CPUC) and CEC are jointly responsible for implementing the program. SB X1-2 (2011) set forth a longer range target of procuring 33% of retail sales by 2020. The RPS has been extended by SB 350.

Senate Bill 350—De Leon (Clean Energy and Pollution Reduction Act of 2015) (2015)

Senate Bill 350 was approved by the California legislature in September 2015 and signed by Governor Brown in October 2015. Its key provisions are to require the following by 2030: (1) a renewables portfolio standard of 50%, and (2) a doubling of energy efficiency (electrical and natural gas) by 2030, including improvements to the efficiency of existing buildings. These mandates will be implemented by future actions of the CPUC and CEC.

Senate Bill 32 and Assembly Bill 197 (2016)

SB 32 requires the ARB to ensure that statewide GHG emissions are reduced to at least 40 percent below 1990 levels by 2030. The companion bill, AB 197, creates requirements for ARB to form a Joint Legislative Committee on Climate Change Policies, to prioritize direct emission reductions and consider social costs when adopting regulations to reduce GHG emissions beyond the 2020 statewide limit, and to prepare reports on sources of GHGs and other pollutants.

Local

San Joaquin Valley Air Pollution Control District

SJVAPCD has local air quality jurisdiction but does not have land use jurisdiction or jurisdiction over mobile sources in the San Joaquin Valley Air Basin (SJVAB). The SJVAB includes Fresno, Kings, Madera, Merced, San Joaquin, and Stanislaus Counties, as well as the western part of Kern County. SJVAPCD has adopted advisory thresholds for the analysis of GHG emissions in its staff reports, *Addressing GHG Emissions Impacts under CEQA* and *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA*.

In December 2009, SJVAPCD formally adopted the region's first GHG thresholds for determining significant climate change impacts in the SJVAB in the two staff reports referenced in the previous paragraph. The guidance is intended to streamline CEQA review by quantifying emissions reductions that would be achieved through the implementation of best performance standards (BPSs). BPSs are developed by SJVAPCD and are based on current technologies, operating principles, and energy efficiency tactics. According to SJVAPCD's *Guidance for Valley Land-Use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA*, stationary-source projects failing to implement BPSs or demonstrate a 29% reduction in GHG emissions relative to business as usual (BAU) conditions are considered to have a significant impact on climate change (San Joaquin Valley Air Pollution Control District 2009). The GHG thresholds only apply to stationary-source projects that would result in increased GHG emissions, for which SJVAPCD is the lead agency (San Joaquin Valley Air Pollution Control District 2015). The thresholds were developed for internal use on projects in which SJVAPCD is the lead agency; however, the thresholds are the basis for the guidance SJVAPCD issues to other agencies establishing their own processes for determining significance related to climate change (San Joaquin Valley Air Pollution Control District 2015). In March 2015, SJVAPCD adopted its CEQA guidance document, the *Guidance for Assessing and Mitigating Air Impacts*. This revision indicates that the 2009 documents continue to be relevant policies to address GHG emission under CEQA (San Joaquin Valley Air Pollution Control District 2015).

Kern Water Bank Authority

As provided in KWBA Board Resolution 2016-2, KWBA will implement efficiency measures related to pumping operations, including: monitoring the efficiency of its recovery well pumps at regular intervals during recovery periods; using monitoring data to strategically and actively rehabilitate, retrofit, and/or replace pumps as needed during recovery periods; maintaining a reporting program that would report on pump efficiency, electricity efficiency, and plans for future pump rehabilitation, retrofit, or replacement; purchasing new pumps that comply with current pump efficiency regulations; and considering the replacement of older pumps with new pumps with increased efficiency technology (Kern Water Bank Authority 2016).

3.4.1.2 Environmental Setting

Study Area

GHG emissions generated at a project site are typically a result of construction and operation. The unique chemical properties of GHGs enable them to become well-mixed within the atmosphere and transported over long distances. Consequently, unlike other resource areas that are primarily concerned with localized project impacts (e.g., within 1,000 feet of the project site), the global nature of climate change requires a broader analytical approach. This analysis considers potential regional and global GHG impacts.

Greenhouse Gases

Greenhouse Effect and Climate Change

The phenomenon known as the *greenhouse effect* keeps the atmosphere near the Earth's surface warm enough for the successful habitation of humans and other life. Present in the Earth's lower atmosphere, GHGs play a critical role in maintaining the Earth's temperature. Sunlight including infrared, visible, and ultraviolet radiation passes through the atmosphere. Some of the sunlight striking the earth is absorbed and converted to heat, which warms the surface. The surface emits infrared radiation to the atmosphere, where some of it is absorbed by GHGs and re-emitted toward the surface; some of the heat is not trapped by GHGs and escapes into space. Human activities that emit additional GHGs to the atmosphere increase the amount of infrared radiation that gets absorbed before escaping into space, thus enhancing the greenhouse effect and amplifying the warming of the earth (Center for Climate and Energy Solutions 2017).

Increases in fossil fuel combustion and deforestation have increased concentrations of GHGs in the atmosphere since the Industrial Revolution. Rising atmospheric concentrations of GHGs in excess of natural levels enhance the greenhouse effect, which contributes to global warming of the Earth's lower atmosphere. This warming induces large-scale changes in earth surface temperatures, ocean circulation patterns, precipitation patterns, global ice cover, biological distributions, and other changes to the earth system that are collectively referred to as *climate change*.

Greenhouse Gases

As noted above, the principal anthropogenic (human-made) GHGs contributing to global warming are CO_2, methane (CH_4), nitrous oxide (N_2O), and fluorinated compounds, including sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorinated carbons (PFCs). Water vapor, the most abundant GHG, is not included in this list because its natural concentrations and fluctuations far outweigh its anthropogenic sources. Principal characteristics surrounding the principal anthropogenic GHGs are discussed below.

CO_2 enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products; respiration; and as a result of other chemical reactions (e.g., manufacture of cement). CO_2 is also removed from the atmosphere (or sequestered) when it is absorbed by plants as part of the biological carbon cycle.

CH_4 is emitted during the production and transport of coal, natural gas, and oil. CH_4 emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.

N_2O is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

SF_6, an anthropogenic chemical, is used as an electrical insulating fluid for power distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer chemical for the study of oceanic and atmospheric processes.

HFCs are anthropogenic chemicals used in commercial, industrial, and consumer products and have high global warming potential (GWP). HFCs are generally used as substitutes for ozone-depleting substances in automobile air conditioners and refrigerants.

PFCs are typically emitted as byproducts of industrial and manufacturing processes. They were originally introduced as alternatives to ozone-depleting substances.

Methods have been set forth to describe emissions of GHGs in terms of a single gas to simplify reporting and analysis. The most commonly accepted method to compare GHG emissions is the GWP methodology defined in the Intergovernmental Panel on Climate Change (IPCC) reference documents. The IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of carbon dioxide equivalent (CO_2e), which compares the gas in question to that of the same mass of CO_2 (CO_2 has a global warming potential of 1 by definition).

Table 3.4-1 lists the global warming potential of relevant GHGs, their lifetimes, and abundances in the atmosphere.

Table 3.4-1. Atmospheric Lifetimes and Global Warming Potentials of Key Greenhouse Gases

Greenhouse Gases	GWP (100 years)	Lifetime (years)	2014 Atmospheric Abundance
CO_2	1	50–200	400 ppm
CH_4	25	9–15	1,834 ppb
N_2O	298	121	328 ppb
HFC-23	14,800	222	18 ppt
HFC-134a	1,430	13.4	84 ppt
HFC-152a	124	1.5	3.9 ppt
SF_6	22,800	3,200	8.6 ppt

Sources: Myhre et al. 2013; Blasing 2016; Intergovernmental Panel on Climate Change 2007.
CH_4 = methane.
CO_2 = carbon dioxide.
HFC = hydroflourocarbons.
N_2O = nitrous oxide.
ppb = parts per billion.
ppm = parts per million.
ppm = parts per trillion.

Greenhouse Gas Emissions Inventories

A GHG inventory is a quantification of all GHG emissions and sinks[1] within a selected physical and/or economic boundary. GHG inventories can be performed on a large scale (e.g., for global and national entities) or on a small scale (e.g., for a particular building or person). Although many processes are difficult to evaluate, several agencies have developed tools to quantify emissions from certain sources. Table 3.4-2 outlines the most recent global, national, statewide, and local GHG inventories to help contextualize the magnitude of potential project-related emissions.

Table 3.4-2. Global, National, State, and Local GHG Emissions Inventories

Emissions Inventory	CO_2e (metric tons per year)
2010 IPCC Global GHG Emissions Inventory	52,000,000,000
2015 EPA National GHG Emissions Inventory	6,586,700,000
2015 ARB State GHG Emissions Inventory	440,400,000
2005 Kern County GHG Emissions Inventory	27,045,617

Sources: Intergovernmental Panel on Climate Change 2014; U.S. Environmental Protection Agency 2017; California Air Resources Board 2017; Kern County 2012.

ARB = Air Resources Board.
CO_2e = carbon dioxide equivalent.
EPA = U.S. Environmental Protection Agency.
GHG = greenhouse gas.
IPCC = Intergovernmental Panel on Climate Change.

Potential Effects of Climate Change in California and in the Project Area

Climate change is a complex phenomenon that has the potential to alter local climatic patterns and meteorology. Although modeling indicates that climate change will result in sea level rise (both globally and regionally), as well as changes in climate and rainfall, among other effects, there remains uncertainty with regard to characterizing precise *local* climate characteristics and predicting precisely how various ecological and social systems will react to any changes in the existing climate at the local level. Regardless of this uncertainty, it is widely understood that substantial climate change is expected to occur in the future, although the precise extent will take further research to define. Consequently, the SJVAB, including the project area, will be affected by changing climatic conditions, as follows (PRBO Conservation Science 2011).

- Hotter and drier climate, with average annual temperatures increasing 1.4–2.0 degrees Fahrenheit by 2070 and mean annual rainfall decreasing by 23–81 millimeters (0.9–3.2 inches).
- Longer, more frequent periods of inundation for vernal pools.
- Increased potential for island flooding and a high probability of sudden landscape change occurring within the delta that could potentially lead to levee failures.
- Decrease in grasslands by 6–11% by 2070.
- Changes in water management that may cause severe changes in the amount of grain crops, some row crops, and pasture lands and wildlife habitats.

[1] A GHG sink is a process, activity, or mechanism that removes a GHG from the atmosphere.

- Increased heat and decreased air quality, with the result that public health will be placed at risk, and native plant and animal species may be lost.

As a result of climate change, energy demand in California will increase at a greater rate than population because (1) average and extreme temperatures will be warmer, increasing statewide summer cooling demand, and (2) future population growth is anticipated in the warmer central areas of the state. Studies suggest residential energy expenditures could increase as much as 17%, even accounting for gains in energy efficiency, due solely to climate change in California (California Climate Action Team 2010). Decreased hydrologic power capacity in response to a smaller Sierra snowpack could further challenge the state's energy supply. Warmer climates will also likely result in a greater demand on water for irrigation because greater evaporation occurs in warmer climates, increasing electrical demands for water conveyance.

Energy

Energy usage is typically quantified using the British thermal unit (BTU[2]). California has a diverse portfolio of energy resources. The state ranked fourth in the nation in 2015 in conventional hydroelectric generation and third in the nation for crude oil production and oil refining capacity. The state is ranked first as a producer of electricity from biomass, geothermal, and solar energy. Other energy sources in the state include natural gas, nuclear, and biofuels (U.S. Energy Information Administration 2016).

Energy efficiency efforts have dramatically reduced statewide per capita energy consumption relative to historical averages. According to the U.S. Energy Information Administration (2016), California consumed approximately 7,249 trillion BTUs of energy in 2014. Per capita energy consumption (i.e., total energy consumption divided by the population) in California is amongst the lowest in the country, with 196 million BTUs in 2014, ranking 49th among all states. Natural gas accounted for the majority of energy consumption (33%), followed by motor gasoline (23%), distillate and jet fuel (16%), interstate electricity (11%), nuclear and hydroelectric power (5%), and a variety of other sources (U.S. Energy Information Administration 2016). The transportation sector consumed the highest quantity of energy (39%), followed by the industrial (24%) and commercial (19%) sectors (U.S. Energy Information Administration 2016).

California's per capita energy consumption, in general, is declining due to improvements in energy efficiency and design. However, despite this reduction in per capita energy use, the state's overall (i.e., non-per capita energy consumption) energy consumption is expected to increase over the next several decades due to growth in population, jobs, and demand for vehicle travel. Electricity usage is anticipated to grow about 13% over the next 25 years (2015–2040), and diesel fuel and natural gas consumption may increase by 5% and 25%, respectively, over the same time period. Gasoline usage, however, is expected to decrease by 20%. This decrease would largely be a result of high fuel prices, efficiency gains, and competing fuel technologies (U.S. Energy Information Administration 2017).

Regionally, Pacific Gas & Electric (PG&E), the provider for electricity and natural gas in the project area, has a diverse power production portfolio, which consists of a variety of renewable and non-renewable sources. Energy production typically varies by season and by year depending on hydrologic conditions. Regional electricity loads also tend to be higher in the summer because the

[2] A British thermal unit is a standard unit of energy measure, which is the quantity of heat required to raise the temperature of 1 pound of water 1 degree Fahrenheit at or near 39.2 degrees Fahrenheit. A therm is a unit of heat equivalent to 100,000 BTUs.

higher summer temperatures drive increased demand for air-conditioning. In contrast, natural gas loads are higher in the winter because the colder temperatures drive increased demand for natural gas heating.

At the local level, Kern County consumes a larger amount of electricity relative to the state. Electricity usage are approximately about 5.3% of the statewide total (California Energy Commission 2015). For reference, Kern County is home to about 2% of California residents. As a whole, Kern County consumed 15,071 gigawatt-hour (GWh) of electricity. Table 3.4-3 provides a summary of total and per-capita Kern County electricity consumption in 2015.

Table 3.4-3. Kern County Total and Per Capita Electricity Consumption (2015)

	Consumption		
Energy	Mass	Million BTUs	Per Capita BTUs
Electricity	15,071 GWh	51,424,386	59,399,616

Sources: California Energy Commission 2015; U.S. Census Bureau 2017.

Notes: 0.00000000029 GWh = 1 BTU; 865,736 = Kern County 2015 Population.

GWh = gigawatt-hours.

BTU = British thermal unit.

Kern County is a major producer of renewable energy, producing more than any other county in California. Renewable energy sources, such as wind, small hydropower, solar, and biomass, are increasingly serving the county. As of 2015, Kern County has permitted over 11,000 megawatts (MW) of all types and sizes of renewable energy sources. Currently, the county has a total on-line generating capacity of 5,293 MW and anticipates increasing its sources of renewable energy (California Energy Commission 2017).

3.4.2 Impact Analysis

3.4.2.1 Methods

The key climate change and energy impacts were identified and evaluated based on the environmental characteristics of the project area and the magnitude, intensity, and duration of activities related to the operation of the project.

The analysis of potential GHGs that may result from the project (distinct for existing and ongoing project operations) is dependent on the incremental increase in pumping that is reasonably expected to occur to recover stored Intertie water (as opposed to other sources of stored water). To quantify GHG emissions for the project, the most reasonable and straightforward approach is to determine the expected yield of the project and prorate that increment against non-project water stored over the period under consideration, then estimate the increment of stored water that could have been recovered during the historical period.

KWB's water availability analysis provides an analysis of potential KWB deliveries of Intertie water based on historical data from 1978 through 1998. As stated in the analysis:

> "These estimates are considered to be an upper bound of potential deliveries to the KWB of water that has historically been delivered to the Intertie. The analysis assumes that all flows that would have historically been diverted to the Intertie would be available to the KWB. The analysis also neglects changes in land use over time that would affect Intertie deliveries."

There has been a substantial increase in the number of banking projects from the 1990s forward that can now absorb Kern River floodwaters. Therefore, the determination of project yield for this analysis disregards the yield estimates for years prior to 1990. Kern River Intertie deliveries after 1990 total 233,000 AF (see Table 8 in Appendix L). Intertie deliveries in 2006 are also disregarded because they were made due to reservoir level restrictions at Lake Isabella to address dam safety concerns, and otherwise would not have occurred. No Intertie deliveries were made in 2011, and none are expected in 2017.

The 233,000 AF estimate reflects the maximum volume of Intertie water that could have been delivered. Losses on this water would be 10%, so only 90% of the water, or 209,700 AF would be available for recovery. During the same period (1995 through 2011) the KWB recharged (net of losses) approximately 1.95 MAF from all sources. Therefore, the 209,700 AF would represent an increment of about 11% of the water available for recovery for the 1995 through 2011 period. During that period, approximately 860,000 AF of the available 1.95 MAF of water was recovered. The 11% increment would be 94,600 AF over the period in question. Recovery operations are based on water demands in dry years or multiple dry years and not on annual recharge operations. Historical recovery operations data (pumping for participant uses and pumping for water sales) is presented and associated energy emissions have been quantified. Historical Intertie water recovery operational data is also presented and associated energy emissions have been quantified to show the incremental contribution of Intertie water recovery operations to total water recovery operations by pumping. This analysis would be conservative and reflects conditions that are unlikely to recur, as at the end of both the 2007-2009 and 2012-2016 droughts the KWB maintained substantial positive storage balances, so that as compared to the baseline, the recovery of Intertie water would not have been necessary.

No construction activities are planned for the project; therefore, GHG, climate change, and energy impacts related to construction are not considered further in this analysis.

3.4.2.2 Significance Criteria

Greenhouse Gases and Climate Change

The thresholds for determining the significance of impacts relating to GHG emissions in this analysis are based on State CEQA Guidelines Appendix G (14 CCR 15000 et seq.). For this analysis, the project would be considered to have a significant impact if it would result in any of the following conditions.

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Climate change is a global problem and GHGs are global pollutants, unlike criteria air pollutants (such as ozone precursors), which are primarily pollutants of regional and local concern. Given their long atmospheric lifetimes (refer to Table 3.4-1) GHGs emitted by countless sources worldwide accumulate in the atmosphere. No single emitter of GHGs is large enough to trigger global climate change on its own. Rather, climate change is the result of the individual contributions of countless past, present, and future sources. Therefore, GHG impacts are inherently cumulative.

SJVAPCD Greenhouse Gases CEQA Guidance

Current local air district GHG thresholds are found in the *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* (San Joaquin Valley Air Pollution Control District 2015). As described in Section 3.4.1.1, *Regulatory Setting,* the SJVAPCD has declined to set numerical standards below which a project would be determined not to have an impact. Instead, it has identified a number of BPS and numeric reductions from BAU. This method of impact assessment is mostly applied to residential, commercial, and mixed-use development projects. As described in Section 2, *Project Description*, because the KWB and its operations are unique in nature and are not easily categorized as a typical land use development or stationary source project, SJVAPCD thresholds would not be directly applicable to a water banking project such as the KWB. Although KWB activities are more similar to a stationary source than a land use development project because of the infrastructure-like service and types of emission sources, KWB operations still do not fit into the typical stationary source profile that the SJVAPCD developed its guidance/policy to evaluate. Therefore, this analysis does not use the SJVAPCD GHG CEQA Guidance to evaluate the GHG emissions from KWB activities.

Consistency with Scoping Plan Water Sector Measures

Considering the lack of an appropriate quantitative threshold to evaluate KWB, for the purposes of this analysis, the GHG emissions from KWB activities are evaluated for consistency with the Scoping Plan's GHG reduction target measures for the water sector. The current Scoping Plan identifies six measures that would contribute to water-related GHG reductions required to meet the State's overall emissions reduction target. The water measures are listed below along with a description of their applicability to KWB activities.

- Measure W-1 (Water Use Efficiency): KWB activities do not use water, but rather manage water by recharging, storing, recovering, and conveying water for the KWB participants. The efficiency of the KWB's "use" would be through how water is moved through KWB's system, which is addressed in Measure W-3 below. Measure W-1 is not applicable to KWB activities.
- Measure W-2 (Water Recycling): KWB activities are not a user of water and therefore recycling KWB water would not be a feasible option. This measure is not applicable to KWB activities.
- Measure W-3 (Water System Energy Efficiency): KWB activities move water through recharge, storage, and conveyance (canals and pipelines) facilities, many of which require energy input in the form of electricity to run water pumps. This measure is applicable to KWB activities.
- Measure W-4 (Water Reuse Urban Runoff): KWB activities are not similar to land use development projects (i.e., residential or commercial) in an urban, suburban, or rural area. Urban runoff would not be applicable to KWB activities because essentially all KWB Lands would be permeable, natural surfaces where infiltration can readily occur. This measure is not applicable to KWB activities.

- Measure W-5 (Increase Renewable Energy Production): This measure was considered with regard to KWB activities. The KWB Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) permits specific uses for KWB Lands. With respect to water banking operations, KWBA may install, construct, repair, maintain, and operate water recharge, water recovery, and water conveyance facilities. Solar energy production is not one of the permitted uses. The construction and operation of a solar facility on KWB Lands, including ancillary facilities such as roads and transmission lines to service the solar facility, could substantially affect the conservation value of the KWB. For these reasons, this measure is not feasible for KWB activities.
- Measure W-6 (Public Good Charge): This measure was intended to affect water prices on a statewide level and was not designed to be implemented at an individual water provider level. In addition, this measure's GHG reductions are still listed as "To Be Determined" in the Scoping Plan. This measure is not applicable to KWB activities. The First Update to the Climate Change Scoping Plan (2014) did not identify additional specific measures applicable to projects like KWB. Therefore this analysis will review KWB's consistency with Measure W-3, the applicable water-related emission reduction measure from the Scoping Plan that applies to KWB, as the criterion to evaluate GHG impacts. Quantitative thresholds described above will be provided when possible for informational and contextual purposes.

The First Update to the Climate Change Scoping Plan (2014) did not identify additional specific measures applicable to projects like KWB. Therefore this analysis will review KWB's consistency with Measure W-3, the applicable water-related emission reduction measure from the Scoping Plan that applies to KWB, as the criterion to evaluate GHG impacts. Quantitative thresholds described above will be provided when possible for informational and contextual purposes.

Energy

Appendix F of the State CEQA Guidelines identifies the following potential environmental impacts related to energy that may be considered in an EIR.

1. The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project, including construction, operation, maintenance, and/or removal. If appropriate, the energy intensiveness of materials may be discussed.
2. The effects of the project on local and regional energy supplies and on requirements for additional capacity.
3. The effects of the project on peak- and base-period demands for electricity and other forms of energy.
4. The degree to which the project complies with existing energy standards.
5. The effects of the project on energy resources.
6. The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

The State CEQA Guidelines recommend that the discussion of applicable energy impacts focus on whether the project would result in the wasteful, inefficient, or unnecessary consumption of energy. Efficiency projects that incorporate conservation measures to avoid wasteful energy usage facilitate long-term energy planning and avoid the need for unplanned or additional energy capacity. Accordingly, based on the criteria outlined in the State CEQA Guidelines Appendix F, the project

would cause significant impacts related to energy if it would lead to significant increases in energy consumption necessitating the need to construct new energy facilities or if it would lead to a wasteful, inefficient, and unnecessary usage of direct or indirect energy. As discussed in Section 3.4.1.1, *Regulatory Setting*, energy legislation, policies, and standards adopted by California and local governments were enacted and promulgated for the purpose of reducing energy consumption and improving efficiency (i.e., reducing wasteful and inefficient use of energy). Therefore, for the purposes of this analysis, substantial increases in energy consumption, inconsistency with legislation, policies, or standards designed to avoid wasteful and inefficient energy usage is used as the basis for evaluating whether the project would result in a significant impact related to energy resources and conservation. Potential effects on local and regional energy supplies, as they relate to energy consumption, are also assessed.

3.4.2.3 Impacts and Mitigation Measures

Greenhouse Gases and Climate Change

Impact CC-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment (Less than significant)

Impact CC-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs (Less than significant)

Consistent with the conclusions presented in Section 3.2, *Air Quality*, no direct or indirect GHG emissions are expected from the project because there will be no planned construction or substantial operational changes between project and baseline conditions. Under the project, the State Water Resources Control Board would allow up to 500,000 AFY of water from the Kern River to be diverted to the KWB to increase reliability and enhance the dry year water supply to KWBA's participating members.[3] The baseline maximum diversion is defined by the historical maximum diversion to KWB, which was 447,148 AFY in 2011. The project would not necessitate changes to current pumping operations or require construction or modification of pumps or other facilities or structures.

No climate change impacts are expected as a result of project diversion methods. Under baseline conditions, all of the water received from the Kern River is diverted to the KWB by gravity. No pumps or other equipment are used to facilitate this diversion that would otherwise create offsite GHG emissions from electricity generation. Under the project, no additional pumps or equipment would be needed to accommodate the maximum potential diversion of 500,000 AFY. The Kern River water would be diverted to the KWB through the same waterways as under baseline conditions, and diversions would continue to be gravity driven. Consequently, GHG emissions are generally not expected from water diversion under the project.[4]

However, as described above in Section 3.4.2.1, *Methods,* there is a potential for incremental increases in Intertie water recovery operations by pumping over the life of the project. These increases would generate GHG emissions and could potentially result in climate change impacts from operation of

[3] According to KWBA, 500,000 AFY represents the maximum volume of water that KWBA can physically divert and recharge within the KWB in the wettest years. The baseline maximum diversion is defined by the historical maximum diversion to KWB, which was 447,148 AFY in 2011.

[4] It is anticipated that at times, Kern River diversions would be made in lieu of deliveries from the State Water Resources Control Board, actually eliminating offsite emissions from electricity generation.

pumps and lift stations. Between 1995 and 2011, the KWB could have recovered up to an estimated maximum of 94,600 AF of Intertie water by pumping. The total GHG emissions from recovery operations by pumping for the same period were 80,617 $MTCO_2e$ (See Table 3.4-4). The estimated incremental contribution of Intertie water recovery operations by pumping could have constituted approximately 11%, or 8,752 $MTCO_2e$, of those emissions (See Table 3.4-5). Amortized over the same period, this amounts to approximately 547 $MTCO_2e$ annually. This estimate is considered conservative as the 547 $MTCO_2e$ annual increase in GHGs reflects conditions that are unlikely to reoccur as the KWB maintained substantial positive storage balances at the end of both the 2007-2009 and 2012-2016 droughts and recovery of Intertie water by pumping would not have been necessary. Therefore, any incremental increases over the life of the project is not anticipated to result in substantial amounts of GHG emissions, either under the applied threshold or other bright-line thresholds commonly applied in California (e.g., from 1,100 $MTCO_2e$ to 25,000 $MTCO_2e$).

Table 3.4-4. Greenhouse Gas Emissions Associated with Total Kern Water Bank Recovery Operations by Pumping (1995–2011)

Year	Recovery Operations by Pumping (acre-feet)	Greenhouse Gas Emissions (metric tons)[a]			
		$C0_2$	CH_4	N_20	CO_2E
1995	–	–	–	–	–
1996	–	–	–	–	–
1997	–	–	–	–	–
1998	–	–	–	–	–
1999	–	–	–	–	–
2000	–	–	–	–	–
2001	85,301	7,860	0.36	0.08	7,891
2002	56,328	5,190	0.23	0.05	5,211
2003	16,267	1,499	0.07	0.01	1,505
2004	45,709	4,212	0.19	0.04	4,229
2005	–	–	–	–	–
2006	–	–	–	–	–
2007	227,540	20,966	0.95	0.20	21,050
2008	238,062	21,936	0.99	0.21	22,024
2009	156,027	14,377	0.65	0.14	14,434
2010	46,185	4,256	0.19	0.04	4,273
2011	–	–	–	–	–
1995–2011	871,419	80,296	3.6	0.8	80,617
Annual Average	54,464	5,018	0.23	0.048	5,039

Sources: California Air Pollution Control Officers Association 2016 (Table 1.2); California Energy Commission 2006; Insight Environmental Consultants Inc., 2015.

Note: 1 acre foot = 32,581 gallons.

$C0_2$ = carbon dioxide.

CH_4 = methane.

N_2O = nitrous oxide.

CO_2E = carbon dioxide equivalent.

[a] Numbers may not add up due to rounding.

Table 3.4-5. Greenhouse Gas Emissions Associated with Intertie Water Recovery Operations and Total Kern Water Bank Recovery by Pumping (1995-2011)

Year	Intertie Water Recovery Operations By Pumping (acre-feet)	Greenhouse Gas Emissions (metric tons)[a]			
		CO_2	CH_4	N_20	CO_2E
1995-2011	94,600	8,717	0.39	0.08	8,752
Annual Average[b]	5,913	545	0.02	0.01	547
Incremental Percentage of Intertie Water Recovery for Total Recovery Operations (1995-2011)	11%				

Sources: California Air Pollution Control Officers Association 2016 (Table 1.2); California Energy Commission 2006.

Note: 1 acre foot = 32,581 gallons.

CO_2 = carbon dioxide.

CH_4 = methane.

N_2O = nitrous oxide.

CO_2E = carbon dioxide equivalent.

[a] Numbers may not add up due to rounding.

[b] The average presented is not representative of any given year.

Under the project, the KWB may store a greater volume of water, but recovery is not expected to exceed baseline conditions, which takes into account the maximum amount of water actually recovered over an extended drought, in a single year, and in any single month with existing recovery facilities (Section 3.1.3.3, *Baseline Conditions*). At most, with additional storage volumes, recovery facilities might be allowed to operate for longer periods—i.e., additional months or years—during extended droughts. However, because no expansion of pumping stations or other facilities is proposed or expected, there would be no significant increase in offsite emissions from electricity generation or in the number of employee work trips or associated increases in mobile-source emissions. In addition, increased emissions are not anticipated from stationary sources (e.g., generators).

As described in Section 3.4.1.1, *Regulatory Setting,* pursuant to KWBA Board Resolution 2016-2 KWBA will implement efficiency measures related to pumping operations, including: monitoring the efficiency of its recovery well pumps at regular intervals during recovery periods; using monitoring data to strategically and actively rehabilitate, retrofit, and/or replace pumps as needed during recovery periods; maintaining a reporting program that would report on pump efficiency, electricity efficiency, and plans for future pump rehabilitation, retrofit, or replacement; purchasing new pumps that comply with current pump efficiency regulations; and considering the replacement of older pumps with new pumps with increased efficiency technology (Kern Water Bank Authority 2016). Existing KWBA monitoring and maintenance actions have achieved sizeable energy savings through pump retrofits and rehabilitations, resulting in in annual emission reductions of approximately 322 $MTCO_2e$ and 633 $MTCO_2e$ in years 2011 and 2015, respectively (California Department of Water Resources 2016). Consistency with Scoping Plan Measure W-3 (Water System Energy Efficiency) can be tracked as part of KWBA's implementation of its efficiency measures. Therefore, it is anticipated that KWBA would be consistent with the applicable water-related Scoping Plan measures (i.e., Measure W-3) and KWB's future operation and maintenance-related GHG emissions and climate

change impacts. Therefore, no climate change impacts are expected from recovery operations or other related sources, and the project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Under the project, the KWB may be able to supplant the delivery of alternative water sources (State Water Project or Friant-Kern Canal sources) with Kern River water, which would reduce some emissions that exist under baseline conditions. No mitigation is required because the project would not result in significant impacts related to climate change.

Energy

Impact E-1: Potentially require or result in the construction of new electrical facilities (No impact)

Impact E-2: Potentially develop land uses and patterns that cause substantial wasteful, inefficient, and unnecessary consumption of energy that would result in an increased demand for energy (Less than significant)

Under normal operations, no pumps or other equipment are used to facilitate water diversion from the Kern River that would otherwise create offsite GHG emissions from electricity generation. Under the project, no additional pumps or equipment would be needed to accommodate the maximum potential diversion of 500,000 AFY. The diversion of 500,000 AFY from the Kern River to the KWB would not result in increased electricity consumption under normal operations because diversions would continue to be gravity driven.[5]

However, as described above in Section 3.4.2.1, *Methods,* there is a potential for incremental increases in Intertie water recovery operations by pumping over the life of the project. These increases would result in increased electricity consumption. Between 1995 and 2011, the KWB consumed approximately 942,317 million BTUs during its recovery operations by pumping for participant uses and water sales (see Table 3.4-6). As previously described and for purposes of this analysis, the incremental contribution of Intertie water recovery operations by pumping between 1995 and 2011 is estimated to have constitute approximately 11%, or 102,297 million BTUs (See Table 3.4-7). Amortized over the same period, this would amount to approximately 6,394 million BTUs annually. This estimate is considered conservative as the increase of 6,394 million BTUs in annual energy consumption estimate reflects conditions that are unlikely to reoccur as the KWB maintained substantial positive storage balances at the end of both the 2007-2009 and 2012-2016 droughts and recovery of Intertie water by pumping would not have been necessary. Therefore, any incremental increases over the life of the project are not anticipated to result in substantial amounts of energy consumption.

[5] It is possible that the River Area Pump Station may be used to deliver Kern River water under emergency conditions if the City of Bakersfield Basin 9 diversion point is temporarily inoperable. These diversions would be short-lived until repairs can be completed.

Table 3.4-6. Estimated Kern Water Bank Energy Consumption of Total Recovery Operations By Pumping (1995–2011)

Year	Recovery Operations By Pumping (acre-feet)	Energy Consumption (million BTU)
1995	–	–
1996	–	–
1997	–	–
1998	–	–
1999	–	–
2000	–	–
2001	85,301	92,241
2002	56,328	60,911
2003	16,267	17,590
2004	45,709	49,428
2005	–	–
2006	–	–
2007	227,540	246,053
2008	238,062	257,431
2009	156,027	168,721
2010	46,185	49,942
2011	–	–
1995–2011	871,419	942,317
Annual Average[a]	54,464	58,895

Source: Insight Environmental Consultants 2015.
Note: 1 kilowatt-hour = 3412.14 BTU.
BTU = British thermal unit.
[a] The average presented is not representative of any given year.

Table 3.4-7. Projected Kern Water Bank Energy Consumption of Intertie Water Recovery Operations By Pumping (1995–2011)[a]

Year	Recovery Operations By Pumping (acre-feet)	Energy Consumption (million BTU)[b]
1995-2011	94,600	102,297
Annual Average[c]	5,913	6,394
Incremental Percentage of Energy Consumption for Total Recovery Operations (1995–2011)	11%	

Source: Insight Environmental Consultants 2015.
Note: 1 kilowatt-hour = 3412.14 BTU.
BTU = British thermal unit.
[a] Section 3.4.2.1, Methods, describes the approach used to project these quantities.
[b] Numbers may not add up due to rounding.
[c] The average presented is not representative of any given year.

In addition, KWBA owns and operates well pumps used to recover water from storage for the purpose of fulfilling water demand. Under the project, the KWB may store a greater volume of water, but recovery is not expected to exceed baseline conditions in any given year, which take into account the maximum amount of water actually recovered over an extended drought, in a single year, and in any single month, with existing recovery facilities (Section 3.1.3.3, *Baseline Conditions*). At most, with additional storage volumes, recovery facilities might be allowed to operate for longer periods—i.e., additional months or years—during extended droughts. However, because no expansion of pumping stations or other facilities is proposed or expected, there would be no significant increase in electricity consumption in any given year that would require the construction of new electrical facilities or result in the development of land uses and patterns that cause substantial wasteful, inefficient, and unnecessary consumption of energy that would result in an increased demand for energy.

It is also anticipated that electricity-related GHG emissions would decrease as a result of statewide GHG reduction measures that would reduce electricity-related GHG emissions, such as the Renewable Portfolio Standard (see Senate Bills 1078 and 107 and Executive Orders S-14-08 and S-21-09) and Senate Bill 350. PG&E currently provides the KWB with electricity for activities, including the operation of water pumps and other related water conveyance infrastructure. As PG&E continues to add renewable resources to its electricity portfolio, the GHG intensity of electricity used for operation activities, such as recovery by pumping, and overall electricity-related GHG emissions is expected to decrease (Pacific Gas & Electric Company 2017).

Furthermore, pursuant to KWBA Board Resolution 2016-2, energy efficiency measures will reduce any wasteful, inefficient, and unnecessary consumption of energy during future recovery operations. Currently, KWBA performs routine maintenance and monitoring of its pumps for operations and maintenance activities. Pumps are prioritized for retrofit, rehabilitation, and replacement as necessary based on monitoring data and current operations and pumping demands. Existing KWBA monitoring and maintenance actions have achieved sizeable energy savings through pump retrofits and rehabilitations. In 2011 and 2015, KWBA retrofit and rehabilitation actions resulted in annual energy savings of approximately 1,792 MWh and 3,546 MWh, respectively. These achieved energy savings in 2011 and 2015 represent approximately 3.2% and 6.4%, respectively, of KWB's total annual average electricity consumption (California Department of Water Resources 2016). Given that electricity consumption accounts for 91% of KWB's annual GHG emissions, purchasing electricity accounts for a large majority of KWB operational costs. Therefore, KWBA has an inherent financial incentive to operate pumps at an efficient level.

Consistency with Scoping Plan Measure W-3 (Water System Energy Efficiency) can be tracked as part of KWBA's agreement with DWR. Therefore, it is anticipated that KWBA would be consistent with the applicable water-related Scoping Plan measures (i.e., Measure W-3) and KWB's future operation and maintenance-related energy consumption would result in less than significant energy impacts. No mitigation is required because the project is not expected to result in significant impacts related to energy.

3.4.3 References

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3.5 Geology and Seismicity

3.5.1 Existing Conditions

3.5.1.1 Regulatory Setting

Federal

No federal laws, regulations, or policies were found to be relevant to geology and seismicity for the project.

State

Alquist-Priolo Earthquake Fault Zoning Act

California's Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (PRC § 2621 et seq.) is intended to reduce damage resulting from earthquakes through zoning earthquake-prone areas and regulating development accordingly. Under the Alquist-Priolo Act, faults are zoned, and construction along or across them is strictly regulated if they are "sufficiently active" and "well defined." A fault is considered *sufficiently active* if one or more of its segments or strands show evidence of surface displacement during Holocene time (defined for purposes of the Alquist-Priolo Act as referring to approximately the last 11,000 years). A fault is considered *well-defined* if its trace can be identified clearly by a trained geologist at the ground surface or in the shallow subsurface using standard professional techniques, criteria, and judgment (Bryant and Hart 2007).

Seismic Hazards Mapping Act

Like the Alquist-Priolo Act, the Seismic Hazards Mapping Act of 1990 (PRC §§ 2690–2699.6) is intended to reduce damage resulting from earthquakes through zoning and regulating development in the state. While the Alquist-Priolo Act addresses surface fault rupture (visual disruption of the Earth's surface as a result of fault activity), the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong ground shaking, liquefaction, and seismically induced landslides. Under the Seismic Hazards Mapping Act, the State is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards, and cities and counties are required to regulate development within mapped seismic hazard zones through permit review. Cities and counties are prohibited from issuing development permits for sites within seismic hazard zones until appropriate site-specific geologic and/or geotechnical investigations have been carried out and measures to reduce potential damage have been incorporated into the development plans.

California Building Standards Code

California's minimum standards for structural design and construction are provided in the California Building Standards Code (CBSC) (24 CCR). The CBSC provides standards for various aspects of construction, including excavation, grading, and earthwork construction; fills and embankments; expansive soils; foundation investigations; and liquefaction potential and soil strength loss.

Sustainable Groundwater Management Act

In 2014, the Legislature enacted the Sustainable Groundwater Management Act, Cal. Water Code §§ 10720, et seq. (SGMA), mandating the local development of Groundwater Sustainability Plans ("GSPs") for medium- or high-priority groundwater basins. The GSP must avoid overdraft of the basin and include measurable objectives to achieve sustainable yield, which is defined as the "maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result" (Cal. Water Code, § 10721(v). Among the undesirable results that must be avoided under SGMA, is "[s]ignificant and unreasonable land subsidence that substantially interferes with surface land uses" (Cal. Water Code, § 10721(x)(5).

Local

Kern County General Plan

The *Kern County General Plan* has adopted policies and implementation measures to address seismic hazards and safety (Kern County 2009). These policies and implementation measures are excerpted below.

Policies

1) Determine the liquefaction potential at sites in areas of shallow groundwater (Map Code 2.3) prior to discretionary development and determine specific mitigation to be incorporated into the foundation design, as necessary, to prevent or reduce damage from liquefaction in an earthquake.
2) Route major lifeline installations around potential areas of liquefaction or otherwise protect them against significant damage from liquefaction in an earthquake.
3) Reduce potential for exposure of residential, commercial, and industrial development to hazards of landslide, land subsidence, liquefaction, and erosion.

Implementation Measures

B) Require liquefaction investigations in all areas of high groundwater potential and appropriate foundation design to mitigate potential damage to buildings on sites with liquefaction potential.

C) Develop and maintain maps, at an appropriate scale, showing the location of all geologic hazards, including active faults, Alquist-Priolo Earthquake Fault Zones, 100-year flood hazard boundary, the extent of projected dam failure inundation and time arcs, depth of inundation, land subsidence, slope failure and earthquake-induced landslides, high groundwater, and liquefaction potential.

D) Discretionary actions will be required to address and mitigate impacts from inundation, land subsidence, landslides, high groundwater areas, liquefaction and seismic events through the CEQA process.

Kern County Grading Code

The Kern County Grading Code requires preparation of an engineering geology report for building projects and a liquefaction study for projects in areas with shallow groundwater and unconsolidated sandy soils. Except as exempted in the Kern County Grading Code, no grading is allowed without a permit (Kern County 2013).

3.5.1.2 Environmental Setting

Geologic Conditions

The project area is situated at the southern end of the San Joaquin Valley, which is a deep, structurally controlled trough flanked by the Coast Ranges on the west and by the Sierra Nevada on the east (Norris and Webb 1990:419). The valley is bounded on the southeast by the Tehachapi Mountains and on the southwest by the San Emigdio Mountains.

The San Joaquin Valley floor, a thick sequence of sedimentary deposits, ranges in age from Jurassic through Quaternary. Under the eastern and central portions of the valley, the base of the sequence likely rests on Mesozoic crystalline rock allied to the plutons of the Sierra Nevada; to the west, basement rocks are believed to be Franciscan metasediments and/or mélange. Mesozoic sedimentary rocks now in the subsurface indicate marine deposition. These rocks are overlain by Tertiary strata reflecting marine, estuarine, and terrestrial conditions, which are in turn overlain by Quaternary fluvial and alluvial strata recording uplift and erosion of the Sierra Nevada and Coast Ranges to approximately their present shape (Norris and Webb 1990:412–426).

These Tertiary and Quaternary sediments form the aquifer system that underlies the project area. The Quaternary Kern River alluvial fan deposits, which make up the uppermost part of the strata, are late Pleistocene and Holocene aged (Negrini 2008:96–97) and are comprised of highly permeable sand and gravel deposits with discontinuous layers of less permeable fine-grained silt and clay deposits. These deposits, which are remnants of old stream channels, are generally unconsolidated and occur as long, winding stringers and sheets throughout the project area (Department of Water Resources and the State of California 2010:56). Studies of the project area indicate that the upper 300 feet of the aquifer is made up of 70% sand and that there are no laterally extensive clay layers (Parker pers. comm.).

Additional information regarding the geologic conditions of the project area as they pertain to potential hydrologic impacts is discussed in Section 3.6, *Hydrology and Water Quality*.

Seismic Conditions

Primary Seismic Hazards

The State of California considers two aspects of earthquake events as primary seismic hazards: surface fault rupture and seismic ground shaking.

Surface Fault Rupture

In the IS prepared for the project (Kern Water Bank Authority 2012), surface fault rupture was found to have no impact because the project area is not within an Alquist-Priolo Earthquake fault zone (Bryant and Hart 2007). In addition, no active faults were identified during a review of the California Geological Survey's fault data (California Geological Survey 2010). Active faults within a 25-mile radius from the project area are the White Wolf, Kern Front, Buena Vista, and San Andreas faults. The closest fault is the Buena Vista fault, which is approximately 10 miles from the project area.

Seismic Ground Shaking

Unlike surface fault rupture, ground shaking is not confined to the trace of a fault, but rather it propagates into the surrounding areas during an earthquake. The intensity of ground shaking typically diminishes with distance from the fault, but ground shaking may be locally amplified and/or prolonged by some types of substrate materials. These factors are used to map the probabilistic shaking hazards throughout the state.

Based on the probabilistic seismic hazard map, which depicts the peak horizontal ground acceleration values exceeded at a 10% probability in 50 years (Figure 3.5-1; Cao et al. 2003), the probabilistic peak horizontal ground acceleration values for the project area are 0.30–0.50g (where g equals the acceleration of gravity) (Figure 3.5-1). As a point of comparison, probabilistic peak horizontal ground acceleration values for the San Francisco Bay Area range from 0.40g to more than 0.80g. The acceleration value for the project area indicates a moderate seismic ground-shaking hazard.

Secondary Seismic Hazards

Secondary seismic hazards are seismically induced landslide, liquefaction, and related types of ground failure events. As discussed in Section 3.5.1, *Existing Conditions* under *Regulatory Setting*, the State of California maps areas that are subject to secondary seismic hazards pursuant to the Seismic Hazards Mapping Act. The State has not yet published seismic hazard mapping in Kern County under the Seismic Hazards Mapping Program (California Geological Survey 2018). Secondary seismic hazards are addressed briefly below based on available information.

Landslide and Other Slope Stability Hazards

The project area is located in a valley floor. Because of the area's gentle topography, the potential for slope failure, including seismically induced landsliding, is low.

Liquefaction

Liquefaction is the process by which soils and sediments lose shear strength and fail during seismic ground shaking. The vibrations caused by an earthquake can increase pore pressure in saturated materials. If the pore pressure is raised to be equivalent to the load pressure, this causes a temporary loss of shear strength, allowing the material to flow as a fluid. This temporary condition can result in severe settlement of foundations and slope failure. The susceptibility of an area to liquefaction is determined largely by the depth to groundwater and the properties (e.g., grain size, density, degree of consolidation) of the soil and sediment within and above the groundwater. The sediments most susceptible to liquefaction are saturated, unconsolidated sand and silt within 40 feet of the ground surface (California Geological Survey 2008). More specifically, in late Pleistocene sediments (e.g., those underlying the project area), the California Geological Survey (CGS) (2004) recommends further investigation of liquefaction susceptibility before building if a site has a "peak acceleration that has a 10% probability of being exceeded in 50 years is greater than or equal to 0.30 g and the anticipated depth to saturated soil is less than 20 feet." In Holocene sediments, CGS recommends further investigation if a site has a peak greater than or equal to 0.20 g and the anticipated depth to saturated soil is less than 30 feet.

Kern County is known to have some liquefaction hazards, particularly in the southern portion of the county. The potential for liquefaction in the project area is uncertain, but a conservative assessment of the general conditions (i.e., soils and sediments, shaking potential, and groundwater levels),

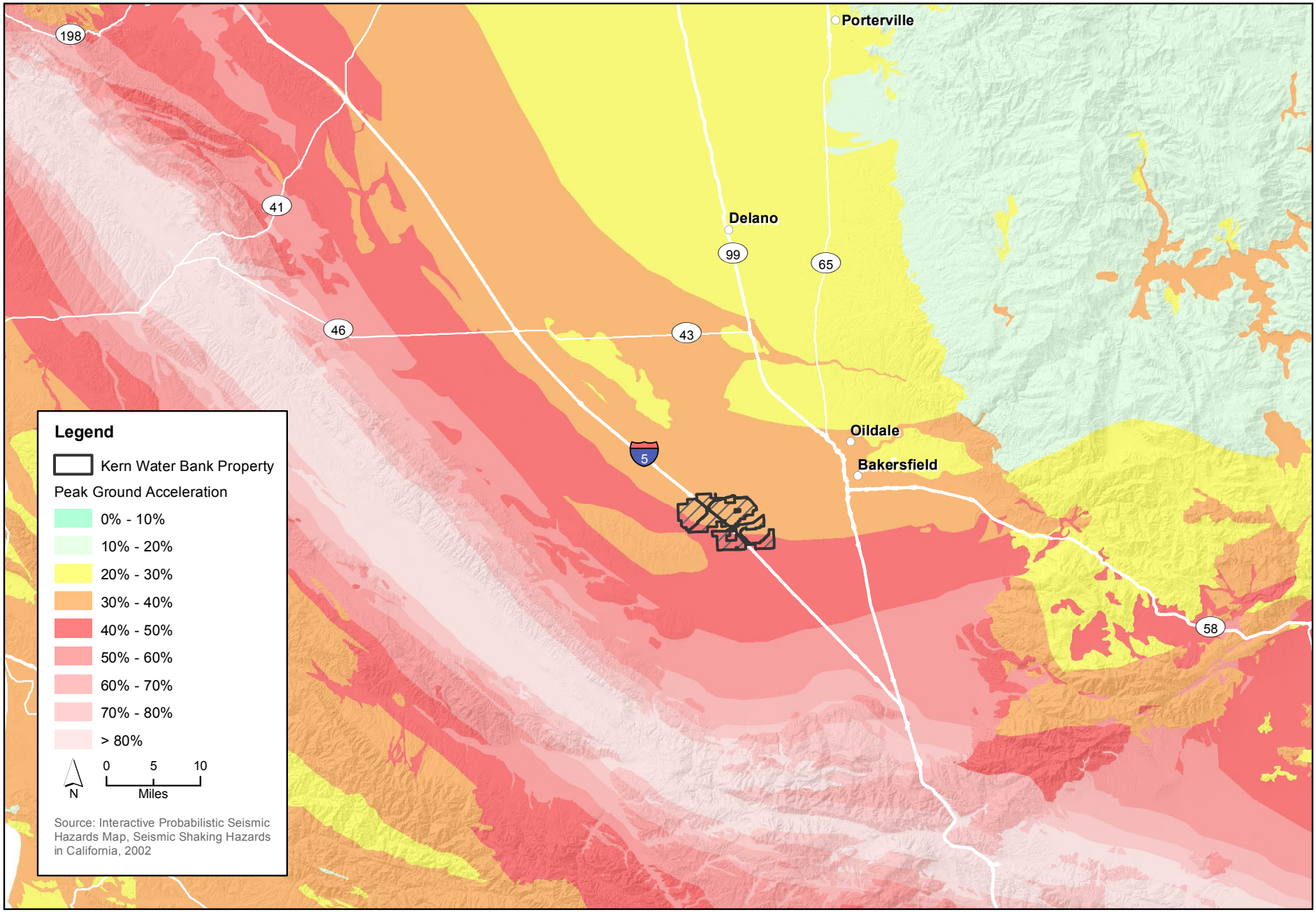

Figure 3.5-1
Seismic Shaking Hazards

indicates there is some risk. In addition to the risk factors mentioned above—the uppermost sediments in the project area being late Pleistocene unconsolidated alluvial deposits and the probabilistic peak horizontal ground acceleration values for the project area being 0.30–0.50g—groundwater levels could pose a liquefaction risk. KWBA groundwater monitoring well data indicate that groundwater levels in the project area fluctuate widely, from 0 feet below ground surface (very near ponds after extensive recharge) to far below 40 feet below ground surface. After two years of nearly continuous recharge (i.e., the maximum baseline level of recharge), depth to groundwater was less than 40 feet at points within the KWB boundaries. Even under maximum baseline recharge conditions, however, depth to groundwater beyond the boundaries of the KWB never rose above the 40-foot level. In contrast, groundwater levels drop dramatically in dry years and can be more than 150 feet below ground surface (Section 3.6, *Hydrology and Water Quality*).

Other Liquefaction-Related Ground Failure

Other types of ground failure related to liquefaction include lateral spreading and differential settlement. *Lateral spreading* is a failure of soil and sediment within a nearly horizontal zone that causes the soil to move toward a free face (such as a streambank or canal) or down a gentle slope. Lateral spreading can occur on slopes as gentle as 0.5%. Even a relatively thin seam of liquefiable sediment can create planes of weakness that could result in continuous lateral spreading over large areas (California Geological Survey 2008). Canal banks in the project area are free faces that could potentially facilitate lateral spreading. *Differential settlement*—the uneven settling of soil—is the most common fill displacement hazard (California Geological Survey 2008). Examples of fill in the project area that could experience differential settlement include road fills (e.g., Interstate 5) and, possibly, foundation fills (e.g., pump houses and other structures).

Land Subsidence

Subsidence is the sinking of a large area of ground surface in which the material is displaced vertically downward, with little or no horizontal movement. Many areas in the Central Valley have experienced subsidence, most notably the San Joaquin Valley and Delta (Faunt 2009:99). Subsidence occurs in primarily three ways: as a result of groundwater overdraft or oil and gas withdrawal, compaction and oxidation of peat soils, and hydrocompaction (U.S. Geological Survey 2000:1–2). Land subsidence as a result of groundwater overdraft is discussed below. Land subsidence as a result of compaction and oxidation of peat soils and/or hydrocompaction are not significant concerns in the project area and are not discussed further.

Land subsidence as a result of groundwater overdraft occurs when excessive groundwater pumping depletes an aquifer, and the semi-consolidated sediments of the aquifer collapse together, becoming compacted. This reduction in pore space (i.e., space between sediments that had been occupied by groundwater) is permanent and cannot be recovered (U.S. Geological Survey 2000:1–2).

Land subsidence as a result of groundwater overdraft is a major concern in the San Joaquin Valley, including Kern County (Kern County 2009:163; Galloway and Riley 1999:23). More than half the area of the valley has experienced more than 1 foot of subsidence since groundwater pumping for irrigation began. Subsidence near Mendota in Fresno County has caused a drop of 28 feet. According to the U.S. Geological Survey (2000), “one of the single largest human alterations of the Earth’s surface topography has resulted from excessive groundwater pumpage to sustain an exceptionally productive agriculture.” Efforts to slow or stop subsidence have been largely successful, but resumption of groundwater overdraft would quickly cause groundwater levels to drop and result in further subsidence (Galloway and Riley 1999:30–31).

DWR has monitored an extensometer located within the KWB since 1994. It indicates that the aquifer behaves elastically in response to banking operations, subsiding less than 0.2 feet and then rebounding the same amount or more. Over time, the average elevation of the land surface in the project area has risen approximately 0.8 feet.

3.5.2 Impact Analysis

3.5.2.1 Methods

This analysis of geology and seismicity impacts is based on professional standards and information cited throughout this section. The key effects were identified and evaluated based on the environmental characteristics of the project area and the magnitude, intensity, and duration of activities related to operation of the project. Effects related to soils and landsliding were dismissed in the IS (Kern Water Bank Authority 2012); therefore, they are not discussed further.

For the purposes of this analysis, it was assumed that the existing KWB area canals, pipelines, levees, and roads, including Interstate 5, were constructed according to applicable building codes and design standards, including the CBSC (Section 3.5.1, *Existing Conditions*, *Regulatory Setting*). No construction activities are planned for the project; therefore, geology and seismicity impacts related to construction are not considered further in this analysis.

3.5.2.2 Significance Criteria

The thresholds for determining the significance of impacts pertaining to geology and seismicity in this analysis are based on State CEQA Guidelines Appendix G (14 CCR 15000 et seq.) and standards of professional practice. For this analysis, the project would be considered to have a significant impact on geology and seismicity if it would result in any of the following conditions.

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
    - Strong seismic ground shaking.
    - Seismic-related ground failure, including liquefaction.
    - Landslides.
- Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.

The project area is not in an Alquist-Priolo Earthquake Fault Zone, and no active faults are in or adjacent to the project area; therefore, there is no need to address effects related to this CEQA criterion.

3.5.2.3 Impacts and Mitigation Measures

Impact GEO-1: Expose people or structures to adverse effects associated with an increased risk of liquefaction and related ground failures as a result of elevated groundwater levels (Less than significant)

Shallow groundwater (i.e., groundwater levels less than 40 feet or, in the case of the project, less than 20 feet below ground surface) is one of the risk factors related to liquefaction. The KWB is in an area having sediments that could be susceptible to liquefaction, and CGS has designated the vicinity as potentially having sufficiently strong ground shaking that could result in liquefaction.

By diverting surface water from the Kern River into percolation ponds, groundwater banking could raise the groundwater level or extend the time that shallow groundwater occurs in the project area, thereby increasing the potential risk of liquefaction. Liquefaction could cause damage to lined canals, pipelines, utilities, and structures in the project area. However, such recharge operations already occur within the KWB, and groundwater elevations are not expected to increase significantly beyond baseline conditions as a result of the project (Section 3.6, *Hydrology and Water Quality*).

Under baseline conditions, KWBA has diverted and stored 447,148 AF of water in a single year. The project could, under ideal conditions, increase diversions to 500,000 AF in a single year, which amounts to an increase of 52,852 AF of water (11.8%). Under most hydrologic year types, however, diversions of Kern River water would increase only marginally. Consequently, onsite recharge operations and groundwater levels, and any associated liquefaction risks, would not change substantially over baseline conditions (see Impact Hydro-2). This impact is less than significant.

No mitigation measures are required because the project is not expected to result in significant impacts related to liquefaction or ground failure.

Impact GEO-2: Cause land subsidence as a result of groundwater overdraft (No impact)

DWR has monitored an extensometer within the KWB since 1994. Although groundwater pumping has caused subsidence elsewhere in the southern San Joaquin Valley, onsite extensometer data indicates that the Kern Fan aquifer behaves elastically in response to the banking operations, subsiding less than 0.2 foot and then rebounding the same amount or more. Over time, the average elevation of the land surface has risen approximately 0.8 foot.

As compared to baseline conditions, maximum recovery volumes during an extended 3-year drought, in any single year, or in any single month, are not expected to change substantially under the project because no new recovery facilities would be constructed. It is conceivable that during an extreme drought of many years, the banking and storage of Kern River water under the project may result in additional recovery, but this would not exceed banked quantities and cause overdraft. As described in Impact Hydro-2, maximum recovery volumes during an extended 3-year drought are not expected to change substantially as a result of the project because no new recovery facilities would be constructed, and KWBA participating members have historically maintained a significant surplus groundwater balance. Further, the project proposes to promote additional recharge to the underlying aquifer in wet years, which in most years would add water to storage and have a resulting beneficial impact on groundwater and surface land levels (described in section 3.6, Hydrology and Water Quality). The project—a recharge project—would not cause land subsidence. Thus, there would be no impact.

No mitigation measures are required because the project is not expected to result in land subsidence impacts.

3.5.3 References

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3.6 Hydrology and Water Quality

3.6.1 Existing Conditions

3.6.1.1 Regulatory Setting

Federal

Clean Water Act

The State Water Board is the state agency with primary responsibility for implementing the federal Clean Water Act (CWA) in California, which establishes regulations relating to water resource issues. Typically, the State Water Board implements all regulatory requirements through nine regional water quality control boards (regional water boards) established throughout the state. The Central Valley Regional Water Quality Control Board (Central Valley Water Board) is responsible for regulating discharges in the San Joaquin Valley.

The CWA is the primary federal law that protects the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. It operates on the principle that discharges of pollutants into the nation's waters are unlawful unless specifically authorized by a permit. Permit review is the CWA's primary regulatory tool. The following sections provide additional details on specific sections of the CWA.

Section 404: Permits for Fill Placement in Waters and Wetlands

Section 404 of the CWA requires that a permit be obtained from the U.S. Army Corps of Engineers (USACE) for the discharge of dredged or fill material into "waters of the United States, including wetlands." *Waters of the United States* include wetlands and lakes, rivers, streams, and their tributaries. *Wetlands* are defined for regulatory purposes (33 CFR § 328.3) as follows.

> (1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of tide; (2) All interstate waters, including interstate wetlands; (3) All other waters such as intrastate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce; (4) All impoundments of waters otherwise defined as waters of the United States under the definition; (5) Tributaries of waters identified in paragraphs 1–4 in this section; (6) The territorial seas; and (7) Wetlands adjacent to waters identified in paragraphs 1–6 in this section.

CWA Section 404(b) requires that USACE process permits in compliance with guidelines developed by the U.S. Environmental Protection Agency (EPA). These guidelines (404[b][1] Guidelines) require an analysis of alternatives available to meet the project purpose and need, including those that avoid and minimize discharges of dredged or fill materials into waters. The project for which USACE issues a permit must be the least environmentally damaging practicable alternative for the proposed activity.

Section 401: Water Quality Certification

CWA Section 401 regulates activities associated with dredging and placement of fill materials into waters of the United States. Water quality certifications under CWA Section 401 are issued by one of nine regional water boards of the State Water Board. Applicants seeking a federal license or permit for work that could result in the discharge of dredged and fill materials into surface waters and wetlands of the United States must obtain water quality certification. The Section 401 certification is required to illustrate that applicable provisions are met, including CWA Sections 301, 302, 303, 306, and 307, as well as California water quality standards. Any project containing a federal component that could affect state water quality requires compliance with CWA Section 401.

Section 402: Permits for Discharge to Surface Waters

CWA Section 402 regulates industrial and municipal point source dischargers through the National Pollutant Discharge Elimination System (NPDES) program, administered by EPA. In California, the State Water Board is authorized by EPA to oversee the NPDES program through the regional water boards (see related discussion in this section under *Porter-Cologne Water Quality Control Act*). The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits.

Sections 303 and 305: Impaired Waters and Water Quality Reporting

California adopts water quality standards to protect beneficial uses of state waters as required by CWA Section 303 and the Porter-Cologne Water Quality Control Act of 1969. Under Section 303(d) of the CWA, states, territories, and authorized tribes are required to develop a list of water quality limited segments (i.e., those that are impaired). In California, the State Water Board develops the list of impaired water bodies, which is subject to EPA review and approval. Waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. Section 303(d) also establishes the total maximum daily load (TMDL) to guide implementation of state water quality standards.

In addition to the impaired water body list required by CWA Section 303(d), CWA Section 305(b) requires states to develop a report assessing statewide surface water quality. Both CWA requirements are being addressed through the development of a 303(d)/305(b) integrated report that will address both an update to the 303(d) list and a 305(b) assessment of statewide water quality. The State Water Board developed a statewide 2012 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report) based on the integrated reports from each of the nine regional water boards. After the 2012 Integrated Report was approved by the State Water Board at a public hearing on April 8, 2015, the report was submitted to EPA. EPA partially approved the 303(d) list portion of the Integrated Report on June 26, 2015 and, after Topaz Lake was added, gave its final approval on July 30, 2015. The 305(b) portion of the Integrated Report requires no approval by the State Water Board or EPA.

Flood Control Act of 1944

The Flood Control Act of 1944 authorized the construction and modification of certain public works, including dams and levees, on rivers and harbors for flood control and other purposes. The construction of Isabella Reservoir and Isabella Dam, which impounds the Kern River about 40 miles northeast of Bakersfield, was authorized by this act. Construction of the dam was completed in 1954. The reservoir provides flood control and irrigation benefits for downstream areas.

National Flood Insurance Program

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 were intended to reduce the need for large, publicly funded flood risk management structures and disaster relief by restricting development on floodplains. The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) to subsidize flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA issues Flood Insurance Rate Maps (FIRMs) for communities participating in the NFIP. These maps delineate flood hazard zones in the community. These maps are designed for flood insurance purposes only and do not necessarily show all areas subject to flooding. The maps designate lands likely to be inundated during a 100-year event and elevations of this flooding. A 100-year event is the level of flooding for which there is a 1% statistical chance of occurrence in any given year. The maps also depict areas between the limits affected by 100-year and 500-year events and areas of minimal flooding. These maps often are used to establish building pad elevations to reduce risk to new development from flooding effects. For guidance on floodplain management and floodplain hazard identification, communities turn to FEMA guidelines, as defined in 44 CFR 59–77. For a levee to be recognized by FEMA under the NFIP, the community must provide evidence demonstrating that adequate design and operation and maintenance systems provide a level of performance adequate to address the base flood (1% or 100-year flood).

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act was enacted in 1969 to preserve, enhance, and restore the quality of the state's water resources. It established the State Water Board and nine regional water boards. The State Water Board is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, although much of its daily implementation authority is delegated to the regional water boards, which are responsible for implementing CWA Sections 402 and 303(d). In general, the State Water Board manages both water rights and statewide regulation of water quality, while the regional water boards focus exclusively on water quality in their regions.

Basin Plan Water Quality Objectives

The Porter-Cologne Water Quality Control Act provides for the development and periodic review of water quality control plans (basin plans) that designate beneficial uses of California's major rivers and groundwater basins and establish narrative and numerical water quality objectives for those waters. Beneficial uses represent the services and qualities of a water body (i.e., the reasons the water body is considered valuable), while water quality objectives represent the standards necessary to protect and support those beneficial uses. Beneficial uses for the Kern River in the Tulare Lake Basin Plan (Central Valley Regional Water Quality Control Board 2016) are presented below under *Basin Plan Status*.

Basin plans are implemented primarily by using the NPDES permitting system to regulate waste discharges so that water quality objectives are met (see previous discussion of the NPDES system under *Clean Water Act*). Basin plans are updated every 3 years and provide the technical basis for determining waste discharge requirements (WDRs) and taking enforcement actions.

Central Valley Regional Water Quality Control Board

The Central Valley Water Board is responsible for implementing its basin plan for the Tulare Lake Basin. The Kings, Kaweah, Tule, and Kern Rivers provide the bulk of the surface water supply native to the basin. Imported surface supplies enter the basin through the San Luis Canal/California Aqueduct System, Friant-Kern Canal, and the Delta-Mendota Canal. The Tulare Lake Basin Plan identifies beneficial uses of the river and its tributaries and water quality objectives to protect those uses. Numerical and narrative criteria are contained in the Tulare Lake Basin Plan for several key water quality constituents, including dissolved oxygen (DO), water temperature, trace metals, turbidity, suspended material, pesticides, salinity, and radioactivity.

The methods the Central Valley Water Board uses to implement the Tulare Lake Basin Plan criteria include issuing WDRs. WDRs are issued to any entity that discharges to a surface water body and does not meet certain water quality criteria, such as those related to sediment. WDR permits also serve as a federally-required NPDES permit (under the CWA) and incorporate the requirements of other applicable regulations.

Regional Water Quality Objectives

The regional water boards have set water quality objectives for all surface waters in their respective regions (including the Tulare Lake Basin) for the following substances and parameters: ammonia, bacteria, biostimulatory substances, chemical constituents, color, DO, floating material, oil and grease, pH, pesticides, radioactivity, salinity, sediment, settleable material, suspended material, tastes and odors, temperature, toxicity, and turbidity. Specific objectives for concentrations of chemical constituents are applied to bodies of water based on their designated beneficial uses (Central Valley Regional Water Quality Control Board 2016). Water quality objectives applicable to all groundwater in the region have been set for bacteria, chemical constituents, radioactivity, tastes and odors, and toxicity (Central Valley Regional Water Quality Control Board 2016).

The Central Valley Water Board Tulare Lake Basin Plan (2016) states acceleration of salts accumulation is the greatest groundwater quality problem. The groundwater quality objective of the Central Valley Water Board for the Kern River Basin is a maximum average annual increase in electrical conductivity of 5 micromhos per centimeter (µmhos/cm) (Central Valley Regional Water Quality Control Board 2004). The Central Valley Water Board also states dissolved matter in groundwater shall be maintained as close to natural concentrations as reasonable considering careful use and management of water resources. Additional discussion of groundwater quality in the Tulare Lake Basin is follows later in this section.

State Implementation Plan

In 1994, the State Water Board and EPA agreed to a coordinated approach for addressing priority toxic pollutants in inland surface waters, enclosed bays, and estuaries of California. In March 2000, the State Water Board adopted a state implementation plan (SIP) for priority toxic pollutant water quality criteria contained in the California Toxics Rule (CTR). EPA promulgated the CTR in May 2000. The SIP also implements National Toxics Rule (NTR) criteria and applicable priority pollutant objectives in the basin plans. In combination, the CTR, NTR, applicable basin plan objectives existing Central Valley Water Board beneficial use designations, and the SIP, compose water quality standards and implementation procedures for priority toxic pollutants in non-ocean surface waters in California, such as the Kern River.

State Water Resources Control Board: Division of Water Rights

The State Water Board is also the state agency responsible for regulating surface water rights in California in line with the California constitution. A water right is a legal entitlement authorizing water to be diverted from a specific source and put to beneficial, non-wasteful use. Though water rights are property rights, their holders do not own the water itself, but rather the right to use the water. The exercise of post-1913 water rights requires a permit or license from the State Water Board, and must satisfy the admonitions of Article X, section 2, of the California constitution:

> [B]ecause of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare.

In making water rights decisions, the State Water Board must consider, among other factors:

- Developing water resources in an orderly manner.
- Preventing waste and unreasonable use of water.
- Protecting the environment, the public trust, and the public interest.

The State Water Board also may be required to adjudicate partial or entire systems or act as a referee or fact finder in water rights court cases.

California Water Code Section 1260(k): Water Availability Analysis

In order for the State Water Board to issue a water right, it must find that there is "unappropriated water available to supply the applicant." (Water Code § 1375[d]). Every water right application submitted to the State Water Board must include "sufficient information to demonstrate a reasonable likelihood that unappropriated water is available for appropriation." (Water Code § 1260[k]).[1] To satisfy this requirement, West Yost and Associates prepared a water availability analysis in support of Application 31676 for use in determining if water was available for diversion and to evaluate the potential environmental impacts that could result from the project's requested additional appropriations (Appendix L). For the purposes of the project, the project proponent need only show that there is a "reasonable likelihood that unappropriated water is available for appropriation" (Water Code § 1260[k]) since the project is not a proposal for development requiring provision of ongoing and future water supply.

Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA) went into effect on January 1, 2015. It established a new structure for managing groundwater in California. In enacting SGMA, the Legislature sought to, among other goals, provide for sustainable management of groundwater basins and "increase groundwater storage and remove impediments to recharge" (Water Code, §§ 10720.1(a),(g)). SGMA requires development of projects and programs to achieve long-term basin

[1] Because this project does not propose new development that requires service by urban water suppliers, it is not subject to Senate Bill (SB) 610 (Water Code §§ 10910-10912) or SB 221 (Cal. Government Code § 66473.7), which require the preparation of assessments and analyses verifying available water supplies to certain residential or other development projects in the CEQA process. Nevertheless, the water availability analysis under Water Code section 1260[k] serves much the same function.

sustainability. SGMA requires formation of groundwater sustainability agencies (GSAs) for all basins that DWR has designated as high or medium priority. SGMA also requires development of a groundwater sustainability plan (GSP) and implementation of the GSP to maintain sustainable yield and avoid "undesirable results," including chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply or significant and unreasonable reductions in groundwater storage, water quality, subsidence, or seawater intrusion (Cal. Water Code § 10721(x)). If a GSP is not completed in the time allotted or if the State determines that the GSP will fail to meet SGMA's sustainability objectives, the State may intervene and enforce an interim plan.

DWR has designated the Kern County Subbasin as a high priority basin. This designation means local agencies in this subbasin were required to form GSAs by June 30, 2017,[2] and to develop and adopt their GSPs by January 2020. As of June 30, 2017, eleven local agencies have submitted GSA formation notices for this subbasin. Each GSP needs to include measurable goals and objectives and implementation actions to achieve or maintain basin sustainability. The subbasin needs to be sustainably managed by 2040, by implementing monitoring, project implementation, and administrative actions.

Specifics of the legislation include:

Assembly Bill 1739

Assembly Bill (AB) 1739 requires sustainable groundwater management in all groundwater subbasins determined by DWR to be at medium to high risk of significant economic, social, and environmental impacts due to an unsustainable and chronic pattern of groundwater extractions exceeding the ability of the surface water supplies to replenish the subbasin. Most pertinent to the General Plan update, AB 1739 requires, prior to the adoption or any substantial amendment of a general plan, that the planning agency review and consider a groundwater sustainability plan, groundwater management plan, groundwater management court order, judgment, or decree, adjudication of water rights, or a certain order or interim plan by the State Water Board. This statute requires the planning agency to refer a proposed action to adopt or substantially amend a general plan to any groundwater sustainability agency that has adopted a groundwater sustainability plan or local agency that otherwise manages groundwater and to the State Water Board if it has adopted an interim plan that includes territory within the planning area. This is not applicable to the project because no such plan has been adopted.

Senate Bill 1168

California Senate Bill (SB) 1168 enacts the Sustainable Groundwater Management Act and states as the intent of the Legislature that, among other things, all groundwater basins and subbasins must be managed sustainably by local entities pursuant to an adopted sustainable groundwater management plan. SB 1168 requires that for all groundwater basins designated as high- or medium-priority basins by DWR, agencies must develop and implement a groundwater sustainability plan to be developed and implemented to meet the sustainability goal, established as prescribed, and would require the plan to include prescribed components. This bill encourages and authorizes basins designated as low- or very low priority basins to be managed under groundwater sustainability plans. At this time, no regional management agency has been established.

[2] Where no GSA has been designated, the county is deemed the GSA for the basin or subbasin.

Senate Bill 1319

SB 1319 additionally authorizes the State Water Board to designate certain high- and medium-priority basins as probationary if, after January 31, 2025, prescribed criteria are met, including that the State Water Board determines that the basin is in a condition where groundwater extractions result in significant depletions of interconnected surface waters. This bill adds to the prescribed determinations that would prevent the State Water Board from designating the basin as a probationary basin for a specified time period and requires that the State Water Board exclude from probationary status any portion of a basin for which a groundwater sustainability agency demonstrates compliance with the sustainability goal.

Local

Courts have held that cities and counties may regulate groundwater use under their police powers to protect the public's health, safety and welfare. Groundwater is often regulated on an ad-hoc basis by a disparate group of local agencies. These agencies include local districts with statutory authority to manage groundwater (such as water conservation districts), local water agencies that have adopted groundwater management plans pursuant to statute, and cities and counties that have adopted local groundwater ordinances. Although not necessarily applicable to the KWB or its operations, local policies and goals related to hydrology and water quality in Kern County are listed below.

Kern County General Plan

The following policies and implementation measures from the *Kern County General Plan* (Kern County 2009) are relevant to groundwater resources generally in unincorporated Kern County.

1.9 Resource

Policies

10. To encourage effective groundwater resource management for the long-term economic benefit of the County the following shall be considered:

    (a) Promote groundwater recharge activities in various zone districts.

    (c) Support the development of groundwater management plans.

    (d) Support the development of future sources of additional surface water and groundwater, including conjunctive use, recycled water, conservation, additional storage of surface water and groundwater and desalination.

1.10 General Provisions

1.10.6 Surface Water and Groundwater

Policy

34. Ensure that water quality standards are met for existing users and future development.

35. Ensure that adequate water storage, treatment, and transmission facilities are constructed concurrently with planned growth.

39. Encourage the development of the County's groundwater supply to sustain and ensure water quality and quantity for existing users, planned growth, and maintenance of the natural environment.

40. Encourage utilization of community water systems rather than the reliance on individual wells.

Implementation Measures

X. Encourage effective groundwater resource management for the long-term benefit of the County through the following:

i. Promote groundwater recharge activities in various zone districts.

iii. Support the development of Groundwater Management Plans.

iv. Support the development of future sources of additional surface water and groundwater, including conjunctive use, recycled water, conservation, additional storage of surface water, and groundwater and desalination.

The Kern River Plan Element

The following sections from the *Kern River Plan Element* (Kern County and City of Bakersfield 1985) of the *City of Bakersfield General Plan and Kern County General Plan* are generally relevant to the Kern River Fan area within unincorporated Kern County and the city of Bakersfield.

Chapter III. Issues, Goals, and Basic Plan Policies

3.4 Floodplain Management

3.4.1 Issues

From a safety and resource management standpoint, floodplain management is a major priority issue. Activities related to groundwater recharge, channel maintenance, levee maintenance and construction, and diversion structures have a direct relationship to public safety and environmental quality.

3.4.2 Goals

To maintain the integrity of the River channel so as to facilitate a floodway for Kern River waters for the health and safety of the community.

To maximize and fully utilize the groundwater recharge potential of the Kern River, its floodplains, and other potential recharge aquifers. Enhance riparian vegetation and wildlife habitat as a component of groundwater recharge programs. Design recharge facilities in such a way as to facilitate public use for riding and hiking trails, nature study, or other non-intensive forms of recreation. Encourage protection of land within the plan area which preserves and propagates examples of endemic and endangered plant species.

Study Area Groundwater Management Plans

Sections 10750–10756 of the California Water Code (Assembly Bill [AB] 3030) provide a systematic procedure for an existing local agency to develop a groundwater management plan. This section of the code provides such an agency with the powers of a water replenishment district to raise revenue to pay for facilities to manage the basin (recovery, recharge, conveyance, quality). Several agencies in the area have groundwater management plans.

- North Kern Water Storage District: Groundwater Management Plan (July 1993)
- Buena Vista Water Storage District: Groundwater Status and Management Plan (Revised May 2002)
- Rosedale-Rio Bravo Water Storage District: Groundwater Management Plan (Draft 2012)

2010 Urban Water Management Plan (Improvement District No. 4 of the Kern County Water Agency and North of the River Municipal Water District)

An Urban Water Management Plan (UWMP) is a planning tool that generally guides the actions of water management agencies by providing a broad perspective on a number of water supply issues. Primarily, the plan forecasts continued participation in water banking projects to provide sufficient recharge, storage and recovery capacity to meet the needs of the Kern County Water Agency Improvement District No. 4 (ID4). ID4's water banking projects allow ID4 to cushion impacts associated with the SWP's variability and re-regulate high flow waters for recovery during dry years.

3.6.1.2 Environmental Setting

The following section discusses salient hydrologic features of the project, including an overview of the Kern River watershed, the hydrology of the lower Kern River and major water diversion points, groundwater elevations, and surface water and groundwater quality. The discussion describes how KWBA has historically operated and the hydrologic changes that would occur if the project were implemented.

Kern River Watershed

The Kern River watershed in the southern Sierra Nevada is the second largest watershed in the Tulare Lake Basin and covers approximately 2,442 square miles based on U.S. Geological Survey HUC-10 hydrologic basin boundaries for the Kern River (U.S. Department of Agriculture Natural Resources Conservation Service 2012). The Kern River watershed is bordered to the north by the Kings River watershed in the Sierra Nevada, on the west by the Tulare Lake Basin and eastern side of the Coast Ranges, on the east by Owens Valley, and to the south by the Tehachapi Mountains. The topography of the Kern River watershed is dominated by steep river canyons and large mountains. The minimum elevation is 300 feet near the Intertie and California Aqueduct, the mean elevation is 6,791 feet, and the maximum elevation is 14,478 feet at Mt. Whitney's summit. Figure 3.6-1 shows the Kern River watershed boundaries.

The primary water features in the Kern River watershed are the Kern River and South Fork Kern River, which flow into Lake Isabella, and the Kern River channel, which outflows from Lake Isabella, down past Bakersfield, and into the Intertie. Maximum streamflows occur during peak snowmelt (typically above 5,000 feet elevation) in late spring and early summer.

The climate of the Kern River watershed is highly variable. At the lower elevations in the project area, the climate is arid to semi-arid with dry, hot summers and mild winters. Summer daily maximum temperatures often exceed 100°F with low humidity, and winter temperatures are only occasionally below freezing. Conditions are cooler and there is more precipitation at the higher elevations.

The project area is located in the rain shadow of the Coast Ranges to the west and the Tehachapi Mountains to the south; as a result, the lands in the vicinity of the KWB and Bakersfield in the Tulare Lake Basin are some of the driest places in California. Mountain-induced cooling results in rainfall and snowfall precipitation on the western side of the Sierra Nevada at higher elevations east of the project area. The 1971–2000 mean annual precipitation at Bakersfield is 6.49 inches (Stachelski et al. 2008). Annual precipitation totals can be quite variable, with 13.32 inches in 1998, the wettest year measured, and 1.87 inches in 1959, the driest year measured (Stachelski and Sanger 2008). On average, 5.6 inches of the total annual precipitation (86%) occurs during the months of November

through April. Only 5 % (0.35 inches) of the rainfall occurs from June through September. However, substantially higher rainfall and snowfall in the eastern portions of the watershed means high-volume flows in the watershed's tributaries during wet years.

Surface Water

Kern River

The Kern River can be divided into several segments, each with distinct characteristics. The uppermost segments consist of the north and south forks of the river above Lake Isabella in the Sierra Nevada. These portions of the river lie above 2,600 feet, are uncontrolled except for the Fairview Dam on the north fork, and are largely designated as National Wild and Scenic Rivers. Below Lake Isabella, the river plunges from 2,600 feet to about 700 feet through the rugged Kern River Canyon. The flows in this segment are controlled by Isabella Dam (construction completed in 1954 and operated by USACE) and provide power generation and significant recreation, including fishing and whitewater rafting. Beyond the mouth of the Kern River Canyon, the river gradient greatly diminishes as it enters the valley floor and flows southwest through Bakersfield.

Prior to the establishment of major water diversions and hydromodifications in the late 1800s, the river drained into a series of sloughs and lakes (including Buena Vista Lake) in the closed Tulare Lake Basin with no outlet, except for infrequent overflowing during wet years into the San Joaquin River. Currently, the Kern River is dry through Bakersfield most years due to numerous diversions for irrigation and municipal water supply. Only during wet runoff years does the river continue flowing southwest past the Bakersfield diversions and through the City of Bakersfield's 2,800-acre recharge facility before terminating at the Intertie.

In addition to the effect of Lake Isabella Dam (discussed below under *Kern River Flows*), the Kern River's regulated flows are controlled by a series of weirs that are used to divert water into several canals and recharge areas. The key features in this lower segment of the river are the First Point of Measurement, the Beardsley Weir and Canal, the Rocky Point Weir and the Carrier Canal, the Calloway Weir and Canal, the River Canal Weir and River Canal, the Bellevue Weir and Goose Lake Slough, the McClung Weir, the Kern Water Bank Canal, the Alejandro Canal, the Second Point of Measurement and Diversion Weir, the Sand Plug, the Intertie and Outlet Weir, the Outlet Canal, and the Kern River Flood Channel (Figures 3.6-2 and 3.6-3).

The First Point of Measurement (Figure 3.6-2) is approximately 30 miles downstream of Lake Isabella. It was established by the Miller-Haggin Agreement of 1888[3] as a place to measure river flow prior to any major diversions so the flows could be properly apportioned among rights holders. The canals and weirs downstream of the First Point of Measurement are used to divert Kern River water for various uses, primarily irrigation and groundwater recharge. Several of these facilities, including the Beardsley Weir and Canal, the Rocky Point Weir and the Carrier Canal, and the Calloway Weir and Canal, were constructed in the latter half of the 1800s. The Second Point of Measurement was also established by the Miller-Haggin Agreement of 1888 as a place to document deliveries to downstream rights holders (Figure 3.6-2). Except under high flow conditions, the Carrier Canal and the River Canal, which are adjacent to the river channel, are used in lieu of the river channel to reduce water losses

[3] *Contract and Agreement between Henry Miller and others of the first part, and James B. Haggin and others of the second part*, dated July 28, 1888.

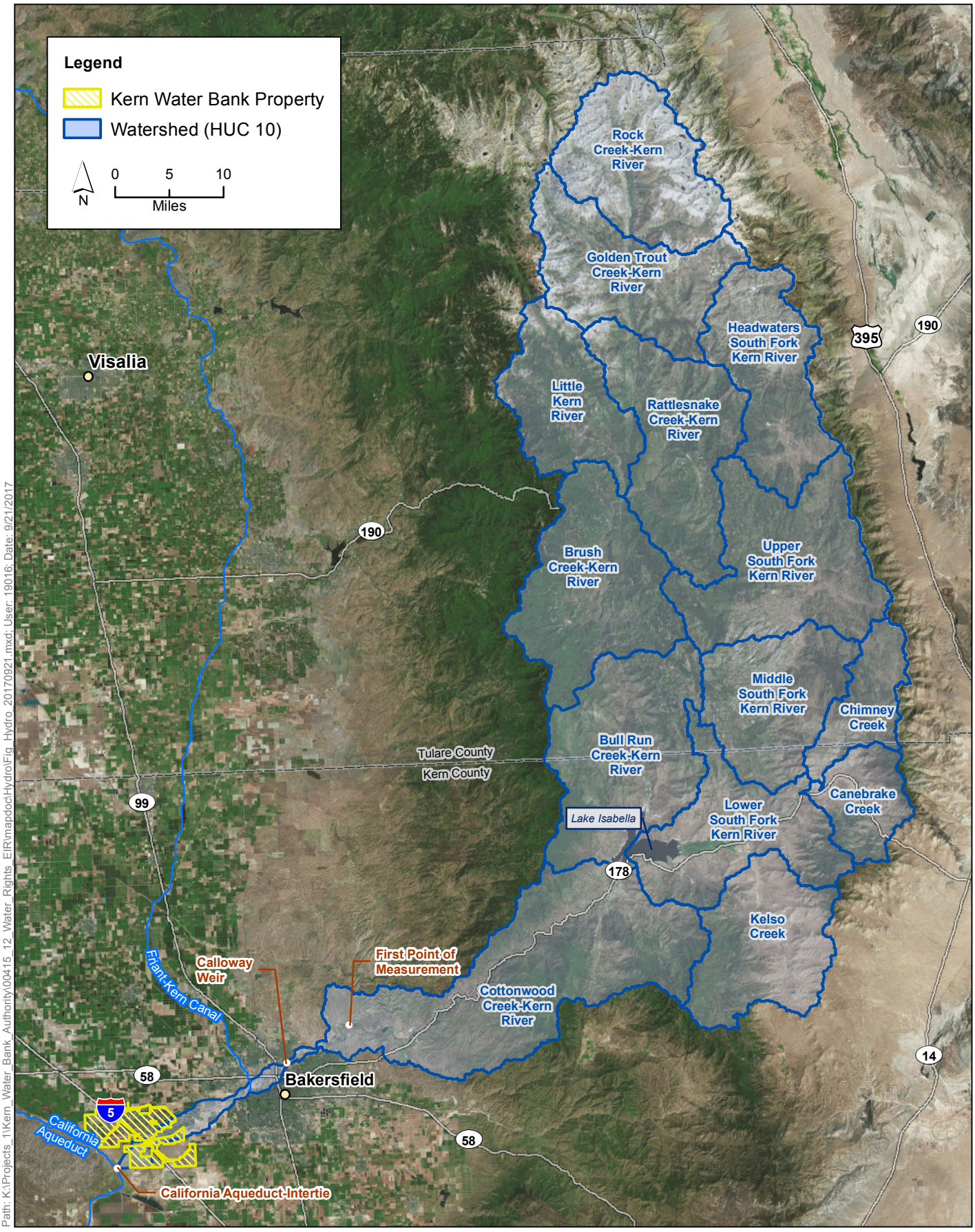

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Figure 3.6-1
Kern River Watershed

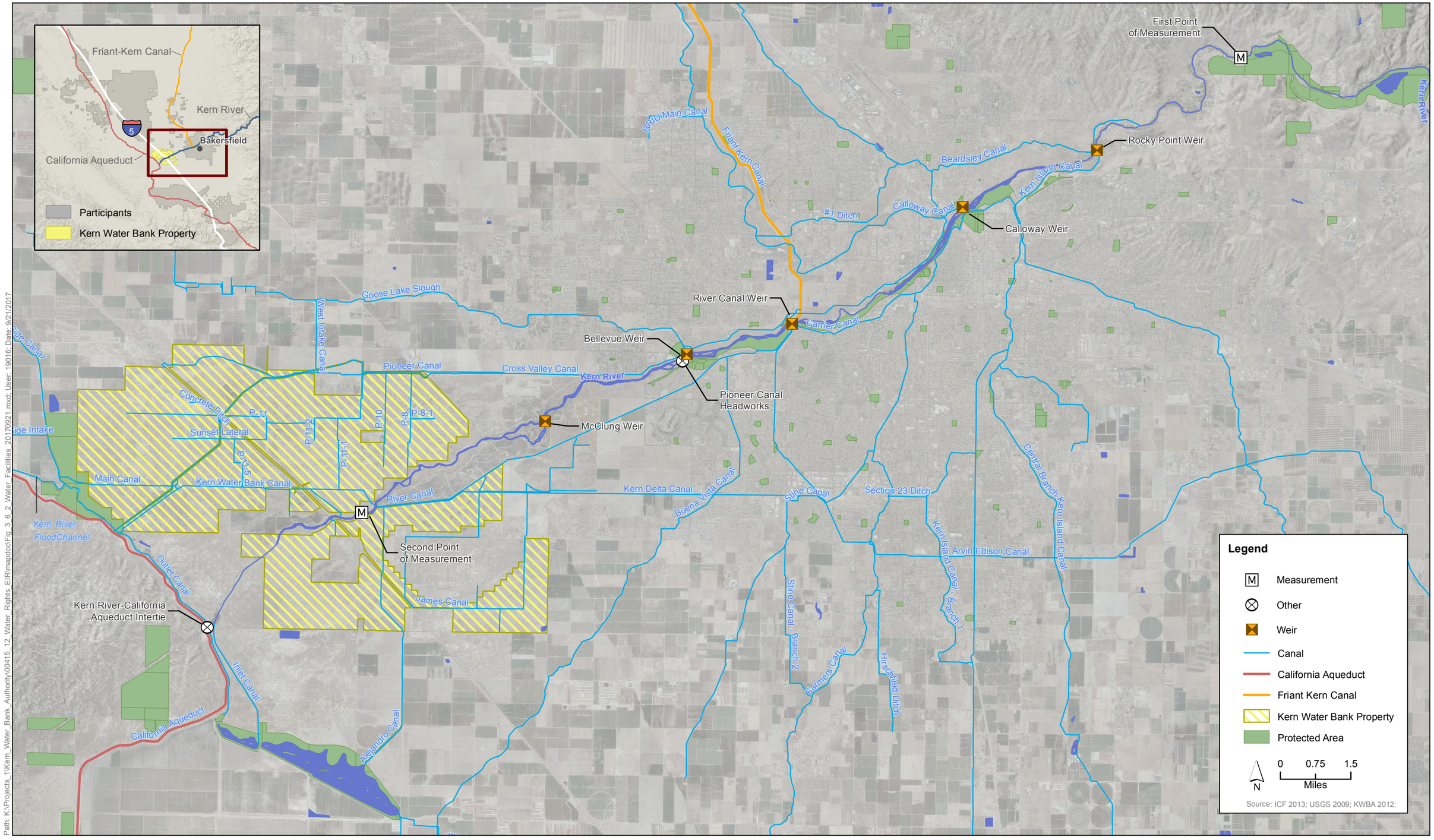

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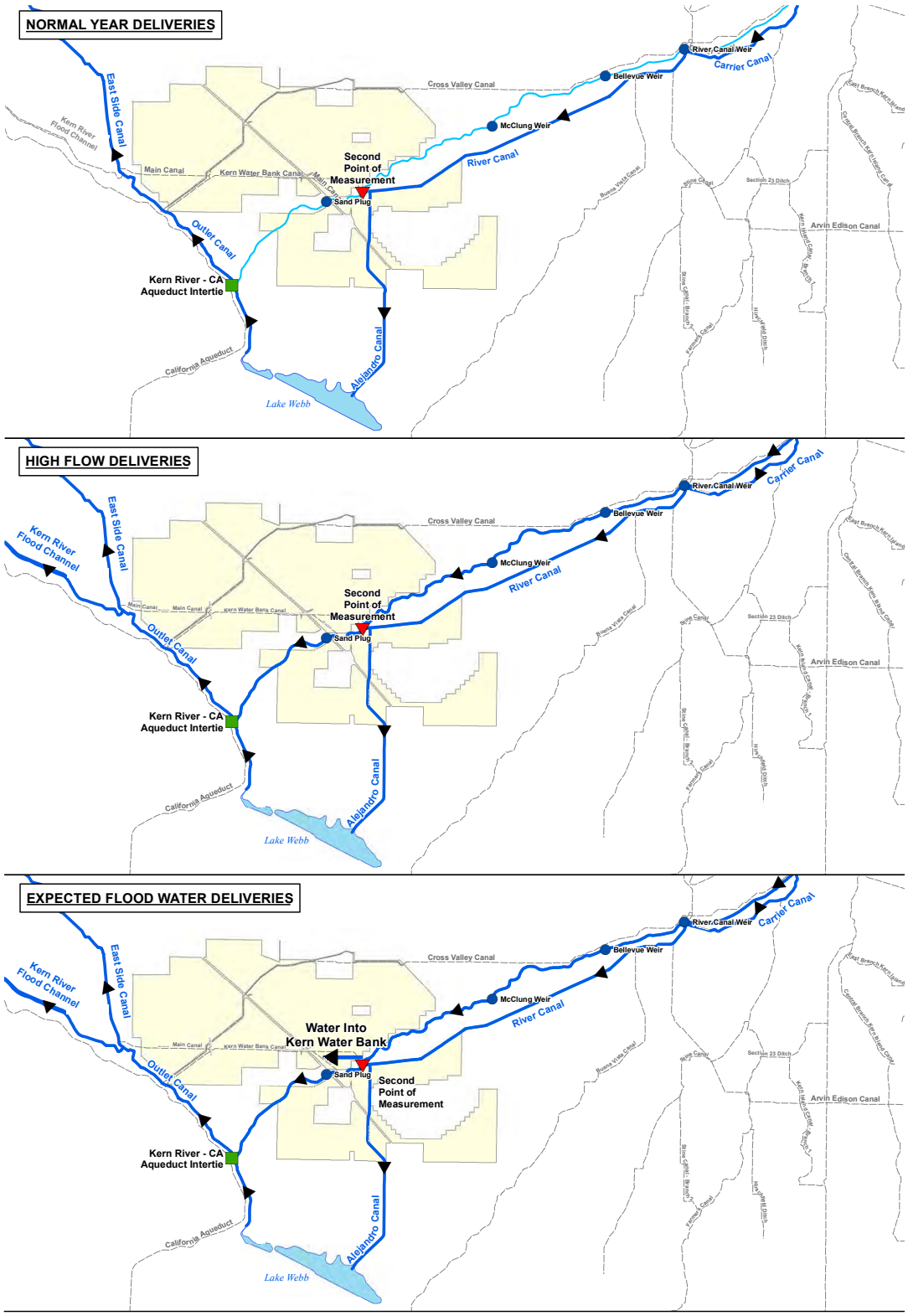
Figure 3.6-2
Key Water Resource Facilities on the Lower Kern River



Source: West Yost Associates (2014)

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Figure 3.6-3
Flow Routing Under Various Hydrologic Conditions

between First Point and Second Point. Downstream of Second Point, the Alejandro Canal is used annually by Buena Vista Water Storage District to deliver Kern River water to the Outlet Canal and Eastside Canal for irrigation purposes (Figure 3.6-3).

USACE built the Intertie in 1977 with the primary function of alleviating flooding in the lower Kern River during wet years when high flows would spill into agricultural fields in the Buena Vista Lake and Tulare Lake beds. The Intertie has the capacity to divert 3,500 cubic feet per second (cfs) of Kern River flow into the California Aqueduct, where the water is then routed further south (U.S. Army Corps of Engineers 1974).

During normal years, Buena Vista Water Storage District delivers irrigation water down the Alejandro Canal to the Outlet Canal and then to the Eastside Canal into its service area. During high flow conditions, water can be delivered past Second Point down the Kern River channel, and to the Outlet Canal via a gate structure at the Intertie. The Kern River Flood Channel can receive flow from a gate structure from the Outlet Canal. Buena Vista Water Storage District uses the Flood Channel to recharge non-flood Kern River water under its existing rights (Figure 3.6-3). Prior to the construction of the Intertie, the Flood Channel was also used to divert flood flows north to the Tulare Lake bed.

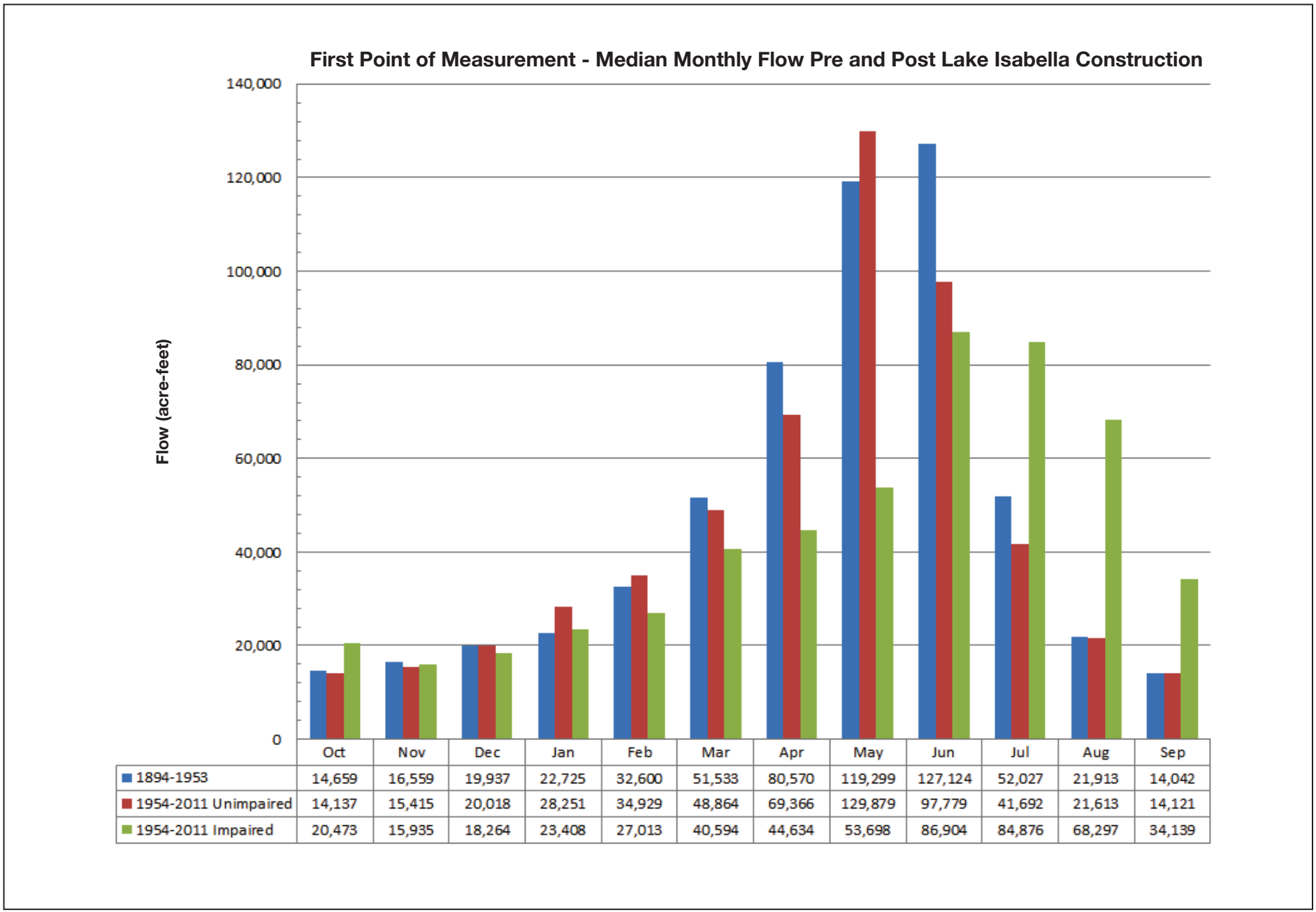
Kern River Flows

Completion of Lake Isabella Dam in 1954 altered the snowmelt-driven hydrology of the Kern River. Monthly flow data reported for the First Point of Measurement is available from the *Kern River 2011 Hydrographic Report* (City of Bakersfield 2011) for water years 1894 through 2011. Regulated flows released from Lake Isabella Dam are also reported for water years 1954 through 2011. The data includes the impaired flows released at the dam and unimpaired flows corrected to show what the natural flows would have been without flow regulation. The pre- and post-Lake Isabella Dam flows are plotted together in Figure 3.6-4 to show the typical seasonality of monthly flows on the Kern River. As is common in reservoir operations, monthly impaired flow releases are less than the unimpaired flow for months December through June, as winter runoff and the spring snowmelt flows are stored in the reservoir so water will be available for release later in the year. Flow impoundment is greatest in April and May, with respective decreases in the median monthly natural flow regime of 36% and 59% (Table 3.6-1). As the snowmelt diminishes and flow levels recede into Lake Isabella during the months of July through October, the regulated flows released at the dam are higher than the unimpaired natural flow regime as releases are made to meet water demands downstream. The median monthly impaired flows in July, August, and September are 104%, 216%, and 142% (respectively) greater than the unimpaired flows (Table 3.6-1).

Table 3.6-1. Median Monthly Flow for First Point of Measurement Unimpaired and Impaired Flows (acre-feet)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1894–1953	14,659	16,559	19,937	22,725	32,600	51,533	80,570	119,299	127,124	52,027	21,913	14,042
1954–2011 Unimpaired	14,137	15,415	20,018	28,251	34,929	48,864	69,366	129,879	97,779	41,692	21,613	14,121
1954–2011 Impaired	20,473	15,935	18,264	23,408	27,013	40,594	44,634	53,698	86,904	84,876	68,297	34,139
% Change from Unimpaired	45%	3%	-9%	-17%	-23%	-17%	-36%	-59%	-11%	104%	216%	142%

Source: City of Bakersfield 2012.



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1894-1953	14,659	16,559	19,937	22,725	32,600	51,533	80,570	119,299	127,124	52,027	21,913	14,042
1954-2011 Unimpaired	14,137	15,415	20,018	28,251	34,929	48,864	69,366	129,879	97,779	41,692	21,613	14,121
1954-2011 Impaired	20,473	15,935	18,264	23,408	27,013	40,594	44,634	53,698	86,904	84,876	68,297	34,139

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Figure 3.6-4
Kern River Median Monthly Flow (Acre-Feet) Comparison at the First Point of Measurement for Pre- and Post-Lake Isabella Dam Periods

Downstream of the First Point of Measurement, numerous structures and canals divert most of the Kern River flow. Approximately 80% of the water flowing past the First Point of Measurement was diverted once it reached the Calloway Weir between 1970 and 2010 (City of Bakersfield 2012). Table 3.6-2 shows monthly flow statistics for the Kern River at the Calloway Weir for water years 1970 through 2010 compared with regulated First Point of Measurement flows for the same period. The values show a median monthly flow of 0.0 AF in 7 months of the year. Median monthly flows are highest in July (1,500 AF) and August (700 AF) in the Kern River below the Calloway Weir. In at least a quarter of the years, there is no monthly flow in the Kern River downstream of the Calloway Weir. Flows are reduced even further downstream. For the 24 year period from 1988 through 2011, water only reached the Second Point of Measurement via the Kern River channel 24% of the time and only reached the Intertie 13% of the time. Figure 3.6-5 plots flows in the lower Kern River at the four locations of the First Point of Measurement, The Second Point of Measurement, the Outlet Weir, and the Intertie for the period 1988 through 2012. Figure 3.6-5 illustrates how infrequently water flows in the lower Kern River past the Second Point of Measurement and how even less frequently water makes it all the way downstream to the Intertie. See the section *Kern Water Bank Operations* below for specifics on how the Kern Water Bank alters Kern River Flows.

Since its initial operation in 1978, the Intertie has operated in 9 years (Table 3.6-3), all of which were wet water year types except the above-normal water year in 1984, which was carryover from Lake Isabella storage of the extremely wet 1983 water year (discussion of water year type classification is presented below in the section *Kern Water Bank Authority Operations*). The Intertie typically receives Kern River flows when First Point of Measurement unimpaired cumulative flow for the water year reaches about 500,000 AF (Lake Isabella's capacity is 570,000 AF) (Appendix L). The volume of Kern River water that reached the Intertie ranged from 1,793 AF in 1997 to 664,036 AF in 1983. The number of days of Intertie operation also varies greatly, ranging from 3 days in 1986 to 283 days in 1983.

Tulare Lake Basin Plan

The Tulare Lake Basin Plan (Central Valley River Water Quality Control Board 2016) describes beneficial uses for waters in the Kern River watershed. Table 3.6-4 lists the beneficial uses of the Kern River above Lake Isabella, at Lake Isabella, from Lake Isabella to Kern River Powerhouse No. 1, and below Powerhouse No. 1.

Table 3.6-2. Kern River Flows at Calloway Weir and First Point of Measurement, 1970 through 2010 (acre-feet)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Kern River at Calloway Weir 1970–2010[a]												
Median	100	0	0	0	0	300	1,500	700	0	0	100	0
Average	3,600	6,900	8,000	14,200	26,100	31,000	24,000	13,400	5,900	5,500	5,600	4,800
Kern River at First Point of Measurement 1970–2010 (Impaired)												
Median	24,117	27,013	38,878	44,894	53,698	83,715	84,876	68,881	34,415	20,772	15,935	18,264
Average	28,552	35,935	49,512	60,842	86,493	114,294	114,016	84,975	43,202	34,015	27,958	25,448
Percent Reduction in Kern River Flow at Calloway Weir												
Median	-99.6%	-100.0%	-100.0%	-100.0%	-100.0%	-99.6%	-98.2%	-99.0%	-100.0%	-100.0%	-99.4%	-100.0%
Average	-87.4%	-80.8%	-83.8%	-76.7%	-69.8%	-72.9%	-79.0%	-84.2%	-86.3%	-83.8%	-80.0%	-81.1%

[a] Calloway Weir flow data from Appendix D in City of Bakersfield Draft Environmental Impact Report 2012.

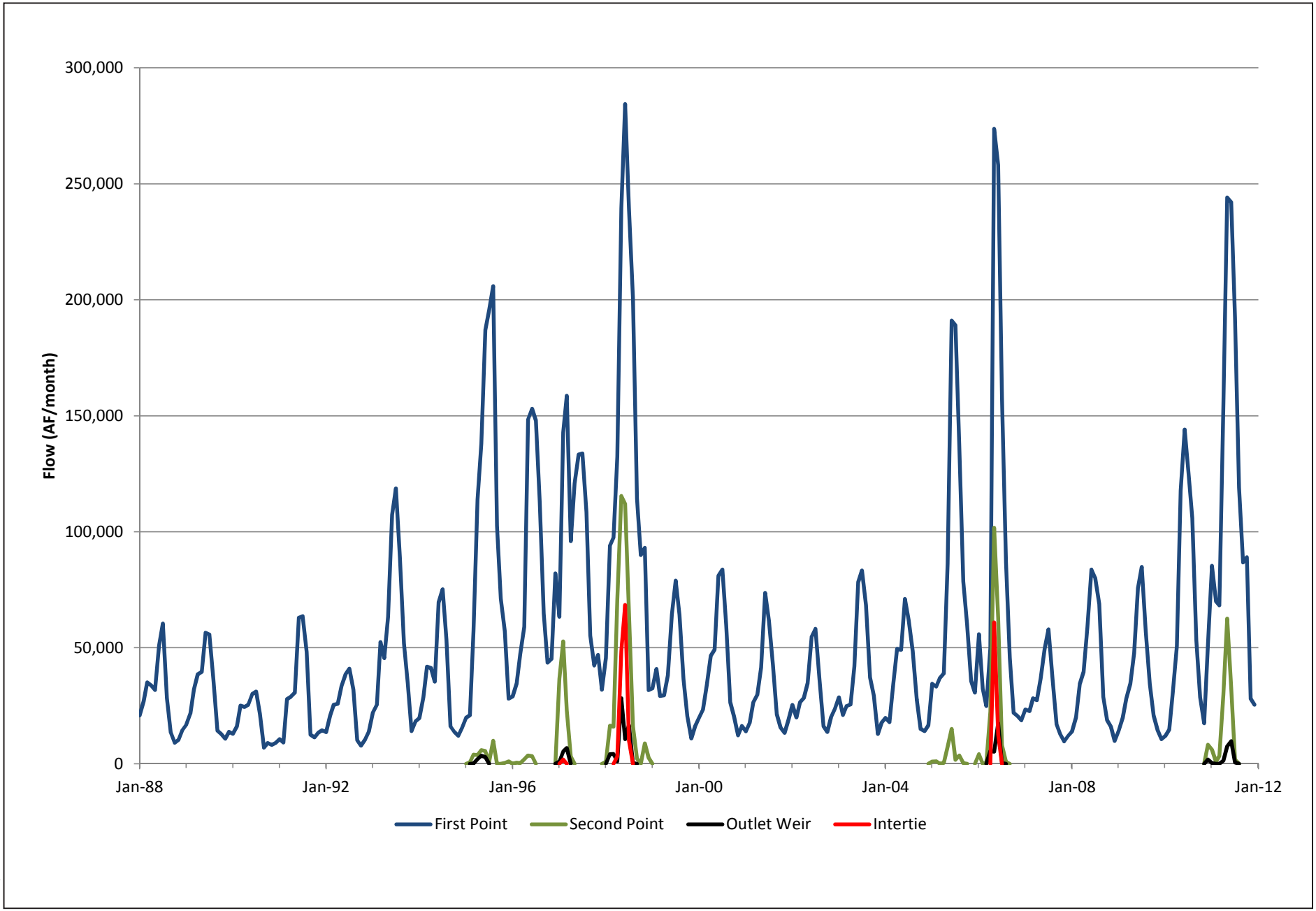

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Figure 3.6-5
Flows at Four Locations on the Lower Kern River 1988–2012

Table 3.6-3. Intertie Operation and Flow from 1978 through 2012[a]

Year	Water Year Type	Kern River Water (AF)	Days of Operation	Friant-Kern Water (AF)	Days of Operation	Total Water (AF)	Total Days of Operation	Kern River Annual Flow as % of Normal
1978	Wet	168,818	84	9,113	16	177,931	84	234%
1980	Wet	138,816	112	0	0	138,816	112	212%
1982	Wet	12,000[b]	13	11,968	21	22,307	34	171%
1983	Wet	664,036	283	96,200	83	760,236	338	331%
1984[c]	Above Normal	26,720	40	0	0	26,720	40	91%
1986	Wet	1,868	3	15,580	22	17,448	25	190%
1997	Wet	1,793	7	51,055	48	52,848	48	122%
1998	Wet	130,226	71	57,822	44	188,048	97	243%
2006[d]	Wet	73,411	49	28,329	30	101,740	49	170%
TOTALS		1,216,027	662	270,067	264	1,486,094	827	

Source: State Water Resources Control Board 2009.

AF = acre-feet.

[a] The Intertie only operates during flood conditions. From 1978 through 2012, the Intertie has operated in 9 years.

[b] Detailed Intertie records actually total to 12,000 AF.

[c] Kern River Intertie flow carryover from 1983 Lake Isabella storage.

[d] Kern River Intertie flows due to storage restrictions imposed on Lake Isabella.

Table 3.6-4. Beneficial Uses of Surface Water in the Kern River Watershed

	Kern River			
Beneficial Uses	Above Lake Isabella	Lake Isabella	Lake Isabella to Kern River Powerhouse No. 1	Below Kern River Powerhouse No. 1
Municipal & Domestic	✓			✓
Agricultural Supply				✓
Industrial Service Supply				✓
Industrial Process Supply				✓
Hydropower Generation	✓	✓	✓	✓
REC-1	✓	✓	✓	✓
REC-2	✓	✓	✓	✓
Warm Freshwater Habitat	✓	✓	✓	✓
Cold Freshwater Habitat	✓	✓	✓	
Wildlife Habitat	✓	✓	✓	✓
RARE	✓		✓	✓
SPWN	✓			
Groundwater Recharge				✓
Freshwater Replenishment	✓	✓		

Source: Central Valley Water Resources Quality Control Board 2004.

RARE = Rare, threatened, or endangered species

SPWN = Spawning, reproduction, and/or early development

REC-1 = Indicates recreational activities involving body contact with water, where ingestion of the water is reasonably possible. These uses include, but are not limited to, swimming, wading, water skiing, skin and scuba diving, surfing, white water activities, fishing, and use of natural hot springs.

REC-2 = Indicates recreational activities involving proximity to water, but generally with no body contact with water nor any likelihood of ingestion of water. These include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, and aesthetic enjoyment associated with these activities.

Groundwater

The Kern County Subbasin is within the Tulare Lake Hydrologic Region and comprises an area of approximately 1,945,000 acres (3,040 square miles) in Kern County. The subbasin is bounded to the north by the Tulare Lake and Tule Subbasin, to the east by crystalline bedrock of the Greenhorn Mountains and Sierra Nevada, to the south by crystalline bedrock and marine sediments of the Tehachapi and San Emigdio Mountains, and to the west by the marine sediments of the Coast Ranges. Recharge occurs primarily through infiltration into the streambed of the Kern River and artificial recharge at groundwater banking facilities that exist throughout most of the area. Secondary sources of recharge include return flows from agricultural and municipal irrigation and infiltration of flows from intermittent streams along the edge of the subbasin. The primary sources of groundwater discharge are water pumped for irrigation and municipal supply (Burton and Belitz 2012).

Regional Geologic Setting

As mentioned in Section 3.5, *Geology and Seismicity*, Tertiary and Quaternary aged sediments form the shallow to intermediate depth water-bearing units underlying the project area. From oldest to youngest, the deposits include: the Olcese and Santa Margarita Formations, the Tulare Formation (western portion of the subbasin) and laterally equivalent Kern River Formation (eastern portion of the subbasin), older alluvium, and younger alluvium and laterally equivalent flood basin deposits (Department of Water Resources 2003).

The origin of the Miocene Olcese and Santa Margarita Formations varies from continental to marine from east to west across the subbasin. The Olcese and Santa Margarita Formations are current sources of drinking water only in the northeastern portion of the subbasin where they occur as confined aquifers. The Olcese Formation is primarily sand, ranging in thickness from 100 to 450 feet. The Santa Margarita Formation is from 200 to 600 feet thick and consists of coarse-grained sand (Department of Water Resources 2003).

The Tulare and Kern River Formations are both Plio-Pleistocene aged and represent a west–east facies change across the subbasin. The Tulare Formation (western subbasin) contains up to 2,200 feet of interbedded, oxidized to reduced sands; gypsiferous clays and gravels derived primarily from Coast Ranges sources. The formation includes the Corcoran Clay, which is present in the subsurface from the Kern River Outlet Canal on the west through the central and much of the eastern subbasin at depths of 300 to 650 feet. Groundwater beneath the Corcoran Clay is confined. The Kern River Formation includes from 500 to 2,000 feet of poorly sorted, lenticular deposits of clay, silt, sand, and gravel derived from the Sierra Nevada. Both units are moderately to highly permeable and yield moderate to large quantities of water to wells (Department of Water Resources 2003).

The older alluvium and terrace deposits are composed of up to 250 feet of Pleistocene-aged lenticular deposits of clay, silt, sand, and gravel that are loosely consolidated to cement and are exposed mainly at the subbasin margins. This sedimentary unit is moderately to highly permeable and yields large quantities of water to wells. The unit is often indistinguishable from the Tulare and Kern River Formations below and, together with these underlying formations, forms the principal aquifer in the Kern County Subbasin (Department of Water Resources 2003).

The Holocene-aged younger alluvium and flood basin deposits vary in character and thickness in the subbasin. Along the eastern and southern subbasin margins, the unit consists of up to 150 feet of interstratified and discontinuous beds of clay, silt, sand, and gravel. In the southwestern portion of the subbasin, the unit is finer grained and less permeable as it grades into fine-grained flood basin deposits underlying the historic lakebeds of Buena Vista and Kern Lakes. The flood basin deposits consist of silt, silty clay, sandy clay, and clay interbedded with poorly permeable sand layers. These flood basin deposits are difficult to distinguish from underlying fine-grained older alluvium, and the total thickness of both units may be as much as 1,000 feet (Department of Water Resources 2003).

Faults that affect groundwater movement in the Kern County Subbasin include the Edison, Pond-Poso, and White Wolf faults. Other barriers to groundwater movement include anticlinal folds, such as Elk Hills and Buena Vista Hills, angular unconformities, and contacts with crystalline and consolidated sedimentary rocks at the subbasin margins. The Corcoran Clay significantly impedes vertical groundwater movement where present (Department of Water Resources 2003).

Kern River Alluvial Fan Aquifer

Locally, sediments deposited by the ancestral Kern River into an alluvial fan or fan delta comprise the aquifer underlying the KWB and surrounding area.[4] These sediments consist of varying amounts of sand, silt, gravel, and clay. Sand count data compiled by California State University Bakersfield (Negrini et al. 2005) indicate the upper 300 feet of the aquifer consists of about 70% sand, whereas below this depth the aquifer consists of about 50% sand. The balance of the sediments consists of silt and lesser amounts of gravel and clay. Unlike some other parts of the groundwater basin, no laterally extensive clay deposits (e.g., the Corcoran Clay) are present under the KWB (Negrini et al. 2005). In fact, those who have studied the stratigraphy of the aquifer find it very difficult to find any single deposit that can be correlated with confidence across the Kern Fan (California State University Bakersfield 2005; Department of Water Resources 1990; Pacific Geotechnical Associates 1991; Wilson 1993). The usable part of the aquifer is above the base of fresh water (electrical conductivity less than 3,000 µmhos/cm), which varies in depth from about -2,800 feet mean sea level (msl) near the eastern edge of the KWB to about -800 feet msl adjacent to Elk Hills (Page 1976).

The Kern Fan's stratigraphy has resulted in a leaky aquifer, as evidenced by hydraulic head data from monitoring wells located throughout the KWB area. Recharge events initially result in successively higher head levels in successively shallower intervals. With time, however, pressure equalization occurs as the head in the intervals converge as water migrates down through the vadose zone, reaches the water table, and re-pressurizes the lower parts of the aquifer. This is a classic example of a leaky aquifer, where there are no distinct, laterally extensive aquitards preventing this re-pressurization.

Groundwater Levels

Groundwater elevations and depths for August 2012 are shown in Figures 3.6-6 and 3.6-7, respectively. As shown in Figure 3.6-6, a groundwater mound exists in the eastern KWB area with groundwater gradients of about 25 feet per mile toward the northwest and southeast. The depth to water at that time ranged from about 40 feet to about 120 feet in the vicinity of the KWB ponds (Figure 3.6-7).

The August 2012 groundwater levels are a single snapshot in time of groundwater conditions. Historic water levels in the project area have varied through time in response to wet and dry cycles and water banking operations. Long-term groundwater hydrograph plots of potentiometric surfaces are shown in Figure 3.6-8 for the 11P wells and in Figure 3.6-9 for the 16L wells[5] (located at township and range T30S/R25E). These hydrographs are for clustered monitoring wells that are completed at various depths as indicated in the figures. The shallower completions document water levels in the aquifer, whereas the deeper completions represent hydraulic head in the aquifer. Both hydrographs show a steady decline in water levels through the early 1990s due to drought conditions. The recharge activities of the KWB and other banking projects can be seen in the dramatic rise in water levels from 1995 through 1999. Several recharge and recovery cycles, coinciding with wet and dry periods, are documented after this time by rises and falls in water levels and hydraulic head.

[4] The area including and surrounding the KWB is often referred to as the "Kern Fan" in reference to the Kern River Alluvial Fan.

[5] Wells are numbered on the state well numbering system.

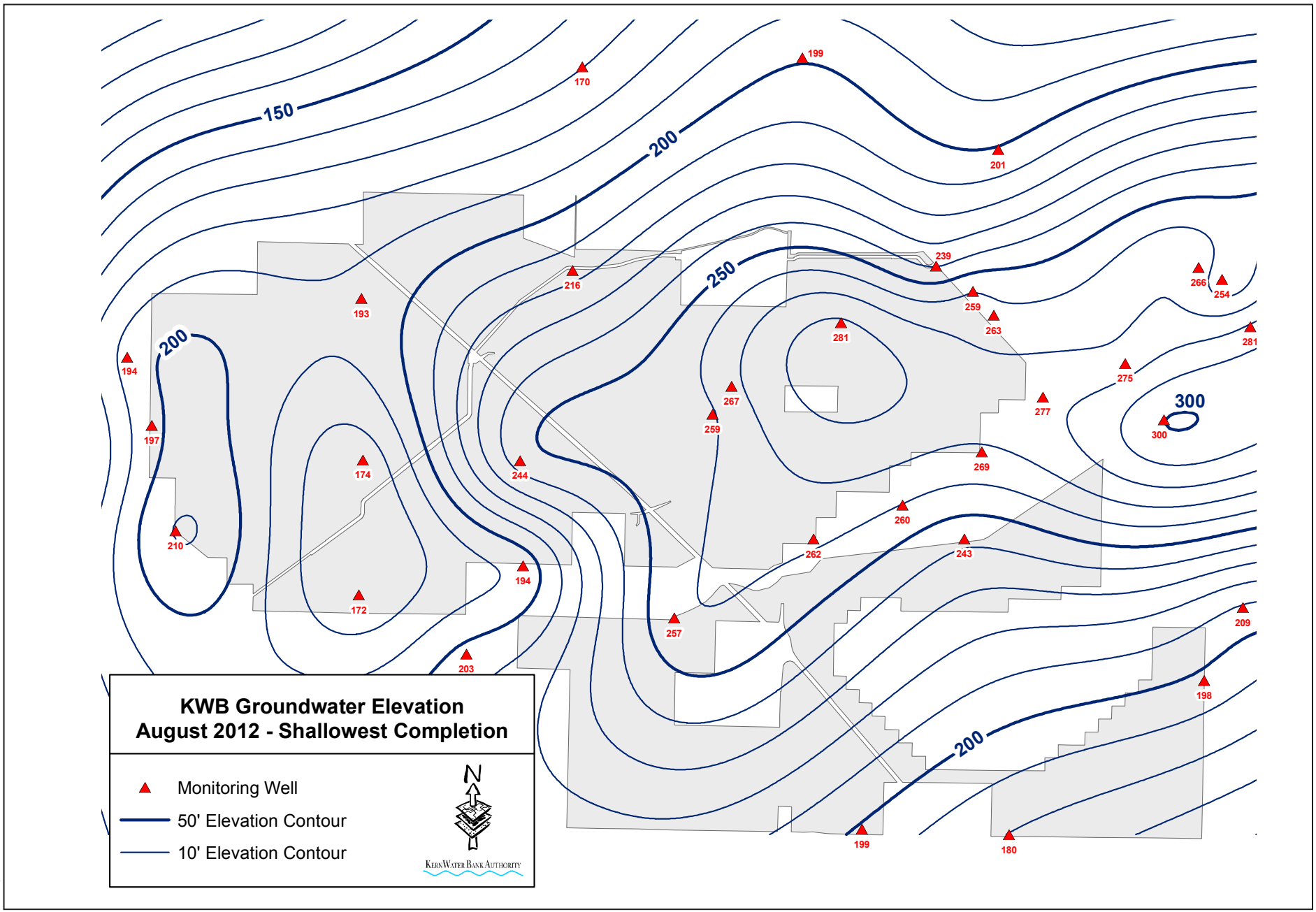
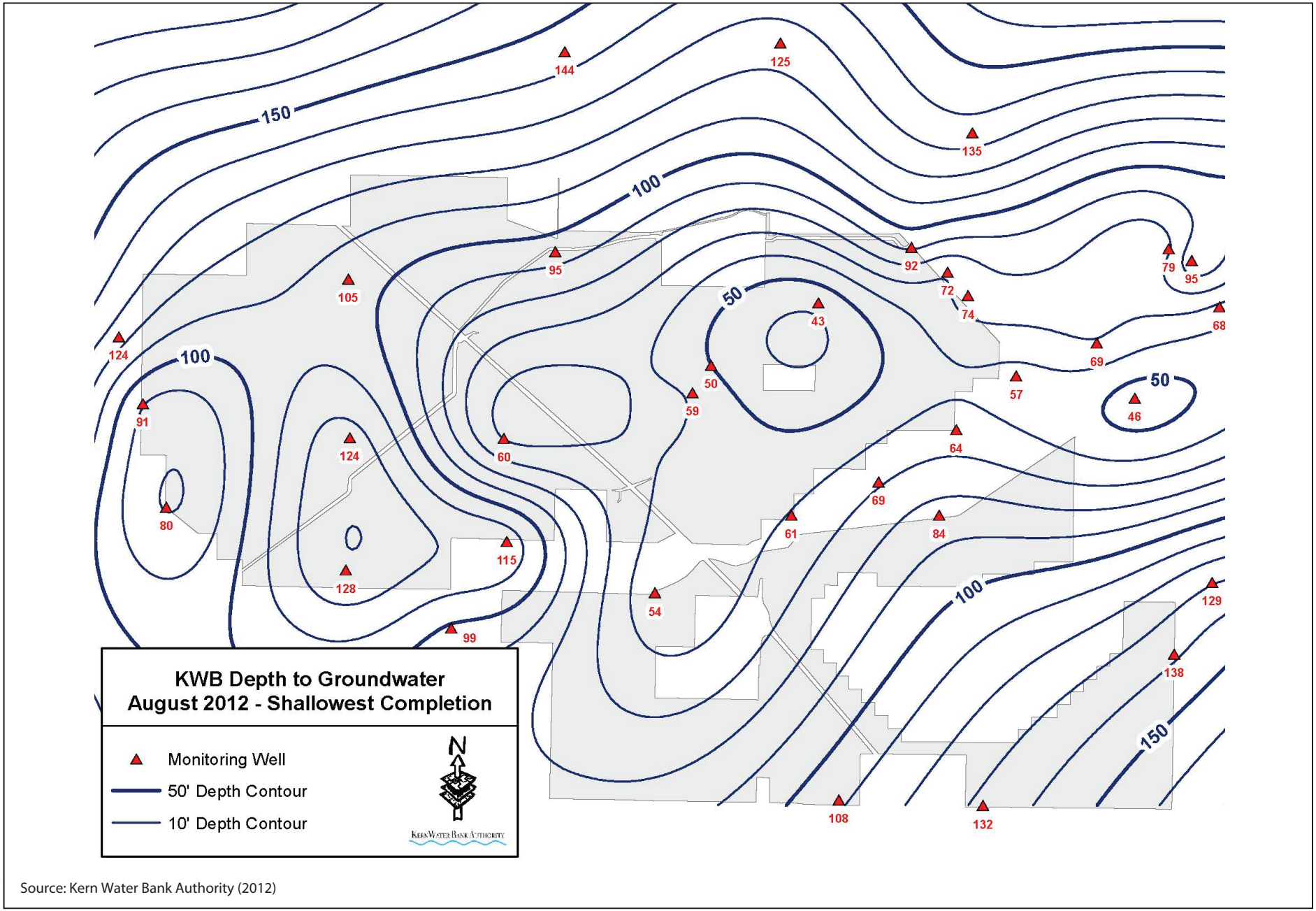


Figure 3.6-6
Groundwater Elevation Contours in the Kern Water Bank–Shallowest Completion August 2012



Source: Kern Water Bank Authority (2012)

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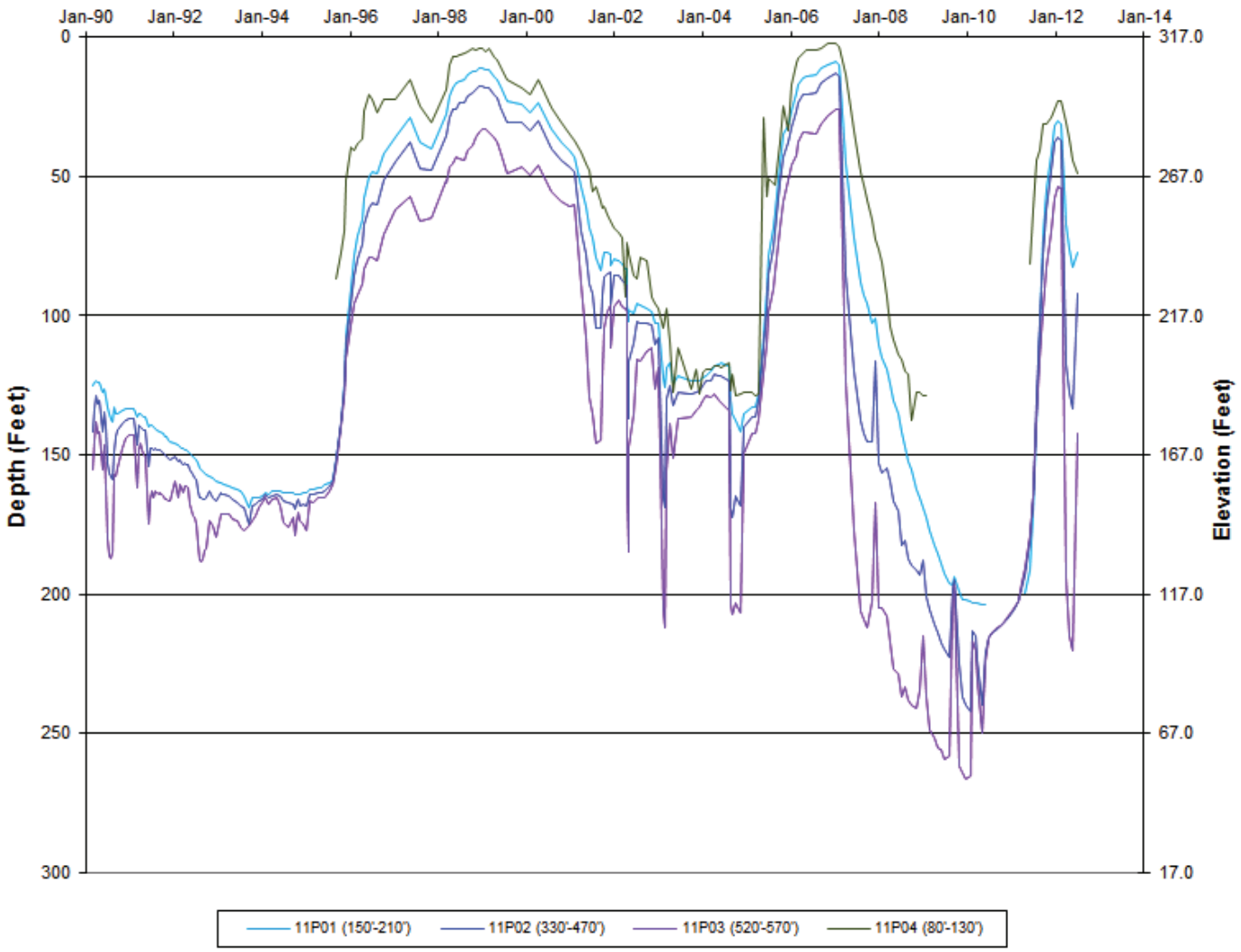
Figure 3.6-7
Depth to Groundwater Contours in the Kern Water Bank–Shallowest Completion August 2012



Source: Kern Water Bank Authority

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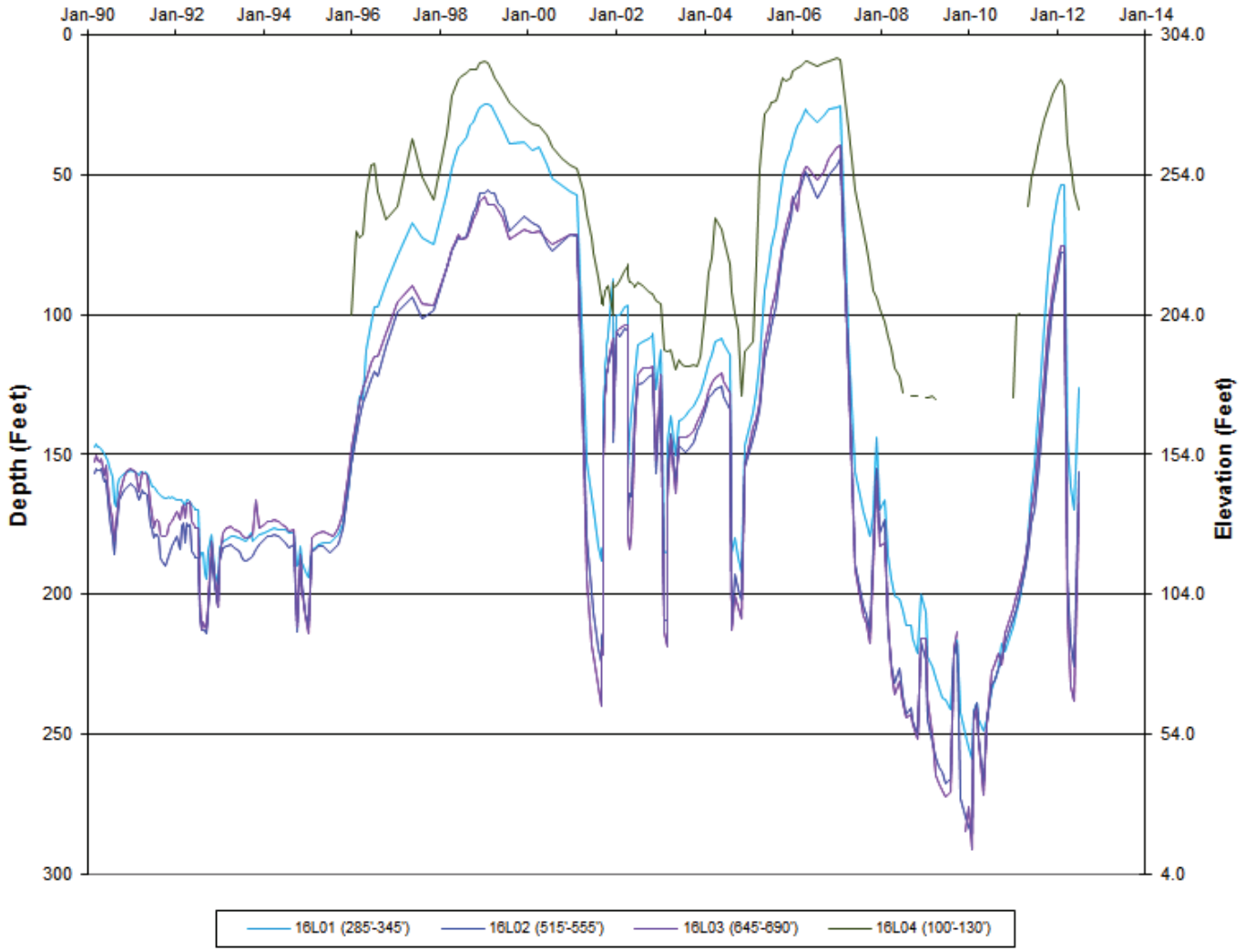
Figure 3.6-8
1990–2012 Timeseries of Groundwater Potentiometric Surface at Kern Water Bank Authority 11P Wells



Source: Kern Water Bank Authority

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Figure 3.6-9
1990–2012 Timeseries of Groundwater Potentiometric Surface at Kern Water Bank Authority 16L Wells

Surface Water Quality

Surface waters are supplied to the KWB region for recharge from three primary sources: the Kern River, the CVP via the Friant-Kern Canal, and the SWP via the California Aqueduct (Figure 3.6-2). Due to the mostly undeveloped nature of the Kern River watershed, the water quality of the Kern River is very good to excellent as it enters the Tulare Basin. Imported surface water from the California Aqueduct is of good quality and of the Friant-Kern Canal is of very good to excellent quality.

Total dissolved solids (TDS)[6] in the Kern River, as reported by Improvement District No. 4 for 2011, was 96 milligrams per liter (mg/L), arsenic[7] was 4 micrograms per liter (µg/L), and nitrate[8] was not detected. These values are all below the California drinking water maximum contaminant levels (MCLs) specified for these three constituents of 1,000 mg/L for TDS, 10 µg/L for arsenic, and 10 mg/L for Nitrate plus Nitrite. Typically, Kern River water has lower TDS levels compared to both groundwater and SWP water sources. CVP water from the San Joaquin River watershed usually has the lowest TDS levels. For 2007 through 2011, Kern River TDS levels averaged 100.4 mg/L. Central Valley Project water from the San Joaquin River watershed has a reported TDS of 59 mg/L for 2007–2011, with only one year of detections of arsenic or nitrate. Nitrate plus nitrite were not detected in Kern River data for 2007 through 2011, and arsenic is always well below the MCL, with an average of 4 µg/L over the 2007 through 2011 period. The SWP water quality varies throughout the year and also by water year type. Water quality is generally better in spring and summer and poorer in fall and winter. In addition, wetter water years exhibit better water quality, whereas progressively drier years exhibit progressively poorer quality. It should be noted, however, that most major recharge episodes occur in wet years, when SWP TDS averages 223 mg/L (Department of Water Resources 2001).

Groundwater Quality

Extensive monitoring conducted in the Kern Fan area has established that baseline water quality is very good. The average TDS concentration measured at 84 KWB recovery wells in 2011 and 2012 is 291 mg/L. TDS concentrations generally increase from east to west, coincident with a general change in water type from calcium or sodium bicarbonate to calcium sulfate. No pesticides or other organic contaminants are confirmed present in any of the KWB recovery wells.

Water Banking

Formal water banking was initiated in the Kern Fan area in 1978 with the construction of the City of Bakersfield's 2,800-acre recharge facility. Several additional projects were developed after the mid-1990s, including the KWB, the Berrenda Mesa Project, the Pioneer Project, the Buena Vista–West Kern Project, the Strand Ranch Project (owned by Irvine Ranch Water District), and the Rosedale

[6] TDS represents the total concentration of dissolved substances in water. TDS is made up of inorganic salts, as well as a small amount of organic matter. These minerals can originate from a number of sources, both natural and as a result of human activities.

[7] Trace metals such as arsenic occur naturally in the environment. Many trace metals are necessary for healthy biological function, where deficiencies in certain trace metals can result in disease and ailment. At elevated levels, trace metals can be toxic.

[8] Drinking water standards have been set for nitrate because nitrate and nitrite can cause effects in humans at elevated levels.

Rio-Bravo Water Storage District Project (see Figure 3.6-10 for KWB facilities). With only a few exceptions, all of the water stored in the projects was directly recharged to the aquifer; very little was recharged through in-lieu methods. Recovery from these projects can either occur through pumping wells or by exchange. Current storage in these projects exceeds 2.5 million acre-feet (MAF). Details regarding KWB facilities and historic operations are provided in Section 2.2, *Existing KWB Conditions*.

Kern Water Bank Operations

Water Sources

The volumes and percentages of water provided by the KWB's three major sources of water—the SWP via the California Aqueduct, CVP via the Friant–Kern Canal, and Kern River—from 1995 to 2017 are summarized in Table 3.6-5 and displayed in Figure 3.6-11. Excluding minor contributions from third-party sources, from 1995 to 2016, the California Aqueduct has been the largest source of water to the KWB at 58.5%, followed by the Kern River at 27%, and Friant–Kern Canal at 14.5% (Table 3.6-5). In 14 of the 22 years that the KWB has been operational, no water was obtained from the Kern River. Although the water year is not complete, the current year is a wet year following several years of drought conditions. Through September 2017, the KWBA has recharged approximately 216,000 AF of Kern River water and 246,000 AF of SWP water. The KWBA expects to recharge a total of approximately 550,000 AF in 2017 (data not included in Table 3.6-5) (Kern Water Bank Authority pers. comm.).

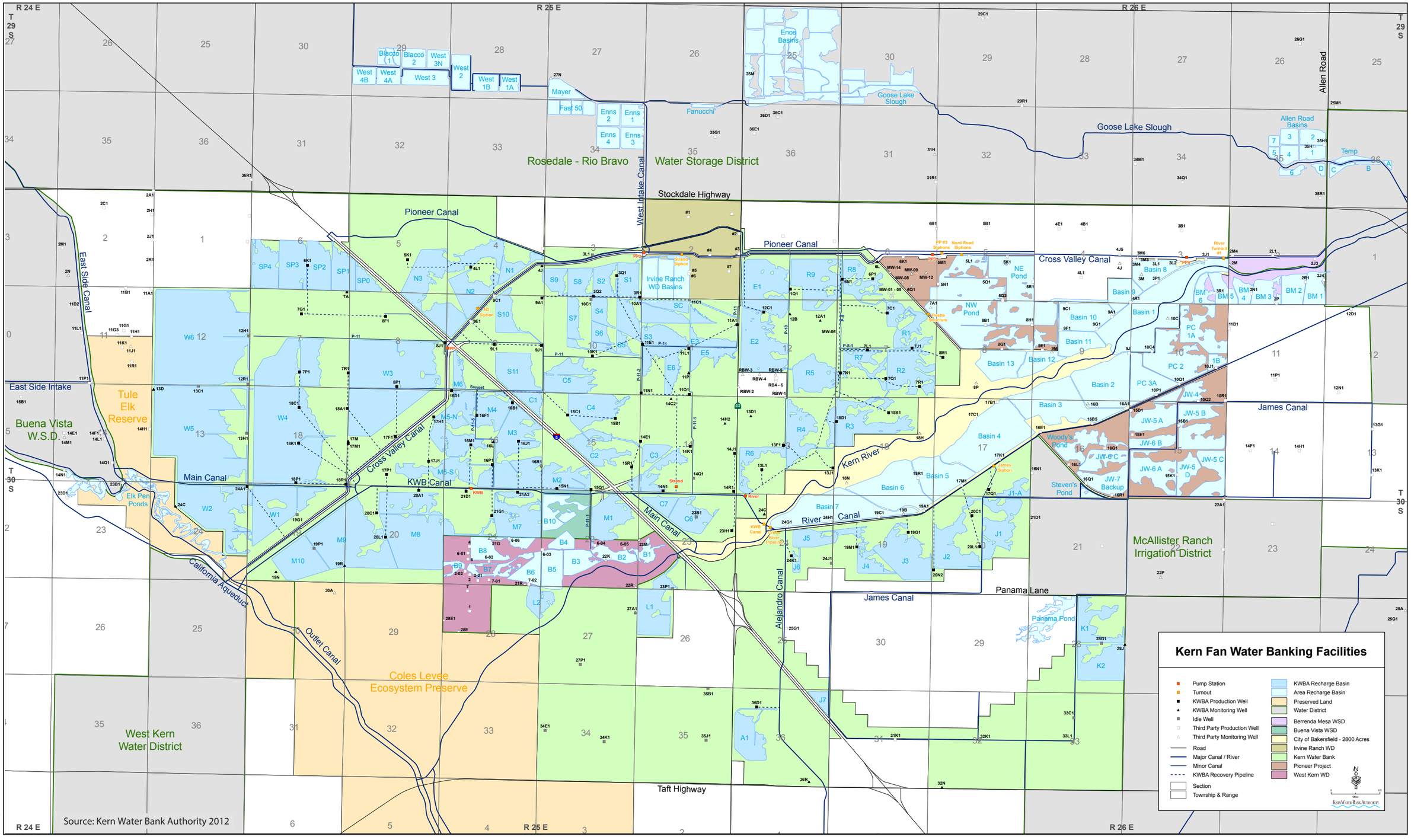
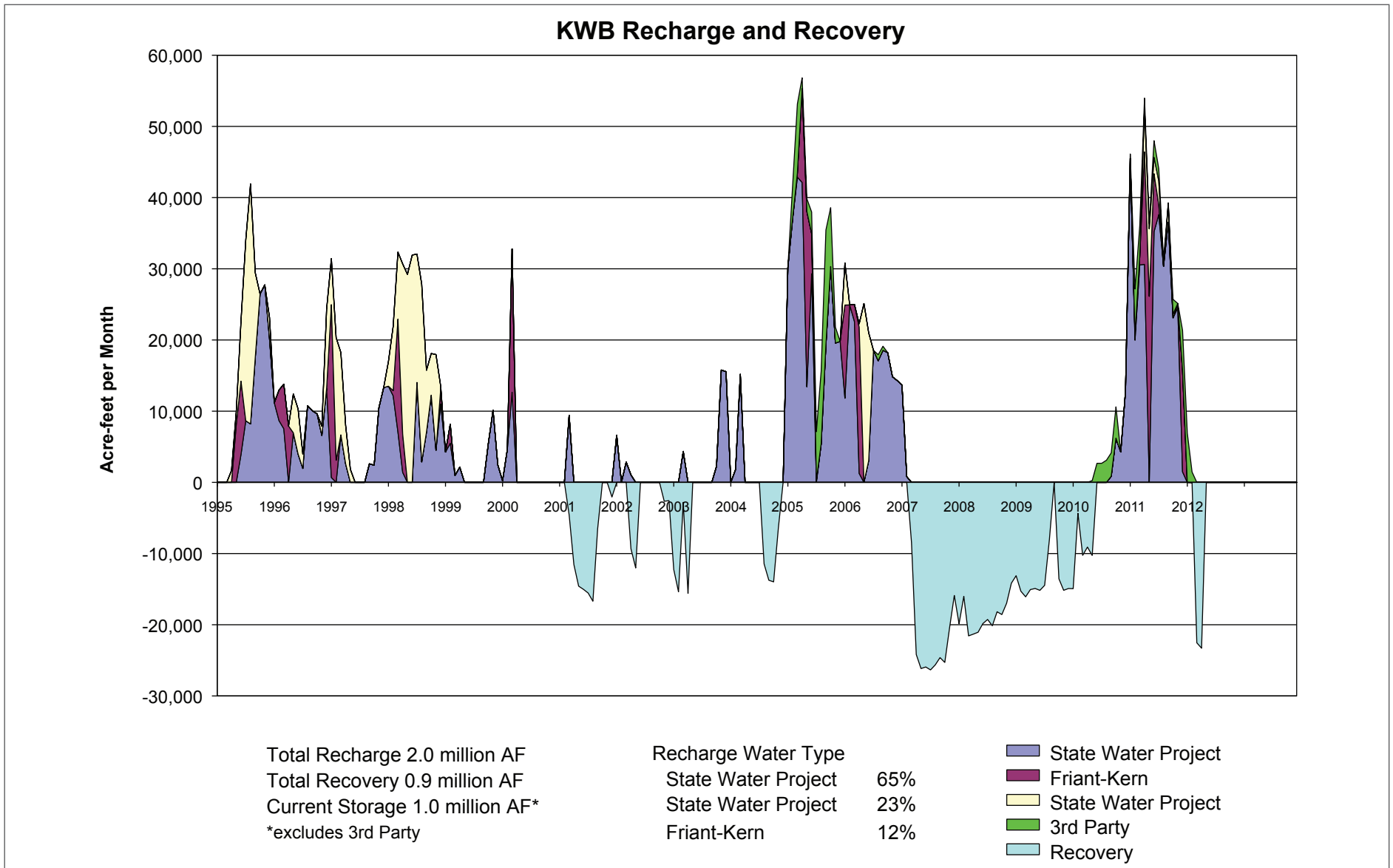


Figure 3.6-10
Kern River Alluvial Fan Water Banking Facilities



Source: Kern Water Bank Authority 2012

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Figure 3.6-11
Kern Water Bank Sources of Groundwater Recharge and Recovery Rates 1995–2012

Table 3.6-5. Kern Water Bank Sources of Water by Year and Water Year Type

Year	Water Year Type[a]	State Water Project (acre-feet)	State Water Project (% of Total)	CVP (Friant-Kern) (acre-feet)	CVP (Friant-Kern) (% of Total)	Kern River[b] (acre-feet)	Kern River[b] (% of Total)	Total (acre-feet)
1995	Wet	70,329	31.6%	47,035	21.2%	104,896	47.2%	222,260
1996	Wet	87,492	50.3%	49,893	28.7%	36,490	21.0%	173,875
1997	Wet	40,049	35.7%	28,806	25.7%	43,407 (22,187)	38.7%	112,262
1998	Wet	51,155	16.9%	55,248	18.2%	196,683 (79,121)	64.9%	303,086
1999	Above-Normal	26,011	70.8%	10,563	28.7%	179	0.5%	36,753
2000	Above-Normal	19,455	70.5%	8,124	29.5%	–	0.0%	27,579
2001	Dry	10,030	100%	–	0.0%	–	0.0%	10,030
2002	Dry	13,439	100%	–	0.0%	–	0.0%	13,439
2003	Below-Normal	40,374	100%	–	0.0%	–	0.0%	40,374
2004	Dry	18,065	100%	–	0.0%	–	0.0%	18,065
2005	Wet	327,418	84.5%	59,239	15.3%	900	0.2%	387,557
2006	Wet	178,065	62.9%	40,244	14.2%	64,924 (46,349)	22.9%	283,233
2007	Critical	16,728	100%	–	0.0%	–	0.0%	16,728
2008	Critical	–	–	–	–	–	–	–
2009	Below-Normal	–	–	–	–	–	–	–
2010	Above-Normal	33,131	100%	–	0.0%	–	0.0%	33,131
2011	Wet	352,297	78.8%	68,230	15.3%	26,621	6.0%	447,148
2017 (Est. thru September)[c]	Dry	246,000	53.1%	1,600	0.3%	216,000	46.6%	463,600
Aver.[d]		77,224		20,499		35,894		133,618
Total		1,488,038	58.5%	368,982	14.5%	690,100	27%	2,547,120

Source: Derived from Appendix L.

[a] Water Year type determined from the *California Department of Water Resources Water Year Hydrologic Classification Index for the San Joaquin Valley* (no specific DWR classification is available for the Kern River watershed).

[b] Values in parentheses indicate the portion of the total Kern River diverted water that was from flood water.

[c] No deliveries were made to the KWB in 2012 through 2016.

[d] Average represents water years 1995 through 2011.

DWR's *Water Year Hydrologic Classification Index* (Department of Water Resources 2012) provides water year[9] classifications for the San Joaquin Valley (no specific DWR classification is available for the Kern River watershed). Analysis of the water sources by water year type shows that water is obtained from Friant–Kern Canal and Kern River sources only in above-normal and wet years (Table 3.6-6). Nearly all of the Kern River (flood and non-flood) water diverted by KWB for groundwater recharge occurred during wet water year types (a mere 179 AF was diverted in above-normal year 1999).

Table 3.6-6. Kern Water Bank Sources of Water Summarized by Water Year Type

	State Water Project		Friant-Kern		Kern River		
Water Year Type	(acre-feet)	(% of Total)	(acre-feet)	(% of Total)	(acre-feet)	(% of Total)	Total (acre-feet)
Wet	1,106,805	57%	348,695	18%	473,921	25%	1,929,421
Above-Normal	78,597	81%	18,687	19%	179	0%	97,463
Below-Normal	40,374	100%	–	0%	–	0%	40,374
Dry	41,534	100%	–	0%	–	0%	41,534
Critical	16,728	100%	–	0%	–	0%	16,728

Source: Derived from Kern Water Bank Authority 2013.

The unimpaired First Point of Measurement median annual flow for the period 1954 through 2011 was 555,182 AF. By comparison, the median annual flow from 1995 through 2011 was quite similar at 588,685 AF. Likewise, the distribution of water year types from 1995 through 2011 compared to 1954 through 2011 is quite similar (Table 3.6-7). Thus, the hydrologic record shows that 1995 to 2011 is typical of the longer term record, and the variability in percentages of water received from the three major sources from 1995 to 2011 could be expected to represent future conditions, at least for the near term.

Table 3.6-7. Comparison of Water Year Type Distribution

	1954–2011		1995–2011	
Water Year Type	Number	% of Total	Number	% of Total
Wet	20	34%	7	41%
Above-Normal	8	14%	3	18%
Below-Normal	7	12%	2	12%
Dry	10	17%	3	18%
Critical	13	22%	2	12%

[9] Water year types for the San Joaquin Valley are classified as one of five categories: 1) Wet; 2) Above Normal; 3) Below Normal; 4) Dry; and 5) Critical, and are determined from calculations of unimpaired runoff from the Stanislaus River, Tuolumne River, Merced River, and San Joaquin River.

Flows and Climate Change

Climate change models show that increased temperatures will result in lower annual runoff in Sierra Nevada watersheds. Null et al.'s study, *Hydrologic Response and Watershed Sensitivity to Climate Warming in California's Sierra Nevada* (2010), used calibrated modeling to predict the change in mean annual flow in Sierra Nevada watersheds due to temperature increase scenarios of 2°, 4°, and 6°C. The climate change model results show decreases in Kern River watershed mean annual flow of 4.2%, 8.2%, and 12.2% for the respective temperature increases (Table 3.6-8). Most of the decreases are due to higher evapotranspiration with climate warming. The study's results are consistent with other climate change models, such as Brekke et al. (2004), which show inflow into San Joaquin Valley floor reservoirs will decrease by 5% by 2025 and by 14% by 2065. The modeling suggests climate warming will create a shift from snowfall to more frequent rainfall storms over larger watershed areas. The resulting watershed runoff hydrographs will be flashier, resulting in shorter duration flood events, often with higher peak flows. The change in the timing, magnitude, and duration of future flood events will ultimately result in reduced water storage in the watersheds. The timing of annual runoff is also predicted to change such that it will leave the Kern River watershed about 3 weeks earlier in April in the 6°C warming scenario. The change in runoff timing in the Kern River is not as dramatic as other Sierra Nevada watersheds. Although future snowpack would decrease, the Kern River has the highest crest elevations of any Sierra Nevada watershed, and the cooler temperatures maintained at the high elevations would enable continued snowpack melting and runoff later in spring compared to other, lower elevation watersheds.

Table 3.6-8. Modeled Reductions in Mean Annual Flow in Sierra Nevada Watersheds Due to Climate Change Temperature Increases

	Annual Average Flow (acre-feet)				Percent Reduction from Basecase		
Watershed	Basecase	2°C	4°C	6°C	2°C	4°C	6°C
Feather	4,682,680	4,579,719	4,434,602	4,267,595	2.2	5.3	8.8
Yuba	2,448,354	2,399,711	2,343,772	2,274,861	2	4.3	7.1
Bear	398,871	385,089	372,117	360,767	3.6	6.7	9.6
American	2,882,896	2,795,339	2,701,297	2,608,875	3.1	6.3	9.5
Cosumnes	488,860	462,917	440,217	419,949	5.2	10	14
Mokelumne	793,688	766,935	744,235	719,103	3.4	6.2	9.4
Calaveras	267,535	258,618	251,321	244,025	3.3	6.3	8.9
Stanislaus	1,265,523	1,234,716	1,201,477	1,163,374	2.4	5.1	8.1
Tuolumne	1,982,194	1,946,523	1,908,419	1,867,883	1.8	3.7	5.8
Merced	1,092,841	1,060,413	1,031,227	1,002,852	3	5.6	8.2
San Joaquin	1,859,776	1,836,266	1,811,944	1,784,380	1.3	2.6	4.1
Kings	1,716,280	1,697,634	1,678,176	1,654,666	1.1	2.2	3.6
Kaweah	475,078	457,242	439,407	420,760	3.8	7.6	11.5
Tule	161,332	154,036	145,928	138,632	4.6	9.5	14.3
Kern	750,720	719,103	689,106	659,110	4.2	8.2	12.2

Source: Modified from Table 5 in Null et al. 2010.

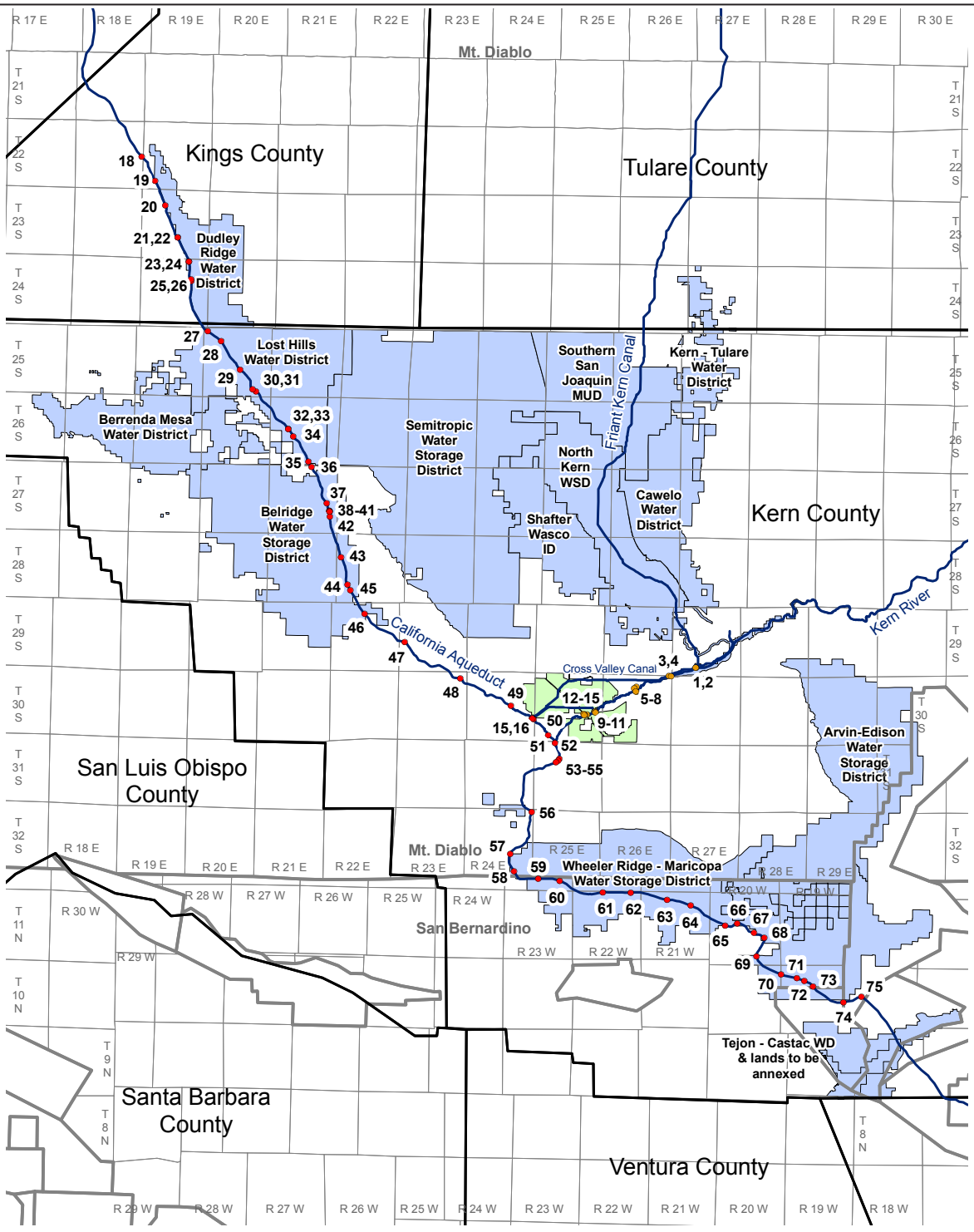
Water Diversions

KWBA diverts water from the Kern River at multiple diversion locations. The potential diversion locations are listed in Table 3.6-9 and mapped in Figure 3.6-12. A major diversion point for KWBA is Location 10 on Figure 3.6-12, the Kern Water Bank Canal diversion, which has a capacity of 800 cfs. This diversion is about 1 river mile upstream of I-5. In part, the limiting factor for diversion to KWB facilities is recharge capacity of the ponds, not diversion capacity, because recharge capacity decreases over time as groundwater levels rise and sediments become saturated, as illustrated in Figure 3.6-13. KWBA also has the ability to use its Kern Water Bank Canal or the Pioneer Canal Headworks and Cross Valley Canal to redivert flood water to the California Aqueduct for delivery to KWB members for beneficial uses.

Table 3.6-9. Kern Water Bank Diversion Locations

No.	Diversion Location	Capacity (cfs)	Notes
1	River Canal Weir	NA	Onstream impoundment.
2	River Canal East	900	Used to deliver Kern River water to the main canal and West Kern Basin 1. Supplied from River Canal Weir.
3	Bellevue Weir	NA	Onstream impoundment.
4	Pioneer Canal Headworks	350	Used to deliver water to the project via the Cross Valley Canal. Supplied from Bellevue Weir.
5	McClung Weir/City of Bakersfield Basin 1	NA	Onstream impoundment.
6	City of Bakersfield Basin 2	500	Used to deliver water to the Kern Water Bank via Pioneer Project. Basins are supplied from McClung Weir.
7	City of Bakersfield Basin 9	600	
8	City of Bakersfield Basin 10	150	
9	Second Point Diversion Weir	NA	Onstream impoundment.
10	Kern Water Bank Canal	800	Main diversion point for the Kern Water Bank. Supplied from Second Point Diversion Weir.
11	River Canal West	300	Alternate means of delivering water to the Main Canal. Supplied from Second Point Diversion Weir.
12	Sand Plug	NA	Onstream impoundment.
13	Main Canal	250	Supplied from Sand Plug.
14	KWB Basin L1	40	Supplied from Sand Plug.
15	West Kern Basin 1	200	Used to deliver water to L2 pond. Supplied from Sand Plug.
Points of Rediversion to the California Aqueduct			
16	Kern County Water Agency Turnout, Milepost 238.19	750	Supplied from Kern Water Bank Canal.
17	Kern County Water Agency Turnout, Milepost 280.04	800	Supplied from Pioneer Canal Headworks via Cross Valley Canal. Pioneer Canal Headworks capacity would limit rediversion amount to 350 cfs.

Source: Appendix D.
cfs = cubic feet per second.



Legend

- Point of Diversion
- Point of Rediversion
- River / Canal
- KWB Place of Use
- Kern Water Bank

NOTE: Deliveries to some areas by exchange.

N

KERN WATER BANK AUTHORITY

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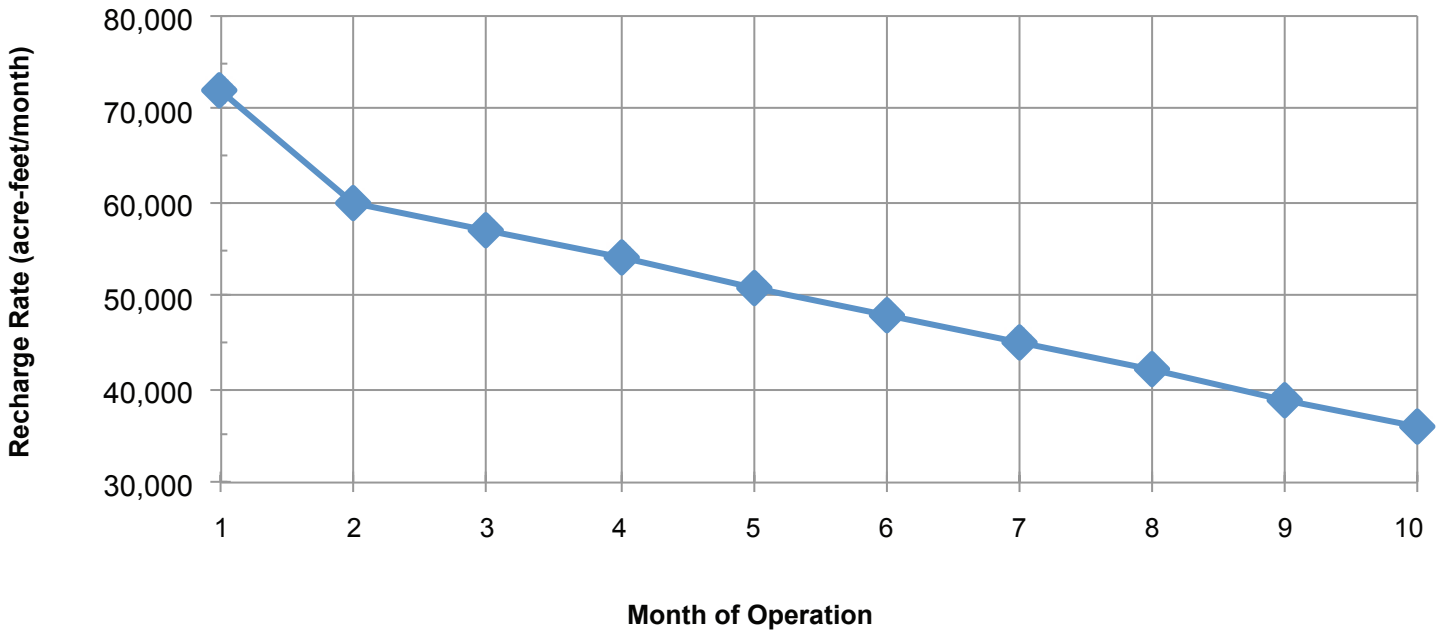
Figure 3.6-12
Kern Water Bank Points of Diversion and Rediversion



Source: derived from KWBA, as reported in West Yost Associates 2012

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Figure 3.6-13
Kern Water Bank Authority Estimated Recharge Capacity

Pursuant to the 1962 *Kern River Water Rights and Storage Agreement*, the Kern River Watermaster prepares records of Kern River flows, storage, and releases from Lake Isabella. Since at least 1986, the Kern River Watermaster has implemented a Policy Re-Utilization of Isabella Lake Reservoir Flood Releases (Flood Policy). The Flood Policy has been implemented pursuant to the agreement and consent of other water right holders on the Kern River. The Flood Policy provides that during periods in which (1) abnormal flow is being released from Lake Isabella by order of USACE, and (2) such flow is entering into the California Aqueduct through the Intertie,

> [w]ater will be made available to any person, interest or group in Kern County who wish to divert that water, up to the amount of water flowing into the Intertie, provided such interest, person or group acknowledges their desire to divert said water by executing an "Order" which shall include, among other things, a description of the point they wish to divert such flow, the rate of flow they wish to divert and provide a schedule such that the request may be honored by the operating Kern River entity. This policy is without prejudice to the rights of any of the Parties.

KWBA water records show that between 1995 and 2011, there were 3 years (all wet water year types) in which KWBA diverted Lake Isabella flood releases, often termed flood flows (Table 3.6-10). In 1997, 22,187 AF of flood water was diverted for groundwater recharge purposes in accordance with the Flood Policy, and another 79,121 AF in 1998. An additional 46,349 AF of flood water was diverted in 2006. This year is considered an anomaly because more water was released from Lake Isabella due to dam safety concerns. The amount of water remaining in the river after KWBA made these flood water diversions in these 3 years is listed as Intertie flow in Table 3.6-10.

Table 3.6-10. Kern River Flood Water Diversions (acre-feet)

Year	Total KWBA Water Sources	Total Kern Water Diverted	Kern River Flood Water Diverted	Flood Water Diverted as % of total KWBA Sources	Flood Water Diverted as % of total Kern River Diversions	Kern River Flow at the Intertie
1997	112,262	43,407	22,187	20%	51%	1,793
1998	303,086	196,683	79,121	27%	41%	130,226
2006	283,233	64,924	46,349	16%	71%	73,411

Source: Derived from Kern Water Bank Authority 2013.

3.6.2 Impact Analysis

This section describes the environmental impacts related to hydrology, water quality, and groundwater resources for the project. It describes the methods used to determine the effects of the project and lists the thresholds used to conclude whether an impact would be significant.

3.6.2.1 Methods

This evaluation of hydrology and water quality is based on professional standards and information cited throughout the section. The impact analysis utilizes results from the *Kern Water Bank Authority Water Availability Analysis* prepared by West Yost Associates to determine how proposed KWB operations would alter baseline conditions (Appendix L). The key effects were identified and evaluated based on the environmental characteristics of the KWB project area and the magnitude, intensity, and duration of activities related to the operation of the project.

No construction activities are planned for the project; therefore, this analysis does not consider construction-related hydrology and water quality.

KWBA Proposed Operations

KWBA, on behalf of its five participating members, filed Application 31676 with the State Water Board to appropriate up to 500,000 AFY of water from the Kern River. Diversion of 500,000 AFY of Kern River floodwater would be a rare occurrence (if ever). Based on analysis described in detail in this section, flood flows would be available for diversion in approximately only 18% of water years, and even that at levels well below the 500,000 AFY sought through KWBA's application to appropriate. Rather, the 500,000 AFY constitutes the estimated maximum quantity that KWBA can physically divert and recharge within the KWB in the wettest years. This quantity is based on the estimated diversion and recharge capacity of the facilities, with diversions over a 12-month period, assuming that flood water is available during those 12 months. The specific quantity of water available for diversion to the KWB in any given year would depend on annual and seasonal hydrologic and climatologic conditions and would supplement water already received by KWBA participating members from the SWP via the California Aqueduct, the CVP via the Friant–Kern Canal, and directly from the Kern River through purchases or transfers. The appropriation of water under this application would also supplement and permit water historically diverted from the Kern River to the KWB in wet water years when excess water has been made available for diversion to avoid additional flood risks downstream.

The project would allow KWBA to appropriate water in the Kern River found to be unappropriated water by the State Water Board. In prior wet years, there have been instances when more than 500,000 AFY of Kern River water was available for diversion or diverted into the Intertie on the California Aqueduct for flood control purposes. If the State Water Board approves KWBA's application to appropriate, this water will remain in the Kern River watershed for instream beneficial purposes until diverted west and downstream of the greater Bakersfield area.

Most water diverted under the project would be delivered via the Kern Water Bank Canal (800 cfs), the Cross Valley Canal (up to 350 cfs), and the City of Bakersfield's 2,800-acre recharge facility groundwater recharge facility via McClung Weir and Basins 9 and 10. The Cross Valley Canal delivers water via turnouts to the northern portion of the KWB. Basins 9 and 10 deliver water to the Pioneer Project, which then in turn delivers to the KWB. The capacities of Basins 9 and 10 are 600 and 150 cfs, respectively, but the maximum delivery to the KWB via these diversion points is limited to about 400 cfs. However, there are multiple other possible diversion locations as illustrated in Figure 3.6-12. The River Canal East provides alternative conveyance for the river channel itself. This canal is used as an alternative or supplement if the City of Bakersfield requests that the river channel not be used. Basin 2 delivers water to the 2,800-acre recharge facility and the Pioneer Project, and then in turn to the KWB (up to 150 cfs). The River Canal West can be used as an alternative or supplement to the Kern River channel to deliver water to the Second Point Diversion Weir or directly to the Kern Water Bank Canal via a pipeline. The Main Canal would be used as an alternative to the Kern Water Bank Canal. KWB Basin L1 is a direct diversion to one KWB pond. West Kern Basin 1 delivers up to 200 cfs into the West Kern Project and in turn the KWB can deliver 20 cfs into KWB pond L2.

Kern River water can also be rediverted into the California Aqueduct via the Kern Water Bank Canal and Cross Valley Canal and then delivered either directly to KWBA participating members through California Aqueduct turnouts or by exchange (Figure 3.6-12). The ability to redivert water in this

way can provide significant water conservation benefits by maximizing the beneficial uses of Kern River water, preventing potential flooding, and lowering energy usage necessary to deliver water to KWBA participating members.

Water Availability Analysis

To estimate how much water would be available for appropriation by KWBA in various high water years, West Yost Associates prepared a water availability analysis (Appendix L). A two-step process was used to evaluate the availability of water for diversion. First, historical operations, as documented in the Kern River Annual Hydrological Reports (City of Bakersfield 2011), were used to quantify deliveries of water to local recharge projects and to assess maximum deliveries to these projects. Then, using maximum delivery estimates, additional possible deliveries using appropriative filings were assessed. The analysis relies on a number of factors, including daily records for Kern River deliveries to the Intertie for the 1978 through 2012 period (Table 3.6-3), daily First Point of Measurement unimpaired flow records for the 1978 through 2012 period, banking facility diversion capacities, and groundwater basin infiltration recharge rates, all of which allowed West Yost to estimate how much excess water could have been delivered to the KWB, based on past hydrology, after rights of existing users were satisfied.[10] A key objective of the analysis is to determine if flood water is available for appropriation.

Information from the Annual Hydrological Reports and Buena Vista Water Storage District 2nd Point flow records was used to establish historical deliveries of flood flows during the period when the Intertie was flowing. Historical deliveries were then compared with maximum delivery rates for the facilities to determine whether more water could have been delivered based on the appropriative water right applications that have been filed. Potential flood water diversions for 1978 through 1998 were estimated as the minimum of (1) the flow delivered to the Intertie, (2) facilities diversion capacity, and (3) the monthly recharge rate plus rediversion of up to 1,100 cfs to the California Aqueduct to meet irrigation deliveries. These estimates are considered to be an upper bound of potential deliveries to the KWB of water that has historically been delivered to the Intertie.

The water availability analysis estimates what diversion rates could have been in previous years based on existing water banking recharge and diversion capacity, and assumes that all flood flows reaching the Intertie would be available to KWBA. Thus, the diversions predicted for previous years (e.g., 1998) are higher than they actually would have been at the time since the ability to divert and recharge was less than it is now. The model results thus represent the amount of water that could be diverted if similar water year types were to occur today or in the future based on existing diversion infrastructure. Furthermore, the model represents the upper limit of potential diversions, assuming all available floodwater could be captured before reaching the Intertie. In this manner, the model conservatively predicts the maximum of water available based on a given year type.

The Buena Vista Water Storage District has a senior water right to Kern River water. During normal water years, Buena Vista Water Storage District water is typically delivered down the Carrier Canal and the River Canal, which are adjacent to the river channel, in lieu of the river channel to reduce water losses between First Point and Second Point. Downstream of Second Point, the Alejandro Canal is used annually by Buena Vista Water Storage District to deliver Kern River water to the

[10] The *Kern Water Bank Authority Water Availability Analysis* (Appendix H) analyzes both pre-1914 and appropriative water rights filings to demonstrate water is available.

Outlet Canal and East Side Canal for irrigation purposes, thus bypassing the reach of the lower Kern River channel from Second Point to the Intertie. Under high flow conditions, if water remains in the Kern River channel downstream of Second Point, water can also be delivered to the Outlet Canal via a gate structure at the Intertie. The Kern River Flood Channel can receive flow from a gate structure from the Outlet Canal allowing Buena Vista Water Storage District to use the Flood Channel to recharge non-flood Kern River water under its existing right. Even if KWBA diverted all of the flood water that would have entered the Intertie, water would still remain in the lower Kern River to satisfy Buena Vista Water Storage District's senior water rights.

Results from the potential water availability diversion analysis are presented in Table 3.6-11. For the 1978 through 2012 period, the Intertie has operated 9 times, or 26% of the time. However, the year 2006 was excluded from the analysis because flood releases were made due to reservoir level restrictions at Lake Isabella to address dam safety concerns. Of the years of Intertie operation, 1983 was an extremely wet year, with the April through July runoff the third highest in the 90-year record (1916 was highest, 1906 was second highest). Actual reported KWB deliveries of Kern River flood water were 22,187 AF in 1997 and 79,121 AF in 1998 (Table 3.6-11). The West Yost analysis predicts that if the KWB, as currently configured, maximized diversions of flood waters by diverting at full capacity (given current infrastructure and the groundwater basin recharge limits), then 24,000 AF could have been diverted in 1997 (8% increase over the actual 22,187 AF diversion) and 209,000 AF could have been diverted in 1998 (164% increase over the actual 79,121 AF diversion) (Appendix L).

Table 3.6-11. Estimated Intertie and Kern Water Bank Authority Water Diversions for 1978 through 2011 Calendar Years (acre-feet per year)[a]

Year	Water Year Type	First Point Unimpaired	Intertie Estimated	Intertie Actual	Possible KWB Flood Water Deliveries (Estimated)	KWB Flood Water Deliveries Actual
1978	Wet	1,654,000	148,000	169,000	169,000	0
1980	Wet	1,640,000	143,000	139,000	139,000	0
1982	Wet	1,271,000	18,000	12,000	12,000	0
1983	Wet	2,489,000	679,000	664,000	500,000	0
1984	Above-Normal	822,000	0	27,000	27,000	0
1986	Wet	1,445,000	77,000	1,900	1,900	0
1997	Wet	1,182,000	0	24,000[b]	24,000	22,187
1998	Wet	1,718,000	170,000	209,000[b]	209,000	79,121

Source: Appendix L.

[a] The Intertie only operates during flood conditions. From 1978 through 2011, the Intertie has operated in only 9 years. This table excludes data from 2006 because flood releases were made due to reservoir level restrictions at Lake Isabella to address dam safety concerns.

[b] 1997 and 1998 Intertie deliveries also include KWB deliveries of Kern River water that would have reached the Intertie if the KWB were not in place. In 1997, 22,187 AF was delivered to the KWB. In 1998, 79,121 AF was delivered to the KWB.

Monthly output from the analysis is graphed individually by water year in Figure 3.6-14. The graphs show the First Point of Measurement impaired flow and, from the water availability analysis, the estimated KWBA flood water diversions and the Kern River flow reaching the Intertie.

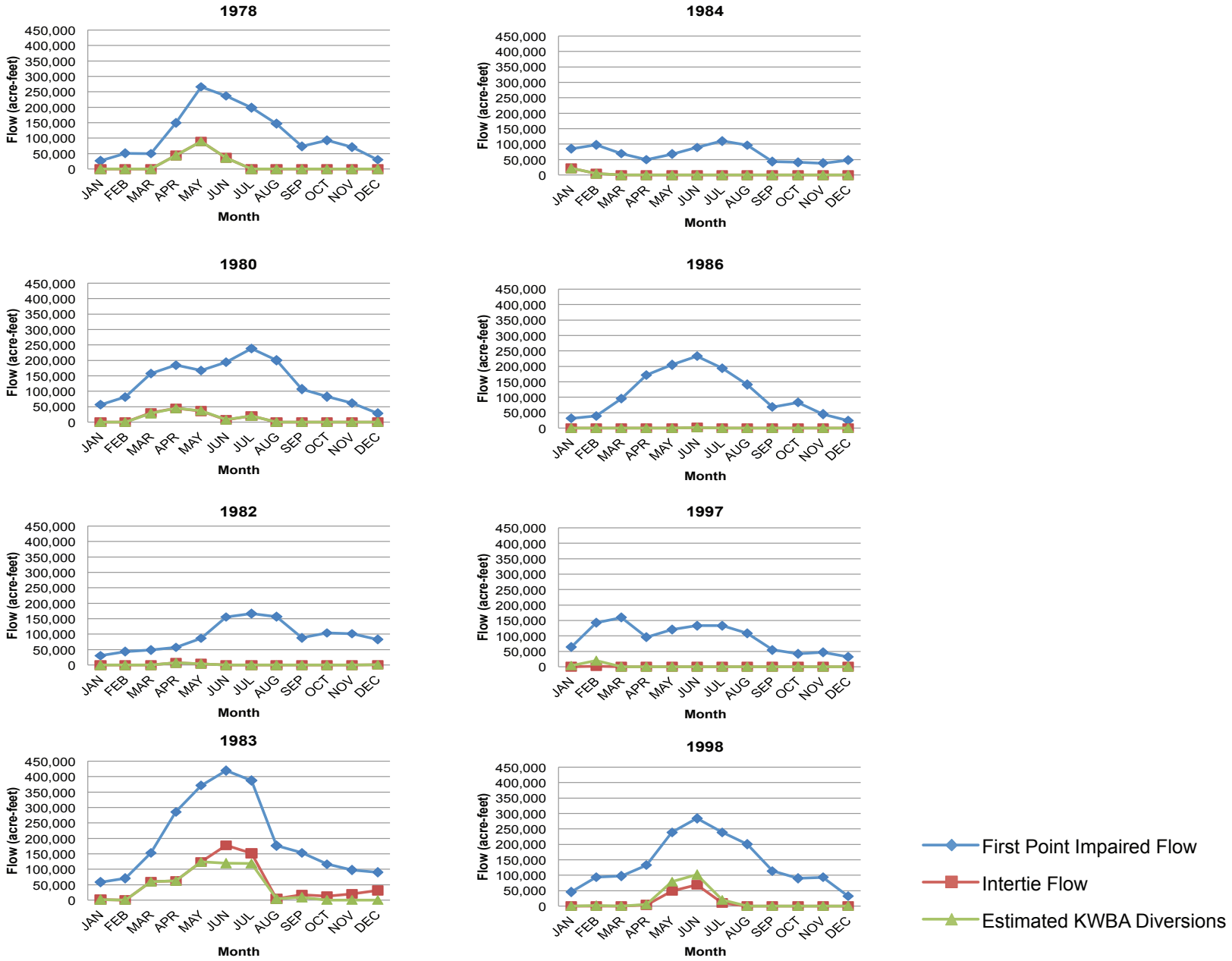

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Figure 3.6-14
Comparison of First Point, Intertie, and Potential Flood Water Diversions for Years the Intertie Operated between 1978 and 1998

The analysis shows when the proposed KWBA flood water diversions would have had the potential to divert 100% of the monthly Intertie flow all of the months on record from 1978 to 1998 except for three months in the exceptionally wet year of 1983 in which KWBA-proposed operations would have diverted 75% of the flood water. It should be noted that 100% of the Intertie flow does not mean 100% of the total river flow. For example, Buena Vista Water Storage District has continued to call for water and utilize its rights in past years, maintaining water in the Kern River between Second Point and the Intertie for much of the spring in some years under high flow conditions. Table 3.6-12 shows monthly Kern River flows at the Second Point of Measurement, the Outlet Canal just upstream of the Intertie, and at the Intertie for 1988 through 2011. The table shows lower Kern River flows for the reach upstream of the Second Point of Measurement (Second Point in Table 3.6-12), the reach between the Second Point of Measurement and the diversion at the weir at the Intertie to the Outlet Canal (Outlet Canal Weir in Table 3.6-12), and the amount of water that entered the Intertie (Kern River to Intertie in Table 3.6-12). Analysis of the flow data shows that flow was in the channel for 5 of the 24 years (21% of the years), all occurring in wet water years. Of these 5 years, the duration the lower Kern River downstream of the Second Point had active flow typically varied from 3 to 4 months.

Prior to construction of the Intertie in 1977, flood flows from the Kern River were routed to the Kern River Flood Control Channel via Buena Vista Water Storage District's Outlet Canal. The Intertie has a flow capacity of 3,500 cfs (U.S. Army Corps of Engineers 1974). Analysis of historical diversions through the Intertie indicates that daily flows reported to the Intertie have been less than 3,500 cfs in all the years that the Intertie has operated. In May 1983, the maximum daily Kern River intertie flow was 3,374 cfs on May 28th, 1983. In most years, flows to the Intertie were significantly less than the Intertie diversion capacity.

During high flow conditions when all Kern River flow is not diverted by Buena Vista Water Storage District into the Alejandro Canal and then into the East Side Canal, some water remains in the Kern River channel downstream of Second Point where it can be delivered to the Outlet Canal via a gate structure at the Intertie. The Kern River Flood Channel can receive flow from a gate structure from the Outlet Canal. Buena Vista Water Storage District currently uses its existing water rights to maximize deliveries of non-flood Kern River water to the Flood Channel for recharge. Thus, Buena Vista Water Storage District's deliveries and use of the Flood Channel for recharge would be unaffected by reductions in Intertie flows, since Buena Vista Water Storage District would maximize its use of Kern River water under its existing right before mandatory release (flood) conditions would be reached.

Proposed diversions of flood flow to the KWB could possibly reduce flows to the Kern River Flood Channel during a period in which available Kern River flood flow exceeds 3,500 cfs, and the KWB is maximizing recharge operations and is diverting water to the California Aqueduct via the Kern Water Bank Canal. This condition would be very rare, and would not have occurred historically, based on Intertie flow records.

Table 3.6-12. Kern River Flows at the Second Point of Measurement, the Outlet Canal Weir, and the Intertie from 1988 through 2011[a]

Year	Location	Index	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Acre-feet														
1995	Second Point	189%	–	641	3,955	3,766	5,839	5,505	978	9,917	–	–	321	1,002
	Outlet Canal Weir		–	–	30	1,994	3,396	2,906	–	–	–	–	–	–
	Kern River to Intertie		–	–	–	–	–	–	–	–	–	–	–	–
1997	Second Point	162%	36,670	52,712	23,023	3,039	–	–	–	–	–	–	–	–
	Outlet Canal Weir		912	5,175	6,684	–	–	–	–	–	–	–	–	–
	Kern River to Intertie			1,793										
1998	Second Point	235%	887	16,381	15,941	70,814	115,392	112,011	65,798	16,187	2,225	–	8,741	2,610
	Outlet Canal Weir		–	4,092	4,243	1,033	28,219	10,536	16,635	250	–	–	–	–
	Kern River to Intertie					3,118	48,615	68,478	10,017					
2006	Second Point	147%	4,084	–	323	22,401	101,706	62,826	7,891	722	–	–	–	–
	Outlet Canal Weir		–	–	–	5,431	5,181	17,421	264	–	–	–	–	–
	Kern River to Intertie						60,932	12,479						
2011	Second Point	188%	6,064	871	3,322	29,753	62,613	32,754	1,787	–	–	–	–	–
	Outlet Canal Weir		260	–	–	1,353	7,505	9,667	536	–	–	–	–	–
	Kern River to Intertie		–	–	–	–	–	–	–	–	–	–	–	–
Mean cubic feet per second														
1995	Second Point	189%	–	12	64	63	95	93	16	161	–	–	5	16
	Outlet Canal Weir		–	–	0	34	55	49	–	–	–	–	–	–
	Kern River to Intertie		–	–	–	–	–	–	–	–	–	–	–	–
1997	Second Point	162%	596	949	374	51	–	–	–	–	–	–	–	–
	Outlet Canal Weir		15	93	109	–	–	–	–	–	–	–	–	–
	Kern River to Intertie		–	32	–	–	–	–	–	–	–	–	–	–

Year	Location	Index	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Acre-feet														
1998	Second Point	235%	14	295	259	1,190	1,877	1,882	1,070	263	37	–	147	42
	Outlet Canal Weir		–	74	69	17	459	177	271	4	–	–	–	–
	Kern River to Intertie		–	–	–	52	791	1,151	163	–	–	–	–	–
2006	Second Point	147%	66	–	5	376	1,654	1,056	128	12	–	–	–	–
	Outlet Canal Weir		–	–	–	91	84	293	4	–	–	–	–	–
	Kern River to Intertie		–	–	–	–	991	210	–	–	–	–	–	–
2011	Second Point	188%	99	16	54	500	1,018	550	29	–	–	–	–	–
	Outlet Canal Weir		4	–	–	23	122	162	9	–	–	–	–	–
	Kern River to Intertie		–	–	–	–	–	–	–	–	–	–	–	–

Source: Appendix L.

[a] The Intertie only operates during flood conditions. No other years since 2006 were wet enough for diversions.

The analysis predicts KWBA could have diverted, through a combination of diversion to recharge ponds for storage and direct diversions for irrigation deliveries, up to 500,000 AF of Kern River flood water in 1983, which is the Kern River's wettest year since initial operation of the Intertie in 1978. The Intertie operated for 11 months in that calendar year, with a small amount of flow in January, and substantial flow starting in March and continuing through December (Figure 3.6-14). In January through May, all Intertie water could have been delivered to the KWB. In the summer, diversions would have taken 69% of the June Intertie flow, 80% in July, 100% in August, and 16% in September.

In below-normal and above-normal water years, the Intertie typically does not receive any Kern River flow and KWBA does not divert any flood water. Only once, in 1984, was water available for diversion in an above-normal year. However, this above-normal water year in 1984 was an anomaly because of the extremely wet antecedent conditions in 1983 and, overall, diversion of flood water in above-water normal water years has a low probability of occurring in the future since the 1983 was an extremely wet year, with the April through July runoff the third highest in the 90-year record (1916 was highest, 1906 was second highest).

Groundwater Model Overview

In 2015, DWR conducted a quantitative assessment of the effects of KWB activities on groundwater resources in the Kern County Subbasin using the DWR Kern Water Bank Model (DWR KWB Model). The DWR KWB Model (MODFLOW-NWT) is a refined version of an existing groundwater model (Kern Water Bank Authority [KWBA] Model) of the KWB area, developed by KWBA. The DWR KWB Model simulated response of the groundwater aquifer to stresses such as groundwater recharge and pumping by predicting groundwater elevations. The DWR KWB Model evaluation considered both past (1995-2014) and future operations (2015-2035) by comparing actual historic water levels that

reflect project operations and predicted future water levels that reflect project operations to those levels predicted had the project never operated. With respect to past operations, the evaluation indicates that groundwater levels were higher over significant areas outside KWB lands for the entire period as a result of project operations (1995-2014). These areas of positive benefits extended as much as 6 miles away from KWB lands. The areas where groundwater levels were lower as a result of project operations were much more limited and reflected temporary changes at the end of significant recovery operations.

With respect to future operations (under both current conditions and after additional buildout), the evaluation indicates that groundwater levels will be higher over significant areas outside KWB lands for virtually the entire period as a result of project operations (2015-2035). These areas of positive benefits extended as much as 5.5 miles away from KWB lands. The areas where groundwater levels were lower as a result of project operations were much more limited and reflected temporary changes at the end of significant recovery operations.

CEQA Baseline

Under CEQA, the significance of any physical impact is assessed against a baseline reflecting existing conditions (State CEQA Guidelines, § 15125[a]). However, as discussed in Section 3.1.3.3, the potential impacts of the project on hydrology, water quality, and groundwater are evaluated in relation to two baseline conditions (i.e., baseline operations). The purpose of having two baselines is to more accurately characterize how the project will operate given historic operations (i.e., diversions). Additionally, analyzing impacts against two baselines allows a more precise measurement of whether there is (1) an impact caused by KWBA diverting an increased amount of water, and (2) an impact caused by KWBA diverting flood waters. For some of the impact measures, it is appropriate to compare against only one of the baseline conditions depending on whether the potential impact is affected by an increased diversion of water or an increased diversion of flood flows.

There are several other entities who have filed appropriative water right applications which are before the State Water Board. Since these have not yet been approved and are not part of the baseline conditions, they are not further discussed in this section. However, their potential to create a cumulative impact in addition to the project is further studied in Chapter 5, *Other CEQA Considerations*.

Baseline Condition 1. The first baseline condition is the amount of water actually diverted by KWBA in a single year (447,148 AF in 2011) from all its water sources combined, which includes water from the SWP, CVP, Kern River, and other purchased water. Baseline Condition 1 shows the highest use historically of KWB recharge facilities. Baseline Condition 1 also reflects the maximum amount of water actually recovered over an extended drought (650,000 AF), in a single year (227,000 AF), and in any single month (26,000 AF). The project's proposed diversion of 500,000 AFY would represent an increase in the volume of water recharged under Baseline Condition 1. The 52,852 AFY incremental increase would be the difference between 500,000 AFY and the historical levels (447,148 AFY) actually achieved. This increase could only occur if in the very unlikely scenario the USACE declared mandatory flood release conditions that would last an entire calendar year.

Baseline Condition 2. The second baseline condition is the amount of water actually diverted in a single year by KWBA during periods of high flow when Kern River surplus water (flood water) would have otherwise been delivered to the Intertie or flooded areas toward Buena Vista or Tulare

Lakes. KWBA first diverted Kern River flood waters in 1997 and then again in 1998 and 2006; this represents 20% of the years over the 15-year period (Table 3.6-10). Of these 3 years, the largest diversion occurred in 1998, when 79,121 AF of flood water was diverted. The flood water diversion accounted for 27% of KWBA's total diversions and 41% of its total Kern River diversions that year. Baseline Condition 2 is different from Baseline Condition 1 in that it focuses on the source of the water (flood water) and the impacts that would result from recharging Kern River flood water under flood or wet-year hydrology. Actual historical recovery operations are addressed under Baseline Condition 1, and applied where appropriate.

3.6.2.2 Significance Criteria

The thresholds for determining significance of impacts on hydrology and water quality in this analysis are based on State CEQA Guidelines Appendix G (14 CCR 15000 et seq.) and standards of professional practice. For this analysis, the project would be considered to have a significant impact pertaining to hydrology and water quality if it would result in any of the following conditions.

- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level such that the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite.
- Substantially degrade water quality.

The overall availability of the water proposed for diversion is evaluated in this section, and therefore the following criterion is also used.

- Lack sufficient available water supply to serve the project from existing entitlements or resources.

Based on the nature and function of the project, several of the criteria included in Appendix G of the State CEQA Guidelines do not apply to this analysis and are not used, as explained below.

- **Violate any water quality standards or waste discharge requirements.** The project does not propose to discharge to any waters of the State or United States, and, therefore, would not violate any water quality standards or waste discharge requirements. Flood water diverted from the Kern River would be applied to existing KWBA recharge facilities for later recovery and reuse, as has occurred since 1995, though volumes may at times be higher. The water being used is of excellent quality. Further, KWBA has an extensive water quality monitoring program to ensure it does not adversely impact water quality during recharge or recovery operations. Therefore, no impact would occur.
- **Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.** No construction is proposed as part of the project; therefore, no additional impervious surfaces are planned as part of the project, and it would not affect existing stormwater drainage

systems or provide substantial sources of polluted runoff. Flood water diverted from the Kern River would be delivered to existing KWBA groundwater recharge facilities via existing diversion and canal infrastructure, and diversions would not exceed the capacity of the canals or recharge facilities. KWBA does not propose to utilize stormwater drainage facilities. Therefore, no impact would occur.

- **Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.** Portions of the project area west of I-5 are within a Federal Emergency Management Agency (FEMA) flood hazard zone. However, the project would not place structures or houses within the flood zone, and no new facilities would be constructed that could be at risk of being in a 100-year flood hazard area. Therefore, no impact would occur.
- **Place structures that would impede or redirect flood flows within a 100-year flood hazard area.** No new structures are proposed in the project area that could impede or redirect flood flows. Further, to the extent that existing diversion facilities proposed to divert additional flood waters, the project would have a beneficial impact on flood risks downstream. Therefore, no impact would occur.
- **Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.** The project would not expose people or structures to flood flows that could result in loss, injury, or death. The KWB is an existing facility for the storage and recovery of water for beneficial uses by KWBA member agencies, and new facilities to accommodate people or structures are not proposed. As the project would divert Kern River water when available, the project has the potential to reduce the risk of flooding loss, injury, or death downstream. Therefore, no impact would occur.
- **Inundation by seiche, tsunami, or mudflow.** The project area contains shallow water recharge basins that have a low probability of creating standing waves (seiche). This is an existing condition, and there are no structures in the vicinity of the recharge basins that would be likely to be inundated. The project area is not located close to the ocean; therefore, there is no possibility of injury or loss caused by tsunami. The project area is not located within an area with much topography and is not located in a mudflow hazard area. Therefore, no impact would occur.
- **Conflict with established federal, state, or local policies regarding water supply and quality.** Operation of the project would be subject to a variety of regulatory standards that are in place to safeguard the environment. Certain local, state, and federal regulations require either the lead agency or project proponent to obtain applicable permits before project implementation; other regulations require agency consultation but may not require issuance of any authorization or entitlements before project implementation. It is important for CEQA compliance purposes to identify any relevant local land use plans, policies, and regulations that are adopted for the purpose of avoiding or mitigating an environmental effect (Section 3.6.1). Potential inconsistencies with such enactments do not *per se* translate into significant impacts under CEQA. In this instance, the project is expected to be consistent with and fully comply with the federal, state, and local water supply and water quality laws and policies listed in Section 3.6.1.

3.6.2.3 Impacts and Mitigation Measures

Impact HYDRO-1: Lack available water supply to serve the project from existing resources (Less than significant)

The project seeks new and expanded water supply entitlements to surplus water flood flows on the Kern River once existing Kern River rights have been satisfied and as long as surplus water continues to exist.

As discussed earlier under *Kern Water Bank Operations* in Section 3.6.1.2, the distribution of 1995 to 2011 water year types compared to 1954 to 2011 is quite similar (Table 3.6-7). This suggests the hydrologic record from 1995 to 2011 is typical of the longer term record, and the variability in percentages of water received from the three major sources from 1995 to 2011 could be expected to represent future conditions, at least for the near term. The frequency of future KWBA flood water diversions would be similar to what has been diverted during the 1995 to 2011 period. KWBA water records show that between 1995 and 2011, there were 3 years (18% of the time and all wet water year types) in which KWBA diverted flood flows (Table 3.6-10). Therefore, it can be assumed that flood flows would be available for diversion approximately 18% of the time.

As described in the *Water Availability Analysis* section, West Yost Associates prepared a water availability analysis to estimate how much water would be available for appropriation by KWBA in various high water years. A key objective of the analysis was to determine if flood water is available for appropriation.

The water availability analysis found that the historical record demonstrates that these surplus flows are available; deliveries of surplus water to the Intertie have occurred in 9 years since 1978, with as much as 664,000 AF of water being delivered in 1983. These flows are surplus and available for appropriation, as the Intertie is only used to divert water that cannot otherwise be used or stored by existing Kern River water right holders (Appendix L).

Baseline Condition 2 shows that the largest diversion of flood flows to date occurred in 1998, when 79,121 AF of flood water was diverted. Even with diversion of that volume of flood water, 209,000 AF of water reached the Intertie (see Table 3.6-11). In the 15-year period since 1997, KWBA has been able to divert flood water in 20% of the years (Table 3.6-10).

KWBA did not begin diverting Kern River flood waters until 1997, but based on an analysis of 1983 conditions, it is estimated that up to 500,000 AF could have been diverted to KWB facilities at that time (see *Water Availability Analysis* under Section 3.6.2.1, *Methods*). The 500,000 AF includes water that could also be rediverted directly to KWBA participating members as discussed in the *KWBA Proposed Operations* section, allowing for diversion of amounts in excess of the capacity of the recharge basins.

The historical record as well as the water availability analysis show that there exists both the opportunity to fulfill the water requested by the project as well as the quantity of surplus water being requested by the project on these occasions. Because KWBA would only divert available surplus Kern River water which cannot otherwise be used or stored by existing Kern River water right holders, and would not divert surplus flows in normal or dry years, this impact is less than significant. No mitigation is required because the project is not expected to result in a significant impact on available water supply.

Impact HYDRO-2: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge (Less than significant)

The project would add to groundwater supplies and increase the quantity and quality of water available for storage within the KWB through the appropriation of available Kern River flood water and, thus, the project would beneficially add to groundwater supplies and recharge. Under Baseline Condition 1, KWBA has diverted and stored 447,148 AF of water in a single year. The project could, under ideal conditions, increase diversions to 500,000 AF, an increase of 52,852 AF of water (11.8%), in a single year. This incremental increase in diversion and storage would benefit groundwater recharge. Under most conditions the diversion of the requested Kern River water may only marginally increase the amount of water recharged in a given year or might be used to replace surface water supplies from other sources without increasing the amount of water recharged in a given year. Onsite recharge operations would therefore not change substantially over Baseline Condition 1 because no new recharge facilities would be constructed. Recharging this water would raise the local groundwater levels and result in a net increase in aquifer volume.

Further, maximum recovery volumes during an extended 3-year drought, in any single year, or in any single month, are not expected to change substantially as a result of the project because no new recovery facilities would be constructed, and KWBA participating members have historically maintained a significant surplus groundwater balance. During an extreme drought or multi-dry years, the banking and storage of Kern River water under the project may result in extended periods of recovery (e.g., additional months or years), but, as described in the KWB MOU (see Section 2.2.3.1.), this would not exceed banked quantities. Overall, this project would not recover more groundwater than has been recharged. KWBA's pre-existing operational commitments and extensive groundwater monitoring program would ensure that banking additional water would maintain a net surplus and would not result in a deficit in aquifer volume or a lowering of the groundwater table levels that would result in potential adverse impacts to the production rate of pre-existing nearby wells or existing or approved land uses.

Moreover, recovery operations are subject to the conditions specified in the KWB MOU (see Section 2.2.3.1.). Consistent with the KWBA MOU, and a similar MOU governing banking operations in the Rosedale-Rio Bravo Water Storage District (Rosedale), the KWBA and Rosedale developed an Interim Operations Plan (Interim Plan) that designated measures to be employed to "prevent, eliminate or mitigate significant adverse impacts" resulting from cumulative recovery operations of KWBA and Rosedale projects subject to said MOUs (Appendix E). The Interim Plan was effective until the 2014 Writ was discharged in October, 2017. As a responsible agency to DWR's REIR, KWBA subsequently approved a *Long Term Operations Plan Regarding Kern Water Bank Authority Project* (2016) which sets further parameters on long-term banking operations (Long-Term KWB Plan; Appendix C). Most recently, KWBA entered into a joint plan, *Project Recovery Operations Plan Regarding Pioneer Project, Rosedale-Rio Bravo Water Storage District, and Kern Water Bank Authority Projects* (Joint Plan) (Appendix F). The recovery operations plans all include a joint committee that regularly monitors potential groundwater level impacts of banking project recovery operations on neighboring agricultural and domestic wells based on groundwater modeling and specified triggers for potential mitigation actions, with significant impacts being avoided, eliminated, or mitigated by implementing one or more corrective actions, including investigation of any claims and pump lowering, well replacement, and/or reduction or adjustment of banking project recovery operations, as appropriate.

As under Baseline Condition 1, under Baseline Condition 2 KWBA is not expected to interfere with groundwater recharge or substantially deplete groundwater supplies—the project proposes only to increase water available for recharge and storage to ensure long-term reliability and certainty in water supplies from the KWB in multiple dry years. Under Baseline Condition 2, KWBA has diverted approximately 80,000 AF of flood water in a single year. The water availability analysis indicates as much as 500,000 AF of water could be diverted in a year similar to 1983 for pond recharge and direct deliveries to KWBA participating members. Intertie deliveries have exceeded 660,000 AFY and, as discussed under Impact HYDRO-1, these supplies would be surplus to existing Kern River rights holders. The project would not interfere with water already allocated to other uses (including any beneficial uses), and recharging this water would raise the local groundwater table level and result in a net increase in aquifer volume. Again, recovery operations for the project as compared to Baseline Condition 2 would not change, other than to allow the KWB to continue to recover water (within historical levels) in multi-dry years. As a consequence, recovery operations would not result in any marginal lowering of groundwater levels absent the project. This impact is less than significant.

No mitigation is required because the project is not expected to result in significant impacts on groundwater recharge or local groundwater elevations. Furthermore, in a given year the project is intended to aid in long-term reliability of water supplies (not development of new supplies).

Impact HYDRO-2a: Raise groundwater levels sufficiently to substantially impact existing infrastructure (e.g., Cross Valley Canal) (Less than significant)

Extremely shallow groundwater conditions could potentially impact the Cross Valley Canal. The shallow groundwater could place hydraulic pressure and cause piping behind the canals panels resulting in panel failure. The Kern County Water Agency and KWBA have entered into an agreement to monitor shallow groundwater conditions and conduct several proactive measures to prevent damage to the Cross Valley Canal including: monitoring shallow groundwater conditions on a weekly/monthly basis, coordinating water operations with KCWA, and managing recharge operations to help ensure that groundwater gradient is away from the Cross Valley Canal during shallow groundwater conditions. Should groundwater conditions develop that might induce piping behind the Cross Valley Canal's liner, KWBA will minimize recharge adjacent to the Cross Valley Canal (see Appendix M). This impact is less than significant.

No mitigation is required because the project is not expected to result in significant impacts on groundwater levels.

Impact HYDRO-3: Substantially alter the existing drainage pattern of the site or area that would result in substantial erosion or siltation (Less than significant)

As discussed previously, flow in the Kern River is managed with a series of impoundment structures that are used to divert water into canals or recharge ponds. The volume of water that flows past each of these structures is significantly reduced as water is diverted for use by Kern River rights holders, so that progressively less and less water is transported downstream (Figure 3.6-5). Under most circumstances, flow velocity in the river channel immediately upstream of each of these structures is also greatly reduced as the water is impounded. This reduction in velocity eliminates almost all sediment transport (primarily sand), leaving sediment deposits upstream of the structures. The entities that operate and maintain these impoundment structures routinely excavate these sediments from the channel.

At times water flows unimpeded past one or more impoundment structures. Under these circumstances, sediment is transported to the next downstream structure. The furthest downstream of these structures is the Intertie. Sediments were last removed from this structure in 2006 (Lutje pers. comm.).

The project would not alter the existing drainage pattern of the site or area by changing the physical location of drainage paths. As is the case under baseline conditions, the project would continue to bank water flowing down the lower Kern River in years when flood water is available for diversion. In terms of frequency, diversions under the project would be similar to baseline conditions. KWBA diverted flood water in 3 of the 17 years, or 18% of the time, in the 1995 to 2012 period. The water availability analysis shows that over the period of record dating back to 1978, flood water was available for diversion in approximately 24% of the years (Table 3.6-11). Thus, the expected frequency of flood water diversions for the project is approximately the same as it has been under baseline conditions. Under Baseline Condition 2, the diversion of flood flows would alter the magnitude of flood flow in the lower Kern River since flood flows would be reduced below the McClung Weir and the Second Point Diversion Weir (although deliveries by KWBA and Buena Vista Water Storage District to Second Point, and Buena Vista Water Storage District to the Outlet Weir, would still maintain flows in these reaches). These reductions would reduce the volume of sediments transported downstream in these reaches of the river and likely reduce the need to remove accumulated sediments upstream of each of the impoundment structures. There are no other major sources of sand or silt to the Kern River channel other than what is transported from upstream by the Kern River itself. Sediment from stormwater outfalls, diversion returns, and other non-Kern River sources is negligible. Thus, reduction of flood flow volumes due to the proposed flood water diversions would not cause siltation or buildup of substantial sediment deposits in the Kern River channel. This impact is less than significant.

No mitigation is required because the project is not expected to result in significant impacts on existing drainage patterns, erosion or siltation.

Impact HYDRO-4: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff that would result in flooding onsite or offsite (Less than significant)

The project would not alter drainage patterns of the area or substantially increase the rate or amount of surface runoff that would result in flooding onsite or offsite. As under baseline conditions, the project would continue to bank flood water flowing down the lower Kern River in years when water is available for diversion, reducing flood flows downstream. This reduction in flood flows could potentially provide beneficial flood protection downstream of the KWB diversion points by reducing peak flood flows.

The Intertie's primary function is alleviating flooding in the lower Kern River during wet years when high flows spill into the Buena Vista Lake and Tulare Lake beds. The Intertie has the capacity to divert 3,500 cfs of Kern River flow into the California Aqueduct, where the water is then routed further south (U.S. Army Corps of Engineers 1974). The capacity equates to about 208,000 AF per month based on a 30-day month. The estimated maximum potential KWBA flood water diversions are 72,000 AF per month, or 1,200 cfs (Figure 3.6-13). Therefore, when maximizing flood water diversions, the project has the ability to divert about 35% of the Intertie's capacity. This amount would increase should operational constraints on the California Aqueduct limit diversions at the

Intertie. Since KWBA would continue to divert Kern River flood flows and reduce the amount of flood water flowing downstream to the Intertie, the project has the potential to reduce flooding, and, therefore, this impact is less than significant.

No mitigation is required because the project is not expected to result in significant impacts on the course of a stream or river, or on the amount of surface runoff.

Impact HYDRO-5: Substantially degrade water quality (No impact)

As is the case under both baseline conditions, diversion of the full amount in very wet years would not alter the chemistry or quality of the Kern River surface water. Kern River water is of excellent quality, with a substantially lower salt content than the groundwater in the Kern Fan aquifer (96 mg/L for Kern River water as compared to 291 mg/L for groundwater). Therefore, recharging Kern River water under the project compared to either Baseline Condition 1 or 2 would improve groundwater quality. The preferential recharge of Kern River water over SWP water would also provide a groundwater quality benefit, as Kern River water is of better quality than SWP water.

The Central Valley Water Board Tulare Lake Basin Plan (2004) states acceleration of salts accumulation is the greatest groundwater quality problem in the basin. KWB operations actually result in a net reduction of salts in the Kern Fan aquifer due to the export of salts during recovery operations (Kern Fan Monitoring Committee 2012). The ratio of salts removed to those imported is 1.5:1. The recharge of high quality Kern River water in the future would help maintain this beneficial salt removal. Therefore, the proposed flood water appropriation would have no negative impact on groundwater quality.

No mitigation is required because the project would not result in significant impacts on water quality.

3.6.3 References

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3.6.4 Personal Communications

Kern Water Bank Authority. Phone call to Jonathan Parker, Kern Water Bank Authority General Manager.

Lutje, Joe. Manager. Henry Miller Water District, Bakersfield, CA. Phone call to Jonathan Parker, Kern Water Bank Authority General Manager.

3.7 Utilities and Service Systems

3.7.1 Existing Conditions

3.7.1.1 Regulatory Setting

Federal

No federal laws, regulations, or policies were found to be relevant to utilities and service systems for the project.

State

Water Quality Control Plan for the Tulare Lake Basin

California's water quality standards are embodied in basin plans administered by Regional Water Quality Control Boards and in several statewide plans and policies administered by the State Water Board. Kern County is under the jurisdiction of the Central Valley Regional Water Quality Control Board (CVRWQCB), which is responsible for implementing state and federal water quality protection guidelines. CVRWQCB adopted the *Water Quality Control Plan for the Tulare Lake Basin* (Tulare Lake Basin Plan [Central Valley Regional Water Quality Control Board 2004]) in 1975. The Tulare Lake Basin Plan is a master policy document for managing water quality issues in the region. The plan establishes beneficial water uses for waterways and water bodies within the region. Beneficial uses of surface waters in the Central Valley include water contact recreation, non-contact water recreation, industrial service supply, irrigation supply, navigation, shellfish harvesting, fishing, and preservation of rare and endangered species. Beneficial uses of the Tulare Lake Basin groundwater aquifer (the aquifer underlying the project area) include municipal and domestic supply, industrial process supply, industrial service supply, irrigation supply, and wildlife habitat.

The California Integrated Waste Management Act

The California Department of Conservation (CalRecycle) provides regulatory oversight of solid waste management facilities. The California Integrated Waste Management Act (Assembly Bill [AB] 939, Sher, Chapter 1095, Statutes of 1989, as amended) made all California cities, counties, and regional solid waste management agencies responsible for planning and implementing diversion of solid waste from solid waste disposal facilities. CalRecycle oversees and assists local governments to develop and implement the mandates and subsequent legislation. Enforcement of the regulations is primarily carried out by local enforcement agencies with CalRecycle acting as the state enforcement agency. Kern County's Solid Waste Management Department and the City of Bakersfield's Public Works Solid Waste Division serve the project area.

Local

Kern County General Plan

The Public Facilities and Services section in the Land Use, Open Space, and Conservation Element of the *Kern County General Plan* contains policies that generally pertain to water infrastructure (Kern County 2009).

The General Plan's policies related to public facilities and services are excerpted below (General Provisions–1.10.1 Public Services and Facilities).

> **Policy 12.** All methods of sewage disposal and water supply shall meet the requirements of the Kern County Environmental Health Services Department and the California Regional Water Quality Control Board. The Environmental Health Department shall periodically review and modify, as necessary, its requirements for sewage disposal and water supply, and shall comply with any new standards adopted by the State for implementation of Government Code Division 7 of the Water Code, Chapter 4.5 (Section 13290–13291.7). (Assembly Bill 885).
>
> In order to carry out these policies, the *Kern County General Plan* has adopted the following implementation measure.
>
> - Project developers shall coordinate with the local utility service providers to supply adequate public utility services.
>
> The General Plan also contains the following policies related to surface water and groundwater (1.10.6 Surface Water and Groundwater).
>
> - **Policy 33.** Water related infrastructure shall be provided in an efficient and cost effective manner.
> - **Policy 37.** Ensure maintenance and repair of existing water systems.
> - **Policy 39.** Encourage the development of the County's groundwater supply to sustain and ensure water quality and quantity for existing users, planned growth, and maintenance of the natural environment.
> - **Policy 40.** Encourage utilization of community water systems rather than the reliance on individual wells.
>
> Kern County has adopted the following implementation measures in furtherance of the surface water and groundwater policies (General Provisions–1.10.6 Surface Water and Groundwater).
>
> - **U.** The Kern County Environmental Health Services Department will develop guidelines for the protection of groundwater quality that will include comprehensive well construction standards and the promotion of groundwater protection for identified degraded watersheds.
> - **X.** Encourage effective groundwater resource management for the long-term benefit of the County through the following.
>
> i. Promote groundwater recharge activities in various zone districts.
>
> ii. Support for the development of Urban Water Management Plans (UWMPs) and promote Department of Water Resources grant funding for all water providers.
>
> iii. Support the development of Groundwater Management Plans.
>
> iv. Support the development of future sources of additional surface water and groundwater, including conjunctive use, recycled water, conservation, additional storage of surface water, and groundwater and desalination.

Kern River Plan

The Kern River Plan Element (Kern County 1985) incorporated in both the *City of Bakersfield General Plan* (2007) and the *Kern County General Pla*n, espouses a goal of maximizing and fully utilizing the groundwater recharge potential of the Kern River, its floodplains, and other potential recharge aquifers. Additionally the Kern River Plan includes a goal of enhancing riparian vegetation and wildlife habitat as a component of groundwater recharge programs.

2010 Urban Water Management Plan (Improvement District No. 4 of the Kern County Water Agency and North of the River Municipal Water District)

An UWMP is a planning tool that generally guides the actions of water management agencies by providing a broad perspective on a number of water supply issues. Primarily, the plan forecasts continued participation in water banking projects to provide sufficient recharge, storage and recovery capacity to meet the needs of the Kern County Water Agency Improvement District No. 4 (ID4). ID4's water banking projects allow ID4 to cushion impacts associated with the SWP's variability and re-regulate high flow waters for recovery during dry years.

National Pollutant Discharge Elimination System Permit CA00883399

The State Water Board adopted NPDES Permit CA00883399 to establish requirements for urban stormwater discharges for Kern County and the City of Bakersfield (Central Valley Regional Water Quality Control Board 2001):

> The City of Bakersfield requires that most new developments include retention basins designed to contain run-off produced by the 100-year, 24-hour storm event and capable of draining by percolation or evaporation within seven days. In cases where retention basins cannot be used, the City requires that developments include detention basins. The retention or detention basins become part of the MS4 subject to this permit.
>
> The impact on surface water quality and groundwater quality will be minimized through implementation of best management practices (BMPs), and any consequent degradation considered in the best interest of the people of the state. The discharge will not unreasonably threaten present and anticipated beneficial uses or result in groundwater that exceeds or threatens to exceed water quality objectives set forth in the Basin Plan. Given these considerations, the discharge is consistent with the antidegradation provisions of 40 CFR [Code of Federal Regulations] 131.12 and State Water Resources Control Board Resolution No. 68-16.

3.7.1.2 Environmental Setting

Wastewater Management

The Kern County Waste Management Department (WMD) operates two county sanitation districts (Kern Sanitation Authority and Ford City-Taft Heights Sanitation District), two wastewater plants owned by the County of Kern, and two county service area (CSA) wastewater treatment facilities (Kern County Waste Management Department 2017). The WMD also provides maintenance or treatment services for several CSA wastewater collection systems.

Municipal and industrial wastewater is typically transported to a treatment facility, treated, and then discharged into a receiving water body (i.e., rivers, streams, creeks, and sloughs). Methods of land disposal include evaporation/percolation ponds or, during the summer months, application to irrigated agricultural lands. Excess recycled water from the winter months is held in storage reservoirs for the following growing season (California Water Service 2016).

Stormwater Drainage

Typically, stormwater drainage networks consist of both natural and human-made conveyance systems to collect, convey, and store runoff resulting from a storm event. Most stormwater drainage systems in urban areas and in some rural areas are managed by flood control districts.

Much of the stormwater runoff from the Bakersfield Metropolitan Area is directed to retention basins, of which there are approximately 200 in the area (Central Valley Regional Water Quality Control Board 2001). Most new developments are required by the City of Bakersfield to include retention basins designed to contain runoff produced by the 100-year, 24-hour storm event. Detention basins are required where retention basins cannot be used.

Detention basins are used within the Bakersfield Metropolitan Area to contain water before discharging it to surface water. Some stormwater runoff is directed to the Kern River. Approximately 65% of stormwater runoff discharged to receiving waters is discharged to the Kern River, 20% to the East Side Canal, 10% to the Kern Island Canal, 5% to the Carrier Canal, and less than 1% to the Stine Canal (Central Valley Regional Water Quality Control Board 2001).

3.7.2 Impact Analysis

3.7.2.1 Methods

For the purposes of this analysis, utilities and service systems include wastewater management, and stormwater drainage. Utilities are provided throughout the project area by various entities including counties, cities, community services/special districts, or private companies.

This analysis considers the potential for implementation of the project to interfere with provision and/or use of utilities and service systems (wastewater management, and stormwater drainage). The key effects were identified and evaluated based on the environmental characteristics of the project area and the magnitude, intensity, and duration of activities related to operation of the project.

No construction activities are planned for the project; therefore, utilities and service systems impacts related to construction are not considered in this analysis. Because the project is limited to the diversion and recovery of additional water and would not generate any solid waste beyond that already generated by KWB operations, solid waste is not considered in this analysis.

Impacts on water supply are addressed in Section 3.6, *Hydrology and Water Quality*, and are not addressed in this impact analysis.

3.7.2.2 Significance Criteria

The thresholds for determining the significance of impacts on utilities and service systems in this analysis are based on State CEQA Guidelines Appendix G (14 CCR 15000 et seq.) and standards of professional practice. For this analysis, the project would be considered to have a significant impact on utilities and service systems if it would result in any of the following conditions.

- Conflict with wastewater treatment requirements of the applicable Regional Water Quality Control Board.

- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Require or result in the construction of new stormwater drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Result in a determination by the wastewater treatment provider, which serves or may serve the project, that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

3.7.2.3 Impacts and Mitigation Measures

Impact UTIL-1: Conflict with wastewater treatment requirements of the applicable Regional Water Quality Control Board (No impact)

Impact UTIL-2: Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects (No impact)

Impact UTIL-3: Require or result in the construction of new stormwater drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects (No impact)

Impact UTIL-4: Result in a determination by the wastewater treatment provider, which serves or may serve the project, that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments (No impact)

Under the project, diversion, recharge, and recovery of currently unappropriated flood water to the KWB would continue through KWBA's operation of existing infrastructure and facilities on the Kern River and within the KWB, which includes diversion structures, primary water supply and transport canals, and recovery wells.

Implementation of the project would not result in impacts on utilities and service systems because there would be no construction under the project, and there would be no substantial changes to operations that could affect wastewater management or stormwater drainage in the project area. Any changes in operations under the project would not involve the construction or use of local or regional wastewater treatment plants (i.e., wastewater treatment or handling), and would not conflict with the Central Valley Regional Water Board wastewater treatment requirements. Similarly, implementation of the project would not require use of existing stormwater drainage facilities, nor would it require the construction of new stormwater facilities. Indeed, the project would increase the certainty and reliability of dry-year water supplies, which would help ensure the longer-term availability of water to serve KWBA's participating members.

No mitigation measures are required because the project is not expected to result in impacts on utilities and service systems.

3.7.3 References

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Chapter 4
Alternatives

4.1 Overview

The purpose of this chapter is to describe the alternatives considered as part of this EIR. According to Section 15126.6 of the State CEQA Guidelines:

> An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation.

This chapter provides a description of project objectives, significant impacts, screening process for alternatives used in this planning effort, alternatives considered but rejected, alternatives analyzed, summary of the environmentally superior alternative, and a comparison to the project.

4.1.1 Project Objectives

As described in Chapter 2, *Project Description*, the project objectives are to:

- Secure water rights to unappropriated Kern River Water in order to make greater use of the water bank's existing capabilities.
- Allow Kern River water to be diverted to the KWB during times of excess Kern River flows for recharge and later recovery by KWBA.
- Enhance water supply reliability, particularly in dry years, to KWBA participating members through storage within the KWB.
- Enhance groundwater resources by maximizing the amount of water recharge and storage within the KWB.
- Maximize the beneficial uses of Kern River water, including agricultural supply, municipal, and industrial uses through both groundwater storage and direct deliveries to KWBA participating members.
- Enhance and support fish and wildlife resources within the KWB and upstream in the Kern River.
- Maintain and improve groundwater quality through recharge of high quality water from the Kern River.
- Reduce risks of Kern River flooding below the KWB's points of diversion during high flows.

The KWB provides an efficient, reliable, and environmentally sound water source for both municipal water supplies and hundreds of thousands of acres of crops, including fruits, vegetables, nuts, fiber, and livestock. Utilizing water from the Kern River would provide multiple benefits to the KWBA

participating members, as well as the region. Such benefits include increasing groundwater recharge, enhancing riverine and wetland ecology and habitats, improving water quality, and improving the aesthetic quality of the river and KWB.

4.1.2 Significant Impacts

Due to the project's lack of significant environmental impacts as proposed, the effort to develop a range of alternatives was uniquely challenging. Nevertheless, this EIR evaluates the project's potential for significant impacts in the areas of air quality, biological resources, climate change, geology and seismicity, hydrology and water quality, and utilities and service systems. To facilitate full disclosure and evaluate the comparative merits of other alternatives' environmental effects, alternatives were considered and evaluated as described below.

4.2 Alternatives Development

The alternative development process was focused and specific for this project. The specific methods and screening criteria, and alternatives considered but rejected, are described below.

4.2.1 Methods and Screening Criteria

Alternative screening criteria included:

- **Adherence to project objectives** – the extent to which an alternative fulfills the project's objectives.
- **Impact avoidance** – the extent to which an alternative substantially avoids, minimizes, reduces or eliminates an impact.
- **Feasibility** – the extent to which an alternative is potentially capable of being accomplished given economic, environmental, legal, social, and technological factors.

KWBA developed a list of alternatives and evaluated them against these criteria.

4.2.2 Alternatives Considered but Rejected

Alternatives considered included a list of various diversion amounts, project modifications, and other techniques to minimize effects. These are summarized in Table 4-1.

Table 4-1. Alternatives Considered

Alternative	Screening Criteria: Meets Objectives	Screening Criteria: Avoids Impact	Screening Criteria: Feasible	Rationale for Inclusion/Elimination
Diversion – 75% of Request (375,000 AF)	Yes	No	Yes	This alternative is a significant reduction in the requested diversion allocation, but is consistent with historically high diversions. It generally achieves most objectives of the project. However, it does not avoid any impacts. It is feasible to achieve this alternative, though not preferred by KWBA because it does not maximize the water right to be put to beneficial uses. This alternative was retained for analysis.
Offsite Banking – KWBA could bank Kern River flows at other locations within in the Kern Fan.	No	No	No	This alternative does not achieve the project objectives or lessen a significant environmental effect. It is also infeasible as there are no other local or regional locations with existing recharge ponds and recharge capacities of the KWB (and none available for control and/or operation by of KWBA), and substantial additional costs would be incurred developing such facilities. This alternative was eliminated.
Banking via Transfers – KWBA could bank additional water by letting Kern River flows arrive at the Intertie, then working with DWR or other SWP participants, arrange to bank these surplus flows through future water transfers.	No	Yes	No	This alternative would reduce potential instream impacts on the Kern River below the points of diversion. However, it does not achieve the primary project objectives, including consistency and reliability that accompany a secure water right and would not reduce risk of downstream flooding. Furthermore, this alternative is logistically problematic because it requires complicated and uncertain water transfers, which could conflict with competing water rights/water demands and have unanticipated indirect environmental impacts which cannot be analyzed at this point. This alternative was therefore eliminated from consideration.

4.3 Alternatives Analyzed

4.3.1 Alternative 1—No Project

Under the No Project Alternative, the KWBA would not divert unappropriated flood flows in the Kern River for groundwater recharge. Instead, the surplus water that is available in wet water years after all water diversion needs have been met would flow downstream and either (1) be diverted at the Intertie and conveyed toward southern California via the California Aqueduct; or (2) flood farmlands in the Tulare Lake Basin. KWBA would continue to buy water from other sources and recharge and recover that water consistent with the KWB's historical practices.

4.3.1.1 Air Quality, Greenhouse Gases, Climate Change, and Energy

Under the No Project Alternative, no new construction or changes in operations are proposed. Unlike the project, the No Project Alternative would not involve the diversion of marginally increased quantities of water in very wet water years. Therefore, with the lack of change (or even reduced) operation of the KWB, operations are not expected to result in any increase in air quality, GHG, climate change, or energy impacts either from gravity-fed diversion methods or from the operation of KWB pumps and lift stations.

Farmlands could potentially be flooded indirectly under the No Project Alternative and result in reduced agricultural operations and related indirect changes in criteria air pollutant emissions. In addition, agricultural air pollutant emissions are, expected decline into the future as current federal and state regulations and SJVAPCD rules and incentive programs are expected to continue to reduce emissions. Therefore, air quality impacts would be likely be further reduced under the No Project Alternative.

Under the No Project Alternative, additional water could reach the Intertie and be subject to additional pumping by the SWP to move the water to southern California, which would also create additional indirect demands for electricity and generate GHG emissions. However, recovery volumes during an extended 3-year drought, in any single year, or in any single month, could increase but are not expected to change substantially under the No Project Alternative because no new recovery facilities would be constructed and KWBA's member entities have historically maintained a significant surplus groundwater balance.

In addition, as described in Section 3.4, *Greenhouse Gases, Climate Change, and Energy,* the No Project Alternative would remain consistent with the Scoping Plan Measure W-3 (Water System Energy Efficiency) and would not increase energy consumption that would necessitate the construction of new energy facilities, or result in the development of land uses and patterns that cause substantial wasteful, inefficient, and unnecessary consumption of energy that would result in an increased demand for energy. As described in Section 3.4.1.1, *Regulatory Setting,* as part of KWBA's agreement with DWR to operate the KWB, KWBA has agreed to implement energy efficiency measures that would further reduce any wasteful, inefficient, and unnecessary consumption of energy during future recovery operations, increasing the energy efficiency of its water pumping and subsequently reducing GHG emissions. Currently, KWBA performs routine maintenance, monitors its pumps for operations and maintenance activities, and prioritizes pumps for retrofit, rehabilitation, and replacement as necessary based on monitoring data and current operations and pumping demands. Existing KWBA monitoring and maintenance actions have achieved sizeable energy savings through pump retrofits and rehabilitations. In 2011 and 2015, KWBA retrofit and rehabilitation actions resulted in annual energy savings of approximately 1,792 MWh and 3,546 MWh, respectively. These achieved energy savings in 2011 and 2015 represent approximately 3.2% and 6.4%, respectively, of KWB's total annual average electricity consumption. Given that electricity consumption accounts for 91% of KWB's annual GHG emissions, purchasing electricity accounts for a large majority of KWB operational costs. Therefore, KWBA has an inherent financial incentive to operate pumps at an efficient level.

It is also anticipated that electricity-related GHG emissions would decrease as a result of statewide GHG reduction measures imposed on electricity retailers in the state that would reduce electricity-related GHG emissions, such as the Renewable Portfolio Standard and Senate Bill 350. PG&E currently provides the KWB with electricity for activities, including the operation of water pumps

and other related water conveyance infrastructure. As PG&E continues to add renewable resources to its electricity portfolio, the GHG intensity of electricity used for operation activities, such as recovery by pumping, and overall electricity-related GHG emissions is expected to decrease. Therefore, no significant greenhouse gas, climate change, or energy impacts are expected.

Under the No Project Alternative, the KWB could be required to continue to purchase and pump more water for recharge purposes, when compared to the project, to support current member participants. Further, additional SWP pumping may be necessary to move Kern River diversions from the Intertie to Southern California. This could result in greater GHG emissions and energy consumption than the project. As with the project, there would be no construction or changes in operations, or associated greenhouse gas, climate change, or energy impacts. Overall, the potential impacts of the No Project Alternative on greenhouse gas, climate change, or energy would be greater than under the project.

4.3.1.2 Biological Resources

Aquatic Resources

As described in Section 3.3, *Biological Resources*, the Kern River in the study area below the KWB points of diversion is dry in many years and does not presently sustain fish species. No changes to the conveyance of water, either within or beyond the KWB, would take place under this alternative. Aquatic resources would therefore remain unchanged under the No Project Alternative. As with the project, there would be no impact on fish species under this alternative.

Botanical Resources

The Kern River in the study area is dry in many years. The variation in the already irregular water regime is not expected to result in adverse effects on botanical resources, which would remain unchanged under the No Project Alternative. As described in Section 3.3, the KWB HCP/NCCP would continue to cover activities that may affect the 44 special-status plant species identified within the KWB. Overall, the potential impacts of the No Project Alternative on botanical resources would be similar to those of the project.

Wildlife Resources

The Kern River in the study area is dry in many years. Water diversions, and therefore wildlife resources, within the Kern River would remain unchanged under the No Project Alternative. As under the project, the KWB HCP/NCCP would continue to cover activities that may affect the 117 special-status wildlife species identified within the KWB. However, under this alternative the benefits to wildlife resulting from intermittent wetland habitat would not be realized to the same extent as under project conditions. Overall, fewer benefits would result in the potential for slightly greater impacts on wildlife resources under the No Project Alternative than under the project.

4.3.1.3 Geology and Seismicity

No impacts on geology or seismicity, such as liquefaction or subsidence, are expected due to implementation of the No Project Alternative because there would little change to existing diversions or operations. Under the No Project Alternative, there would be no increase in groundwater levels that could increase the liquefaction potential during a seismic event. There would also be no groundwater pumping that could cause groundwater overdraft and result in land

subsidence because, as noted in Sections 3.5 and 3.6 of this EIR, KWB participating members have historically maintained a significant surplus groundwater balance. Further, groundwater basins in California are subject to SGMA, which prohibits overdraft of medium- and high-priority groundwater basins. Overall, the potential impacts of the No Project Alternative on geology and seismicity would be similar to those of the project.

4.3.1.4 Hydrology and Water Quality

Under the No Project Alternative, the KWBA would not divert flood water for groundwater recharge. Instead, the flood water that is available in wet water years after all water diversion needs have been met would flow into the Intertie and toward southern California via the California Aqueduct. Flood water may also be diverted into the Kern River Flood Channel and flood farmland in the Tulare Lake Basin. If future flows to the Intertie resemble previous records showing it received flow in the 9 years between 1978 and 2012 (Table 3.6-3), then flood water would enter the California Aqueduct approximately once every 4 years.

The estimated maximum potential KWBA flood water diversion is 72,000 AF per month, or about 1,200 cfs (Figure 3.6-13). Therefore, if no flood water diversions are made, a monthly flow of up to 1,200 cfs of Kern River water would flow into the California Aqueduct during peak flood water runoff in addition to water already in the Kern River for approximately one month every 4 years. If the capacity of the Intertie is exceeded, the Kern River Flood Channel would convey the water into the Tulare Lake Basin.

Under the No Project Alternative, the KWBA may not be able to deliver as much total water to its recharge basins as it could if it were diverting flood water under existing or project conditions. Based on the water availability analysis, 500,000 AF of the total Intertie flow of 664,000 AF could potentially have been diverted in 1983, through a combination of diversion to recharge ponds for storage and direct diversions for irrigation deliveries, if KWBA were diverting flood water prior to 1997 (Table 3.6-11). Under the No Project Alternative, all of this flow would go into the Intertie or flood farmland. The Intertie's primary function is alleviating flooding in the lower Kern River during wet years. Without the additional diversion of flood flow, farmland flooding conditions in the Tulare Lake Basin would remain unchanged. In wet years when the capacity of the Intertie is exceeded, flood flows would be conveyed in the Flood Channel and into the farmlands. If there is risk of flooding, the Buena Vista Water Storage District would typically divert more flow to the Outlet Canal for in-channel recharge first, and then divert flow to the Intertie. However, under the No Project Alternative, flows to the Kern River Flood Channel would not be reduced. Climate change model results show decreases in Kern River watershed mean annual flow of up to 12.2%, with predicted flashier hydrographs that translate into fewer months with high Kern River flows (Null et al. 2010). Additional water banking may be needed in the future to maintain water supplies in drier years brought on by climate change. The No Project Alternative would not make increased Kern River water available for groundwater recharge.

Under the No Project Alternative, high quality Kern River water would flow out the Intertie instead of into groundwater recharge. The groundwater quality benefits that would be realized by the project's preferential recharge of Kern River water would not be obtained under the No Project Alternative.

Patterns of erosion and siltation under the No Project Alternative would remain similar to existing patterns. Flow in the Kern River is managed with a series of impoundment structures that are used to divert water, leaving sediment deposits upstream of the structures. In 2006, significant erosion occurred at the I-5 overpass of the Kern River, threatening the structure's integrity (Lutje pers. comm.). This erosion may have been exacerbated had the KWBA not been diverting flood water.

Offsite effects of recovered KWB water on KWB participants' delivery areas would remain similar to existing conditions. The KWB has a self-contained system of recovery facilities including pumping wells and conveyance facilities such as canals, aqueducts to deliver recovered water. Other than in multiple dry years, the No Project Alternative would not impact KWB participant delivery areas associated with either the rate and amount of surface runoff or the volume of offsite recovered KWB water. During extended drought periods, however, the No Project Alternative could impact water availability for beneficial uses (agriculture and municipal uses). Overall, the potential impacts of the No Project Alternative on hydrology and water quality would be greater than those of the project.

4.3.1.5 Utilities and Service Systems

No impacts on utilities or service systems are expected due to implementation of the No Project Alternative. There would be no construction under this alternative, nor would any changes to current operations relative to the baseline affect wastewater management, stormwater drainage, or solid waste generation or disposal in the project area or within the KWB participants' delivery areas. Deliveries of recovered water to KWB participants' points of use would continue at current rates under the No Project Alternative, and are not expected to require additional wastewater management, stormwater drainage, or solid waste generation or disposal facilities or services in those areas. As with the project, because KWB operations would remain unchanged, the No Project Alternative would not result in impacts on utilities and service systems. Overall, the potential effects of the No Project Alternative on utilities and service systems would be similar to those of the project.

4.3.2 Alternative 2—Diversion of up to 375,000 Acre-Feet (75% of Request) of Flood Flows a Year

Under Alternative 2, the KWBA would divert up to 375,000 acre-feet of unappropriated Kern River flood flows per year for groundwater recharge. This amount represents 75% of the total diversion requested under the project. In wet water years, after all water diversion needs have been met, any flood flows in excess of that amount would flow into the Intertie and be conveyed downstream toward southern California via the California Aqueduct or potentially toward flood farms within the Tulare Lake Basin. To supplement the smaller amount of diverted water, KWBA would continue to buy water, although a smaller quantity, from other sources and would continue recovery pumping in a manner consistent with historical practices.

4.3.2.1 Air Quality, Greenhouse Gases, Climate Change, and Energy

Under Alternative 2, no new construction or changes in operations are proposed, no significant air quality, GHG, climate change or energy impacts are expected, either from gravity-fed diversion methods or from the operation of KWB pumps and lift stations. Because it would recharge less water, this alternative could result in less recovery pumping at KWB, and therefore lower GHG emissions, than the project. However, at times, SWP water would be recharged instead of Kern River water, creating additional indirect demands for electricity under this alternative. Under this

alternative, some additional water could reach the Intertie and be subject to additional pumping by the SWP to move the water to southern California, which would also create additional indirect demand for electricity. Maximum recovery volumes during an extended 3-year drought, in any single year, or in any single month, are not expected to change substantially under Alternative 2 because no new recovery facilities would be constructed and KWBA's member entities have historically maintained a significant surplus groundwater balance. Because it would not involve any construction or change in operations, Alternative 2 would not result in substantial changes in GHG emissions, increase energy consumption that would necessitate the construction of new energy facilities, or result in the development of land uses and patterns that cause substantial wasteful, inefficient, and unnecessary consumption of energy that would result in an increased demand for energy. Furthermore, as described in Section 4.3.1, *Alternative 1 – No Project,* and Section 3.4.1.1, *Regulatory Setting,* as part of KWBA's agreement with DWR to operate the KWB, KWBA has committed to implementing energy efficiency measures that would further reduce any wasteful, inefficient, and unnecessary consumption of energy during future recovery operations. Implementation of energy efficiency measures have been taking place. In addition, as described in above for 4.3.1, *Alternative 1 – No Project,* as PG&E continues to add renewable resources to its electricity portfolio, the GHG intensity of electricity used for operation activities, such as recovery by pumping, and overall electricity-related GHG emissions is expected to decrease, Therefore, no significant greenhouse gas, climate change, or energy impacts are expected.

Under Alternative 2, as under the project, there would be no GHG emissions or energy consumption associated with construction or substantial changes in operations. Without the project flood flow diversions, the KWB could be required to purchase and pump more water for recharge purposes as has historically been the case, to support current participants. Further, additional SWP pumping may be necessary to move Kern River diversions from the Intertie to Southern California. Compared to the project, this could result in greater GHG emissions and energy consumption associated with water acquisition. Like the project, Alternative 2 is not anticipated to result in changes in normal recovery operations, but may in the latter years of a multi-year drought allow the KWB to maintain normal operations for a longer period. Overall, the potential impacts of the Alternative 2 on greenhouse gas, climate change, or energy would be slightly greater than under the project.

4.3.2.2 Biological Resources

Aquatic Resources

During many years the Kern River channel in the study area below the KWB points of diversion is dry; as a result, the river does not presently sustain fish species. Consequently, although some flows could reach the Intertie in wet water years under Alternative 2, because the Kern River cannot sustain fish species, aquatic resources would remain unchanged. As with the project, there would be no impact on fish species under this alternative.

Botanical Resources

The Kern River in the study area is dry in many years, and botanical resources in the project area are expected to remain unchanged under Alternative 2. Recent surveys confirmed that two of the 21 special-status plant species that have potential to occur in the study area—the California satintail (*Imperata brevifolia*) and the slough thistle (*Cirsium crassicaule*)—are not present in the study area (Jones pers. comm.). A variation in the already-irregular water regime is not expected to result in adverse effects on these species. Further, as described in Section 3.3, the KWB HCP/NCCP would

cover activities that may affect the 44 identified special-status plant species within the KWB. Overall, the potential impacts of Alternative 2 on botanical resources would be similar to those of the project.

Wildlife Resources

Alternative 2 would not result in direct impacts on special-status wildlife because no new construction or ground disturbing activities would occur. Some common and special-status wildlife species, particularly waterbirds, would benefit from longer and more frequent ponding of recharge basins if additional water is diverted onto the KWB. Likewise, Alternative 2 is not expected to cause a substantial adverse effect, either directly or through habitat modifications, on a special-status species. Changes in flood flows under this alternative are not expected to cause a substantial adverse effect on the riparian vegetation (particularly the cover of willow and cottonwood trees) in the project reach of the Kern River because there is currently little to no riparian recruitment and existing vegetation is likely dependent on Buena Vista Water Storage District's diversions via Kern River and groundwater rather than flood flows. Further, the KWB HCP/NCCP would continue to cover activities that may affect the 117 special-status wildlife species identified within the KWB. However, under this alternative, recharge activities and, therefore, the duration of water present in KWB recharge basins, would potentially be of shorter duration than under the project. Thus, the benefits to wildlife resulting from intermittent wetland habitat would not be realized to the same extent under Alternative 2 compared to project conditions. Overall, fewer benefits would result in the potential for slightly greater impacts on wildlife resources under Alternative 2 than under the project.

4.3.2.3 Geology and Seismicity

Shallow groundwater (i.e., groundwater levels less than 40 feet or, in the case of Alternative 2, less than 20 feet below ground surface) is one of the risk factors related to liquefaction. The project area is in a region having sediments that could be susceptible to liquefaction, and the California Geological Survey has designated the vicinity as potentially having sufficiently strong ground shaking that could cause liquefaction.

However, groundwater elevations are not expected to increase or decrease substantially as a result of Alternative 2. While groundwater banking could extend the length of time that groundwater levels are above the liquefaction hazard threshold, under Alternative 2, groundwater levels may be above this threshold for a shorter duration than under the project. As described for the project in Impact GEO-2, onsite extensometer data indicates that the Kern Fan aquifer behaves elastically in response to the banking operations, subsiding less than 0.2 foot and then rebounding the same amount or more. Further, as noted in Sections 3.5 and 3.6, KWBA participating members have historically maintained a significant surplus groundwater balance. Further, groundwater basins in California are subject to SGMA, which prohibits overdraft of medium- and high-priority groundwater basins. Thus, Alternative 2 is expected to result in comparable subsidence to the project. Furthermore, there are no structures within the KWB that would be susceptible to liquefaction. Overall, the potential impacts of Alternative 2 on geology and seismicity would be similar to those of the project.

4.3.2.4 Hydrology and Water Quality

Under Alternative 2, the KWBA would divert up to 375,000 acre-feet per year of flood water for groundwater recharge. In wet water years, after all water diversion needs have been met, any flood flows in excess of that amount would flow into the Intertie and be conveyed downstream toward southern California via the California Aqueduct or flow into the Kern River Flood Channel and flood farmland in the Tulare Lake bed.

Under Alternative 2, the KWBA may not be able to deliver as much total water to its recharge basins as it could if it were diverting flood water under historic or proposed conditions. Based on the water availability analysis (Appendix L), if the KWBA had been diverting flood water prior to 1997, 500,000 AF of the total Intertie flow of 664,000 AF could potentially have been diverted in 1983, the Kern River's wettest year since initial operation of the Intertie in 1978. Under Alternative 2, only 375,000 AF could have potentially been diverted for recharge, leaving 125,000 AF of water to reach the Intertie.

Climate change model results show decreases in Kern River watershed mean annual flow of up to 12.2%, with predicted flashier hydrographs that translate into fewer months with high Kern River flows (Null et al. 2010). Additional water banking may be needed in the future to maintain water supplies in drier years brought on by climate change. Alternative 2 would make some Kern River water available for groundwater recharge and eventual recovery during those expected drier years. Under Alternative 2, less water would be delivered for recharge operations compared to the project. However, because KWBA would divert less water than under the project, more water would reach the Intertie, and as a result, more flow would be available to flood farmlands or be conveyed downstream via the California Aqueduct and to KWB participants' delivery areas. In wet years when the capacity of the Intertie is exceeded, flood flows would be conveyed in the Flood Channel and into the farmlands.

Although KWBA would not divert surplus flows in normal or dry years, under Alternative 2 less surplus Kern River water would be diverted compared to the project, and therefore less water would be contributed to banking operations. As a result of KWB recharge and recovery operations, groundwater elevations have fluctuated. Years with recharge activities correlate to higher groundwater levels, while recovery periods are related to lower groundwater levels. During multi-dry years (i.e., extended drought periods), water banking projects can reduce impacts associated with variability and high flow waters can be re-regulate for recovery. Under Alternative 2, some of the high-quality Kern River water that would be diverted under the project would flow out the Intertie instead of into local groundwater recharge. During wet years, the Intertie's primary function is alleviating flooding in the lower Kern River. Some groundwater quality benefits associated with the recharge of Kern River water and reduced flooding would be realized, but, due to the reduced quantity of Kern River water that would be diverted under Alternative 2, the benefits would be proportionately less than those expected under the project.

Patterns of erosion and siltation under Alternative 2 would likely increase slightly compared to existing patterns, but less than under the project. Although the lower Kern River channel is dry in many years, some flows could reach the Intertie in wet water years under Alternative 2. Somewhat higher flows downstream of the proposed diversion would move more sediment downstream where it would be deposited at impoundment structures.

Offsite effects of recovered KWB water on KWB participants' delivery areas would remain similar to historic conditions. Under Alternative 2, the rate and amount of surface runoff would not affect KWB participant delivery areas. During extended drought periods, however, Alternative 2 could result in less water supply reliability than the project for beneficial uses (agriculture and municipal uses). Overall, the potential impacts of the Alternative 2 on hydrology and water quality would be greater than those of the project.

4.3.2.5 Utilities and Service Systems

As with the project, Alternative 2 would not result in impacts on utilities and service systems because there would be no construction and no substantial changes to operations that could affect wastewater management, stormwater drainage, and solid waste management in the project area or within the KWB participants' delivery areas. Any changes in operations under Alternative 2 would not involve the construction or use of local or regional wastewater treatment plants (i.e., wastewater treatment or handling), and would not conflict with the CVRWQCB wastewater treatment requirements. Similarly, Alternative 2 would not require use of existing stormwater drainage facilities, nor would it require the construction of new stormwater facilities. Any increased water reliability associated with Alternative 2 would serve to extend the duration of water deliveries during extended dry periods rather than increase the rate of delivery. Deliveries of recovered water to KWB participants' points of use would therefore continue at current rates under Alternative 2, and are not expected to require additional wastewater management or stormwater drainage facilities, or result in increased solid waste generation requiring increased disposal facilities or services in those areas. As with the project, because KWB operations in any given year would remain unchanged, Alternative 2 would not result in increased solid waste generation or disposal. Overall, the potential effects of the No Project Alternative on utilities and service systems would be similar to those of the project.

4.4 Environmentally Superior Alternative

Section 15126.6 of the State CEQA Guidelines requires that an EIR identify an environmentally superior alternative among the alternatives that are evaluated. The environmentally superior alternative is typically the alternative that would be expected to generate the fewest adverse impacts. If the No Project Alternative is identified as environmentally superior, then Section 15126.6(e)(2) of the State CEQA Guidelines requires that the EIR identify which of the other alternatives is environmentally superior. Determination of the environmentally superior alternative uses the impact evaluations of the project and of each alternative in a comparative process. The impacts of each alternative are identified and compared to those of the project. The relative severity and quantity of each alternative's impacts are evaluated, and the alternative found to have the least impact, as compared to the others, is determined to be the environmentally superior alternative.

None of the alternatives—the project, the No Project Alternative, or Alternative 2—has any significant, unavoidable impacts. Therefore, the comparison of effects considers the relationship among varying degrees of less-than-significant impacts across the alternatives. The No Project Alternative would result in the greatest amount of water potentially reaching the Intertie and requiring SWP pumping, with associated greenhouse gas emissions and energy consumption. Compared to the project, Alternative 2 would also result in greater flows reaching the Intertie, with somewhat more pumping—and associated emissions and energy use—required, although less than

under the No Project Alternative. Conversely, the No Project Alternative (and to a lesser degree Alternative 2) would add downstream flooding risk. Effects on biological resources associated with all three alternatives would be less than significant. However, fewer benefits to wildlife would be realized under the No Project Alternative and Alternative 2 than under the project.

As noted previously, no significant impacts associated with liquefaction or subsidence would be associated with the project or any of the alternatives. Because the KWBA participating members have historically maintained a surplus groundwater balance, there would be little discernible difference among the alternatives' geologic impacts associated with groundwater elevation changes.

Under the No Project Alternative, the KWBA may not be able to deliver as much total water to its recharge basins as it could if it were diverting flood water under the project, and would not make increased Kern River water available for groundwater recharge, leaving high quality Kern River water to flow out the Intertie instead, reducing the groundwater quality benefits associated with the project's preferential recharge of Kern River water. This effect would be less pronounced under Alternative 2 but would still be greater than under the project. Patterns of erosion and siltation would increase slightly under the No Project Alternative and Alternative 2. Flood flows and associated downstream flood hazards would not be reduced under the No Project Alternative and would be reduced less under Alternative 2 than under the project. During extended drought periods, both the No Project Alternative and Alternative 2 could result in less water availability than the project for beneficial agricultural and municipal uses. Overall, as demonstrated by Table 4-2, the project would have the least environmental impact compared to both the No Project Alternative and Alternative 2. Therefore, the project would be the environmentally superior alternative.

4.5 Comparison to Project

Table 4-2 presents a comparison of the potential environmental impacts of Alternative 1, the No Project Alternative, and Alternative 2, the 375,000 Acre-Feet Alternative, to the project. The comparison indicates whether an alternative would have the same impact, greater impact, or less impact than the project. All impacts, whether for the project or the alternatives, are less than significant.

Table 4-2. Comparison of Alternatives

Resource Topic	Project	Alternative 1 (No Project Alternative)	Alternative 2 (375,000 Acre-Feet)
Air Quality and Greenhouse Gases	Least impact	Greatest impact[a]	Greater impact than project[b]
Biological Resources	Least impact	Greater impact than project	Greater impact than project
Geology and Seismicity	No impact for subsidence; less than significant for liquefaction	Same as project	Same as project
Hydrology and Water Quality	Least impact	Greatest impact (flooding)	Greater impact than project
Utilities and Service Systems	No impact	No impact	No impact

[a] At times, additional pumping may be required by the State Water Project to move Kern River diversions from the Intertie to Southern California, resulting in higher demands for electricity and potential increases in greenhouse gas emissions.

[b] Since this alternative does not allow for as much recharge from surplus flows, KWBA would supplement recharge with SWP water, which would create demands for electricity to deliver water from that source. However, a lesser amount of SWP water would be recharged than under the No Project Alternative.

4.6 References

Null S. E., Viers J. H., and Mount J. F. 2010. *Hydrologic Response and Watershed Sensitivity to Climate Warming in California's Sierra Nevada*. Available: http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0009932. Accessed: February 2013.

4.7 Personal Communications

Jones, Jr., J. W. Senior Biologist, South Valley Biology Consulting, LLC. Bakersfield, CA. March 19, 2013—Phone call with Brad Norton, Project Director, ICF International, regarding KWBA diversions.

Lutje, Joe. Manager. Henry Miller Water District, Bakersfield, CA. April 4, 2013—Phone call to Jonathan Parker, Kern Water Bank Authority General Manager regarding Intertie maintenance activities.

Chapter 5
Other CEQA Considerations

5.1 Cumulative Impacts

5.1.1 Introduction

The State CEQA Guidelines require that an EIR address the cumulative impacts of a proposed project when the project's incremental contribution to that impact is cumulatively considerable (14 CCR § 15130[a]). *Cumulatively considerable* means that the incremental effects of an individual project are considerable when viewed in connection with the impacts of past, current, and probable future projects (14 CCR § 15065[c]). *Cumulative impacts* are impacts on the environment that result when the incremental impacts of the proposed action are added to other closely related past, present, and reasonably foreseeable probable future actions (14 CCR § 15355[b]). These impacts can result from individually minor but collectively significant actions taking place over time. The cumulative impacts section of an EIR need not discuss impacts that do not result in part from the project evaluated in the EIR (14 CCR § 15130[a]1).

5.1.2 Approach to Analysis

Section 15130 of the State CEQA Guidelines states that the discussion of cumulative impacts need not provide as much detail as the discussion of impacts attributable to the project alone. The level of detail should be guided by what is practical and reasonable.

According to the State CEQA Guidelines, an adequate discussion of significant cumulative impacts should contain the following elements.

- An analysis of related future projects or planned development that would affect resources in the project area similar to those affected by the proposed project.
- A summary of the expected environmental effects to be produced by those projects, with specific reference to additional information stating where that information is available.
- A reasonable analysis of the cumulative impacts of the relevant projects. An EIR shall examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative impacts.

To identify the related projects, the State CEQA Guidelines (§ 15130[b]) recommend either the list or projection approach. This analysis uses both the list and the projection approach, depending upon the resource.

5.1.2.1 Resources Excluded from Cumulative Impact Analysis

As provided in 14 CCR Section 15130(a)(1), this analysis does not consider any environmental resources for which there are no significant cumulative impacts. The resources excluded from cumulative impact analysis for that reason are as follows.

- Geology and Seismicity: The risk of seismic hazards associated with shallow groundwater (i.e., liquefaction) is not expected to increase with implementation of the project because the change in shallow groundwater levels would be small. The soil and groundwater conditions are site-specific and the project would therefore not contribute to a regional increase in liquefaction hazard associated with groundwater levels. In any case, the project proposes no new construction and makes use of existing facilities to operate; therefore, there is no project contribution to cumulative geology and seismicity impacts.
- Utilities: There is no development within the immediate area that requires or will require the construction of substantial utilities. In any case, the project has no new construction and makes use of existing facilities to operate, so it would not contribute to the need for additional utilities. Therefore, there is no project contribution to cumulative utilities impacts.
- Surface Water Quality: As discussed in Section 3.6, *Hydrology and Water Quality*, surface water quality in the area is generally good. There is no cumulative impact on surface water quality from existing conditions. In any case, the project has no new construction and makes use of existing facilities to operate. It would not involve activities that would impact surface water quality; therefore, there is no project contribution to cumulative surface water quality impacts.
- Ground Water Quality: As discussed in Section 3.6, ground water quality in the area is generally very good. There is no cumulative impact on groundwater quality from existing conditions. In any case, the project's risk of impacts on groundwater quality from recharge or recovery operations would remain the same as existing conditions. Operations to date have shown no adverse water quality impacts. KWBA's monitoring program ensures that the project would have no adverse effects on groundwater quality; therefore, there is no project contribution to cumulative groundwater quality impacts.
- Drainage and Flooding: As discussed in Section 3.6, there is no development associated with the project that would alter drainage or flooding patterns. Therefore, there is no project contribution to cumulative drainage and flooding impacts.

In addition, as described in Section 3.1.1, *Resources Dismissed from Further Analysis*, the following resources were eliminated from detailed discussion in this EIR because the project would result in either no impact or a less-than-significant impact for these resources. They are therefore not considered in the cumulative impact analysis.

- Aesthetics
- Agricultural and Forestry Resources
- Cultural Resources
- Hazards and Hazardous Materials
- Land Use and Planning
- Mineral Resources
- Noise

- Population and Housing
- Public Services
- Recreation
- Transportation and Traffic

5.1.2.2 Resources Considered in Cumulative Impact Analysis

For the purpose of this EIR, significant cumulative impacts would occur if impacts related to the project, combined with the environmental impacts of other past, present, and reasonably foreseeable future projects, would result in an adverse significant effect. As indicated in the analysis in Chapter 3 of this EIR, the project would affect a limited range of resources. Further, among those resources, only those impacts that have the potential to incrementally contribute to the cumulatively significant impacts of other relevant projects in the region are analyzed. For an impact to be considered cumulative, its incremental impacts must be related to the types of impacts caused by the project (i.e., the types of impacts caused by groundwater recharge projects) and evaluated in Chapter 3, *Impact Analysis*. Therefore, the cumulative analysis focuses on the following resources.

- Air Quality
- Greenhouse Gases, Climate Change, and Energy
- Biological Resources
- Water Resources and Supply

For each resource, the cumulative impact analysis first considers whether the cumulative condition could result in a significant cumulative impact within a specific resource area (e.g., air quality or biological resources). If a significant cumulative impact is identified, the analysis considers whether the project's incremental contributions to that cumulative impact would be cumulatively considerable. If the project's incremental contribution would be cumulatively considerable, the discussion then describes feasible mitigation measures, if available, to address any significant project contribution to a cumulative impact.

5.1.2.3 Cumulative Condition

This cumulative analysis considers projected growth and past, present, and reasonably foreseeable, relevant projects, focusing primarily on growth in both the KWB vicinity and KWB participants' service areas, water resources projects in the KWB vicinity, and development actions or projects with overlapping geographic or temporal effects that, when combined with the project, could contribute to cumulative impacts. Taken together, the combined environmental influence of these past, present and future changes is referred to as the cumulative condition. Figure 5-1 depicts the locations of specific projects considered for purposes of the cumulative analysis.

The conversion of land to urban uses associated with projected growth is anticipated to have substantial environmental effects in the KWB vicinity and in areas served by KWB member participants. As described in Chapter 2, *Project Description*, KWB participants primarily provide water for agricultural use; a small percentage of the KWB member participants' water is allocated to municipal and industrial (M&I) use. KWB participants provide water to a large geographic area (Figure 2-6). Population growth in Kern County is projected to continue at its current rate of 2.0 percent per year through 2035, with an estimated population increase of approximately 428,000

people by 2035, then continue at a lower annual rate of 1.8 percent, adding approximately 767,000 people between 2035 and 2050 (Kern Council of Governments 2015).

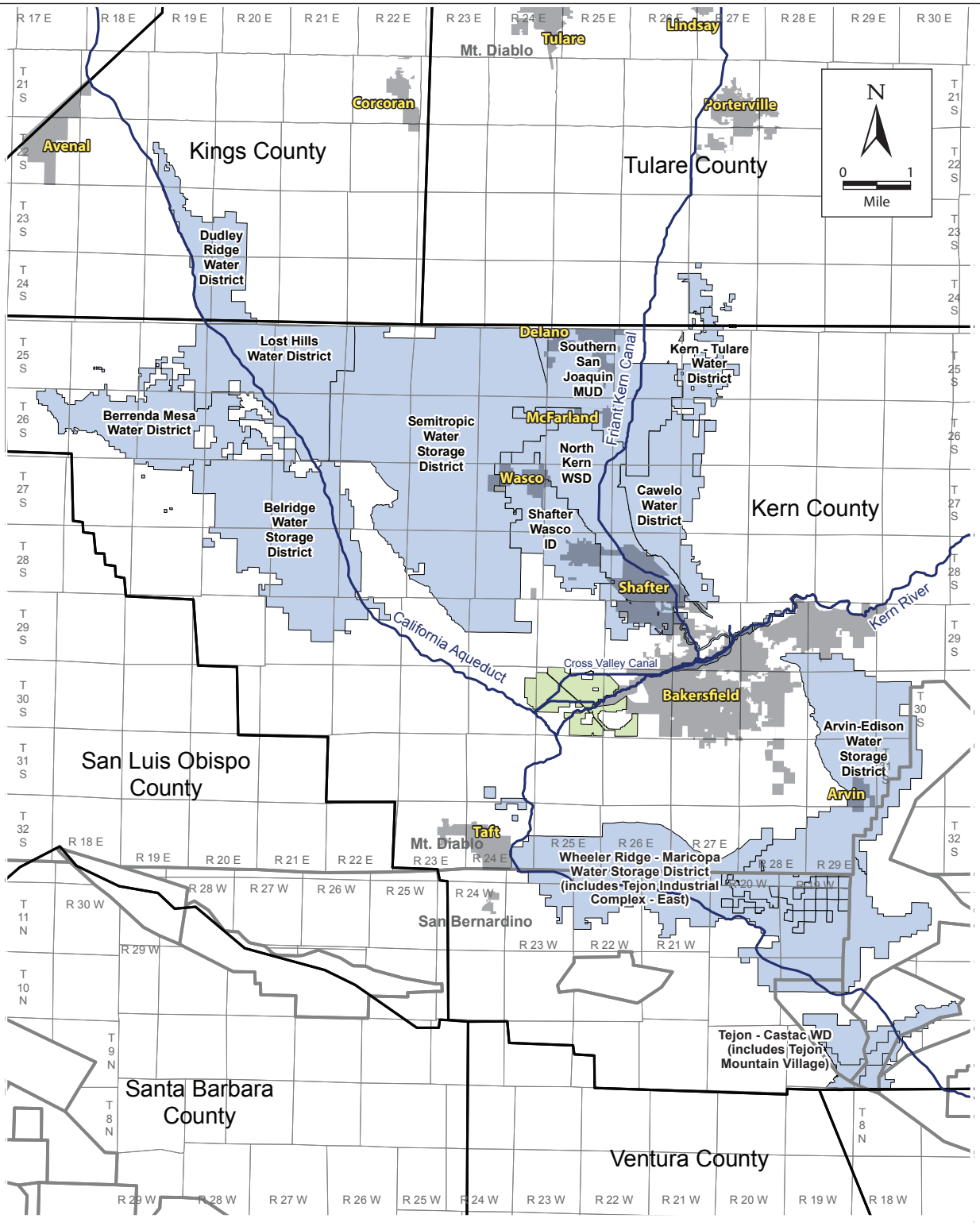
Although the adopted plans for these areas promote relatively dense urban development patterns, development associated with projected population growth would continue to result in the conversion of natural and agricultural land to other uses.

The following adopted local plans comprise the preparing agencies' comprehensive, long-term visions for physical development or resource conservation. These plans, along with the growth projections described previously, are considered in combination with the project for assessing cumulative impacts.

- Kern County General Plan
- City of Bakersfield General Plan
- Kern River Plan

In addition, the analysis considers projects, beyond those already included in local plans, which could affect the same resources as the project and potentially result in a cumulative impact. Projects considered include water resources and large development projects—both in the vicinity of the KWB and within the member participants' delivery areas—that have the potential to affect the resources identified in Section 5.1.2.2, *Resources Considered in Cumulative Impact Analysis*.

Water resources projects considered in this analysis include existing and proposed water rights and diversions from the Kern River watershed and related water resources projects that could together result in cumulative impacts. Table 5-1 identifies water resources projects that would contribute to the cumulative condition.



Legend

- River / Canal
- City
- KWB Participant Place of Use
- Kern Water Bank

Sources:

Kern Water Bank Authority, 2013.

County of Kern. 2005. Tejon Industrial Complex – East Specific Plan. Available: https://www.kerncounty.com/planning/pdfs/SPs/TIC_E_sp.pdf. Accessed: September 19, 2017.

County of Kern. 2009. Tejon Mountain Village Special Planning District Plan. Available: http://pcd.kerndsa.com/planning/environmental-documents/eda/226-tejon-mountain-village. Accessed: September 19, 2017.

ICF Graphics...00415.12 (9-19-2017)

Figure 5-1
Cumulative Condition Projects and Kern River Water Delivery Areas

Table 5-1. Cumulative Water Resources Projects

Agency	Project
KWBA	KWB Recharge and Recovery Project (Integrated Resources Water Management Plan)
Berrenda Mesa Water District	Berrenda Mesa Water Banking Project
	Berrenda Mesa Property Joint Water Banking Project (joint project with KCWA Improvement District No. 4)
Buena Vista Water Storage District	Buena Vista Water Storage District Water Management Program
	Buena Vista / Rosedale-Rio Bravo Water Banking and Recovery Program
	Buena Vista Water Storage District / West Kern Water District Joint Water Supply Project
	Buena Vista Water Storage District / Irvine Ranch Water District Exchange Agreements, 2010—2038
	James Groundwater Storage and Recovery Project
	Palms Groundwater Banking Project
City of Bakersfield	Water Right Application 31674
	2,800 Acre Groundwater Recharge Project
	Kern River Channel Maintenance Project
	Kern River Flow and Municipal Water Program
Kern Delta Water District	Kern-Delta Water District Groundwater Banking Program and In-Lieu Banking Program
	Kern Delta / Metropolitan Water District Water Banking Project
Kern County Water Agency (Improvement District No. 4)	Water Right Application 31677
	Pioneer Project Banking Program
	Joint Use Groundwater Recovery Programs (joint program with Rosedale Water District and Berrenda Mesa Water District)
	Kern County Water Agency Improvement District No. 4 Allen Road Complex Well Field Project
North Kern Water Storage District	North Kern Water Storage District and City of Shafter's water right application (Application 31673)
	North Kern Water Storage District Groundwater Storage Project and Conjunction Use / In-Lieu Recharge Program
	North Kern Water Storage District Drought Relief Project

Agency	Project
Rosedale-Rio Bravo Water Storage District	Water Right Application 31819
	Rosedale-Rio Bravo Water Storage District Groundwater Banking and Sale Program and In-District Conjunctive Use / In-Lieu Recharge Program
	Rosedale-Rio Bravo Water Storage District Joint Use Groundwater Recovery Projects
	Rosedale-Rio Bravo Water Storage District / Irvine Ranch Water District Exchange Agreements, 2009—2039
	Rosedale-Rio Bravo Water Storage District Strand Ranch Integrated Banking Project
	Rosedale-Rio Bravo Water Storage District Stockdale West / Strand Ranch Water Banking Project
	Rosedale-Rio Bravo Water Storage District Drought Relief Project
West Kern Water District	West Kern Water District Groundwater Banking Program
	West Kern Water District North Project Water Banking Expansion

Large development projects considered in this cumulative impact analysis are located within the member participants' delivery areas.

- Tejon Mountain Village
- Tejon Industrial Complex

5.1.3 Cumulative Impact Analysis by Resource

5.1.3.1 Air Quality

The State of California has classified the eight-county SJVAPCD, which includes Kern County, as being in nonattainment for ozone, PM10, and PM2.5. SJVAPCD has adopted attainment plans that address NO_X and ROGs, both of which are ozone precursors, PM10, and PM2.5. The cumulative development scenario for air quality throughout Kern County is expected to continue to be adverse; growth, development, and construction and operation of projects will continue to result in incrementally cumulative adverse effects on regional air quality. The project, however, would not generate local fugitive dust nor other PM10 emissions as there are no new construction activities associated with the project, and the process of diverting and recharging water within the KWB is not a source of these emissions. Operation and maintenance of the project would not result in a net increase in NO_X emissions, ROGs, or PM because pumps would be operated at the same annual or seasonal duration and frequency as they are currently. Maximum recovery volumes are not expected to increase in any single year, or in any single month of a multi-year drought. Overall recovery volumes may increase by extending pumping for a longer period during a multi-year drought but are not expected to change substantially because no new recovery facilities would be constructed and KWB member entities have historically maintained a significant surplus groundwater balance.

Enhanced water supply reliability can be a precursor to the conversion of additional land for agricultural operations, ultimately resulting in new and/or changed indirect in criteria air pollutant

emissions that could exceed established and adopted thresholds of significance criteria. However, the project would not increase recovery pumping beyond current quantities in any given year; rather, it could provide water to meet existing demand for a longer period during a multi-year drought. Further, agriculturally-related air pollutant emissions are expected to decline in the future as current federal and state regulations and SJVAPCD rules and incentive programs continue to reduce emissions. Because it would not result in any discernible increase in criteria air pollutant emissions over baseline conditions (Section 3.2, *Air Quality*), the project is not expected to contribute to cumulative impacts on air quality.

5.1.3.2 Greenhouse Gases, Climate Change, and Energy

The global climate change and energy impacts are described in Section 3.4, *Greenhouse Gases, Climate Change, and Energy*. The project would not involve any new construction and would make use of existing facilities to operate. Further, existing operations and associated energy consumption are not expected to increase markedly with the project, particularly as recharge operations are by gravity and thus would not result in any increase in energy consumption. The project would not increase recovery pumping beyond current quantities in any given year; rather, it could provide water to meet existing demand for a longer period during a multi-year drought. There is therefore a potential for the project to result in incremental and marginal increases in associated water recovery operations by pumping as the additional stored water would be available for recovery in the later years of a multi-year drought. Increased recovery operations over a longer period during a multi-year drought could, in turn, result in incremental increases in GHG emissions and energy consumption from recovery pumping in certain years. However, these increases are not anticipated to result in any substantial changes in GHG emissions and energy consumption over the life of the project or even in any given year.[1] Implementation of energy efficiency measures for KWB pumps and PG&E's ongoing efforts to add renewable energy sources to its portfolio would further reduce any wasteful, inefficient, and unnecessary consumption of energy during future recovery operations. Consequently, the project is not expected to contribute to cumulative greenhouse gas, climate change, and energy impacts in the region or in the state.

5.1.3.3 Biological Resources

Biological resources in the San Joaquin Valley have experienced dramatic changes since farming and settlement began in the valley in the nineteenth century. Loss and degradation of natural communities due to agriculture, urbanization, livestock grazing, water impoundment and diversion, historical predator and pest control, and other human activities have dramatically affected native species and are the major causes of endangerment of state and federally listed species (U.S. Fish and Wildlife Service 1998). Continued regional growth through urbanization and development of renewable energy projects has the potential to continue contributing to the cumulative loss of habitat. However, regional conservation efforts, including KWBA's HCP/NCCP and the City of Bakersfield's HCP, are underway to protect and enhance habitat.

Operation of the project could result in increased wetted area during banking periods and an expansion of habitat and cumulative benefits to wintering waterfowl. Riparian areas are expected to remain unaffected because water would remain within the Kern River for later diversion downstream by senior water right holders. Similarly, the project is not expected to reduce or

[1] The analysis of climate change is distinct from that of air quality. While air quality impacts are measured over a short time period, climate change effects are measured cumulatively over multiple years.

diminish the quality of nearby Buena Vista Lake shrew habitat because these areas are dependent on year-round and consistent water supplies, which do not occur in this river segment, and there would be limited opportunities to take water in most water year types besides wet years (Section 3.3, *Biological Resources*). Other water supply projects are also expected to have limited to no direct biological effects because little new construction would be performed. Nonetheless, the cumulative situation for biological resources throughout Kern County and the participating entities' service areas is expected to continue to be adverse; growth, development, and construction of projects result in the loss of habitat and would continue to result in incremental biological effects. However, because the project provides beneficial effects on biological resources, it is not contributing to these incremental effects and thus is not expected to contribute to cumulative impacts on biological resources.

5.1.3.4 Water Resources and Supply

This analysis examines existing and proposed water rights and diversions from the Kern River watershed to frame the cumulative context of the discussion because impacts resulting from other water diversions within the watershed could potentially combine with those of the project to create cumulative impacts.

Because historical diversions from the Kern River for current water banking operations are considered part of the environmental baseline for this EIR, these diversions are necessarily considered part of the cumulative context in determining the potential cumulative impact of Application 31676.

Table 5-2 lists the reasonably foreseeable future projects considered in the analysis of cumulative impacts on Kern River water resources and supply. Projections from the Kern Integrated Regional Water Management Plan (Kern IRWMP) (Kennedy/Jenks 2011) were also used to identify the past and present related or cumulative impacts. Available information on resource trends in the region was used to augment the analysis.

Table 5-2. Overview of Projects Requesting Entitlements on the Kern River

Project Name	Allocation Request (AF)	Type of Right Requested	Date of Request
North Kern Water Storage District	500,000	Appropriative	April 25, 2007
City of Bakersfield	90,000	Appropriative	May 4, 2007
Rosedale-Rio Bravo Water District	65,750	Appropriative	January 29, 2010
Buena Vista Water Storage District	700,000	Appropriative	August 20, 2007
Kern Water Bank Authority	500,000	Appropriative	September 26, 2007

Source: State Water Resources Control Board 2013.
AF = acre-feet.

Kern River Flows

The project would divert flows from the Kern River, and reduce annual river outflow beyond Second Point during flood conditions. However, as described in the Water Availability Analysis (Section 4.2), Buena Vista Water Storage District, as a Kern River rights holder, delivers water beyond Second Point for irrigation and groundwater recharge within its' service area. During high-flow conditions,

these deliveries are conveyed in the Kern River channel, the Outlet Canal, and the Kern River Flood Channel. Regardless of the utilization of Kern River flood flows by other projects, these deliveries will continue unabated. As such, the flow conditions in the Kern River in high-flow conditions or mandatory release conditions are not expected to change significantly and would not be cumulatively considerable.

Water Quality

Changes in water quality could result from cumulative projects and operations that substantially alter flow in the Kern River and the Intertie. Flow related changes in water quality together with stormwater and treated wastewater discharges from urban development in the Kern River watershed could have potentially significant cumulative impacts on water quality.

As described in Section 3.6, the project would not alter the chemistry or quality of Kern River surface water, and recharging Kern River water under the project compared to either Baseline Condition 1 or 2 would improve groundwater quality and result in no negative impact on groundwater quality. Therefore, the project would not contribute to decreased water quality and its implementation is not anticipated to be cumulatively considerable and would be less than significant.

Supply Availability

The project is requesting an appropriative water right at a time when many other users are also requesting appropriative water rights. However, Application 31676 is different in that it focuses exclusively on wet-year availability and diversions of water in years and seasons when large supplies are available in the system. Section 3.6 analyses and the *Kern Water Bank Authority Water Availability Analysis* (Appendix L) conclude that there is sufficient supply during wet years to bank water within the KWB and still serve senior water right holders. During these wet years, other projects are expected to be operating at capacity and will not have the physical ability to take additional water. This type of water banking project (i.e., the project), therefore, is needed as part of a broader effort to achieve the sort of comprehensive water supply planning and integrated water management described in the Kern IWRMP (Kennedy/Jenks 2011). The Kern River does not possess sufficient water supplies to fulfill all of the water right applications listed in Table 5-2 in most years (including normal, below-normal, and even most above-normal years). As part of the water right permitting process, the State Water Board will have to carefully time and allocate Kern River water supplies for more common water year types. Because the project seeks to divert and store water at a location below the points of diversion for all other water rights applicants and in only the wettest year types, its potential for contributing to cumulative impacts is not anticipated to be cumulatively considerable.

Groundwater Supplies

As detailed in the Kern IRWMP (Kennedy/Jenks 2011) and in DWR's Bulletin 118 (Department of Water Resources 2004), portions of the Tulare Lake Basin have been subjected to long-term groundwater overdraft. There is a net loss of 325 TAF/year. Thirty-nine percent of local water use is groundwater, and the majority of remaining local water districts' water is from SWP and CVP contracts. With decreasing supplies from these sources, it is likely that increased groundwater production will take place with or without the project. If increased groundwater production occurs, the region is likely to experience localized drawdowns of associated aquifers or subbasins, again, with or without the project (subject to any limitations that may be imposed in the future under

SGMA, as noted in Section 3.6.1.1 of this EIR). However, the project would benefit the subbasin because it would result in a net increase in recharge (Section 3.6). During dry years, recovery would be similar to baseline conditions and would result in a temporary lowering of the groundwater table. Overall, however, the project is expected to assist with integrated flood and water management, contribute to long-term supplies, and result in a net benefit to groundwater supplies and water levels. The project would have a negligible (if not a positive) effect on groundwater quality and would not contribute to cumulative effects on groundwater quality. The incremental effect of the project would help reduce adverse cumulative impacts.

5.2 Growth-Inducing Impacts

5.2.1 Introduction

CEQA requires that an EIR discuss the potential for a project to remove an obstacle to growth and present the possible secondary effects that could result from growth indirectly induced by the project. Public Resources Code Section 21100 requires that an EIR analyze the growth-inducing impacts of a project (Public Resources Code § 21100 [b][5]). According to the State CEQA Guidelines (§ 15126.2 [d]), an EIR must discuss how a project could directly or indirectly lead to economic, population, or housing growth. A project can be considered growth-inducing if it removes obstacles to growth, increases the demands on community service facilities, or encourages other activities that can cause significant environmental effects.

5.2.2 Approach to Analysis

For the purposes of this analysis, the implementation of the project would result in a significant impact if it would induce substantial economic growth (e.g., land conversions) or population growth in the study area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through the extension of roads or other infrastructure). In this analysis of growth-inducing impacts, the study area includes the project area and the POU area for the Kern River water considered in this document as identified in Chapter 2, *Project Description*.

5.2.3 Growth-Inducing Impact Analysis

While the project would entitle new water supplies, it is not expected to directly or indirectly induce economic or population growth within the study area because the project seeks only to improve the reliability of existing supplies to fulfill existing demands. It is not designed to accommodate residential or commercial expansion. The majority of KWBA participating members expecting to receive water as a result of the project would use that water for irrigation uses within the existing POUs and not for geographically expanded irrigation uses. Further, while the maximum diversions sought under Application 31676 are high (up to 500,000 AFY), water supply reliability would only increase periodically and sporadically because increased diversions are expected to occur almost exclusively in very wet years. In most years, KWBA would continue to bank water from the SWP, Friant–Kern Canal, and Kern River consistent with its water purchases. Further, recovery capabilities would not increase because no additional facilities would be constructed and recovery pumping would not increase beyond current quantities in any given year. Thus, the project is not

expected to improve water supply reliability such that it would sustain or encourage growth beyond what is accounted for in current city and county general plans.

The increased reliability of water can be considered a precursor to agricultural growth and altered agricultural development patterns. Kern County regularly ranks among the leading agricultural counties in California. In 1995, the year that the KWB was established, upland cotton was California's highest-value field crop (California Department of Food and Agriculture and U.S. Department of Agriculture 1996). Kern County had the third highest total value of agricultural production among California counties in 1995, with grapes, cotton and cottonseed, citrus, almonds and almond byproducts, and milk comprising Kern County's leading crops (California Department of Food and Agriculture and United States Department of Agriculture 1996). In 2015, California's highest-value crops were almonds and grapes (California Department of Food and Agriculture 2016a). Kern County ranked second among California counties in total agricultural production value for 2015; its leading commodities—almonds, table grapes, milk, and tangerines—reflect the increase in perennial crop acreage over two decades as shown in Table 5-3 (California Department of Food and Agriculture 2016a). Between 1995 and 2015, Kern County acreage dedicated to perennial fruit and nut crops more than doubled, increasing from 223,214 acres to 525,398 acres (Table 5-3). Concurrently, the total Kern County acreage dedicated to field and seed crops decreased by approximately 46 percent, from 529,892 acres in 1995 to 287,400 acres in 2015 (Table 5-3). Kern County acreage devoted to vegetable crops also decreased by over 20 percent from 1995 to 2015 (Table 5-3). In 1995, almonds accounted for 86,112 acres of Kern County agricultural lands, grapes occupied 81,501 acres, and 309,850 acres of cotton were harvested (County of Kern Department of Agriculture 1995). By 2015, Kern County agricultural patterns had shifted and the county had 218,970 acres of almonds and 110,320 acres of grapes; only 21,073 combined acres of cotton and cottonseed were harvested (County of Kern Department of Agriculture and Measurement Standards 2016).

Table 5-3. Kern County Harvested Acres, 1995 and 2015

Crop Type	1995 Acres	2015 Acres	Change (Acreage)
Fruit and Nut Crops	223,214	525,398	302,184
Field and Seed Crops	529,892	287,400	–242,492
Vegetable Crops	84,677	66,170	–18,507

Sources: County of Kern Department of Agriculture 1995; County of Kern Department of Agriculture and Measurement Standards 2016.

As indicated in Table 5-4, a similar pattern emerges statewide during the same timeframe (1995 to 2015), with increased acreage devoted to perennial fruit and nut crops, and decreased acreage planted to field and seed crops as well as vegetable crops, in areas that do not receive KWB water. California almond acreage increased from approximately 483,700 acres in 1995 to 1,110,000 acres in 2015 and grape acreage increased from 716,800 acres in 1995 to 918,000 acres in 2015 (California Department of Food and Agriculture and U.S. Department of Agriculture1996; California Department of Food and Agriculture 2016a, 2016b). Statewide, harvested cotton acreage decreased from 1,280,000 acres in 1995 to 162,000 acres in 2015 (California Department of Food and Agriculture and U.S. Department of Agriculture 1996; California Department of Food and Agriculture 2016a).

Table 5-4. California Harvested Acres, 1995 and 2015

Crop Type	1995 Acres	2015 Acres	Change (Acres)
Fruit and Nut Crops	1,998,019	2,907,800	909,781
Field and Seed Crops	4,698,800	2,280,600	–2,418,200
Vegetable Crops	1,027,100	1,013,200	–13,900

Sources: California Department of Food and Agriculture and U.S. Department of Agriculture 1996; California Department of Food and Agriculture 2016a.

Agricultural production trends within the KWB participants' service areas largely follow the countywide and statewide patterns, with increased acreage devoted to fruit and nut production and fewer acres of field, seed, and vegetable crops (Table 5-5). In 1995, at 68,975 acres, cotton constituted the predominant crop in the KWB service area, followed by grains (20,681 acres) and almonds (20,213 acres) (Insight Environmental Consultants 2015). By 2015, KWB participants' service area acreage was primarily dedicated to almond and pistachio crops, with 60,299 acres and 40,468 acres, respectively, followed by citrus (24,763 acres) and grapes (24,031 acres) (Insight Environmental Consultants 2015). Cotton acreage within KWB participants' service areas decreased to 1,590 acres, and grains decreased to 3,002 acres, by 2015 (Insight Environmental Consultants 2015).

Table 5-5. Kern Water Bank Participants' Acreage, 1995 and 2015

Crop Type	1995 Acres	2015 Acres	Change (Acreage)
Fruit and Nut Crops	57,819	163,257	105,438
Field Crops	98,961	11,070	–87,891
Vegetable Crops	15,717	4,500	–11,217

Source: Insight Environmental Consultants 2015.

While the increased reliability of agricultural water supplies can facilitate the use of agricultural lands for perennial crops, the ongoing shift from annual field crops to perennial tree and vine crops within the KWB participants' service areas reflects a similar pattern occurring statewide, as shown in Table 5-4. Water stored within the KWB is used primarily, although not exclusively, for irrigation in existing POUs, and such use would continue under the project. Improving water supply reliability allows current agricultural land uses to continue. The shift of agricultural acreage from one crop to another is part of a larger, recurring trend that is expected to continue regardless of the project and does not represent growth or a change in land use. Other study area land uses include rangeland and, to a much lesser extent, residential and commercial development, but these uses do not receive much water from the participating members. The additional storage of water under the project would be intended for increasing water reliability for existing customers and not to accommodate increased agricultural water usage or urban growth.

5.3 Significant and Unavoidable Impacts

There are no significant and unavoidable impacts associated with the project.

5.4 References

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