RECLAMATION
Managing Water in the West

Draft FINDING OF NO SIGNIFICANT IMPACT

Long-term Warren Act Contract and License for Delta Lands Reclamation District No. 770

FONSI-07-103

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U.S. Department of the Interior
Bureau of Reclamation
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Introduction

In accordance with section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969, as amended, the South-Central California Area Office of the Bureau of Reclamation (Reclamation), has determined that an environmental impact statement is not required for the issuance of a 25-year Warren Act contract and the issuance of a 25-year license to Delta Lands Reclamation District No. 770 (RD770). This Finding of No Significant Impact (FONSI) is supported by Reclamation's Environmental Assessment (EA) Number EA-07-103, *Long-term Warren Act Contract and License for Delta Lands Reclamation District No. 770*, and is hereby incorporated by reference.

Reclamation intends to provide the public with an opportunity to comment on the Draft FONSI and Draft EA during a 30 day public comment period.

Background

Since 1978, Reclamation has periodically entered into Warren Act contracts (both long-term and temporary) with RD770 to allow RD770 to introduce Non-Central Valley Project (Non-CVP) floodwater into the Friant-Kern Canal (FKC) in order to help alleviate damage to farm land, property, improvements, and crops within RD770's boundaries. In addition, in the past, Reclamation has issued licenses to RD770 allowing RD770 access to install pumping equipment on Reclamation lands to pump Non-CVP floodwater from the Kings, St. Johns (a tributary channel of the Kaweah River system), and Tule rivers into the FKC. Floodwater from these pump-in events have periodically been taken by CVP and Non-CVP contractors capable of taking water off the FKC downstream of the RD770 pump stations.

Proposed Action

Reclamation proposes to enter into a 25-year Warren Act contract with RD770 to utilize otherwise unused capacity in the FKC to accept Non-CVP floodwater pumped from the Kings, St John's and Tule Rivers. Such floodwater could be conveyed to CVP contractors, Non-CVP contractors, and other entities (Potential Recipients) that can take delivery of water from the FKC downstream of the RD770 pump stations which divert this water into the FKC. The Potential Recipients will be utilizing the Non-CVP floodwater for irrigation uses, municipal and industrial (M&I) uses, groundwater recharge, and/or for the benefit of fish and wildlife. Uses of this water will be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife (e.g. Kern National Wildlife Refuge). Groundwater recharge can occur on existing groundwater recharge facilities, including existing streams, waterways and basins and on farmland which has been cultivated within the last three years. Notice would be provided to entities accepting this Non-CVP floodwater that this water is not to be used to convert native lands to other uses consistent with the uses described above. Delivery of this water will also be based on an agreement between the Friant Water Authority (FWA) and RD770. Floodwater not diverted from the FKC would be discharged into the Kern River through an existing gate at the terminus of the FKC. The maximum amount of Non-CVP floodwater from the three rivers to be

conveyed in the FKC in any given year is 250,000 acre-feet (AF). The contract term is expected to be from March 2012 through February 2037 but the precise months may vary depending on when the contract is executed.

Non-CVP floodwater will be introduced only when: 1) there is excess capacity in the FKC, as determined by Reclamation in coordination with the FWA, 2) it meets the applicable water quality standards, 3) the introduction of floodwater from the Kings, Kaweah, or Tule rivers is coordinated with the appropriate Watermaster(s) to ensure there is no infringement on any existing diversion rights and/or river operation, 4) the discharge of floodwater into the Kern River is coordinated with the Kern River Watermaster, and 5) the introduction of the Non-CVP floodwater from any of the three rivers is not under active challenge with the California State Water Resources Control Board. Letters from the respective Watermasters will be included as attachments to the Warren Act contract. Non-CVP floodwater will be introduced to the FKC through existing pump stations without modification to the FKC.

In addition, Reclamation proposes to enter into a 25-year license with RD770 which will allow RD770 to access federal land and erect, operate and maintain the pumps when it is determined there is a need to pump. It also allows for the continued existence of the pump station frame, decking, discharge pipes, and other semi-permanent infrastructure on Federal lands.

Reporting Requirements

Annually, RD770 will prepare a Non-CVP Floodwater Delivery Report (Report) to document the amount of Non-CVP floodwater introduced into the FKC as a condition of the Warren Act contract. The Report will identify how much and which contractors diverted floodwater each year floodwater is introduced. The Report will also indicate how much floodwater was discharged into the Kern River. The Report will be due by July 31st of each year floodwater is introduced into the FKC. This Report will be a summarization of the monthly water report RD770 will be required to submit to Reclamation and FWA in the month following the introduction of Non-CVP floodwater into the FKC.

Environmental Commitments

RD770 will implement the following actions for the protection of natural resources. The analysis of the environmental consequences for resource areas assume the commitments specified will be fully implemented.

- RD770 is required to comply with the water quality monitoring program either described in or incorporated by reference within the Warren Act contract (see Appendix A for the water quality monitoring requirements and sampling locations). In addition, if water were to be delivered for fish and wildlife benefit, water in the FKC below the point of diversion will meet standards for fish and wildlife benefit. RD770 will conduct water quality analyses using a Reclamation-approved laboratory. If the quality of the Non-CVP floodwater from one or more of the rivers will substantially degrade the quality of water in the FKC, RD770 will be required to immediately terminate pumping into the canal from the source that will cause the degradation.

- RD770 will remove silt accumulation as directed by FWA or Reclamation and take steps to screen debris from water prior to pumping.

- No water conveyance will be authorized if the conveyance will likely adversely affect the ability to meet fish and wildlife obligations under the Central Valley Project Improvement Act.

- RD770 will comply with Fresno and Tulare County Noise Ordinance regulations as well as respond to any complaints from adjoining landowners regarding noise and take appropriate actions.

- RD770 will not allow contamination or pollution of Federal lands, waters or facilities related to the Proposed Action.

- RD770 will not use any pesticides on Federal lands without prior written approval by Reclamation. All pesticides used will be in accordance with the current registration, label direction, or other directives regulating their use.

- RD770 will immediately notify Reclamation of the discovery of any and all antiquities or other objects of cultural, historic, or scientific interest on Reclamation lands.

- Minimization and avoidance measures for Valley elderberry longhorn beetle will be implemented as described in Appendix C.

- Uses of this water will be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources (e.g. at Kern National Wildlife Refuge). Notice will be provided to entities accepting this Non-CVP floodwater that this water is not to be used to convert native lands to other uses consistent with the uses described above.

- Reclamation will prepare a report evaluating the effects to listed species and designated critical habitat protected under the Endangered Species Act (16 U.S. Code §1531 et. seq.) which result from the Proposed Action. The report will utilize data from monthly and annual water delivery reporting requirements required as part of the Proposed Action, as well as any other information appropriate for this purpose, and will be provided to the U.S. Fish and Wildlife Service (Service) by the 1st of May at least every 10 years, and also at the end of the period of the Proposed Action, or the termination of the Warren Act contract covering the Proposed Action, whichever is earlier.

Reclamation's finding that implementation of the Proposed Action will result in no significant impact to the quality of the human environment is supported by the following findings:

Findings

Water Resources

Past introductions and conveyances of Non-CVP water have occurred infrequently during large flood events in the Kings, St. John's and Tule Rivers. Future introductions of Non-CVP water will be infrequent, intermittent, unreliable and small relative to existing river flows, water needs

and operations as it has been in the past. The Proposed Action is consistent with the County of Tulare's General Plan 2025 flood protection goal and with Executive Order 11988 since it will reduce the exposure of people, land and improvements to risk of damage as a result of flooding or levee failure. However, the level of flood protection will be contingent upon the amount of Non-CVP water that needed to be pumped and the available capacity in the FKC.

Reclamation requires implementation of environmental commitments as well as local, state, and federal laws and regulations in order to reduce potential impacts to water resources within the Proposed Action area. The Proposed Action area includes the lands to which water could be diverted, and also the waters and riparian areas of those waters downstream of the points of diversion that are hydrologically connected to the three rivers from which water is being diverted. Failure to comply will result in the termination of the Warren Act contract and license. Requirements to comply with these commitments, laws and regulations provide additional safeguards to the water resources in the action area.

The Proposed Action will not substantially alter existing drainage patterns or the beneficial aspects periodic flood flows have on channel morphology. Variations in annual flows important to aquatic and riparian habitats have continued since the original contracts in 1978 with water below introduction points in pump-in years remaining greater than 138 percent in all three rivers. The Proposed Action will not impact water quality in the Kings, St. John's and Tule rivers as water quality is not affected by diversion of a portion of the river's flow. Further, the Proposed Action will not interfere with existing deliveries of water for environmental purposes in the Tulare Lake bed. RD770 will continue to coordinate and provide water to wetland areas in the vicinity of the Tulare Lake bed as in the past, including providing water to restored wetlands.

There will be no change in the generation of electrical power on the Kings, Kaweah and Tule rivers as the pumping of Non-CVP water into the FKC is downstream of hydroelectric facilities on these rivers. The generation of electrical power will continue as in the past with or without the Proposed Action.

Water Rights Introduction of this Non-CVP water into the FKC will not alter water rights held by the United States to pump water from the San Joaquin River nor will it alter the water rights of water right holders on the Kings, St. John's (Kaweah), or Tule rivers as water diverted will only be done during flood flows and under the permission of the respective Watermasters.

Water Quality Previous RD770 introductions of Non-CVP water into the FKC resulted in water quality impacts due to slight increases in concentrations of turbidity, total dissolved solids, alkalinity, bicarbonate conductivity and coliform. Water quality monitoring, in accordance with Reclamation's *Policy for Accepting Non-Project Water into the Friant-Kern and Madera Canals: Water Quality Monitoring Requirements*, will continue to be done by RD770, FWA, Friant Division M&I water uses, and Reclamation. If Reclamation determines that the water quality in the canal is negatively affected by the pump-ins sufficiently to cause harm to the CVP or Friant Division contractors, the Warren Act contract will be terminated. Additionally, should silt accumulate in the FKC or channels as a result of the introduction of Non-CVP water, RD770 will remove the silt accumulation as directed by Reclamation and FWA, or reimburse

Reclamation and the FWA for costs associated with its removal. RD770 will also be required to take steps to screen debris from the Non-CVP water prior to pumping.

Discharge of the Non-CVP water into the Kern River will be coordinated with the Kern River Watermaster in order to minimize any potential impacts.

Due to the established monitoring and reporting requirements included as part of the Proposed Action, the diversion of Non-CVP water from the Kings, St. John's and Tule rivers will not have a substantial adverse effect on water quality within these drainages. Water quality within the rivers downstream of the pumping plants is unlikely to change, but if introductions decreased flows and soil erosion, a minor improvement in downstream water quality may result.

Potential Recipients of Introduced Floodwater Introduced floodwater could be diverted by CVP and Non-CVP contractors with the ability to divert water from the FKC downstream of the RD770 pump-in stations. Diverted water could be used within the respective contractors' service area for a variety of purposes, such as agriculture, M&I, groundwater recharge, or wetlands. This introduced floodwater will have beneficial impacts to water supplies as it will supplement existing diminished supplies when available.

San Joaquin River Restoration The Kings River is hydrologically linked to the San Joaquin River via the James Bypass and the Fresno Slough. During flood events, water may be diverted from the Kings River to the San Joaquin River via the James Bypass as floodwater is directed down the South Fork of the Kings River when the North Fork is flowing at capacity. As floodwaters are only released to the South Fork when the North Fork is flowing at capacity, the James Bypass and Fresno Slough will not experience a decrease in flood flows. Consequently, flows in the North Fork (and James Bypass) will be unaffected by the Proposed Action. Because flows in the James Bypass will not be affected, the Proposed Action will have no effect on San Joaquin River Restoration flows.

Flows from the Kaweah/St. Johns and Tule rivers drain directly into the Tulare Lakebed, which historically (in 1870) was hydrologically connected to the San Joaquin River. At present, there is only rare hydrologic connection; therefore, introduction of floodwater from the Kaweah/St. Johns and Tule rivers will have no effect on San Joaquin River Restoration flows.

Groundwater The amount of pumped flood flows is dependent upon rain events, snowmelt and available capacity in the FKC. Groundwater recharge facilities that have the ability to divert water from the FKC below the RD770 pump-in locations could receive floodwater and alleviate some of the groundwater overdraft conditions. In addition, discharges into the Kern River at the terminus of the FKC could provide a slight and short-term benefit by recharging the groundwater as it flows down the Kern River. Quite often the Kern River is in flood conditions at the same time as the pump-ins are occurring which fills the available spreading and recharge facilities in the Kern Fan area. Since this water will be available during wetter periods the water will most likely be used for recharge as well. This recharge may help to ameliorate the continuing overdraft in the San Joaquin Valley and provide some additional conjunctive use water supply benefits.

Overall, the Proposed Action will improve flood management, groundwater supplies and will not impact CVP operations, facilities, water right holder's surface water supplies or water rights, water quality, or wetlands.

Noise

The diesel and electric powered pumps used to pump Non-CVP water into the FKC will generate infrequent, periodic noise. RD770 is required by Reclamation's license to comply with the Fresno and Tulare County Noise Ordinance regulations. Additionally, RD770 will comply with all federal and state noise standards and ordinances. Based on historic frequency, such Non-CVP water introductions will occur, on average, every three to four years. RD770 will provide Reclamation and the FWA with the project specific data as required to determine compliance with the criteria contained within the applicable Fresno and Tulare County Noise Ordinance regulations. The license also requires RD770 to respond to any complaints from adjoining landowners regarding noise and take appropriate actions to lessen noise impacts or cease pumping operations. Therefore, there will be no adverse impact to noise levels as a result of the Proposed Action.

Land Use

The Proposed Action will not conflict with existing zoning for agricultural use or promote the conversion of farmland to non-agricultural use. The existing trend of land use conversion within the San Joaquin Valley from farmland to urban land uses will continue as it has in the past. Conveyance of the Non-CVP water will be infrequent, intermittent, unpredictable and small, relative to existing water needs and operations. Further, the prevention of inundation of farmlands will not change rates of land conversion but will allow existing farmland to remain productive in years when flooding will have impacted productivity. Conveyance of this Non-CVP water is contingent upon available capacity in the FKC and conditions in the Kern River. As a consequence, the Proposed Action is unlikely to lead to any long-term land use decisions. Any available water will be used to maintain existing land uses and will not contribute to impacts to land uses or planning. Consequently, there will be no adverse impacts to land use as a result of the Proposed Action.

Biological Resources

Potential effects on biological resources, including federally listed species and critical habitat, could result from the following components of the Proposed Action: 1) diversion of Non-CVP floodwaters from the Kings, Kaweah/St. Johns, and Tule river systems, and 2) the delivery of Non-CVP floodwaters taken by identified Potential Recipients.

Potential Effects of Floodwater diversions from Kings, Kaweah and Tule Rivers

Floodwater diversion in the Kings, Kaweah/St. Johns, and Tule rivers will only occur during periods of flooding, and flows will remain at flood or near flood stages below their diversion points into the FKC (see Table 3.1 in the EA). Large floodflows that are important to floodplain habitat processes will still regularly occur, and soils in the Action Area will likely already be saturated when diversions occur. Habitat supporting listed species will not be dewatered, deprived of essential soil moisture, or converted to a different habitat type as a result of diversions. Therefore, floodwater diversion may affect, but is not likely to adversely affect, habitats that support listed species located downstream of the diversion points.

Potential Effects of Potential Recipients Taking Delivery of Diverted Floodwaters

The potential effects from Potential Recipients taking delivery of diverted floodwaters include increased groundwater availability, and conversion of land uses to and from agriculture, urban development, and grazing. Land use conversions could affect listed species and critical habitat within the Potential Recipients' boundaries. As described in Section 2.2 of the EA, use of this water has been limited and will therefore not result in land use changes that could affect listed species. In addition, because the availability of this water is unpredictable and intermittent, land use changes due to the use of diverted floodwaters will be difficult to start or sustain. Use of this water for groundwater recharge could have beneficial indirect effects on groundwater storage and availability. Therefore, floodwater delivery to the Potential Recipients may affect, but is not likely to adversely affect, listed species or critical habitat.

No conversions of native lands or adverse impacts to listed species are anticipated from the discharge of floodwater to the Kern River. The volumes represent a small percentage of the water available in the Kern River and the availability of floodwaters is intermittent and unpredictable. Therefore, floodwater discharge into the Kern River may affect, but is not likely to adversely affect, listed species or critical habitat.

Because the following threatened and endangered species are known to occur or could occur in the Action Area, Reclamation has determined that the Proposed Action may affect but is not likely to adversely affect the following: California tiger salamander and its designated Critical Habitat, California condor and its designated Critical Habitat, Southwestern willow flycatcher, Valley elderberry longhorn beetle and its designated Critical Habitat, Vernal pool fairy shrimp and its designated Critical Habitat, Vernal pool tadpole shrimp and its designated Critical Habitat, Buena Vista lake shrew and its designated Critical Habitat, Fresno kangaroo rat and its designated Critical Habitat, Giant kangaroo rat, San Joaquin kit fox, Bakersfield cactus, California jewelflower, Hoover's spurge and its designated Critical Habitat, Kern mallow, San Joaquin adobe sunburst, San Joaquin Valley Orcutt grass and its designated Critical Habitat, San Joaquin woolly-threads, Blunt-nosed leopard lizard, and Giant garter snake.

Reclamation has initiated Section 7 ESA consultation with the Service. Reclamation will not finalize the draft EA until consultation with the Service has been completed.

Cultural Resources

The Proposed Action is the type of activity that has no potential to affect historic properties pursuant to the regulations at 36 CFR Part 800.3(a)(1). There will be no modification of water conveyance facilities and no activities that will result in ground disturbance. Because there is no potential to affect historic properties, no cultural resources will be impacted as a result of implementing the Proposed Action. See Appendix D for the cultural resources determination.

Indian Sacred Sites

There will be no modification of water conveyance facilities and no activities that will result in ground disturbance under the No Action and Proposed Action alternatives; therefore, neither restriction of access to nor adverse effects to the physical integrity of any sacred sites will occur. As such, there will be no direct, indirect, or cumulative impacts to Indian sacred sites as a result of either the No Action or Proposed Action alternatives.

Indian Trust Assets
There will be no impact to Indian Trust Assets as there are none in the Proposed Action area.

Environmental Justice
The Proposed Action will provide an option for some amount of flood protection within the Tulare Lake bed and reduce adverse impacts to minority or low-income farm laborers. In addition, use of this water within CVP and Non-CVP contractor service areas could provide additional beneficial impacts to minority or low-income populations as supplemental water will be used to maintain agricultural production within these areas as well as M&I.

Socioeconomic Resources
All required pumping and conveyance facilities have been constructed and will not be modified under either the No Action or Proposed Action alternatives. All introduced Non-CVP water will be disposed of within existing facilities and requires no new construction. The population and land conversion trends previously described are expected to continue with or without implementing the Proposed Action. The Non-CVP water introduced under the Proposed Action will be intermittent, unpredictable and small in comparison to demand. However, floodwater will be diverted by CVP or Non-CVP contractors downstream of RD770 pump-in locations to supplement diminished water supplies providing slight beneficial socioeconomic impacts within their service areas.

Diverted or discharged water could recharge the groundwater locally and be extracted during dry periods to meet a small fraction of future demands. Uses of this Non-CVP water could include irrigation, groundwater recharge, wetland enhancement and restoration, or M&I uses. However, Reclamation does not have approval authority for subsequent diversions or uses of this Non-CVP water once it is discharged from the FKC. Pumping the flood flows will provide an economic benefit to landowners in the Tulare Lake Basin. Reductions in costs for repairing public facilities, public services and emergency resources from potential floodwater damages will also occur on a small local scale.

Air Quality
The 25 portable diesel and electric pumps are registered at the local and/or state level, have emission standards established within the registration requirement and the emissions are accounted for in the current emission inventory. The federal Title V Program does not apply to these pumps because the diesel engines are classified as non-road portable and will only operate for up to four to five months during years when Non-CVP water is pumped. CVP and Non-CVP contractor turnouts are gravity-fed and will not result in additional pumping.

The 25-year license issued by Reclamation stipulates that RD770 shall comply with all applicable air pollution laws and regulations of the United States, the State of California and local authorities. Electric and diesel-powered pumps will be used to pump water from the Kings, St. John's and Tule Rivers. Although RD770's diversion pumps have never been used simultaneously during past pump-in events and their infrequent use occurs during weather conditions unfavorable for ozone production, estimated emission calculations were based on the use of a 300 horsepower diesel engine running constantly over a five month period as a worst case scenario. Estimated emissions under this scenario are well below the *de minimis* standards

of the San Joaquin Valley Air Pollution Control District; therefore, a conformity analysis is not required and there will be no adverse impacts to air quality.

Global Climate

The introduction of Non-CVP water into the FKC will require the use of diesel and electric pumps. These pumps will produce carbon dioxide (CO_2) emissions which will contribute to greenhouse gas (GHG) emissions within the San Joaquin Valley. However, pump-in events will be infrequent and for short periods of time. Estimated CO_2 emissions from the 25 pumps run constantly over a five month period are well below the Environmental Protection Agency's threshold for annually reporting GHG emissions (25,000 metric tons/year), which is a surrogate for a threshold of significance (EPA 2009). Accordingly, the Proposed Action will result in below *de minimis* impacts to global climate change.

Cumulative Impacts

Water Resources

The conveyance of this Non-CVP water is contingent upon hydrological conditions and capacity in the FKC and acceptable conditions in the Kern River. Pump-ins of this Non-CVP water will not impact existing water rights nor will it create new water rights on any of the rivers and will, therefore, have no cumulative impacts to water rights.

Water quality impacts will be monitored as required in the Warren Act contract and license. The slight increases in turbidity, total dissolved solids, alkalinity, bicarbonate conductivity and coliform during pump-in events may initially impact water quality in the FKC and Kern River; however, these events are short-term, intermittent, and infrequent. In addition, should Reclamation determine that the Non-CVP water does not meet their standards, pump-ins will be terminated minimizing any potential adverse cumulative impacts to water quality.

Discharges to the Kern River could result in limited groundwater recharge on a local and short-term basis. This water could be extracted during dry seasons to meet current demands. The conjunctive use of surface and groundwater supplies to meet existing demands within fluctuating hydrological conditions has occurred historically and is expected to continue into the future.

Availability of this water to CVP and Non-CVP contractors may offset reduced water supplies from hydrologic and environmental conditions, such as the San Joaquin River Restoration Project flows. Consequently, the Proposed Action, when added to other related actions, may have potentially beneficial impacts to water supplies.

The Proposed Action will provide flood protection for the Tulare Lake Basin in addition to that provided by the enlargement of Terminus Dam. The enlargement and raising of Terminus Dam and the Proposed Action will have a somewhat greater flood protection result than either project alone. Depending on the hydrology, this coordinated effect will have a greater or lesser flood protection result. At times of peak flood flows, the cumulative flood protection is still a small percentage of the stream flows; however, during small flood events, the coordinated projects could result in no flooding. The enlargement of Terminus Dam and Proposed Action do not contribute to changes in land use or increases in the need for floodplain insurance.

The Proposed Action will not result in a cumulative decrease in the generation of electrical power as the water to be pumped will be pumped after it has been released from dams and power producing facilities.

Noise

The Proposed Action will be compliant with Fresno and Tulare County ordinances, regulated, intermittent and short-term and will not contribute to long-term or cumulative impacts from noise.

Land Use

The No Action Alternative could result in adverse cumulative effects to agricultural operations within the Tulare Lake Basin, the intensity of which will depend on the frequency and magnitude of future flood events. If Non-CVP water introductions were not authorized, the Tulare Lake Basin could experience additional flooding during winter and spring months. Agricultural lands could be temporarily taken out of production and services supporting agricultural operations could be adversely affected. The economics of farming land subject to occasional inundation may drive farmers to accelerate taking agricultural lands out of production.

Reclamation's action is the conveyance of the Non-CVP water within the FKC where it would either be diverted by CVP and Non-CVP contractors or other entities downstream of RD770's pump-in locations or discharged into the Kern River. Subsequent actions on the Kern River are beyond Reclamation's authority and approvals. Due to the amount of precipitation during flood years, floodwater would not likely be pumped to maintain or grow crops in the same year. Diverted or discharged floodwater could be used to recharge the groundwater locally for later extraction during dry periods to meet a small fraction of future demands. The use of this stored floodwater in dry seasons would be used to maintain and grow crops on existing agricultural lands. No native or previously untilled lands would be put into production. Therefore, there would be no long-term cumulative effects as a result of the Proposed Action.

Biological Resources

Numerous activities continue to eliminate habitat for listed and proposed threatened and endangered species in the Tulare Basin. Habitat loss and degradation affecting both animals and plants continue as a result of urbanization, oil and gas development, road and utility rights-of-way management, flood control projects, climate change, grazing by livestock, and agricultural practices. The conversion of native habitats within the Tulare Basin has caused the decline of numerous species, some to the extent that they have received protection under the ESA (Service 1998). Land conversion continues within the Tulare Basin, but the majority of this conversion is now from irrigated farmland to other uses, primarily urban (CDC 2000).

The Proposed Action may have an indirect and beneficial effect on groundwater if entities use diverted floodwaters for groundwater recharge, but the floodwater diversions will be too infrequent and unpredictable to support land use conversion. Land use conversion due to the Proposed Action's increase in groundwater recharge and availability is discountable and insignificant.

Reclamation and the Service have jointly developed an ESA compliance strategy intended to minimize further losses within the CVP service areas and to offset impacts from ongoing CVP

operations. Reclamation and the Service continue to implement the commitments and conservation measures in the biological opinions issued for CVP operations and contract renewals including several provisions that preclude the conversion of threatened and endangered species habitat to agricultural uses within the boundaries of entities that receive CVP water. The contribution of the Proposed Action to these operations is anticipated to be negligible or non-existent, and future conditions for listed or proposed species will not be expected to differ significantly, with or without the Proposed Action.

Environmental Justice

The Proposed Action is an intermittent action that is expected to occur every three or so years over the 25 year contract period. Use of this floodwater within contractor service areas could provide some cumulatively beneficial impacts to minority or low-income populations as it will be used as a supplemental water supply for existing agricultural lands and for M&I purposes.

Socioeconomic Resources

The Proposed Action may provide some slight cumulatively beneficial impacts to socioeconomic resources within the service areas of contractors that divert this floodwater; however, the availability of this Non-CVP water is infrequent, unreliable and small compared to the existing water demand. Consequently, no long-term or reliable water supply that supports growth or contributes to cumulative impacts on population or housing will result from this action.

The Proposed Action has no negative effect on socioeconomic resources and has a small positive effect. The Proposed Action, when added to other local, state and federal actions will not result in significant impacts to socioeconomic resources. This Non-CVP water will provide local recharge to the groundwater within the Proposed Action area providing a slight benefit to groundwater users.

The cost for emergency services will likely increase under the No Action Alternative due to damage from flooding; however, costs will likely be reduced under the Proposed Action. This benefit will be on a small scale and is contingent upon available capacity in the FKC and the ability to dispose of Non-CVP water. Overall, the Proposed Action will not contribute to significant cumulative impacts to socioeconomic resources within the Proposed Action area.

Air Quality

No construction will be required by the action, nor will the number of pump stations or engines increase. The existing portable diesel pumps are already accounted for in the current emission inventory. Therefore, the Proposed Action will not cumulatively affect air quality.

Global Climate

GHG emissions are considered to be cumulatively adverse impacts; however, the estimated CO_2 emissions for the Proposed Action is roughly 62.5 metric tons per year, which is well below the 25,000 metric tons per year threshold for reporting GHG emissions. As a result, the Proposed Action is not expected to contribute to cumulative adverse impacts to global climate change.

CVP water allocations are made dependent on hydrologic conditions and environmental requirements. Since Reclamation operations and allocations are flexible, any changes in hydrologic conditions due to global climate change will be addressed within Reclamation's

operation flexibility and therefore water resource changes due to climate change will be the same with or without the Proposed Action.

Overall there will be no significant cumulative impacts caused by the Proposed Action.

RECLAMATION

Managing Water in the West

Draft Environmental Assessment

Long-term Warren Act Contract and License for Delta Lands Reclamation District No. 770

EA-07-103

U.S. Department of the Interior
Bureau of Reclamation
Mid Pacific Region
South-Central California Area Office
Fresno, California

January 2012

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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Appendices

List of Acronyms and Abbreviations

AF	Acre-foot
APE	Area of potential effects
Aqueduct	California Aqueduct
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Data Base
CO	Carbon monoxide
CO_2	Carbon dioxide
Corps	U.S. Army Corps of Engineers
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act of 1992
CWA	Clean Water Act
DWR	California Department of Water Resources
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FKC	Friant-Kern Canal
FONSI	Finding of No Significant Impact
FWA	Friant Water Authority
FWCA	Fish and Wildlife Coordination Act
GHG	Greenhouse gases
ITA	Indian Trust Assets
M&I	Municipal and Industrial
mg/L	Milligram per liter
MP	Milepost
MWA	Mendota Wildlife Area

NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NO_2	Nitrogen dioxide
Non-CVP	Non-Central Valley Project
NO_x	Oxides of nitrogen
O_3	Ozone
O&M	Operation and Maintenance
$PM_{2.5}$	Inhalable particulate matter less than 2.5 microns in diameter
PM_{10}	Inhalable particulate matter between 2.5 and 10 microns in diameter
Potential Recipients	CVP and Non-CVP contractors and other entities that can take delivery of RD770's Non-CVP floodwater from the FKC downstream of the RD770 pump stations
RD770	Delta Lands Reclamation District No. 770
Reclamation	Bureau of Reclamation
Report	Non-CVP Floodwater Delivery Report
ROW	Rights-of-way
Service	U.S. Fish and Wildlife Service
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	Sulfur dioxide
SWP	State Water Project
TDS	Total Dissolved Solids
U.S.C.	U.S. Code
VELB	Valley elderberry longhorn beetle
VOC	Volatile organic compound
Water Year	March 1 to February 28/29 of following year
WRP	Wetland Reserve Program

Section 1 Purpose and Need for Action

1.1 Background

The Kings, Kaweah (St. Johns), Tule and Kern rivers drain from the Sierra Nevada Mountains into the landlocked Tulare Lake Basin and are the primary sources of surface water to the southern San Joaquin Valley. Historically, the flow from these rivers converged in the basin forming Tulare Lake; however, these lands were reclaimed for agricultural use beginning in the 1890s. The Tulare Lake last filled and spilled north to the San Joaquin-Sacramento Delta in the 1870s (Tulare Lake Basin Water Storage District 1981).

There are 11 reclamation districts present within the Tulare Lake bed, including Delta Lands Reclamation District Number 770 (RD770). RD770, which encompasses approximately 26,000 acres, historically has been the first area in the lake bed to flood in wet years. Such floods occur on average every four years when the Lake bed is subjected to high inflows from the Kings, Kaweah, and/or Tule rivers. The pre-1914 water rights on each of these rivers are administered by a Watermaster pursuant to the rules and regulations established by a formal association of water users for each river. The waters of the Kings, Kaweah, and Tule rivers are considered Non-Central Valley Project (Non-CVP) water. The introduction of floodwater is coordinated with the appropriate Watermaster(s) to ensure there is no infringement on any existing diversion rights,

Since 1978, the Bureau of Reclamation (Reclamation) has periodically entered into Warren Act contracts (both long-term and temporary) with RD770 to allow RD770 to introduce Non-CVP floodwater into the Friant-Kern Canal (FKC) in order to help alleviate damage to farm land, property, improvements, and crops within RD770's boundaries. In addition, in the past, Reclamation has issued licenses to RD770 allowing RD770 access to install pumping equipment on Reclamation lands to pump Non-CVP floodwater from the Kings, St. Johns (a tributary channel of the Kaweah River system), and Tule rivers into the FKC. See Table 1-1 for previous introductions of floodwaters and their amounts into the FKC. Floodwater from these pump-in events have periodically been taken by CVP and Non-CVP contractors capable of taking water off the FKC downstream of the RD770 pump stations.

Table 1-1 Introductions of Non-CVP Water into the FKC by RD770

Water Year of Introduction	Source of Water	Total Amount Pumped (acre-feet)
1978	St. John's River	9,100
1980	Tule River	5,100
1982	Kings, St. John's, and Tule Rivers	32,500
1983	St. John's and Tule Rivers	248,100
1986	St. John's River	93,853
1995	Kings River	12,700
1997	St. John's and Tule Rivers	109,574
1998	Kings, St. John's, and Tule Rivers	202,583
2006	Kings and St. John's Rivers	29,206
2010	Tule River	10,693
Note: Water year is from March 1st of the year of introduction to February 28/29 of the following year.		

Based on past hydrology, Reclamation anticipates RD770 would conduct pump-ins intermittently during a particular contract year. However, floodwaters could occur during any future contract year. Therefore, Reclamation and RD770 are pursuing negotiations for a 25-year Warren Act contract for conveyance of Non-CVP floodwater within federal facilities and a license for RD770 pump stations located within Reclamation rights-of-way (ROW).

Since the finalization and approval of the 25-year Warren Act contract and license was not expected to be completed and executed until after June 1, 2011 another 12-month license and a temporary Warren Act contract were prepared in case damaging floodwater threatened RD770 during development of the long-term actions. Consequently, an Environmental Assessment, (EA), *EA-09-177 2010 Warren Act Contract and License for Delta Lands Reclamation District 770*, was prepared by Reclamation which analyzed the execution of a 12-month license and temporary Warren Act contract for the time period June 1, 2010 through May 31, 2011. A Finding of No Significant Impact (FONSI) was signed on July 30, 2010 and both EA and FONSI are hereby incorporated by reference (Reclamation 2010).

1.2 Purpose and Need

RD770 needs to protect lands and improvements within their district from potential flood flows. The purpose of the Proposed Action is to allow RD770 to pump floodwaters from the Kings, St. John's and Tule rivers into the FKC.

A secondary purpose of the Proposed Action is to convey this Non-CVP floodwater to CVP contractors, Non-CVP contractors, and other entities that can take delivery of this water from the FKC downstream of the RD770 pumps stations for irrigation, Municipal and Industrial (M&I) use, groundwater recharge, or other purposes.

1.3 Scope

This EA evaluates the execution of a 25-year Warren Act contract and license to RD770 and includes the delivery of this Non-CVP floodwater to CVP and Non-CVP contractors and other entities that can take delivery of this water from the FKC downstream of the RD770 pump stations (hereafter referred to as Potential Recipients). This EA also evaluates the No Action Alternative.

The geographic extent of the Proposed Action includes (1) the riparian areas and floodplains of the Kings, St. John's and Tule rivers downstream from the FKC, (2) wetland areas in the vicinity of the Tulare Lake bed, (3) the FKC, and (4) Potential Recipient service areas near the FKC below milepost (MP) 29.10 (Figure 1-1).

Floodwaters not delivered from the FKC would be discharged into the Kern River. Reclamation has no federal jurisdiction or control of the Non-CVP floodwater once it is discharged into the Kern River. Management of the floodwater discharged into the Kern River becomes the responsibility of the Kern River Watermaster whose approval is required for the release of the floodwater from the FKC into the Kern River. Any use of discharged floodwater from the Kern

River would be dependent upon separate non-federal approval and may require separate environmental compliance, such as those required by State or local laws.

1.4 Reclamation's Legal and Statutory Authorities and Jurisdiction Relevant to the Proposed Federal Action

Several Federal laws, permits, licenses and policy requirements have directed, limited or guided the National Environmental Policy Act analysis and decision-making process of this EA and include the following as amended, updated, and/or superseded (all of which are incorporated by reference):

1.4.1 Warren Act

The Warren Act (Act as of February 21, 1911; CH. 141, [36 STAT.925]) authorizes Reclamation to enter into contracts to impound, store, and/or convey Non-project water when excess capacity is available in federal facilities.

1.4.2 Reclamation States Emergency Drought Relief Act

Section 102 of the Reclamation States Emergency Drought Relief Act of 1991 provides for use of Federal facilities and contracts for temporary water supplies, storage and conveyance of non-project water inside and outside project service areas for M&I, fish and wildlife, and agricultural uses. Section 305, enacted March 5, 1992 (106 Stat. 59), also authorizes Reclamation to utilize excess capacity to convey Non-project water.

1.4.3 Central Valley Project Improvement Act

The Central Valley Project Improvement Act of 1992 (CVPIA), Title 34 (of Public Law 102-575), Section 3408, Additional Authorities (c) authorizes the Secretary of the Interior to enter into contracts pursuant to Reclamation law and this title with any Federal agency, California water user or water agency, State agency, or private nonprofit organization for the exchange, impoundment, storage, carriage, and delivery of CVP and Non-CVP water for domestic, municipal, industrial, fish and wildlife, and any other beneficial purpose, except that nothing in this subsection shall be deemed to supersede the provisions of section 103 of Public Law 99-546 (100 Stat. 3051).

1.4.4 Executive Order 11988 – Floodplain Management

Executive Order (EO) 11988 requires Federal agencies to provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, and health and welfare among other activities.

1.4.5 Water Quality Standards

Reclamation requires that the operation and maintenance of CVP facilities shall be performed in such a manner as is practical to maintain the quality of raw water at the highest level that is reasonably attainable. Water quality and monitoring requirements are established annually by Reclamation and are instituted to protect water quality in federal facilities by ensuring that imported Non-CVP water does not impair existing uses or negatively impact existing water quality conditions (Appendix A). These standards are updated periodically. The water quality standards are the maximum concentration of certain contaminants that may occur in each source

of Non-CVP water. The water quality standards for Non-CVP water to be stored and conveyed in federal facilities are currently those set out in Title 22 of the California Code of Regulations.

1.5 Potential Issues

This EA will analyze the affected environment of the Proposed Action and No Action Alternative in order to determine the potential direct and indirect impacts and cumulative effects to the following resources:

- Water Resources
- Noise
- Land Use
- Biological Resources
- Cultural Resources
- Indian Sacred Sites
- Indian Trusts Assets (ITA)
- Environmental Justice
- Socioeconomic Resources
- Air Quality
- Global Climate

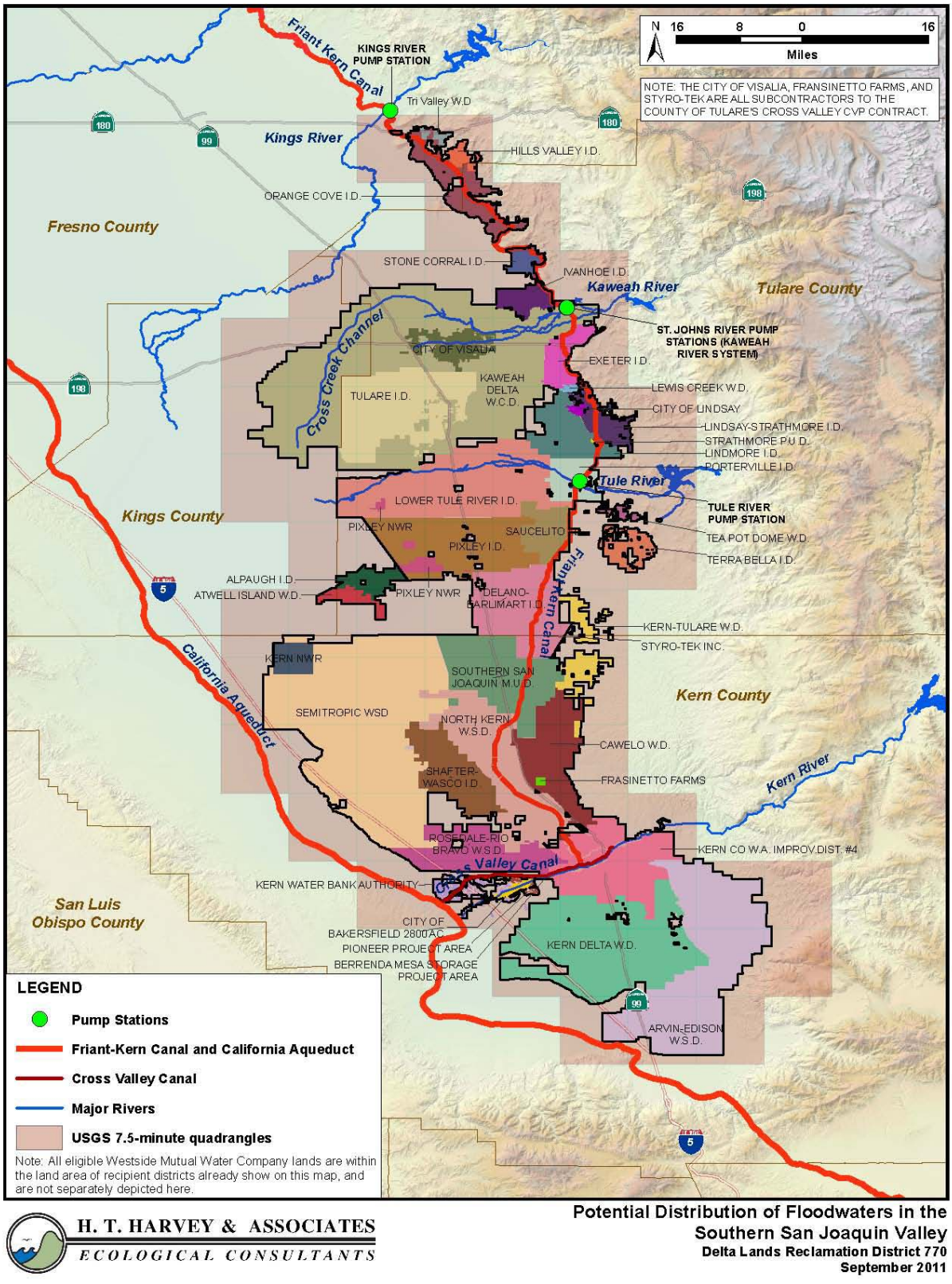

Figure 1-1 Proposed Action Area below MP 29.10

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Section 2 Alternatives Including the Proposed Action

This EA considers two possible actions: the No Action Alternative and the Proposed Action. The No Action Alternative reflects future conditions without the Proposed Action and serves as a basis of comparison for determining potential effects to the human environment.

2.1 No Action Alternative

Under the No Action Alternative, Reclamation would not execute a 25-year Warren Act contract and license with RD 770 to divert Non-CVP floodwaters into the FKC. Under the No Action Alternative, Non-CVP floodwater that otherwise would be introduced into the excess capacity of the FKC would continue downstream and flood the Tulare Lake bed, damaging or threatening productive farmland as well as improvements in the area.

2.2 Proposed Action

The Proposed Action includes the issuance of a 25-year Warren Act contract and the issuance of a 25-year license to RD770.

2.2.1 Issuance of a Conveyance Warren Act Contract

Reclamation proposes to enter into a 25-year Warren Act contract with RD770 to utilize otherwise unused capacity in the FKC to accept Non-CVP floodwater pumped from the Kings, St John's and Tule Rivers. Such floodwater could be conveyed to CVP contractors, Non-CVP contractors, and other entities that can take delivery of water from the FKC downstream of the RD770 pump stations which divert this water into the FKC. The Potential Recipients would be utilizing the Non-CVP floodwater for irrigation uses, M&I uses, groundwater recharge, and/or for the benefit of fish and wildlife. Uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife (e.g. Kern National Wildlife Refuge). Groundwater recharge can occur on existing groundwater recharge facilities, including existing streams, waterways and basins and on farmland which has been cultivated within the last three years. Notice would be provided to entities accepting this Non-CVP floodwater that this water is not to be used to convert native lands to other uses consistent with the uses described above. Delivery of this water would also be based on an agreement between the Friant Water Authority (FWA) and RD770. Floodwater not diverted from the FKC would be discharged into the Kern River through an existing gate at the terminus of the FKC.

The Non-CVP floodwater would be introduced into the FKC at MP 29.10 for the Kings River (Figure 2-1), MP 69.45 and MP 69.58 for the St. John's River (Figure 2-2), and MP 95.67 for the Tule River (Figure 2-3). The maximum amount of Non-CVP floodwater from the three rivers to be conveyed in the FKC in any given year is 250,000 acre-feet (AF). The contract term is

expected to be from March 2012 through February 2037 but the precise months may vary depending on when the contract is executed.

Potential Recipients that currently have the ability to take delivery of water from the FKC downstream of RD770's pump stations are shown in Table 2-1. Descriptions of these contractors can be found in Appendix B. Any contractors or entities listed in Table 2-1 that want to utilize the water on lands that would result in a land use change, any additional contractors or entities able to take water from the FKC not included in Table 2-1, or any new facilities installed for the purpose of moving this water would require separate environmental review and Reclamation's approval before participating in the Proposed Action. The Proposed Action would not result in new construction or modification of existing facilities.

Table 2-1 Potential Recipients of RD770 Floodwater

Alpaugh Irrigation District	Lindsay-Strathmore Irrigation District
Arvin-Edison Water Storage District	Lower Tule River Irrigation District
Atwell Island Water District	North Kern Water Storage District
Berrenda Mesa Project	Orange Cove Irrigation District
Cawelo Water District	Pioneer Groundwater Banking Project
City of Bakersfield's 2800 Acre Groundwater Recharge Project	Pixley Irrigation District
City of Lindsey	Pixley National Wildlife Refuge
County of Tulare subcontractors	Porterville Irrigation District
Delano-Earlimart Irrigation District	Rosedale Rio Bravo Water Storage District
Exeter Irrigation District	Saucelito Irrigation District
Hills Valley Water District	Semitropic Water Storage District
Ivanhoe Irrigation District	Shafter-Wasco Irrigation District
Kaweah- Delta Water Conservation District	Southern San Joaquin Municipal Utility District
Kern County Water Agency	Stone Corral Irrigation District
Kern Delta Water District	Strathmore Public Utility District
Kern National Wildlife Refuge	Tea Pot Dome Water District
Kern-Tulare Water District	Terra Bella Irrigation District
Kern Water Bank Authority	Tri Valley Irrigation District
Lewis Creek Water District	Tulare Irrigation District
Lindmore Irrigation District	Westside Mutual Water Company LLC

Non-CVP floodwater would be introduced only when: 1) there is excess capacity in the FKC, as determined by Reclamation in coordination with the FWA, 2) it meets the applicable water quality standards (Appendix A), 3) the introduction of floodwater from the Kings, Kaweah, or Tule rivers is coordinated with the appropriate Watermaster(s) to ensure there is no infringement on any existing diversion rights and/or river operation, 4) the discharge of floodwater into the Kern River is coordinated with the Kern River Watermaster, and 5) the introduction of the Non-CVP floodwater from any of the three rivers is not under active challenge with the California State Water Resources Control Board. Letters from the respective Watermasters will be included as attachments to the Warren Act contract. Non-CVP floodwater would be introduced to the FKC through existing pump stations without modification to the FKC.

Reporting Requirements

Annually, RD770 would prepare a Non-CVP Floodwater Delivery Report (Report) to document the amount of Non-CVP floodwater introduced into the FKC as a condition of the Warren Act contract. The Report would identify how much and which contractors diverted floodwater each year floodwater is introduced. The Report would also indicate how much floodwater was discharged into the Kern River. The Report would be due by July 31st of each year floodwater is

introduced into the FKC. This Report would be a summarization of the monthly water report RD770 would be required to submit to Reclamation and FWA in the month following the introduction of Non-CVP floodwater into the FKC.

2.2.2 Issuance of a License

Reclamation has historically executed licenses with RD770 to erect and maintain temporary pumps and related equipment within existing infrastructure (pump station frame, decking, discharge pipes, and other semi-permanent infrastructure) located within the ROW of the FKC. Under previous licenses, RD770 constructed semi-permanent pumping plants to pump floodwater into the FKC from the Kings, St. John's and Tule Rivers. When pumping is to occur within a given year, pumps are installed where necessary on the existing infrastructure and existing piping is used to move floodwater from the respective river to the FKC. After the pumping is over, the pumps may be removed and stored offsite. Only mobilization and demobilization of equipment, routine operation and maintenance of the pump stations, and cleaning of the wasteway channels consistent with the current FWA Operation and Maintenance (O&M) agreement are expected during the period of the license.

The license would allow RD770 to access federal land and erect, operate and maintain the pumps when it is determined there is a need to pump. It also allows for the continued existence of the pump station frame, decking, discharge pipes, and other semi-permanent infrastructure on Federal lands. The pumping facilities are owned and operated by RD770. The size and number of the pumps to be installed on the existing infrastructure and total pumping capacity at each station are listed in Table 2-2 below.

Table 2-2 Facilities Operated by RD770 for Pumping Water into the FKC

River System	Discharge Pumps	Total Capacity (cubic feet per second)
Kings River	6	600
St. Johns River	12	1,200
Tule River	7	700
Total	**25**	**2,500**

2.2.3 Environmental Commitments

RD770 would implement the following actions for the protection of natural resources. The analysis of the environmental consequences for resource areas assume the commitments specified would be fully implemented.

- RD770 is required to comply with the water quality monitoring program either described in or incorporated by reference within the Warren Act contract (see Appendix A for the water quality monitoring requirements and sampling locations). In addition, if water were to be delivered for fish and wildlife benefit, water in the FKC below the point of diversion would meet standards for fish and wildlife benefit. RD770 would conduct water quality analyses using a Reclamation-approved laboratory. If the quality of the Non-CVP floodwater from one or more of the rivers would substantially degrade the quality of water in the FKC, RD770 would be required to immediately terminate pumping into the canal from the source that would cause the degradation.

- RD770 would remove silt accumulation as directed by FWA or Reclamation and take steps to screen debris from water prior to pumping.

- No water conveyance would be authorized if the conveyance would likely adversely affect the ability to meet fish and wildlife obligations under the CVPIA.

- RD770 would comply with Fresno and Tulare County Noise Ordinance regulations as well as respond to any complaints from adjoining landowners regarding noise and take appropriate actions.

- RD770 would not allow contamination or pollution of Federal lands, waters or facilities related to the Proposed Action.

- RD770 would not use any pesticides on Federal lands without prior written approval by Reclamation. All pesticides used would be in accordance with the current registration, label direction, or other directives regulating their use.

- RD770 would immediately notify Reclamation of the discovery of any and all antiquities or other objects of cultural, historic, or scientific interest on Reclamation lands.

- Minimization and avoidance measures for Valley elderberry longhorn beetle (VELB) would be implemented as described in Appendix C.

- Uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources (e.g. at Kern National Wildlife Refuge). Notice would be provided to entities accepting this Non-CVP floodwater that this water is not to be used to convert native lands to other uses consistent with the uses described above.

- Reclamation would prepare a report evaluating the effects to listed species and designated critical habitat protected under the Endangered Species Act (ESA, 16 U.S. Code [U.S.C.] §1531 et. seq.) which result from the Proposed Action. The report would utilize data from monthly and annual water delivery reporting requirements required as part of the Proposed Action, as well as any other information appropriate for this purpose, and would be provided to the U.S. Fish and Wildlife Service (Service) by the 1st of May at least every 10 years, and also at the end of the period of the Proposed Action, or the termination of the Warren Act contract covering the Proposed Action, whichever is earlier.

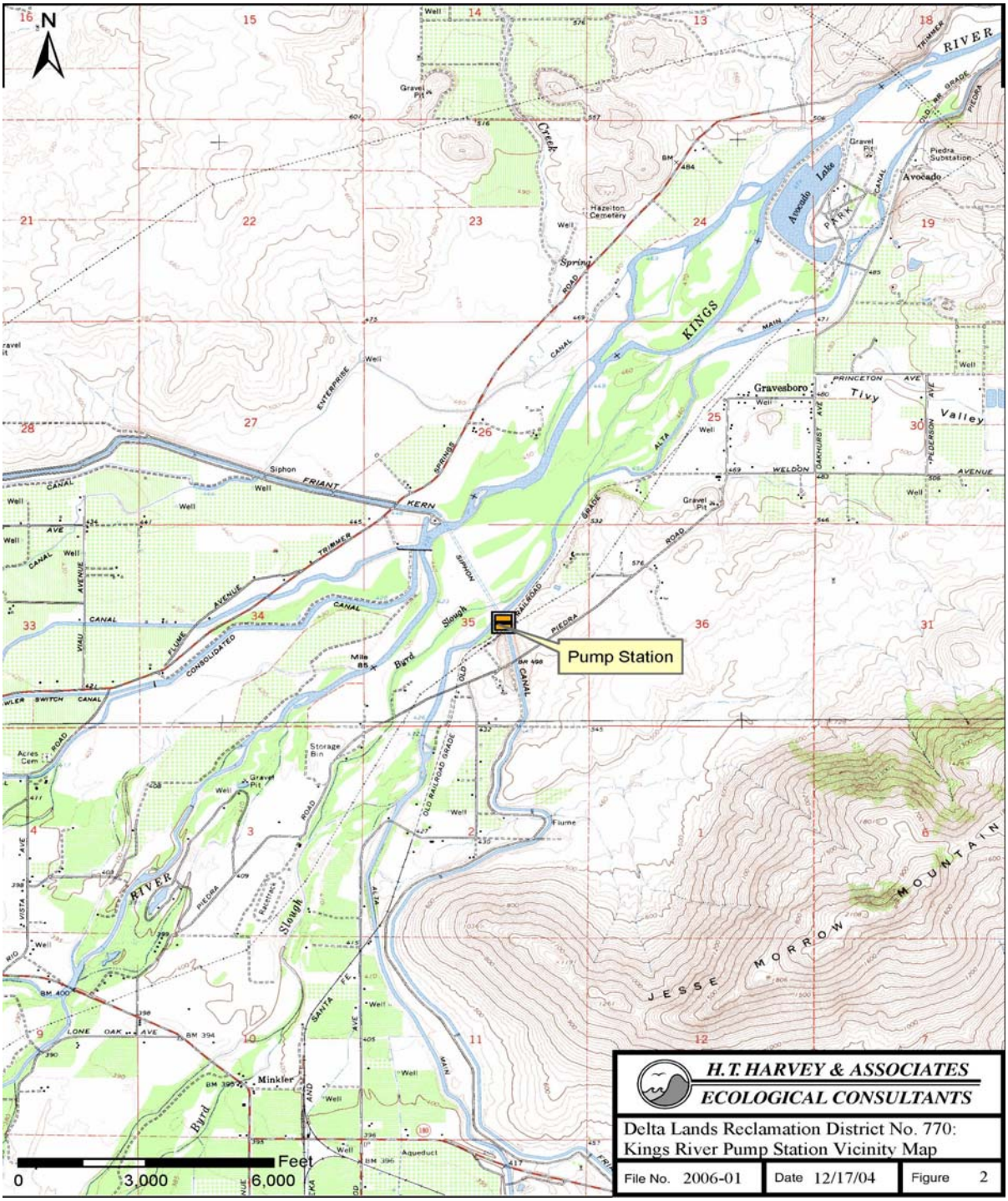

Figure 2-1 Kings River Pumping Station (MP 29.10)

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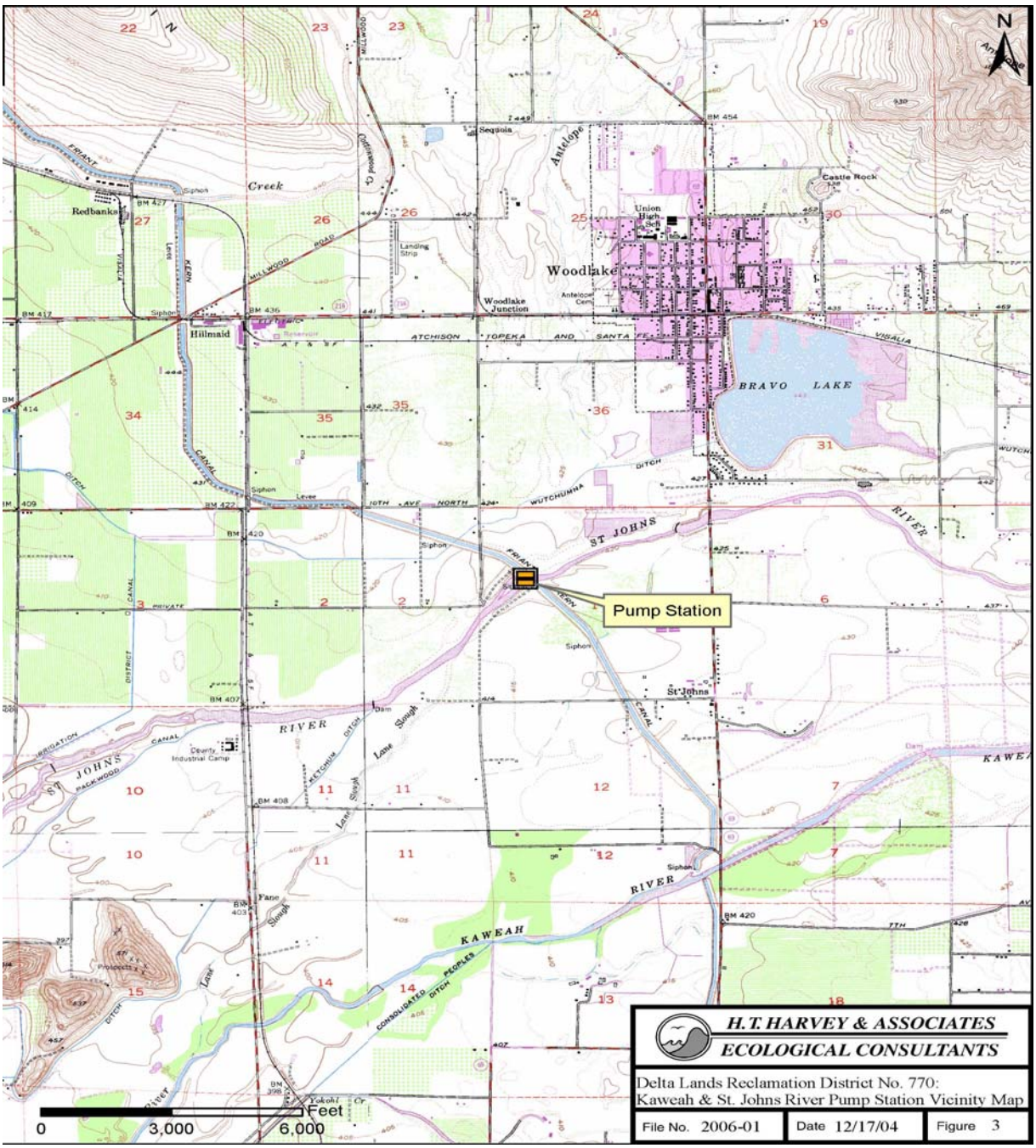

Figure 2-2 Kaweah/St. John River Pumping Station (MP 69.45 and MP 69.58)

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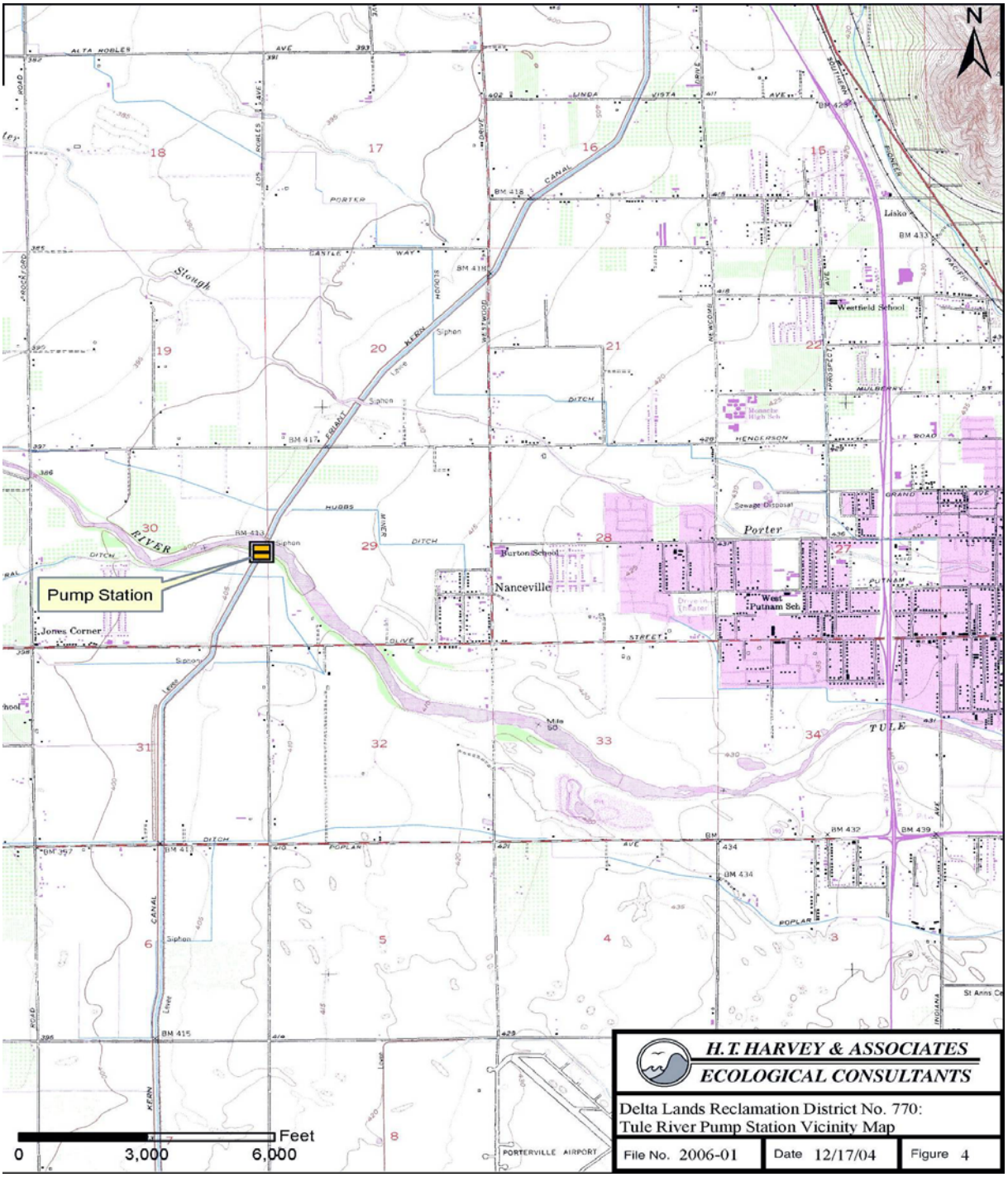

Figure 2-3 Tule River Pumping Station (MP 95.67)

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Section 3 Affected Environment and Environmental Consequences

This section identifies the potentially affected environment and the environmental consequences involved with the Proposed Action and the No Action Alternative, in addition to environmental trends and conditions that currently exist.

3.1 Water Resources

3.1.1 Affected Environment

The landlocked Tulare Lake Basin encompasses approximately 16,400 square miles and is fed by the Kings, St. John's (Kaweah), Tule and Kern Rivers whose watersheds extend high into the Sierra Nevada Mountain range on the east side of the San Joaquin Valley. These rivers all drain into the Tulare Lake bed which formerly was the site of Tulare Lake (ECORP Consulting, Inc. 2007). RD770 lies completely within the Tulare Lake bed and is vulnerable to flooding from the Kings, St. Johns and Tule Rivers (Figure 1-1).

Tulare Lake

Tulare Lake is an extinct fresh-water lake that was formerly the largest in the western United States. The former lake and its surviving wetlands lie in the southern portion of California's San Joaquin Valley, about forty miles south of Fresno. Tulare Lake was estimated to encompass approximately 790 square miles at its highest overflow levels in 1862 and 1868 (ECORP Consulting, Inc. 2007). The lake was "reclaimed" (emptied and dried up) over the course of a few decades as the Kaweah, Kern, Kings and Tule rivers were diverted upstream and canals were built to drain the lake (ECORP Consulting, Inc. 2007). By the end of the nineteenth century the lake had almost completely disappeared. Because of the topography, the lake basin depression remains and a smaller version of the lake occasionally reappears during floods following unusually high levels of precipitation. Aggressive groundwater pumping since the draining of the lake has resulted in a significant lowering of the water table, causing subsidence of the land (California Department of Water Resources [DWR] 2003, ECORP Consulting, Inc. 2007).

Flood Management within the Tulare Lake Basin

Flood control operations on the Kings, Kaweah and Tule rivers are the responsibility of the U.S. Army Corps of Engineers (Corps) and are separate from Reclamation's operation of the CVP. Floodwater releases are made based on the Corps's flood control criteria for operation of Pine Flat Dam on the Kings River, Terminus Dam on the Kaweah River and Success Dam on the Tule River (Corps 2011a, Corps 2011b, Corps 2011c). The diversion of damaging floodwater is also subject to coordination with Kings, Kaweah and Tule River basin water users represented by the Kings River Water Association, Kaweah and St. Johns River Association and the Tule River Association. These associations support the diversion of damaging floodwater that would otherwise damage lands in the Tulare Lake.

The flood flows potentially subject to the Proposed Action arise only during times of heavy precipitation and substantial runoff. By definition, those flows will be substantially in excess of

the demands of water rights holders on the various river systems. The largest volume of flood flows to the Tulare Lake bed historically emanate from the Kaweah and Tule Rivers as there is no natural outlet for floodwater to flow other than flowing into the lake bed. In a few cases, the Kings River has also contributed a substantial amount of floodwater.

Kings River The upper watershed of the Kings River includes the North, Middle and South Forks, all of which converge in the foothills upstream from Pine Flat Dam. Downstream from the dam, the river bifurcates at Island and Army Weirs into the Kings River South, flowing into what was formerly Tulare Lake (and is now the farmed lake bed) and the Kings River North/James Bypass/Fresno Slough, flowing north into Mendota Pool (ECORP Consulting, Inc. 2007). Pine Flat Dam is the main flow-regulating facility on the Kings River and is used for flood management, water supply and power generation. The concrete dam has a storage capacity of 1,000,000 AF and a maximum flood control space of 475,000 AF (Corps 2011a).

Kaweah River (St. Johns) The upper watershed of the Kaweah River includes the North, Marble, Middle, East and South Forks of the Kaweah River, all of which converge in the foothills upstream of Lake Kaweah. The main stem of the Kaweah River downstream of the lake meanders southwest past Visalia to the valley floor. The Kaweah River splits into the St John's River and the Lower Kaweah River east of Visalia. The Lower Kaweah flows are distributed into Packwood Creek, Cameron Creek, and Mill Creek, many of which can "spill" into the Lake bed in wet years as there is no outlet to the ocean (ECORP Consulting, Inc. 2007). Terminus Dam is the main regulating facility on the Kaweah River and, like Pine Flat Dam, is used for flood management, water supply and power generation. The earthen dam's original storage capacity was 143,000 AF (Corps 2011b). In 2004, the Corps installed fusegates that increased the reservoir's storage capacity to more than 184,000 AF and reduced the risk of downstream flooding (Stalker 2011).

Tule River The upper watershed of the Tule River includes the North, Middle and South Forks of the Tule River, which converge in the foothills above Success Dam. Downstream from the dam, the main stem of the Tule meanders west through Porterville and across the valley floor until it drains into the Tulare Lake bed with no outlet to the ocean (ECORP Consulting, Inc. 2007). Success Dam is the main regulating facility on the Tule River and, like the other dams discussed above, is used for flood management, water supply and power generation. The earthen dam has a storage capacity of 82,000 AF and a maximum flood control space of 75,000 AF (Corps 2011c).

The Corps has identified dam safety concerns and has consequently reduced storage in Lake Success to 29,000 AF which will remain in effect until dam safety concerns have been resolved (Corps 2011c). This has impacted, and will continue to impact, the amount of water able to be stored behind Success Dam which may increase potential flooding events from the Tule River since lower reservoir levels means less capacity to absorb flood flows from the watershed and therefore causes larger releases and flood volumes. In 2006, the Corps posted a draft Environmental Impact Statement (EIS) for the *Success Dam Seismic Remediation Project* which analyzed the remediation of seismic, seepage, and hydrologic dam safety concerns (Corps 2010a). In 2010, the Corps released a draft EA for the Success Dam Real Estate Acquisition

which analyzed the environmental impacts of acquiring lands that were shown to be impacted by the remediation project in the EIS (Corps 2010a).

RD770 Flood Management

Damaging flows into the Tulare Lake bed can occur anytime releases are required, (primarily from Success and Terminus dams), that exceed irrigation and spreading demands in the Tulare Lake Basin. The entities that farm the Tulare Lake bed have an extensive levee, distribution and storage system designed to manage flood flows from the four projects and the surrounding uncontrolled drainage areas when necessary. However, when inflows into the lake bed exceed the capacity of the distribution system or storage facilities, productive agricultural lands, businesses and infrastructure such as roads can be flooded (Corps 1996).

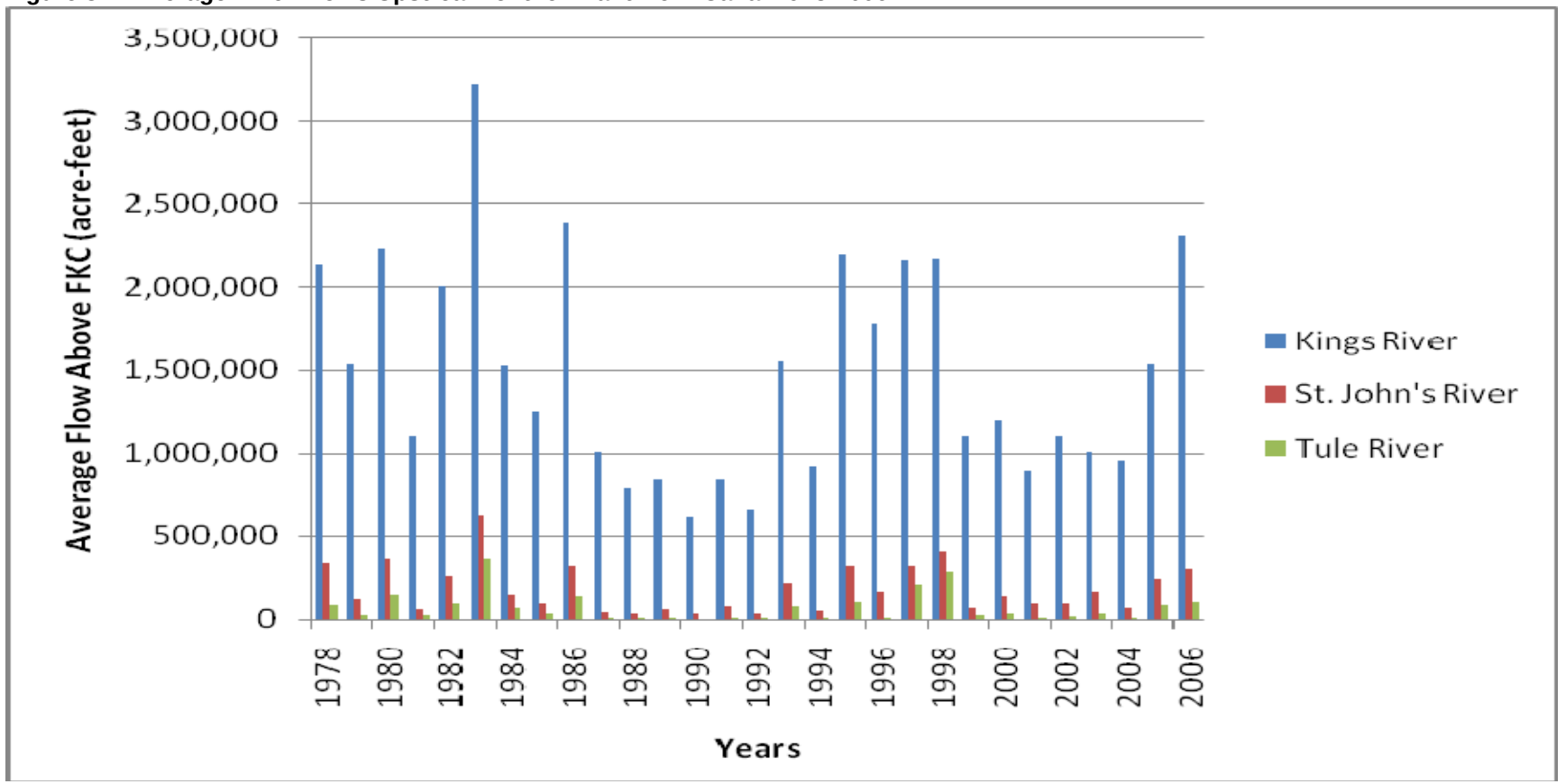
When RD770 makes the decision to pump Non-CVP water into the FKC, it is done based on projections of reservoir operations and the dynamics of the watershed and river systems. RD770 analyzes the data available and tries to determine what water volume will be flowing down the rivers into the lake bed in the near future. The snow pack and the rainfall are evaluated to estimate when the upstream reservoirs would fill up in order to determine when it will be optimal for diversion into the FKC. RD770 also estimates when the Corps will require releases to meet reservoir flood control requirements. RD770 is aware that due to flood control requirements, releases, even when there hasn't been a recent rainfall event, are required to make room in the reservoir for future potential rain flood or snowmelt runoff. These reservoir releases could also potentially cause flooding in the Tulare Lake bed if they are substantial enough in volume and duration.

RD770 can store approximately 100,000 AF in and around the lake bed without flooding farmland. When there is an imminent threat of flooding, areas of lower productivity are flooded first, while the more productive land, protected by levees, remains in production. As more damaging floodwater arrives, more productive land is inundated. Once damaging floodwater inundates farmland in the Tulare Lake bed, the inundated section cannot be farmed in that same year as soils in the area are heavy clay and percolation is very slow, if at all. Diversion of a relatively small amount of damaging floodwater into the FKC has made the difference as to whether it is necessary to flood a large "cell" consisting of thousands of acres. In addition, diversion has enabled crops to be harvested prior to inundation or a newly planted crop (with the ancillary investment) to be protected while inundating a field that has not yet been planted.

Flow Variability in the Kings, Kaweah (St. Johns) and Tule Rivers

Historically, January through July flow volumes in the Kings, St. John's and Tule rivers have been quite variable ranging from 615,764 AF to 3,220,284 AF for the Kings River, 33,683 AF to 620,625 AF for the St. John's River, and 0 AF to 358,680 AF for the Tule River (Figure 3-1 and Table 3-1).

Figure 3-1 Average River Flows Upstream of the Friant-Kern Canal 1978-2006



Note: Flows have not been included for Water Years 2007-2009 as there were no RD770 pump-in events. Although, pump-in events have been done towards the end of the 2010 Water year (March 1, 2010 to February 28, 2011) for 10,692 AF (Table 1-1), they have not been included in this figure as the pump-in period is still in progress and flow data has not yet been calculated.

Table 3-1 Amount of Flow Diverted from the Kings, St. John's, and Tule Rivers by RD770 during Contract Years

Year	Kings River						Kaweah (St. Johns) River						Tule River						Total Flow Diverted (AF)
	Percent of Average Flow	Flow Diverted (AF)	Percent of Flow Diverted	Flow Above Friant-Kern Canal (AF)	Flow Below Friant-Kern Canal (AF)	Percent of Average Flow Below Friant-Kern Canal	Percent of Average Flow	Flow Diverted (AF)	Percent of Flow Diverted	Flow Above Friant-Kern Canal (AF)	Flow Below Friant-Kern Canal (AF)	Percent of Average Flow Below Friant-Kern Canal	Percent of Average Flow	Flow Diverted (AF)	Percent of Flow Diverted	Flow Above Friant-Kern Canal (AF)	Flow Below Friant-Kern Canal (AF)	Percent of Average Flow Below Friant-Kern Canal	
1978	149	0	0	2,140,081	2,140,081	0	191	9,100	2.70	336,674	327,574	188.30	132	0	0	91,296	91,296	0	9,100
1979	107	0	0	1,535,935	1,535,935	0	71	0	0	124,484	124,484	0	44	0	0	30,664	30,664	0	0
1980	155	0	0	2,232,880	2,232,880	0	197	0	0	361,952	361,952	0	216	5,100	3.42	148,948	143,748	212.58	5,100
1981	77	0	0	1,106,439	1,106,439	0	36	0	0	62,889	62,889	0	36	0	0	25,148	25,148	0	0
1982	140	3,200	0.16	2,009,059	2,005,859	139.84	149	29,300	10.74	262,700	233,400	138.26	137	0	0	94,663	94,663	0	32,500
1983	224	0	0	3,220,284	3,220,284	0	353	148,300	23.90	620,625	475,425	329.10	520	99,800	27.82	358,680	258880	492.18	248,100
1984	106	0	0	1,527,535	1,527,535	0	85	0	0	149,094	149,094	0	96	0	0	66,173	66,173	0	0
1985	87	0	0	1,250,175	1,250,175	0	55	0	0	97,431	97,431	0	54	0	0	37,501	37,501	0	0
1986	166	0	0	2,383,604	2,383,604	0	174	93,985	29.54	318,207	224,222	144.46	206	0	0	142,050	142,050	0	93,985
1987	70	0	0	1,006,301	1,006,301	0	24	0	0	41,616	41,616	0	17	0	0	11,999	11,999	0	0
1988	55	0	0	790,207	790,207	0	22	0	0	39,168	39,168	0	10	0	0	7,174	7,174	0	0
1989	58	0	0	841,715	841,715	0	34	0	0	59,412	59,412	0	10	0	0	6,920	6,920	0	0
1990	43	0	0	615,764	615,764	0	19	0	0	33,683	33,683	0	0	0	0	0	0	0	0
1991	59	0	0	846,835	846,835	0	44	0	0	77,438	77,438	0	11	0	0	7,690	7,690	0	0
1992	46	0	0	658,591	658,591	0	21	0	0	36,241	36,241	0	0	0	0	329	329	0	0
1993	108	0	0	1,549,026	1,549,026	0	124	0	0	218,262	218,262	0	112	0	0	77,041	77,041	0	0
1994	64	0	0	926,438	926,438	0	29	0	0	50,681	50,681	0	12	0	0	8,159	8,159	0	0
1995	153	12,700	0.58	2,196,656	2,183,956	152.42	183	0	0	322,118	322,118	0	152	0	0	104,938	104,938	0	12,700
1996	124	0	0	1,782,392	1,782,392	0	96	0	0	168,865	168,865	0	10	0	0	6,866	6,866	0	0
1997	150	0	0	2,165,810	2,165,810	0	183	50,903	15.78	322,585	271,682	167.22	300	36,443	17.58	207,258	170,815	282.42	87,346
1998	151	1,026	0.05	2,171,973	2,170,947	150.95	229	106,488	26.39	403,535	297,047	202.61	408	95,119	33.73	281,963	186,844	374.27	204,092
1999	77	0	0	1,101,328	1,101,328	0	41	0	0	71,275	71,275	0	37	0	0	25,673	25,673	0	0
2000	84	0	0	1,202,470	1,202,470	0	81	0	0	142,602	142,602	0	51	0	0	35,302	35,302	0	0
2001	62	0	0	893,866	893,866	0	55	0	0	96,917	96,917	0	19	0	0	12,961	12,961	0	0
2002	77	0	0	1,103,425	1,103,425	0	56	0	0	98,953	98,953	0	26	0	0	17,773	17,773	0	0
2003	70	0	0	1,010,073	1,010,073	0	95	0	0	167,025	167,025	0	57	0	0	39,114	39,114	0	0
2004	66	0	0	955,411	955,411	0	39	0	0	68,334	68,334	0	20	0	0	13,825	13,825	0	0
2005	107	0	0	1,538,635	1,538,635	0	136	0	0	239,048	239,048	0	122	0	0	84,328	84,328	0	0
2006	161	9,802	0.42	2,312,862	2,303,060	160.58	170	19,494	6.47	299,831	280,428	163.53	151	0	0	104,033	104,033	0	29,296

Source: January through July flow data derived from annual reports published by the Watermaster's office on each river. Volumes diverted provided by RD770.

Note: Flows have not been included for Water Years 2007-2009 as there were no RD770 pump-in events. Although, pump-in events have been done towards the end of the 2010 Water year (March 2010 – February 2011) for 10,692 AF (Table 1-1), they have not been included in this table as the pump-in period is still in progress and flow data has not yet been calculated.

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Floodwater Volumes Introduced Under Previous Contracts

Between Water Years 1978 and 2011, RD770 held temporary or long-term Warren Act contracts for introduction of Non-CVP water into the FKC. During this 33 year period, Non-CVP water was only introduced 10 times for a total volume of approximately 753,408 AF (Table 1-1). The Non-CVP water was introduced, on average, every three years. In five of the nine years, Non-CVP water was pumped from only a single river in any given year (Tables 1-1 and 3-1). In the remaining five years, Non-CVP water was pumped from two rivers within the same year in four years, and from all three rivers only once within a single year (Tables 1-1 and 3-1). Maximum introductions of 248,100 AF in 1983 and 204,092 AF in 1998 into the FKC by RD770 were in response to record setting wet seasons (Table 3-1). However, total volumes pumped in a single year averaged 75,341 AF. Percentages of Non-CVP floodwater conveyed in the FKC during pump-in contract years ranged from less than 1 percent to approximately 19 percent of total water conveyed (Table 3-2).

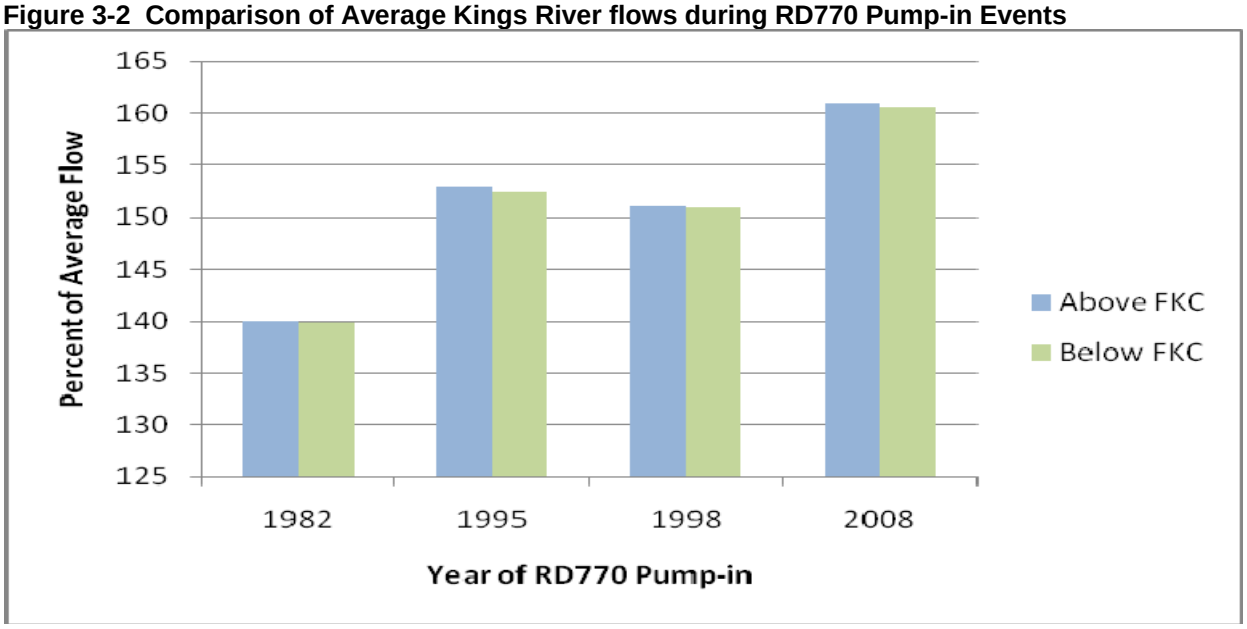
Table 3-2 Percentage of Non-CVP Floodwater Conveyed in FKC

Water Year of Introduction	CVP Water Conveyed in the FKC from Millerton Lake (AF)	Non-CVP Floodwater Introduced into the FKC (AF)	Total Water Conveyed in the FKC (AF)	Percent of Non-CVP Floodwater Conveyed in the FKC
1978	*1,661,475	9,100	1,670,575	0.5%
1980	*1,661,475	5,100	1,666,575	0.3%
1982	*1,661,475	32,500	1,693,975	2%
1983	*1,661,475	248,100	1,909,575	13%
1986	1,484,979	93,853	1,578,832	6%
1995	1,636,020	12,700	1,648,720	0.8%
1997	1,204,632	109,574	1,314,206	9%
1998	889,165	202,583	1,091,748	19%
2006	1,440,078	29,206	1,469,284	2%
2010	**1,172,170	10,693	1,182,863	0.9%

* Amounts are approximate
**Amount conveyed over 9 months.

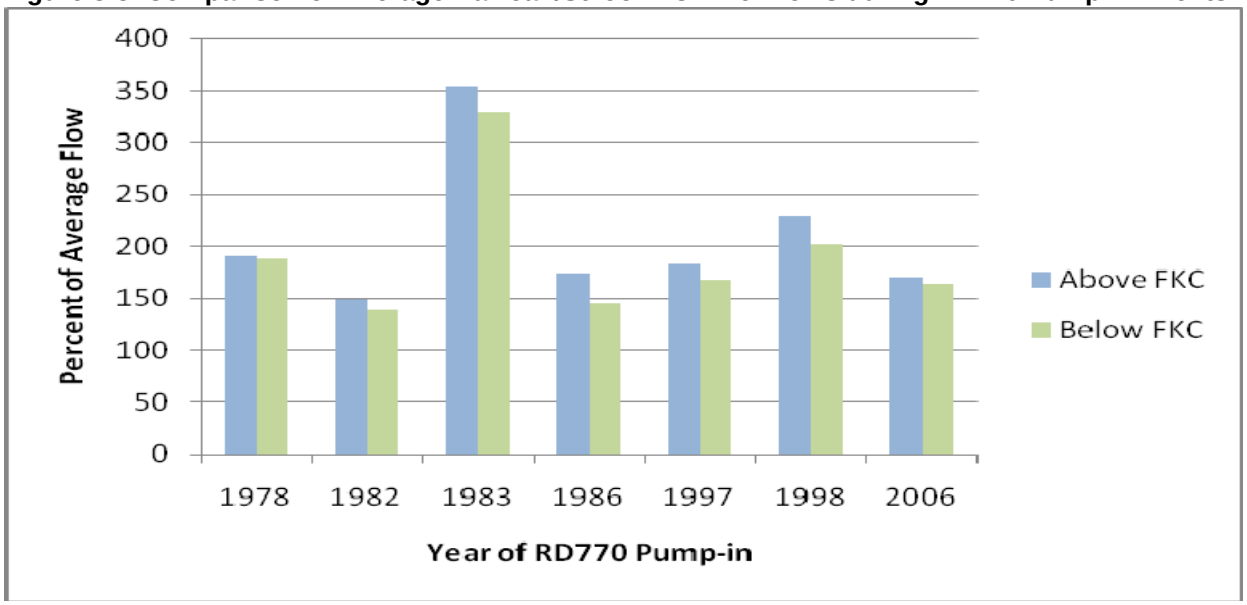
Kings River Introductions of Kings River water into the FKC have occurred only four times between 1978 and 2011 under previous Warren Act contracts. These flows were introduced in 1982, 1995, 1998, and 2006 (Tables 1-1 and 3-1). River diversions into the canal ranged from 1,026 AF to 12,700 AF, when flows were between 135 percent and 148 percent of normal. The diversion of Non-CVP water decreased the volume flowing below the diversion point by a maximum of 0.58 percent. Flows below the FKC in the Kings River during diversion years averaged between 140 to161 percent of average flows (Table 3-1). See Figure 3-2 for a comparison of average Kings River flows above the FKC and below the FKC during previous RD770 pump-in events.

Figure 3-2 Comparison of Average Kings River flows during RD770 Pump-in Events



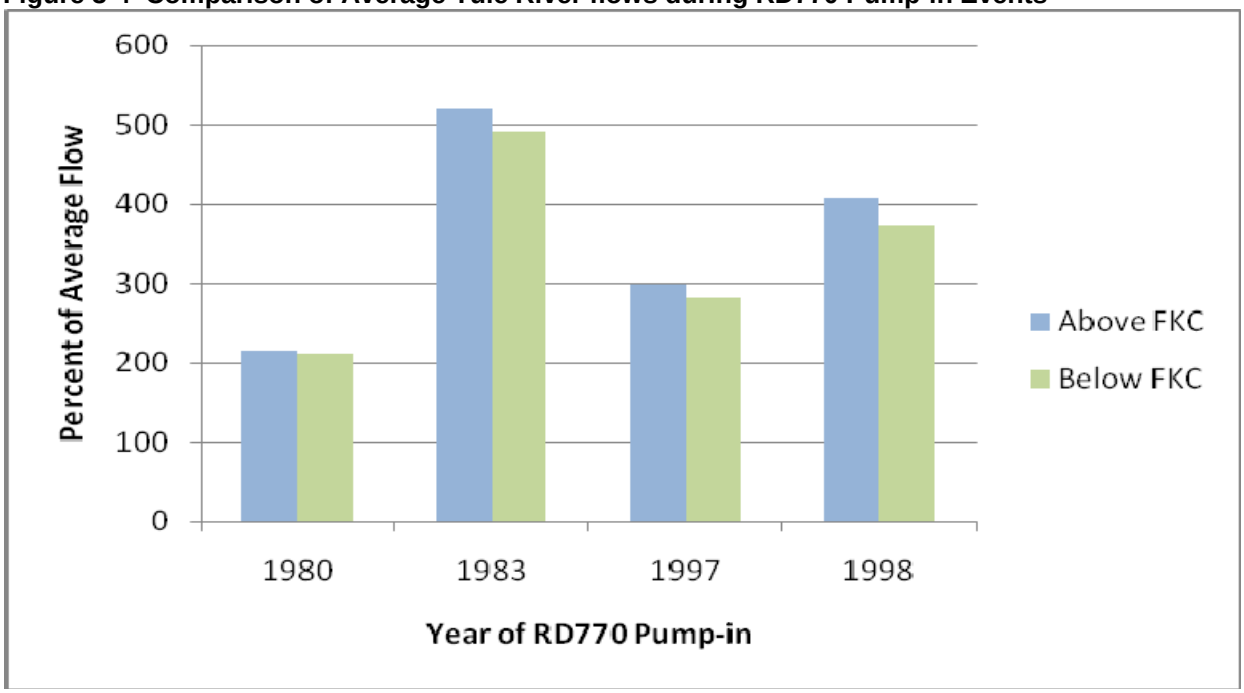
St. John's River Non-CVP water has been pumped from the St. John's River into the FKC in seven different years between 1978 and 2011: 1978, 1982, 1983, 1986, 1997, 1998 and 2006 (Tables 1-1 and 3-1). River diversions into the canal ranged from 9,100 AF to 148,300 AF, when flows were between 191 percent and 353 percent of normal. The diversion of Non-CVP water decreased the volume flowing below the diversion point by a maximum of 29.54 percent. Flows below the FKC in the St. John's River during diversion years averaged between 138 to 329 percent of average flows (Table 3-1). See Figure 3-3 for a comparison of average Kaweah/St. John's River flows above the FKC and below the FKC during previous RD770 pump-in events.

Figure 3-3 Comparison of Average Kaweah/St. John's River flows during RD770 Pump-in Events



Tule River Between 1978 and 2011, Non-CVP water was pumped from the Tule River in five Water Years: 1980, 1983, 1997, 1998, and 2010 (Tables 1-1 and 3-1). River diversions into the canal ranged from 5,100 AF to 99,800 AF, when flows were between 216 percent and 520 percent of normal. The diversion of Non-CVP water decreased the volume flowing below the diversion point by a maximum of 33.73 percent. Flows below the FKC in the Tule River during diversion years averaged between 213 to 492 percent of average flows (Table 3-1). See Figure 3-4 for a comparison of average Kings River flows above the FKC and below the FKC during previous RD770 pump-in events.

Figure 3-4 Comparison of Average Tule River flows during RD770 Pump-in Events



In summary, introductions from the Kings, St. John's, and Tule Rivers under previous Warren Act contracts were intermittent, infrequent, and small relative to average annual flows. Future introductions, if approved, are expected to be similar in all aspects.

The volume of Non-CVP water that can be conveyed is limited by five factors:

1. the amount of floodwater in the river systems under Corps's flood control criteria for operations of Pine Flat, Terminus and Success dams;
2. coordination with Kings, St. John's (Kaweah) and Tule River basin water users;
3. the capacity of RD770's pumping facilities;
4. the unfilled volume, up to capacity, that Reclamation has available in the FKC; and
5. the capacity in the Kern River to take additional flows.

Friant Division

The Friant Division was authorized by Congress under the concept of conjunctive use where the CVP water was meant to be a supplemental supply to alleviate groundwater overdraft in the area. Based on the conjunctive use concept within the Friant Division, contractors are expected to

continue mixed use of CVP and other surface water supplies and groundwater, with greater emphasis on groundwater use during dry periods when surface water is limited or expensive and percolate excess surface water in wet years. The Friant Division is an integral part of the CVP, but is hydrologically independent and therefore operated separately from the other divisions of the CVP (Reclamation 2011). Major facilities of the Friant Division include Friant Dam and Millerton Lake, the Madera Canal and the FKC. The FKC serves over 800,000 acres of farmland and communities in four counties. Water for the Friant Division is pumped from the San Joaquin River at Millerton Lake. From there, water is released from the reservoir to the 152-mile long FKC flowing south to its terminus at the Kern River. The FKC is an earthen and concrete-lined structure operated on behalf of Reclamation by the FWA (Reclamation 2011).

San Joaquin River Restoration Program In 2006, the San Joaquin River Restoration Program (SJRRP) was established to implement the Stipulation of Settlement in *NRDC, et al. v. Kirk Rodgers et al.* (Reclamation 2009). The Settlement's two primary goals include: (1) restoration and maintenance of fish population in the San Joaquin River below Friant Dam to the confluence of the Merced River; and (2) management of water resources in order to reduce or avoid adverse water supply impacts to Friant Division long-term contractors (SJRRP 2012). The SJRRP is a long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of Merced River in order to meet the two goals established in the Settlement (SJRRP 2012). Beginning in 2009, Reclamation initiated Interim Flow releases in support of SJRRP. Full Restoration Flows are scheduled to start no later than January 1, 2014 (SJRRP 2012).

Kern River

The Kern River is located at the southern terminus of the FKC and serves as the discharge point of any canal water not pumped from the canal (Figure 1-1). The upper watershed of the Kern River includes the South Fork of the Kern River and the main stem of the Kern River. The Kern River watershed is smaller than the San Joaquin River's watershed and spans about 2 to 3 million acres (DWR 2003). The main stem of the river flows south through the mountains and directly into Lake Isabella. Downstream from the lake, the river flows southwest toward Bakersfield, where it enters the valley floor and continues in a westerly direction. The Kern River carries the most runoff and is the southern-most river in the Tulare Lake basin (Corps 2011d, ECORP Consulting, Inc. 2007). Isabella Dam is the main regulating facility on the Kern River and is used for flood management and water supply. Isabella Dam provides flood protection to the City of Bakersfield, the developed agricultural areas downstream from the dam, and the Tulare Lake bed (Corps 2011d, ECORP Consulting, Inc. 2007).

Lake Isabella is located 70 miles upstream on the Kern River approximately 45 miles northeast of Bakersfield, California. The Corps has identified dam safety concerns and has consequently reduced storage in Lake Isabella which will remain in effect until dam safety concerns have been resolved (Corps 2011d). This has impacted, and will continue to impact, the amount of water able to be stored behind Lake Isabella Dam which may increase potential flooding events from the Kern River since lower reservoir levels means less capacity to absorb flood flows from the watershed and therefore causes larger releases and flood volumes. On February 5, 2010, the Corps published a Notice of Intent in the *Federal Register* to prepare a draft EIS for the *Lake Isabella Dam Safety Assurance Program* which would analyze the remediation of seismic, seepage, and hydrologic dam safety concerns (Corps 2010b).

Previous Recipients of Introduced Floodwater

During previous pump-in events, contractors capable of diverting introduced floodwater from the FKC below the Kings River pump-in location have diverted this water when there was demand (Table 3-3). Between Water Years 1986 and 2010, a total of 197,419 AF has been diverted by CVP and Non-CVP contractors, approximately 46 percent of the total amount of water introduced to the FKC. Total amounts averaged 13,615 AF and ranged from 1 AF to 58,630 AF (Table 3-3). Total annual diverted amounts ranged from 149 AF to 132,705 AF with percentages of total water diverted ranging from approximately 6 percent to 100 percent (Table 3-3).

Table 3-3 Floodwater taken during RD770 pump-in events (Water Years 1986-2010)

District	1986	1995	1997	1998	2010	Total
Arvin-Edison Water Storage District	0	2,889	17,569	33,318	4,854	**58,630**
City of Lindsay	0	0	26	11	0	**37**
City of Orange Cove	0	0	88	12	0	**100**
Delano-Earlimart Irrigation District	0	1,421	1,050	16,820	328	**19,619**
Exeter Irrigation District	0	0	6	459	0	**465**
Fransinetto Farms (previously Smallwood V.)	0	0	0	151	0	**151**
Hills Valley Water District	0	0	0	1	0	**1**
Ivanhoe Irrigation District	0	0	0	78	0	**78**
Kern County Water Agency	593	841	706	19,830	0	**21,970**
Kern-Tulare/Rag Gulch Water Districts	0	0	396	3,819	383	**4,598**
Kings County Water District	0	0	1,639	0		**1,639**
Lewis Creek Irrigation District	0	0	0	38	0	**38**
Lindmore Irrigation District	0	0	0	2,136	0	**2,136**
Lindsay-Strathmore Irrigation District	0	171	0	1,105	0	**1,276**
Lower Tule River Irrigation District	0	2,421	7,415	16,377	4,311	**30,524**
North Kern Water Storage District	1,928	0	0	3,732	0	**5,660**
Orange Cove Irrigation District	0	152	0	67	0	**219**
Pixley Irrigation District	749	421	266	963	592	**2,991**
Porterville Irrigation District	0	0	306	1,529	135	**1,970**
Saucelito Irrigation District	0	469	288	5,224	90	**6,071**
Semitropic Water Storage District	2,688	0	0	0	0	**2,688**
Shafter-Wasco Irrigation District	0	925	5,121	11,863	0	**17,909**
Southern San Joaquin Municipal Utility District	0	666	764	13,898	0	**15,328**
Strathmore Public Utility District	0	0	40	69	0	**109**
Styro tech, Inc.	0	0	1	2	0	**3**
Tea Pot Dome Water District	0	0	0	311	0	**311**
Terra Bella Irrigation District	0	0	121	892	0	**1,013**
Tulare Irrigation District	0	1,885	0	0	0	**1,885**
Total	**5,958**	**12,261**	**35,802**	**132,705**	**10,693**	**197,419**
Pump-in Event Averages	**1,490**	**1,115**	**2,106**	**5,308**	**1,528**	**13,615**
Total Introduced Water	**93,853**	**12,700**	**109,574**	**202,583**	**10,693**	**429,403**
Percent Diverted water	**6**	**97**	**33**	**66**	**100**	**46**

Note: No water was diverted by contractors during Water Year 2006 (29,206 AF) as it was an extremely wet year and there was no demand. There are no records available of water diverted by contractors for Water Years 1978 (9,100 AF), 1980 (5,100 AF), 1982 (32,500 AF), and 1983 (248,100 AF).

Wetlands in the Tulare Lake Basin In recent years there has been substantial acreage in the south eastern portion of the historic Tulare Lake bed area that has been converted back to wetland habitat, primarily under the U.S. Department of Agriculture program known the

Wetland Reserve Program (WRP). Under this program the federal government pays to place a long-term easement on a property to preserve it for its wetland values and also pays to have the property reformed (de-leveled) to optimize its habitat benefits. The property remains in private ownership. Much of this property has limited access to surface water for wetland purposes and persists in a wetland state using groundwater to the extent it is available (and affordable) and periodic access to floodwater. Floodwater for these properties has been provided periodically by RD770 (and/or landowners benefited by the district) in the past. It is RD770's intent to continue this practice when possible. See Figure 3-5 for WRP locations near RD770.

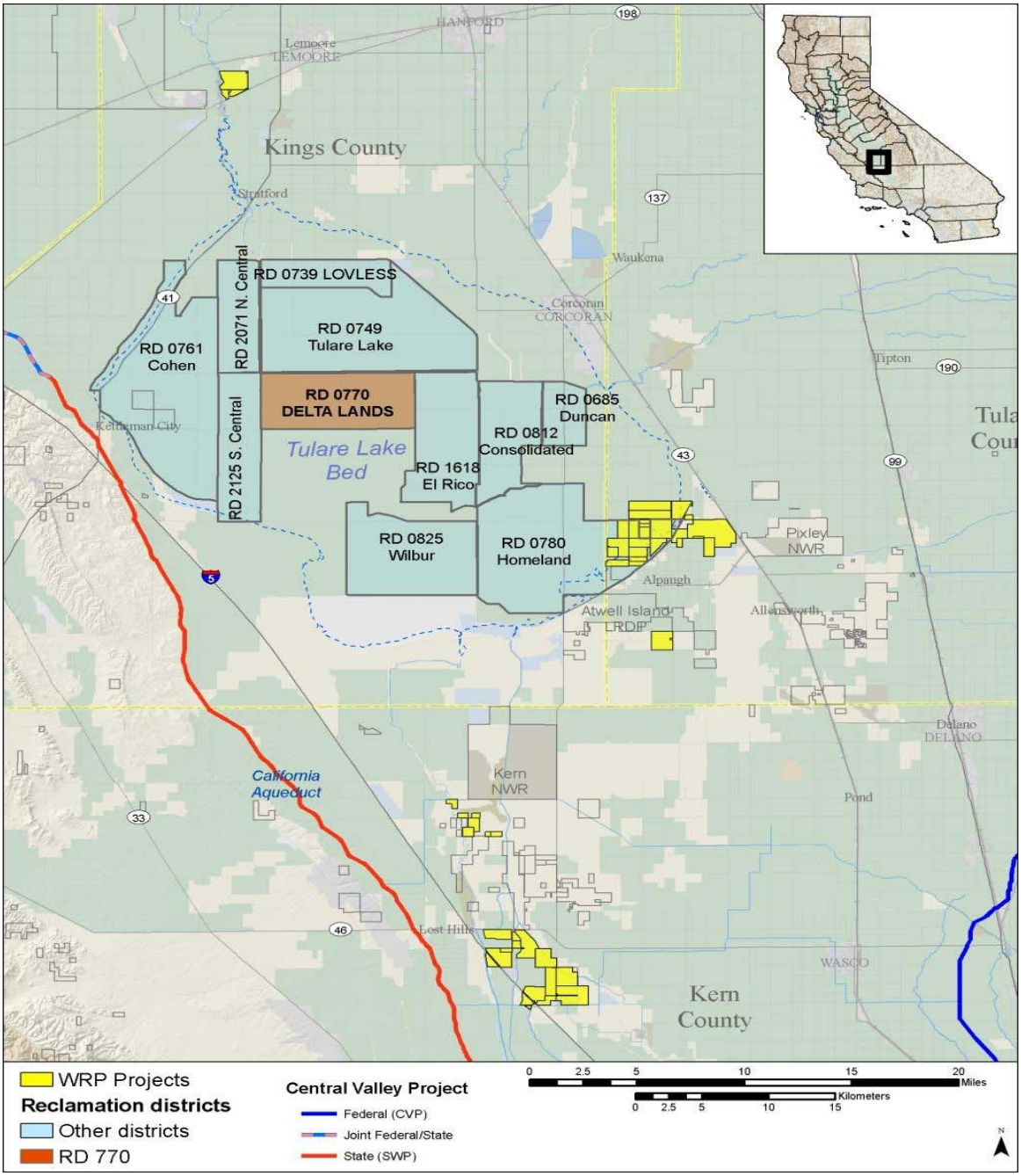


Figure 3-5 Wetland Reserve Programs in the vicinity of RD770

Use of Floodwater in the Kern River Basin Non-CVP water introduced into the FKC and discharged into the Kern River has historically been used by entities taking deliveries from the Kern River or conveyed into the California Aqueduct (Aqueduct). Historically, most of the Non-CVP water that was introduced into the Kern River ended up being delivered into the Aqueduct since RD770 pumping generally occurred at the same time as Kern River flood releases. During flood operations, the Kern River water interests insist that Kern River water be used in the Kern River Basin. Use of Non-CVP water within the basin is prohibited until all available Kern River water has been used. This has resulted in the majority of Non-CVP water being conveyed to the Aqueduct.

In 2006, essentially all of the Non-CVP water from the FKC discharged into the Kern River was subsequently pumped into the Aqueduct (Table 3-4). As described previously in Section 1.3, Reclamation does not have jurisdiction over disposition of the Non-CVP floodwater once it is discharged into the Kern River. Therefore, disposition of Non-CVP floodwater off the Kern River is not considered in the environmental consequences section.

Table 3-4 RD770 and Kern River Diversions into the Aqueduct

	RD770 Floodwater Diversion into FKC	Releases from Isabella Reservoir	FKC Inflow to Kern River			Total Kern River Flow	Diversions into the Aqueduct		
			Other	RD770	Total		RD770	Kern River	Total
1997									
Jan	37,449	63,352	49,739	37,449	87,188	150,540	21,236	0	21,236
Feb	46,241	142,831	0	37,608	37,608	180,439	26,222	1,793	28,015
Mar	3,656	158,678	0	0	0	158,678	0	0	0
Apr	0	95,933	0	0	0	95,933	0	0	0
May	0	120,789	0	0	0	120,789	0	0	0
Jun	0	133,315	0	0	0	133,315	0	0	0
Jul	0	133,724	0	0	0	133,724	0	0	0
Aug	0	108,452	0	0	0	108,452	0	0	0
Sep	0	55,240	0	0	0	55,240	0	0	0
Oct	0	42,278	0	0	0	42,278	0	0	0
Nov	0	46,977	0	0	0	46,977	0	0	0
Dec	0	31,894	0	0	0	31,894	0	0	0
Total	**87,346**	**1,133,463**	**49,739**	**75,057**	**124,796**	**1,258,259**	**47,458**	**1,793**	**49,251**
1998									
Jan	0	45,636	0	0	0	45,636	0	0	0
Feb	873	93,987	9,608	0	9,608	103,595	0	0	0
Mar	35,927	97,468	0	18,967	18,967	116,435	0	0	0
Apr	72,920	132,317	0	46,408	46,408	178,725	40,839	3,118	43,957
May	48,639	239,423	0	13,838	13,838	253,261	13,838	48,614	62,452
Jun	40,040	284,408	0	264	264	284,672	264	68,477	68,741
Jul	5,693	239,607	9,828	2,786	12,614	252,221	2,786	10,017	12,803
Aug	0	200,713	0	0	0	200,713	0	0	0
Sep	0	114,224	0	0	0	114,224	0	0	0
Oct	0	89,980	0	0	0	89,980	0	0	0
Nov	0	93,054	0	0	0	93,054	0	0	0
Dec	0	31,739	15,267	0	15,267	47,006	0	0	0
Total	**204,092**	**1,662,556**	**34,703**	**82,263**	**116,966**	**1,779,522**	**57,727**	**130,226**	**187,953**
2006									
Jan	0	55,783	24,927	0	24,927	80,710	0	0	0
Feb	0	32,313	0	0	0	32,313	0	0	0
Mar	0	24,899	6,691	0	6,691	31,590	0	0	0
Apr	0	49,966	68,296	0	68,296	118,262	0	0	0
May	25,326	273,669	0	24,135	24,135	297,804	24,135	60,932	85,067

	RD770 Floodwater Diversion into FKC	Releases from Isabella Reservoir	FKC Inflow to Kern River			Total Kern River Flow	Diversions into the Aqueduct		
			Other	RD770	Total		RD770	Kern River	Total
Jun	3,970	258,061	1,296	3,969	5,265	263,326	3,969	12,479	16,448
Jul	0	157,823	0	0	0	157,823	0	0	0
Aug	0	86,747	0	0	0	86,747	0	0	0
Sep	0	45,725	0	0	0	45,725	0	0	0
Oct	0	22,006	0	0	0	22,006	0	0	0
Nov	0	20,484	0	0	0	20,484	0	0	0
Dec	0	18,660	0	0	0	18,660	0	0	0
Total	**29,296**	**1,046,136**	**101,210**	**28,104**	**129,314**	**1,175,450**	**28,104**	**73,411**	**101,515**

Flows have not been included for Water Years 2007-2009 as there were no RD770 pump-in events. Although, pump-in events have been done towards the end of the 2010 Water year (March 1, 2010 to February 28, 2011) for 10,692 AF (Table 1-1), they have not been included in this table as the pump-in period is still in progress and flow data has not yet been calculated.

Flow in the river channel in excess of the Kern River Basin's irrigation and spreading demands triggers the operation of the Kern Intertie facility. Either Kern River flood release water or Non-CVP water can be the first water delivered into the Aqueduct. When there are excess flows in the river channel, the Kern River interests coordinate the operation of the Intertie facility with DWR. This coordination is necessary because DWR typically reduces the pumping at the Sacramento-San Joaquin River Delta by an amount that matches the Intertie flow. DWR then delivers the Intertie flow as project water to contractors in Kern County and Southern California.

Potential Recipients of Introduced Floodwater

Potential recipients of introduced floodwater include CVP and Non-CVP contractors listed in Table 2-1 that currently have the ability to take delivery of water from the FKC downstream of RD770's pump stations. Descriptions of these potential recipients can be found in Appendix B. Any additional contractors able to take water from the FKC not included in Table 2-1 or any new facilities installed that are able to move this water in the future would require additional environmental review before participating in the Proposed Action.

Water Quality

Water quality in the FKC is pristine as it emanates from snow melt from the granitic Sierra Nevada Mountains. Salinity, measured as Total Dissolved Solids (TDS), typically averages about 50 milligrams per liter (mg/L). No constituents in this water supply limit its use.

Water quality within the Kings, St. John's and Tule Rivers is also normally pristine as they also originate from the Sierra Nevada Mountains. However, water quality during flood events can be degraded due to additional erosion from the scouring force of the floodwater. Tables 3-5 to 3-7 provide water quality data from the three rivers during the most recent (2006) pump-in event. Note that during this pump-in period the turbidity, TDS, alkalinity, bicarbonate conductivity and coliform concentrations are all elevated above the values in the FKC at the time of the pump-in event.

Table 3-5 Kings River Water Quality on 2006 Pump-in Dates

Sample Date	Turbidity (NTU)	TDS (mg/L)	Alkalinity (mg/L)	Bicarbonate (mg/L)	Conductivity (µmhos/cm)	Aluminum (mg/L)	Iron (mg/L)
5/18/06	1.9	ND	20	30	--	0.08	0.11
5/25/06	1.7	30	20	20	39	--	--
Average	1.8	15	20	25	39	0.08	0.11
FKC	0.9	ND	10	20	25	--	--
MCL	**5**	**500/1000/1500**	**NL**	**NL**	**900/1600/2200**	**2-10**	**0.3**

Note: FKC Data from immediately upstream of Kings River pump-in station.
NTU = Nephelometric Turbidity Unit
MCL = Title 22 maximum contaminant level (Appendix A)
NL = no Title 22 MCL listed (Appendix A)
ND = Non-detect
µmhos/cm = micromhos per centimeter
-- = no data available

Table 3-6 Kaweah River Water Quality on 2006 Pump-in Dates

Sample Date	Turbidity (NTU)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Total Coliform (MPN/100mL)	Fecal Coliform (MPN/100mL)
1/9/06	6.1	--	--	900	23
1/15/06	5.0	--	--	--	--
4/3/06	4.0	--	--	900	50
4/14/06	6.1	--	--	500	50
4/21/06	4.3	70	ND	500	30
4/28/06	4.7	70	ND	110	30
Average	5.0	70	ND	582	37
FKC	3.8	30	ND	110	13
MCL	**5**	**500/1000/1500**	**NL**	**MP**	**MP**

Note: FKC Data from immediately upstream of Kaweah River pump-in station.
NTU = Nephelometric Turbidity Unit
MPN/mL = Most Probable Number per 100 milliliters
MP = Measure for presence, no MCL for this constituent
NL = no Title 22 MCL listed (Appendix A)
-- = no data available

Table 3-7 Tule River Water Quality on 2006 Pump-in Dates

Sample Date	Turbidity (NTU)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Total Coliform (MPN/100mL)	Fecal Coliform (MPN/100mL)
1/9/06	6.9	--	--	1,600	30
1/15/06	7.1	--	--	--	--
4/3/06	5.8	--	--	900	300
4/14/06	12.4	--	--	900	130
4/21/06	7.2	110	ND	500	30
4/28/06	10.4	110	ND	300	50
Average	8.3	110	ND	840	108
FKC	4.0	30	10	167	22
MCL	**5**	**500/1000/1500**	**NL**	**MP**	**MP**

Notes: FKC Data from immediately upstream of Tule River pump-in station.
NTU = Nephelometric Turbidity Unit
MPN/mL = Most Probable Number per 100 milliliters
MP = Measure for presence, no MCL for this constituent
NL = no Title 22 MCL listed (Appendix A)
-- = no data available

Groundwater Recharge

Groundwater overdraft and the potential resulting land subsidence are prevalent in the southern two-thirds of the Central Valley. Currently all basins in this region are in overdraft conditions (DWR 2003). During drought, as surface supplies dwindle and carryover storage in reservoirs is

not replaced, groundwater pumping increases. Between 1970 and 1993, the total mean annual groundwater extraction within this area was 4.6 million AF (DWR 2003). An annual total average of 0.44 million AF (9.5 percent) was used to meet urban needs and 4.2 million AF (90.5 percent) was used for agriculture. The total mean annual overdraft during this period was nearly 0.8 million AF (DWR 2003).

RD770's Non-CVP water has been used for recharge and irrigation purposes by CVP and Non-CVP contractors within the Friant Division service area as well as by those within the Kern River water basin. Water banks have used RD770 Non-CVP water initially to meet their 10 percent aquifer recharge obligation to assuage third party impacts. In years when spreading facilities and RD770 Non-CVP water was still available after satisfying the 10 percent buffer supply, these water banks had the opportunity to use this water in lieu of banked groundwater to meet customer demands. Groundwater banking project participants have used their banked supplies mainly to firm up supplies for existing urban development and existing agricultural production.

In the past, some of the flood flow in the canal has been marketed to CVP and other contractors to augment recharge efforts. Additionally, not all water pumped into the canal was discharged into the Kern River due to canal conveyance losses (Table 3-8). Over the last ten years the flood flows entering the canal were reduced an average of 42 percent before they were discharged into the Kern River. Discharges from the FKC into the Kern River typically made up about 14 percent of the river's flow downstream of the FKC during potential flood discharge events.

Table 3-8 Amount of Pump-in Quantities Delivered to the Kern River

Month and Year of Pump-in	AF Reduced During Transport in FKC	Reduction in FKC between pump-in volume and volume discharged into Kern River	RD770 Discharge into Kern River as a percentage of the Kern River Release Flows
01/1997	0	0%	59%
02/1997	8,792	19%	26%
03/1997	3,656	100%	0%
02/1998	873	100%	0%
03/1998	16,960	47%	19%
04/1998	26,512	36%	35%
05/1998	34,801	72%	6%
06/1998	39,776	99%	0.1%
07/1998	2,907	51%	1%
05/2006	1,191	5%	9%
06/2006	1	0%	2%
Average	**12,315**	**42**%	**14**%
Note: Data for the 2010 Water Year is not yet available as described previously, 2006 was the last Water Year RD770 pumped water into the FKC.			

Tulare County General Plans and Floodwater

The County of Tulare's General Plan 2025, which was most recently updated in 2006, has established a goal of minimizing the possibility for loss of life, injury, or damage to property as a result of flood hazards (County of Tulare 2007).

3.1.2 Environmental Consequences

No Action

Under the No Action Alternative, Reclamation would not approve the 25-year Warren Act contract and license to allow flood control operations and introductions into the FKC. Pumping facilities would not operate and Non-CVP water from the Kings, St. John's and Tule rivers could flow into the Tulare Lake Basin, jeopardizing human safety and property. The exposure of people and structures to risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee conflicts with the County of Tulare General Plan 2025 flood protection goal.

Water quality within Reclamation conveyance facilities would be unaffected since Non-CVP water would not be pumped into the FKC. Holders of water rights would either accept released floodwater that they have a right to or refuse to pump such floodwater. However, water quality in the Kings, St. John's and Tule rivers downstream of the FKC could contain additional suspended sediment if the Non-CVP water that could have been pumped increases soil erosion within or along these drainages.

Reclamation is required by EO 11988 to provide leadership and take action to reduce the risk of flood loss and to minimize the impact of floods on human safety, health and welfare. During its review and consideration of the Proposed Action, Reclamation must evaluate the potential impacts in flood plains. The No Action Alternative does not provide for risk reductions and is inconsistent with EO 11988.

Proposed Action

Past introductions and conveyances of Non-CVP water have occurred infrequently during large flood events in the Kings, St. John's and Tule Rivers (Tables 1-1 and 3-1). Future introductions of Non-CVP water would be infrequent, intermittent, unreliable and small relative to existing river flows, water needs and operations as it has been in the past. The Proposed Action is consistent with the County of Tulare's General Plan 2025 flood protection goal and with EO 11988 since it would reduce the exposure of people, land and improvements to risk of damage as a result of flooding or levee failure. However, the level of flood protection would be contingent upon the amount of Non-CVP water that needed to be pumped and the available capacity in the FKC.

Reclamation requires implementation of environmental commitments (Section 2.2.3, Appendices A and B) as well as local, state, and federal laws and regulations in order to reduce potential impacts to water resources within the Proposed Action area. The Proposed Action area includes the lands to which water could be diverted, and also the waters and riparian areas of those waters downstream of the points of diversion that are hydrologically connected to the three rivers from which water is being diverted. Failure to comply would result in the termination of the Warren Act contract and license. Requirements to comply with these commitments, laws and regulations provide additional safeguards to the water resources in the action area.

The Proposed Action would not substantially alter existing drainage patterns or the beneficial aspects periodic flood flows have on channel morphology. Variations in annual flows important to aquatic and riparian habitats have continued since the original contracts in 1978 with water

below introduction points in pump-in years remaining greater than 138 percent in all three rivers (Table 3-1 and Figures 3-2, 3-3, 3-4). In addition, the Proposed Action would not impact water quality in the Kings, St. John's and Tule rivers as water quality is not affected by diversion of a portion of the river's flow. Further, the Proposed Action would not interfere with existing deliveries of water for environmental purposes in the Tulare Lake bed. RD770 would continue to coordinate and provide water to wetland areas in the vicinity of the Tulare Lake bed as in the past, including providing water to restored wetlands.

There would be no change in the generation of electrical power on the Kings, Kaweah and Tule rivers as the pumping of Non-CVP water into the FKC is downstream of hydroelectric facilities on these rivers. The generation of electrical power would continue as in the past with or without the Proposed Action.

Water Rights Introduction of this Non-CVP water into the FKC would not alter water rights held by the United States to pump water from the San Joaquin River nor would it alter the water rights of water right holders on the Kings, St. John's (Kaweah), or Tule rivers as water diverted would only be done during flood flows and under the permission of the respective Watermasters.

Water Quality Previous RD770 introductions of Non-CVP water into the FKC resulted in water quality impacts due to slight increases in concentrations of turbidity, TDS, alkalinity, bicarbonate conductivity and coliform (Tables 3-5 to 3-7). Water quality monitoring, in accordance with Reclamation's *Policy for Accepting Non-Project Water into the Friant-Kern and Madera Canals: Water Quality Monitoring Requirements*, would continue to be done by RD770, FWA, Friant Division M&I water uses, and Reclamation (Appendix A). If Reclamation determines that the water quality in the canal is negatively affected by the pump-ins sufficiently to cause harm to the CVP or Friant Division contractors, the Warren Act contract would be terminated. Additionally, should silt accumulate in the FKC or channels as a result of the introduction of Non-CVP water, RD770 would remove the silt accumulation as directed by Reclamation and FWA, or reimburse Reclamation and the FWA for costs associated with its removal. RD770 would also be required to take steps to screen debris from the Non-CVP water prior to pumping.

Discharge of the Non-CVP water into the Kern River would be coordinated with the Kern River Watermaster in order to minimize any potential impacts.

Due to the established monitoring and reporting requirements included as part of the Proposed Action, the diversion of Non-CVP water from the Kings, St. John's and Tule rivers would not have a substantial adverse effect on water quality within these drainages. Water quality within the rivers downstream of the pumping plants is unlikely to change, but if introductions decreased flows and soil erosion, a minor improvement in downstream water quality may result.

Potential Recipients of Introduced Floodwater Introduced floodwater could be diverted by CVP and Non-CVP contractors with the ability to divert water from the FKC downstream of the RD770 pump-in stations. Diverted water could be used within the respective contractors' service area for a variety of purposes, such as agriculture, M&I, groundwater recharge, or wetlands.

This introduced floodwater would have beneficial impacts to water supplies as it would supplement existing diminished supplies when available.

San Joaquin River Restoration The Kings River is hydrologically linked to the San Joaquin River via the James Bypass and the Fresno Slough. During flood events, water may be diverted from the Kings River to the San Joaquin River via the James Bypass as floodwater is directed down the South Fork of the Kings River when the North Fork is flowing at capacity. As floodwaters are only released to the South Fork when the North Fork is flowing at capacity, the James Bypass and Fresno Slough would not experience a decrease in flood flows. Consequently, flows in the North Fork (and James Bypass) would be unaffected by the Proposed Action. Because flows in the James Bypass would not be affected, the Proposed Action would have no effect on San Joaquin River Restoration flows.

Flows from the Kaweah/St. Johns and Tule rivers drain directly into the Tulare Lakebed, which historically (in 1870) was hydrologically connected to the San Joaquin River. At present, there is only rare hydrologic connection; therefore, introduction of floodwater from the Kaweah/St. Johns and Tule rivers would have no effect on San Joaquin River Restoration flows.

Groundwater The amount of pumped flood flows is dependent upon rain events, snowmelt and available capacity in the FKC. Groundwater recharge facilities that have the ability to divert water from the FKC below the RD770 pump-in locations could receive floodwater and alleviate some of the groundwater overdraft conditions. In addition, discharges into the Kern River at the terminus of the FKC could provide a slight and short-term benefit by recharging the groundwater as it flows down the Kern River. Quite often the Kern River is in flood conditions at the same time as the pump-ins are occurring which fills the available spreading and recharge facilities in the Kern Fan area. Since this water would be available during wetter periods the water would most likely be used for recharge as well. This recharge may help to ameliorate the continuing overdraft in the San Joaquin Valley and provide some additional conjunctive use water supply benefits.

Overall, the Proposed Action would improve flood management, groundwater supplies and would not impact CVP operations, facilities, water right holder's surface water supplies or water rights, water quality, or wetlands.

Cumulative Impacts

The conveyance of this Non-CVP water is contingent upon hydrological conditions and capacity in the FKC and acceptable conditions in the Kern River. Pump-ins of this Non-CVP water would not impact existing water rights nor would it create new water rights on any of the rivers and would, therefore, have no cumulative impacts to water rights.

Water quality impacts would be monitored as required in the Warren Act contract and license. The slight increases in turbidity, TDS, alkalinity, bicarbonate conductivity and coliform during pump-in events may initially impact water quality in the FKC and Kern River; however, these events are short-term, intermittent, and infrequent. In addition, should Reclamation determine that the Non-CVP water does not meet their standards as outlined in Appendix A, pump-ins would be terminated minimizing any potential adverse cumulative impacts to water quality.

Discharges to the Kern River could result in limited groundwater recharge on a local and short-term basis. This water could be extracted during dry seasons to meet current demands. The conjunctive use of surface and groundwater supplies to meet existing demands within fluctuating hydrological conditions has occurred historically and is expected to continue into the future.

Availability of this water to CVP and Non-CVP contractors may offset reduced water supplies from hydrologic and environmental conditions, such as the San Joaquin River Restoration Project flows. Consequently, the Proposed Action, when added to other related actions, may have potentially beneficial impacts to water supplies.

The Proposed Action would provide flood protection for the Tulare Lake Basin in addition to that provided by the enlargement of Terminus Dam. The enlargement and raising of Terminus Dam and the Proposed Action would have a somewhat greater flood protection result than either project alone. Depending on the hydrology, this coordinated effect would have a greater or lesser flood protection result. At times of peak flood flows, the cumulative flood protection is still a small percentage of the stream flows; however, during small flood events, the coordinated projects could result in no flooding. The enlargement of Terminus Dam and Proposed Action do not contribute to changes in land use or increases in the need for floodplain insurance.
The Proposed Action would not result in a cumulative decrease in the generation of electrical power as the water to be pumped would be pumped after it has been released from dams and power producing facilities.

3.2 Noise

3.2.1 Affected Environment

The Non-CVP water pump-in points are in rural areas with low levels of noise. Noise receptors are relatively far away from the pumps which are the noise generation source.

3.2.2 Environmental Consequences

No Action

RD770 pumping facilities would not operate under the No Action Alternative, and therefore, there would be no impact on the level of noise.

Proposed Action

The diesel and electric powered pumps used to pump Non-CVP water into the FKC would generate infrequent, periodic noise. RD770 is required by Reclamation's license to comply with the Fresno and Tulare County Noise Ordinance regulations. Additionally, RD770 would comply with all federal and state noise standards and ordinances. Based on historic frequency, such Non-CVP water introductions would occur, on average, every three to four years. RD770 would provide Reclamation and the FWA with the project specific data as required to determine compliance with the criteria contained within the applicable Fresno and Tulare County Noise Ordinance regulations. The license also requires RD770 to respond to any complaints from adjoining landowners regarding noise and take appropriate actions to lessen noise impacts or cease pumping operations. Therefore, there would be no adverse impact to noise levels as a result of the Proposed Action.

Cumulative Impacts

The Proposed Action would be compliant with Fresno and Tulare County ordinances, regulated, intermittent and short-term and would not contribute to long-term or cumulative impacts from noise.

3.3 Land Use

3.3.1 Affected Environment

RD770 is a 13,400-acre district located in the heart of the Tulare Basin in the southern San Joaquin Valley (Figure 1-1). Once Non-CVP water inundates farmland in the Tulare Lake bed, the inundated section cannot be farmed in that same year. The soils in the area are heavy clay soils and the percolation, if there is any, is very slow. Dewatering occurs through evaporation, which is also slow, and the utilization of the water for the irrigation in fields that were not flooded (Richard Moss personal communication 2007). RD770 can store approximately 100,000 AF in and around the lake bed without flooding farmland. When there is an imminent threat of flooding, areas of lower productivity are flooded first, while the more productive land, protected by levees, remains in production. As more Non-CVP water arrives, more productive land is inundated. Diversion of a relatively small amount of Non-CVP water into the FKC has made the difference as to whether it is necessary to flood a large "cell" consisting of thousands of acres. Pump-ins in previous years has also allowed flood flows to be pumped in order to allow harvest of existing crops or protection of newly planted crops by allowing inundation of unplanted fields rather than planted fields. Consequently, the diversion of these flood flows, even a small percentage of the total flood flows, has had a positive impact on production and economics (Richard Moss personal communication 2007).

Land Use Conversion

The vast majority of the private land within the Tulare Lake Basin is used for irrigated agriculture. Three million acres of irrigated agriculture occur between the southern limit of the San Joaquin River watershed and the crest of the Tehachapi Mountains, versus 176,300 acres of urban areas (DWR 1998). Kern County was one of three California counties that had irrigated land expansions (mainly orchards) in excess of 5,000 acres between 2004 and 2006. For the same time period, Fresno, Kings, and Tulare counties irrigated lands decreased by more than 10,000 acres (CDC 2008). Fresno and Kern counties were in the top seven urbanizing counties within California between 2002 and 2008 and Fresno, Kern, and Tulare counties were in the top eight of California counties with the most irrigated farmland converted to urban land (CDC 2008). Between 2006 and 2008, all fours counties had increased Other Land and Urban and Built-up land use changes ranging from 158 acres for Kings County to 9,356 acres for Kern County (Table 3-9). Prime Farmland and Unique Farmland decreased for all four counties. Farmland of Statewide Importance decreased for Fresno, Kings, and Tulare but increased for Kern County (Table 3-9).

Table 3-9 Tulare Basin Counties Land Use Conversion (acres) from 2006 to 2008

County	Prime Farmland	Farmland of Statewide Importance	Unique Farmland	Farmland of Local Importance	Grazing Land	Urban & Built-up	Other Land	Water Area
Fresno	-16,343	-39,363	-3,914	+54,372	-161	+2,296	+3,110	+3
Kern	-13,820	+1,500	-10,639	0	+13,103	+9,356	+431	+69
Kings	-431	-21,687	-2,409	+1,172	+22,590	+607	+158	0
Tulare	-4,641	-4,954	-298	+6,368	-284	+2,062	+1,747	0

Source: CDC 2008.

Definitions:

Prime Farmland: The best combination of physical and chemical features able to sustain long-term production of agricultural crops. The land must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date.

Farmland of Statewide Importance: Similar to Prime Farmland but with minor shortcomings (*i.e.* greater slopes or lower moisture storage ability). The land must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date.

Unique Farmland: Land of lesser quality soils used for the production of the state's leading agricultural crops. Usually irrigated, but may include non-irrigated orchards or vineyards. The land must have been cropped at some time during the two update cycles prior to the mapping date.

Farmland of Local Importance: Land of importance to the local agricultural economy, determined by each county's board of supervisors.

Grazing Land: Land, at least 40 acres in size, on which the existing vegetation is suited to the grazing of livestock, defined cooperatively by the California Cattlemen's Association, the University of California Cooperative Extension Service and others interested in grazing activities.

Urban and Built-Up Land: Land occupied by structures with a building density of at least 1 unit per 0.5 acre, or approximately 6 structures per 10-acre parcel.

Water: Water area with an extent of at least 40 acres.

Other Land: Land which does not meet the criteria of any other category.

3.3.2 Environmental Consequences

No Action

Under the No Action Alternative, land conversion would continue as it has in the past. Flooding in the Tulare Lake Basin under the No Action Alternative would not facilitate urbanization and may act as a deterrent to development in the Tulare Lake Basin in the environs of Tulare Lake. Additionally, farmland may be temporarily taken out of production if subjected to flooding.

Proposed Action

The Proposed Action would not conflict with existing zoning for agricultural use or promote the conversion of farmland to non-agricultural use. The existing trend of land use conversion within the San Joaquin Valley from farmland to urban land uses would continue as it has in the past. Conveyance of the Non-CVP water would be infrequent, intermittent, unpredictable and small, relative to existing water needs and operations. Further, the prevention of inundation of farmlands would not change rates of land conversion but would allow existing farmland to remain productive in years when flooding would have impacted productivity. Conveyance of this Non-CVP water is contingent upon available capacity in the FKC and conditions in the Kern River. As a consequence, the Proposed Action is unlikely to lead to any long-term land use

decisions. Any available water would be used to maintain existing land uses and would not contribute to impacts to land uses or planning. Consequently, there would be no adverse impacts to land use as a result of the Proposed Action.

Cumulative Impacts

The No Action Alternative could result in adverse cumulative effects to agricultural operations within the Tulare Lake Basin, the intensity of which would depend on the frequency and magnitude of future flood events. If Non-CVP water introductions were not authorized, the Tulare Lake Basin could experience additional flooding during winter and spring months. Agricultural lands could be temporarily taken out of production and services supporting agricultural operations could be adversely affected. The economics of farming land subject to occasional inundation may drive farmers to accelerate taking agricultural lands out of production.

Reclamation's action is the conveyance of the Non-CVP water within the FKC where it would either be diverted by CVP and Non-CVP contractors or other entities downstream of RD770's pump-in locations or discharged into the Kern River. Subsequent actions on the Kern River are beyond Reclamation's authority and approvals. Due to the amount of precipitation during flood years, floodwater would not likely be pumped to maintain or grow crops in the same year. Diverted or discharged floodwater could be used to recharge the groundwater locally for later extraction during dry periods to meet a small fraction of future demands. The use of this stored floodwater in dry seasons would be used to maintain and grow crops on existing agricultural lands. No native or previously untilled lands would be put into production. Therefore, there would be no long-term cumulative effects as a result of the Proposed Action.

3.4 Biological Resources

3.4.1 Affected Environment

The study area for the Proposed Action is located in the San Joaquin Valley and includes portions of Fresno, Kings, Tulare, and Kern Counties. The Action Area is limited to the downstream drainages of the three Rivers (Kings, St. John's and Tule) where diversions may occur, the immediate area where water is diverted from these rivers, and the areas served by the Potential Recipients from the FKC. Areas upstream from the rivers' diversion points were excluded from consideration since flows in the upper reaches are not affected by pumping this Non-CVP water. The Kern River is not considered part of the study area as Reclamation has no action related to the Non-CVP water once it enters the Kern River system.

Special-Status Species

Reclamation requested an official species list from the Service via the Sacramento Field Office's website, http://www.fws.gov/sacramento/ES_Species/Lists/es_species_lists-form.cfm, on January 6, 2012 (Document number: 120106012333). The list is for the following U.S. Geological Survey 7½-minute topographic quadrangles: Bear Mountain, Arvin, Weed Patch, Mettler, Tejon Hills, Conner, Millux, Coal Oil Canyon, Bena, Oil Center, Lamont, Edison, Oildale, Rosedale, Stevens, Gosford, Rio Bravo, Buttonwillow, East Elk Hills, Tupman, Lokern, Deepwell Ranch, McFarland, Famoso, North of Oildale, Pond, Wasco NW, Wasco SW, Wasco, Lost Hills NE, Lost Hills NW, Lost Hills, Semitropic, Fountain Springs, Ducor, Sausalito

School, Delano East, Richgrove, Pixley, Alpaugh, Allensworth, Delano West, Hacienda Ranch NE, Lone Tree Well, Hacienda Ranch, Frazier Valley, Success Dam, Lindsay, Cairns Corner, Woodville, Porterville, Tulare, Paige, Taylor Weir, Tipton, Waukena, Guernsey, El Rico Ranch, Woodlake, Ivanhoe, Exeter, Rocky Hill, Monson, Traver, Goshen, Visalia, Burris Park, Hanford, Remnoy, Stokes Mountain, Orange Cove North, Wahtoke, and Orange Cove South.

The status and determination of effects from the Proposed Action on federally listed species and their critical habitats, and a summary of the rationale supporting the determination are provided in Table 3-10.

Table 3-10 Federally-listed Species and Designated Critical Habitat

Species	Status[1]	Effects[2]	Summary basis for ESA determination[3]
AMPHIBIANS			
California red-legged frog (*Rana aurora draytonii*)	T	NE	**Absent.** No known occurrences in Action Area based on search of CNDDB (2011) and revised critical habitat designation (Service 2010a).
California tiger salamander, central population (*Ambystoma californiense*)	T, X	NLAA	**Present.** The CNDDB (2011) lists 12 extant and 6 extirpated occurrences within the quadrangles that comprise the Action Area. Critical Habitat Unit 3 in Fresno and Tulare counties and Critical Habitat Unit 5 in Tulare County occur within the Action Area. Land use would not change. The Proposed Action would not likely alter habitats or adversely affect Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Mountain yellow-legged frog (*Rana muscosa*)	C	NE	**Absent.** No known occurrences in Action Area based on search of CNDDB (2011). Species account from Service's website indicates that the species only occurs at 4,500-12,000 feet elevation, outside the Action Area.
BIRDS			
California condor (*Gymnogyps californianus*)	E, X	NLAA	**Possible.** CNDDB (2011) lists 1 occurrence (from 1976) from the Frazier Valley quadrangle within the Action Area. The Blue Ridge Condor Area critical habitat unit in Tulare County occurs within the Action Area. Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Southwest willow flycatcher (*Empidonax trailii extimus*)	E	NLAA	**Possible.** The CNDDB (2011) lists a single extant occurrence in the Stokes Mountain quadrangle in Tulare County, reported in 1988, outside the Action Area. Historically found in the southern 1/3 of California. Migrant willow flycatchers are often seen in California, including the Central Valley, and could utilize the Action Area but would be unlikely to do so given current habitat conditions. Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife

Species	Status[1]	Effects[2]	Summary basis for ESA determination[3]
			resources.
Western snowy plover (*Charadrius alexandrinus nivosus*)	T	NE	**Absent.** No occurrences of the listed entity occur in Action Area based on recovery plan (Service 2007). The interior nesting population of the western snowy plover occurs in Action Area, but this population is not listed.
FISH			
Delta smelt (*Hypomesus transpacificus*)	T	NE	**Absent.** No suitable habitat. No known occurrence records in the Action Area based on search of CNDDB (2011).
INVERTEBRATES			
Conservancy fairy shrimp (*Branchinecta conservatio*)	E	NE	**Absent.** No known occurrences in Action Area based on recovery plan (Service 2005a) and search of CNDDB (2011). Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	T, X	NLAA	**Present.** The CNDDB (2011) lists 10 extant occurrences within the quadrangles that comprise the Action Area. Elderberry shrubs also occur in the vicinity of three of the four pumping stations that would be used to divert floodwaters under the Proposed Action. Avoidance measures would be implemented (see Appendix C). No designated critical habitat present in the Action Area.
Vernal pool fairy shrimp (*Branchinecta lynchi*)	T, X	NLAA	**Present.** The CNDDB (2011) lists 30 extant occurrences within the quadrangles that comprise the Action Area. Portions of Critical Habitat Units 26 and 27 occur within the Action Area. Land use would not change. Critical habitat is not likely to be affected by changes in river flows. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Vernal pool tadpole shrimp (*Lepidurus packardi*)	E, X	NLAA	**Present.** The CNDDB (2011) lists 5 extant occurrences within the quadrangles that comprise the Action Area. A portion of the 14,181-acre Critical Habitat Unit 18 in Tulare and Kings counties overlies the Action Area. Land use would not change. Critical habitat is not likely to be affected by changes in river flows. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
MAMMALS			
Buena Vista lake shrew (*Sorex ornatus relictus*)	E, X	NLAA	**Present.** The CNDDB (2011) lists 6 extant occurrences in the quadrangles that comprise the Action Area. The Kern Lake Preserve Unit (Unit 1) is designated critical habitat in Kern County within the Action Area. Critical habitat was re-proposed in 2009, and 5 of the 6 proposed units occur within the Action Area (Service 2009b). Land use would not change. Critical habitat is

Species	Status[1]	Effects[2]	Summary basis for ESA determination[3]
			not likely to be affected by changes in river flows. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Fresno kangaroo rat (*Dipodomys nitratoides exilis*)	E, X	NLAA	**Possible.** There are no CNDDB (2011) records from quadrangles to which water could be delivered. The most recent record, from 1992, is for a single male trapped at Alkali Sink Ecological Reserve, adjacent to Mendota Wildlife Area (MWA). Flows through Fresno Slough, which pass through MWA would be minimally affected, if at all, by the Proposed Action, and are not likely to affect flooding the species or critical habitat. Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Giant kangaroo rat (*Dipodomys ingens)*	E	NLAA	**Present.** CNDDB (2011) lists 22 occurrences in the quadrangles that comprise the Action Area. All but two of these records are from (1979-1999), and all are presumed extant. Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
San Joaquin kit fox (*Vulpes macrotis mutica*)	E	NLAA	**Present.** The CNDDB (2011) lists over 400 occurrences distributed across the quadrangles within the Action Area. Many of the records are from 1975 and earlier. Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*)	E	NLAA	**Present.** There are 55 CNDDB records within the quadrangles that comprise the Action Area (CNDDB 2011). Three of these records are old (1927-1976) and are presumed extirpated. Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
PLANTS			
Bakersfield cactus (*Opuntia treleasei*)	E	NLAA	**Present**. The CNDDB (2011) lists 36 occurrences within the quadrangles that comprise the Action Area; 9 of which are considered either extirpated or possibly extirpated. Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.

Species	Status[1]	Effects[2]	Summary basis for ESA determination[3]
California jewelflower (*Caulanthus californicus*)	E	NLAA	**Possible.** The CNDDB (2011) lists 12 occurrences of within the Action Area, 11 of which are considered extirpated or possibly extirpated. A single 1987 occurrence from the Lost Hills NE quadrangle is presumed extant. Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Greene's tuctoria (*Tuctoria greenei*)	E	NE	**Absent.** No known extant occurrences in Action Area (populations extirpated in Action Area) based on species account from Service's website and CNDDB (2011). One record in Action Area for extirpated population (CNDDB 2011). Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Hairy Orcutt grass (*Orcuttia pilosa*)	E, X	NE	**Absent.** No known occurrences or designated critical habitat in Action Area based on search of the Service's website and CNDDB (2011). Land use would not change. Critical habitat is not likely to be affected by changes in river flows. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Hartweg's golden sunburst (*Pseudobahia bahiifolia*)	E	NE	**Absent.** No known occurrences in Action Area based on search of the Service's website and CNDDB (2011). Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Hoover's spurge (*Chamaesyce hooveri*)	T, X	NLAA	**Present.** The CNDDB (2011) lists six occurrences within the Action Area in the Ivanhoe and Monson quadrangles (Tulare County) between 1941 and 1997. Land use would not change. Critical habitat would not likely be affected by diversions from rivers. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Keck's checker-mallow (*Sidalcea keckii*)	E, X	NE	**Absent.** No known extant occurrences in Action Area (1 population extirpated in Action Area) based on species account from Service's website and CNDDB (2011). The Porterville Unit of critical habitat for Keck's checker-mallow occurs within the Action Area. Land use would not change. Critical habitat would not be affected. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.

Species	Status[1]	Effects[2]	Summary basis for ESA determination[3]
Kern mallow (*Eremalche kernensis*)	E	NLAA	**Present.** The CNDDB (2011) lists 7 occurrences in Kern and Tulare counties within the Action Area, 1 of which is considered extirpated. Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Palmate-bracted bird's beak (*Cordylanthus palmatus*)	E	NE	**Absent.** No known occurrences in Action Area based on search of the Service's website and CNDDB (2011). Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
San Joaquin adobe sunburst (*Pseudobahia peirsonii*)	T	NLAA	**Present.** The CNDDB (2011) lists 23 occurrences within the quadrangles that comprise the Action Area; 6 of which are considered either extirpated or possibly extirpated. Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
San Joaquin Valley orcutt grass (*Orcuttia inaequalis*)	T, X	NLAA	**Present.** The CNDDB (2011) lists three occurrences in the Action Area, two of which are considered either extirpated or possibly extirpated. Four areas of critical habitat occur within the Action Area, including San Joaquin Valley Orcutt Grass subunit's 6A, 6B, 6C, and 6D. Land use would not change. Critical habitat is not likely to be affected by changes in river flows. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
San Joaquin woolly-threads (*Monolopia congdonii*)	E	NLAA	**Present.** The CNDDB (2011) lists 19 occurrences within the quadrangles that comprise the Action Area, 11 of which are considered either extirpated or possibly extirpated (CNDDB 2011). Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Springville clarkia (*Clarkia springvillensis*)	T	NE	**Absent.** No known occurrences in Action Area based on Service's 5-year review (Service 2009a) indicating that this species only occurs at 1,080-4,000 feet elevation, outside the Action Area.
Succulent owl's clover (*Castilleja campestris* ssp. *succulent*)	T	NE	**Absent.** No known occurrences in Action Area based on search of the Service's website and CNDDB (2011). Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.

Species	Status[1]	Effects[2]	Summary basis for ESA determination[3]
REPTILES			
Blunt-nosed leopard lizard (*Gambelia (=Crotaphytus) sila*	E	NLAA	**Present.** The CNDDB (2011) lists 75 extant and 2 extirpated occurrences for the species within Action Area quadrangles. Habitat is open sparsely vegetated areas, most commonly in grassland and Valley Sink Scrub communities (references in Service 1998). Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.
Giant garter snake (*Thamnophis gigas*)	T	NLAA	**Possible.** The CNDDB (2011) lists three extant records within the quadrangles (Buttonwillow, East Elk Hills, and Tupman quadrangles) that comprise the portion of the Action Area where water could be delivered. Dates for the three records are unknown, although all reportedly occurred prior to 1986 or 1987. Surveys conducted in the South San Joaquin Valley in 2006 did not locate giant garter snakes at the Kern National Wildlife Refuge, Kings River, Fresno Slough, or Lake Evans (Wiley and Amarello 2006). Flows through Fresno Slough would be minimally affected and insignificant, if at all, and not likely affect the species. Land use would not change. Without further environmental review, uses of this water would be limited to lands that have previously been developed and/or cultivated and have not been fallowed for three or more years, or to lands for the benefit of fish and wildlife resources.

[1] Status= Status of federally protected species protected under federal ESA.
E: Listed as Endangered under the federal ESA.
T: Listed as Threatened under the federal ESA.
X: Critical habitat designated under the federal ESA.
[2] Effects = ESA determination
NE: No Effect anticipated from the Proposed Action to federally listed species.
NLAA: May affect, but not likely to adversely affect federally listed species.
[3] Definition Of Occurrence Indicators
Present: Species known to occur within the Action Area.
Possible: Species recorded in area but habitat of actively cultivated lands of poor quality
Absent: Species not recorded in study area and/or habitat requirements not met

The following threatened and endangered species are known to occur or could occur in the Action Area and may be affected by the Proposed Action.

California Tiger Salamander The California tiger salamander, once considered a subspecies of the tiger salamander (*Ambystoma tigrinum*), is medium-sized among California salamanders with a total length up to 8.5 inches. The species was listed as threatened in 2004 (Service 2004). The species has disappeared from a significant portion of its range due to habitat loss from agriculture and urbanization, and the introduction of non-native aquatic predators (e.g., bluegill [*Lepomis macrochirus*], largemouth bass [*Micropterus salmoides*], mosquitofish [*Gambusia affinis*], and bullfrogs [*Lithobates catesbeianus*]). The California tiger salamander's current range includes the Central Valley of California and adjacent foothill districts as well as the coastal grasslands from the vicinity of San Francisco Bay south at least to Santa Barbara County (Morey 1988, Storer 1925).

California tiger salamander populations declined dramatically throughout its range due to loss of breeding ponds and the introduction of exotic fish to breeding ponds (Jennings and Hayes 1994). Jennings and Hayes (1994) mapped 3 extant occurrences in northwestern Tulare County and 1 extirpated occurrence in northeastern Kings County. A recovery plan has not yet been approved for this species.

California Tiger Salamander Critical Habitat Critical habitat for the species was designated in 2005 (Service 2005b). Unit 3 in Fresno and Tulare counties and Unit 5 in Tulare County occur within the Action Area.

California Condor With a wingspan near 9.75 feet, the California condor is the largest flying bird in North America. Adult condors are about 3.75 feet long and weigh more than 20 pounds (Clendenen et al. 1994, Verner 1978). The California condor was listed as endangered by the Service in 1967 and by the State of California in 1971. By 1982, only 22 birds remained in the remote wildlands of southern California (Clendenen et al. 1994). The last wild condor was brought into captivity for captive breeding in 1987 (Snyder and Snyder 1988). The most recent (third) revision of the California condor recovery plan was published in 1996 (Service 1996).

California condors feed exclusively on carrion comprising mostly cattle, sheep, horses, deer, and ground squirrels, and show a preference for deer and calves (Koford 1953). Historically, condors presumably fed on dead marine mammals and spawned salmon (Clendenen et al. 1994). Condors search for carrion while soaring on thermals during the warmer part of the day. Clearance for landing and take-off are critical elements of suitable foraging habitat as are freshwater pools for drinking and bathing. Ridges with low vegetation are used for spotting and feeding upon carcasses. Breeding condors are likely to conduct the majority of their foraging within 31 miles of the nest; therefore, these resources must be well distributed throughout the landscape (Verner 1978).

Current land use within the southern San Joaquin Valley combined with the tendency for the birds to circumnavigate the valley floor, traveling above the ridgelines of the ranges around the valley, reduces the likelihood of California condors foraging on the valley floor.

CNDDB (2011) lists 1 occurrence for the California condor from the Frazier Valley quadrangle within the Action Area. This record (from 1976) predates the 1987 capture of all wild condors for captive breeding and the subsequent releases of captive bred condors into the wild.

California Condor Critical Habitat The first California condor recovery plan designated 9 units of critical habitat totaling about 570,400 acres in Kern, Los Angeles, San Luis Obispo, Santa Barbara, Tulare, and Ventura counties. The Blue Ridge Condor Area critical habitat unit in Tulare County occurs within the Action Area. A few of the 29 wild, southern California-released birds are known to occasionally use critical habitat in Tulare County, and condors from the central California coast may also use this unit on very rare occasions. Habitat types that support condors include primarily chaparral, coniferous forests, and oak savannah in the foothill ranges surrounding the southern San Joaquin Valley.

Southwestern Willow Flycatcher The southwestern willow flycatcher is one of four recognized subspecies of willow flycatcher (Unitt 1987). It breeds in willow riparian habitats in the southwestern United States from southern California to western Texas and historically occurred in the southern 1/3 of California (Service 2005c). The State of California listed the southwestern willow flycatcher as endangered in 1991, and the Service listed the subspecies as endangered in 1995. Widespread loss and degradation of riparian habitats and nest parasitism by brown-headed cowbirds (*Molothrus ater*) are the leading causes of willow flycatcher population declines in California.

The southwestern willow flycatcher population nearest to the Action Area is on the South Fork Kern River in the southern Sierra Nevada (Unitt 1987). Portions of the South Fork Kern River, along with portions of other river systems in the southwest were designated as critical habitat for the southwestern willow flycatcher in 2005 (Service 2005c). The recovery plan for the southwestern willow flycatcher was published in 2002 (Service 2002a).

No breeding populations of willow flycatcher currently exist in the Central Valley. Migrant willow flycatchers are often seen in California, including the Central Valley. These migrants most likely belong to populations breeding outside of California where the species is more numerous.

Valley Elderberry Longhorn Beetle The valley elderberry longhorn beetle historically ranged throughout the Central Valley, from Shasta County south into Kern County (Arnold et al. 1994). In contrast, surveys conducted between 1984 and 1991 detected valley elderberry longhorn beetles in only 12 patches of natural riparian vegetation along the Sacramento, American, and San Joaquin rivers and their tributaries (Arnold et al. 1994). The loss of habitat is the single greatest factor contributing to the decline of this species. Riparian vegetation throughout the Central Valley has been altered as a result of human activities associated with urban development, agriculture, and water diversions.

The Service listed the valley elderberry longhorn beetle as a threatened species in 1980 (Service 1980a). Conservation efforts aimed at the species' recovery have included protecting existing elderberry thickets, replanting elderberry shrubs, and transplanting elderberry shrubs inhabited by beetle larvae to new sites. Critical habitat was designated for this species in two sections of riparian forest along the American River (Service 1980a), which is outside the Action Area. A recovery plan for the species was published in 1984 (Service 1984).

Vernal Pool Fairy Shrimp The vernal pool fairy shrimp is an aquatic crustacean that is endemic to vernal pools in the Central Valley, eastern coastal foothills from Tehama to Riverside counties, and a limited number of sites in the Transverse Range and Santa Rosa Plateau of California (Eng et al. 1990, Sugnet & Associates 1993, Service 1994). Vernal pool fairy shrimp rarely co-occur with other species of fairy shrimp and when they do they are never numerically dominant (Service 1994).

Threats to the species include flood control, impoundments, highway and utility projects, urban development, conversion of native habitats to agriculture, and stochastic events (Service 1994). The species was listed as threatened in 1994 largely because of significant threats associated with

future habitat loss and fragmentation (Service 1994). Its present distribution is restricted to vernal pools extending from Shasta County south through the Central Valley into Tulare County, and along the central coast range from northern Solano County south into San Benito County (Service 1994). This species, however, occurs sporadically within local vernal pool complexes. The total population is known from only 32 locations, about a quarter of which are represented by a single pool.

The vernal pool fairy shrimp are discussed in the Vernal Pool Recovery Plan (Service 2005). Conservation efforts for this species include research and monitoring, protection of existing vernal pool complexes throughout the species' range, and restoration and creation of vernal pools.

Vernal Pool Fairy Shrimp Critical Habitat The Service designated critical habitat for vernal pool fairy shrimp in 2006 (Service 2006). Portions of units 26 and 27 occur within the Action Area. Unit 27 in southern Tulare County September 201143 Biological Assessment for Acceptance of Floodwaters (15,465 acres) represents the southern extent of vernal pool fairy shrimp range along the eastern margin of the Central Valley and contains the largest contiguous habitat for the species in the southern portion of the San Joaquin Valley.

Vernal Pool Tadpole Shrimp Vernal pool tadpole shrimp currently occurs in vernal pools throughout the Central Valley and in the San Francisco Bay National Wildlife Refuge in Alameda County (Service 2005a). Threats to the species include flood control, highway and utility projects, urban development, conversion of native habitats to agriculture, and stochastic events on the small and isolated remaining populations (Service 1994). Habitat loss can occur when pools are destroyed or modified during filling, grading, discing, or leveling. In fact, any activity or disturbance that alters the hydrologic regime of vernal pools may reduce the population size or reproductive success of these animals or eliminate them altogether. The species was listed as endangered by the Service in 1994 largely because of the significant threats associated with future habitat loss and fragmentation (Service 1994).

The vernal pool tadpole shrimp are addressed in the Vernal Pool Recovery Plan (Service 2005). Conservation efforts for this species include continued monitoring, protection of existing vernal pool complexes throughout the species' range, and where possible, restoration and creation of vernal pools.

Vernal Pool Tadpole Shrimp Critical Habitat The Service designated critical habitat for this species in 2006 (Service 2006). A portion of the 14,181-acre Unit 18 in Tulare and Kings Counties overlies the Action Area.

Buena Vista Lake Shrew Buena Vista Lake shrew was listed as federally endangered in 2002 (Service 2002a). This shrew is known from only a few records in the vicinity of Buena Vista Lake in western Kern County (Service 1998). It occurred in freshwater marsh habitats on the perimeter of Buena Vista Lake and probably in the Tulare Basin (Williams 1986). Much of its original habitat had already been lost by 1933 due to the draining and cultivation of habitat (Service 1998). Only 25 shrews were trapped at the Kern Lake Preserve in December 1988 to May 1989, and 10 were trapped there in 1995 (Service 1998). There are also recent records from

the Kern National Wildlife Refuge, 2 in 1992 and 1 in 1994 (Service 1998). The Buena Vista Lake shrew is discussed in the Recovery Plan for Upland Species of the San Joaquin Valley, California (Service 1998). The CNDDB (2011) lists 6 extant occurrences in the quadrangles that comprise the Action Area, and where water could be delivered.

Buena Vista Lake Shrew Critical Habitat Critical habitat for the Buena Vista Lake shrew was designated in 2005 (Service 2005d). Designated critical habitat is on the Central Valley floor of Kern County within the Action Area and comprises the Kern Lake Preserve Unit (Unit 1). Critical habitat was re-proposed in 2009, and 5 of the 6 proposed units occur within the Action Area (Service 2009b).

Fresno Kangaroo Rat The Fresno kangaroo rat, once thought extinct, is one of three geographically separated subspecies of San Joaquin kangaroo rat (Dip*odomys nitratoides*), the others being the Tipton kangaroo rat (*D. nitratoides nitratoides*) and the short-nosed kangaroo rat (*D. nitratoides brevinasus*) (Culbertson 1934, Brylski and Roest 1994, Service 1998). Fresno and Tipton kangaroo rats once occupied contiguous geographic ranges within the Tulare Basin and the southeastern half of the San Joaquin Basin in the San Joaquin Valley (Service 1998).

The Fresno kangaroo rat was listed as endangered by the Service in 1985 and by the State of California in 1980 (Service 1985). Their present distribution is restricted to less than 6,500 acres in fragmented, isolated habitat in Fresno County, but there are no known populations within the historic geographic range in Merced, Madera, and Fresno counties (Brylski and Roest 1994, Service 1998). The last captured specimen was a male caught twice in the autumn of 1992 on the Alkali Sink Ecological Reserve, west of Fresno (Service 1998). Since this last capture in 1992, no extant populations of Fresno Kangaroo rats have been found (Service 2010).

The conversion of native habitat to accommodate agricultural uses, urbanization, and transportation infrastructure is the leading cause of the decline in Fresno kangaroo rat populations (Service 1998). An estimated 14,629 acres of habitat remains for this species, but much is considered marginal because of intense livestock grazing (Service 1998). Moderate livestock grazing may benefit habitat conditions by reducing vegetation and enabling the kangaroo rats to better elude predators (Brylski and Roest 1994). The continued conversion, degradation, and fragmentation of suitable habitat are major threats to the persistence of this species as are floods, rodenticides, predation by native and non-native species, and interspecific competition (Service 1998).

Recovery efforts for this species are focused on locating extant Fresno kangaroo rat populations and understanding the genetic relations among isolated and scattered populations of San Joaquin kangaroo rats. Concurrently, habitat must be consolidated and protected in sufficient quantity to sustain viable populations. Lastly, resources must be expended to obtain knowledge on how to best manage natural lands to maintain or enhance conditions for this species (USFWS 1998).

There are no CNDDB records for the Fresno kangaroo rat from any of the U.S. Geological Survey 7.5 Minute Quadrangles that contain entities that could receive non-CVP floodwaters from the District. The action area is south of the historic distribution of the Fresno kangaroo rat.

Fresno Kangaroo Rat Critical Habitat Accompanying the listing of the Fresno kangaroo rat in 1985 was the designation of 858 acres of critical habitat (Service 1985). This critical habitat comprised portions of the MWA and the Alkali Sink Ecological Reserve, which are both owned and managed by the State of California, as well as 102 acres of private land. This critical habitat is located approximately 40 air miles west, northwest of the Friant Dam forming Millerton Lake and the beginning of the FKC. The critical habitat includes land adjacent to waterways connected to Mendota Pool/Fresno Slough.

Giant Kangaroo Rat The giant kangaroo rat was listed as endangered by the Service in 1987 and by the State of California in 1980 (Service 1987). This species is discussed in the Recovery Plan for Upland Species of the San Joaquin Valley, California (Service 1998). Critical habitat has not been proposed or designated for this species.

Its historic range encompassed a narrow band of gently sloping ground on the west side of the San Joaquin Valley from the base of the Tehachapi Mountains in the south, to a point about 10 miles south of Los Banos in Merced County in the north; the Carrizo and Elkhorn Plains and San Juan Creek watershed west of the Temblor Mountains; the upper Cayuma Valley next to and nearly contiguous with the Carrizo Plain; and on steeper slopes and ridgetops in the Ciervo, Kettleman, Panoche, and Tummey Hills; and in the Panoche Valley (Service 1998). Its current distribution is restricted to less than 28,000 acres (approximately 2 percent of historical habitat) in fragmented, isolated habitat within the historical geographic range in Merced, Fresno, Kings, Kern, San Luis Obispo, and Santa Barbara counties (Service 1998, Williams 1992). Their preferred habitat is annual grasslands with few or no shrubs and gentle slopes (<10 percent), with friable, sandy-loam soils (Service 1998). They also use marginal habitats with slopes up to 22 percent, possibly due to large-scale losses of preferred habitat.

Habitat conversion for agriculture, urbanization, and transportation infrastructure is the leading cause of giant kangaroo rat population declines (Williams 1992). The use of rodenticides to control ground squirrels and kangaroo rats, and the development of infrastructure for petroleum exploration and extraction, may also contribute to the decline (Service 1998, Williams 1992). The continued conversion, degradation, and fragmentation of suitable habitat are major threats to the species as are floods, drought, and rodenticides (Service 1998).

San Joaquin Kit Fox The San Joaquin kit fox was listed as endangered by the Service in 1967 (Service 1967) and by the State of California in 1971. Critical habitat has been neither proposed nor designated for this species. The evolutionary and taxonomic relationships among small North American foxes were recently examined (Dragoo et al. 1990, Mercure et al. 1993), and it was concluded that the San Joaquin Valley population is the most distinct population of kit fox and should be considered a subspecies.

Natural sources of kit fox mortality include predation, starvation, drowning, and disease. Human sources include shooting, trapping, poisoning, electrocution, collisions with vehicles, and suffocation (Service 1998). Habitat loss from urban, agricultural, and industrial development are the principal factors in the decline of the San Joaquin kit fox since at least the 1950s (Morrell 1975). By 1958, about 50 percent of the Valley's original natural communities had been converted (Service 1980b). The completion of the CVP and SWP, which diverted and imported

new water supplies for agriculture, contributed to an estimated 34 percent loss of natural lands between 1959 and 1969 so that by 1979, only about 7 percent of the San Joaquin Valley floor's original wildlands south of Stanislaus County remained untilled and undeveloped (Service 1980b, 1998).

The San Joaquin kit fox is discussed in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (Service 1998).

Tipton Kangaroo Rat The Tipton kangaroo rat was listed as endangered by the Service in 1988 (Service 1988) and by the State of California in 1989. This species is discussed in the *Recovery Plan for Upland Species of the San Joaquin Valley,* California (Service 1998). Critical habitat has not been proposed or designated for this species. The historical distribution of the Tipton kangaroo rat covered about 1.7 million acres on the floor of the Tulare Basin. By 1985, their distribution was reduced to about 63,000 acres and their present distribution comprises scattered, isolated populations in Tulare and Kern counties (Service 1998).

Tipton kangaroo rats occupy arid lands on alluvial fan and floodplain soils having level or near-level topography with elevated soil structures such as mounds, berms, or embankments for burrows (Brylski et al. 1994, Service 1998). Apparently, the relictual interior dune grassland and Sierra-Tehachapi saltbush scrub communities supported the best historical populations (Service 1998). They currently occur in iodine bush shrub land and Valley saltbush scrub and areas that have one or more species of sparsely scattered woody shrubs and a ground cover of native and non-native grasses and forbs (Service 1998). Burrows are usually in open areas. While Tipton kangaroo rats can re-colonize scattered areas of seasonally flooded habitat, areas not subject to flooding are important for permanent occupancy (Service 1998).

The conversion of native habitat for agriculture has been the leading cause of the decline in Tipton kangaroo rat populations (Service 1998). The CVP and State Water Project (SWP) produced a dependable supply of water for irrigation farming. By the mid-1980s, only about 3 percent of the land base in the Tulare Basin was undeveloped (Service 1998). Use of rodenticides to control California ground squirrel populations most likely contributed to the decline in Tipton kangaroo rats. The continued conversion, degradation, and fragmentation of suitable habitat are major threats to the future persistence of this species as are periodic flooding, the use of rodenticides, and competition with Heermann's kangaroo rats that are more successful in maintaining populations in a fragmented landscape (Brylski et al. 1994, Service 1998).

Bakersfield Cactus This shrub occurs in chenopod scrub habitat and sandy soils within valley and foothill grassland habitat. The Bakersfield cactus blooms in May and is limited in range to Kern County. Suitable valley and foothill grassland and chenopod scrub forming arid plains are present in portions of the southeast San Joaquin Valley. This species is threatened by agriculture and some grazing practices (Hickman 1993). The Bakersfield cactus is discussed in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (Service 1998). Critical habitat has not been proposed or designated for this species.

California Jewelflower This annual herb occurs in chenopod scrub and valley and foothill grassland habitats. Its blooming period extends from February to May. Suitable valley and

foothill grassland habitat for this species may occur from the valley floor to the lower elevation foothills of the Sierra Nevada. Chenopod scrub habitat is also suitable for this species, within historical lakebeds with heavy, saline and/or alkaline clays in portions of the southern San Joaquin Valley. Sensitive habitats in which this species occurs include valley sink scrub, which is an element of chenopod scrub (Holland 1986). Agriculture and actions that reduce groundwater levels below the root zone are cited as reasons for the destruction of this habitat (Holland 1986). The California jewelflower is discussed in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (Service 1998). Critical habitat has not been proposed or designated for this species.

Hoover's Spurge Hoover's spurge is an annual herb that occurs in northern-hardpan, basalt-flow, and claypan vernal pools that blooms in July (Holland 1986). The CNPS reports the range of this species includes Tulare County, and the CNDDB reports observations in the County at between 315 and 345 feet elevation. Hoover's spurge continues to be threatened by grazing, agriculture, and non-native plants (CNPS 1994). Hoover's spurge is addressed in the Vernal Pool Recovery Plan (Service 2005a).

Hoover's Spurge Critical Habitat The Service designated final critical habitat for Hoover's spurge in 2006 (Service 2006). Portions of Unit 7 in Tulare County (22,634 acres) north of the Kaweah River occur within the Action Area. Unit 7 supports almost 20 percent of the known occurrences of Hoover's spurge and comprises the southern extent of the species' range (Service 2003).

Kern Mallow This annual herb occurs in chenopod scrub, and valley and foothill grasslands. The blooming period extends from March to May. Sensitive habitats in which this species occurs include valley sink scrub, which is an element of chenopod scrub (Holland 1986). Agriculture and actions that reduce the groundwater level below the root zone are cited as reasons for the destruction of this habitat (Holland 1986). This species is threatened by agriculture and grazing (Hickman 1993). The Kern mallow is discussed in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (Service 1998). Critical habitat has not been proposed or designated for this species.

San Joaquin Adobe Sunburst This annual herb occurs in adobe soils within the cismontane woodland and valley and foothill grassland habitats. The blooming period extends from March to April. The range of this species includes Fresno, Kern, and Tulare counties. Suitable valley and foothill grasslands occur within portions of the southern Sierra Nevada foothills and southeastern San Joaquin Valley. This species occurs in wildflower fields, which are an element of valley and foothill grasslands (Holland 1986). This species is threatened by agriculture (Hickman 1993). The San Joaquin adobe sunburst is not addressed by any recovery plan, and critical habitat has not been proposed or designated for this species.

San Joaquin Valley Orcutt Grass This is a small, tufted member of the grass family (Poaceae) that occurs in vernal pools, and blooms in May through September. The range of San Joaquin Valley Orcutt grass historically included the eastern margin of the valley from Stanislaus County south into Tulare County. At least half the known populations have been extirpated, leaving only 23 known populations. The species declined mainly due to severe habitat loss from

agriculture and urban development in the Central Valley. The San Joaquin Valley Orcutt grass is addressed in the Vernal Pool Recovery Plan (Service 2005).

San Joaquin Valley Orcutt Grass Critical Habitat The Service designated final critical habitat for San Joaquin Valley Orcutt grass in 2006 (Service 2006). Portions of Unit 6 in Tulare County (14,734 acres) north of the Kaweah River occur within the Action Area.

San Joaquin Woolly Threads This annual herb occurs in chenopod scrub, and valley and foothill grasslands. The blooming period extends from March to May. The range of this species includes Fresno and Kern counties. Historical records are known from Tulare County, but the plant is considered extirpated from this area (CNPS 1994). Suitable sandy valley and foothill grassland, and chenopod scrub within lakebeds of heavy, saline, and/or alkaline clays, are present in southwest portions of the San Joaquin Valley. Sensitive habitats in which this species occurs include valley sink scrub, which is an element of chenopod scrub (Holland 1986). Agriculture and actions that reduce groundwater levels below the root zone are cited as reasons for the extirpation of this habitat (Holland 1986). The species is discussed in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (Service 1998). Critical habitat has not been proposed or designated for this species.

Blunt-Nosed Leopard Lizard The blunt-nosed leopard lizard was listed as endangered by the Service in 1967 and by the State of California in 1971 (Service 1967, 1998). Critical habitat has been neither proposed nor designated for this species. This species is endemic to the San Joaquin Valley (Montanucci 1970, Tollestrup 1979 in Service 1998) and is thought to have once occurred from the Tehachapi Mountains in Kern County northward to Stanislaus County (Service 1998). The current range is thought to include scattered populations throughout the undeveloped land of the San Joaquin Valley and in the foothills of the Coast Range below 2600 ft (Montanucci 1970, Service 1998).

The blunt-nosed leopard lizard inhabits open, sparsely vegetated areas within non-native grassland, Valley sink scrub, Valley needlegrass grassland, and alkali playa communities on the floor of the San Joaquin Valley (Holland 1986). The lizards also inhabit saltbush scrub communities within the foothills of the southern San Joaquin Valley and the adjacent Carrizo Plain. They are typically absent where habitat conditions include steep slopes, dense vegetation, or areas subject to seasonal flooding (Montanucci 1965).

Blunt-nosed leopard lizard populations declined to levels warranting listing because of conversion and degradation of suitable habitat (Service 1998). Agricultural, urban, petroleum, mineral, and other development activities altered an estimated 94 percent of the wildlands on the Valley floor by 1985 (Service 1985), and habitat disturbance, conversion, and fragmentation continue to be the greatest threats to the species. Other direct and indirect effects include automobile and off-highway vehicle traffic, livestock grazing, and pesticides (Service 1998).

Giant Garter Snake The giant garter snake was listed as threatened in 1993 (Service 1993). Critical habitat for this species has not been proposed or designated. A draft recovery plan has been issued for this species (Service 1999). Once occurring from Buena Vista Lake southwest of Bakersfield in Kern County north to Shasta County, the species' present range is restricted to

Fresno County, from the vicinity of Mendota, north through the Central Valley to Butte County (CNDDB 2011, Fisher et al. 1994). Giant garter snakes have survived in a few wetlands managed as duck-hunting preserves or waterbird sanctuaries along the San Joaquin River, but these sites are flooded in winter and spring, and drained in summer, which is opposite of what these snakes require (Fisher et al. 1994). Surveys conducted in the South San Joaquin Valley in 2006 did not locate giant garter snakes at the Kern National Wildlife Refuge, Kings River, Fresno Slough, or Lake Evans (Wiley and Amarello 2006). In the northern Sacramento Valley, rice fields may provide the best habitat, but the acreage dedicated for rice production fluctuates with market conditions and water availability (Fisher et al. 1994).

Land development, especially the disking, channeling, and draining of wetlands has fragmented or eliminated much of the original habitat (Hansen and Brode 1980). Due to loss of the snake's historical habitat, the giant garter snakes' typical current habitat includes canals, and permanent and seasonal tule-cattail marshes. Giant garter snakes are also found in flooded rice fields, streams, and sloughs, especially with muddy bottoms (Stebbins 1985). They use rock piles, small mammal burrows, and other suitable sites adjacent to the water conveyance systems as hibernacula.

The biggest threat to the persistence of viable populations of giant garter snakes is habitat conversion and development (Fisher et al. 1994). Other threats include the elimination of prey such as tadpoles, frogs, and small fish by pesticides and fertilizers, spills of pollutants into waterways, introduced predators, and incompatible grazing regimes (Fisher et al. 1994).

Giant garter snakes have been recorded recently at Mendota Pool (Dickert 2003), but there are no known current extant populations of the giant garter snake within the southern San Joaquin Valley.

3.4.2 Environmental Consequences

No Action

Upland and terrestrial riparian habitats for special-status species occur in isolated patches along the Kings, Kaweah and Tule river basins and could be adversely impacted by inundation caused by flooding.

Proposed Action

Potential effects on biological resources, including federally listed species and critical habitat, could result from the following components of the Proposed Action: 1) diversion of Non-CVP floodwaters from the Kings, Kaweah/St. Johns, and Tule river systems, and 2) the delivery of Non-CVP floodwaters taken by identified Potential Recipients.

Potential Effects of Floodwater diversions from Kings, Kaweah and Tule Rivers

Floodwater diversion in the Kings, Kaweah/St. Johns, and Tule rivers would only occur during periods of flooding, and flows would remain at flood or near flood stages below their diversion points into the FKC (see Table 3.1). Large floodflows that are important to floodplain habitat processes would still regularly occur, and soils in the Action Area would likely already be saturated when diversions occur. Habitat supporting listed species would not be dewatered, deprived of essential soil moisture, or converted to a different habitat type as a result of

diversions. Therefore, floodwater diversion may affect, but is not likely to adversely affect, habitats that support listed species located downstream of the diversion points.

Potential Effects of Potential Recipients Taking Delivery of Diverted Floodwaters The potential effects from Potential Recipients taking delivery of diverted floodwaters include increased groundwater availability, and conversion of land uses to and from agriculture, urban development, and grazing. Land use conversions could affect listed species and critical habitat within the Potential Recipients' boundaries. As described in Section 2.2, use of this water has been limited and would therefore not result in land use changes that could affect listed species. In addition, because the availability of this water is unpredictable and intermittent, land use changes due to the use of diverted floodwaters would be difficult to start or sustain. Use of this water for groundwater recharge could have beneficial indirect effects on groundwater storage and availability. Therefore, floodwater delivery to the Potential Recipients may affect, but is not likely to adversely affect, listed species or critical habitat.

No conversions of native lands or adverse impacts to listed species are anticipated from the discharge of floodwater to the Kern River. The volumes represent a small percentage of the water available in the Kern River and the availability of floodwaters is intermittent and unpredictable. Therefore, floodwater delivery into the Kern River may affect, but is not likely to adversely affect, listed species or critical habitat.

California Tiger Salamander and Critical Habitat Diversions could infrequently and indirectly, and both adversely and beneficially, affect the volume of floodwater flowing across the floodplains of Cross Creek, which could indirectly affect California tiger salamanders that breed in the vernal pools in this area. Diversions are not likely to preclude over-bank flooding that fills vernal pools and supports California tiger salamander breeding habitat. In addition, excess floodwaters could introduce predators such as fish and crayfish into vernal pools, such that larvae are flushed out of the pools resulting in mortality of individual larvae or perhaps an entire cohort. The Service recognizes that flood flows generally adversely affect vernal pools and their inhabitants. For example, the Service considers the long-term sustainability of a site for a vernal pool mitigation bank to be less if it is subject to over-bank flooding from nearby streams. Effects are possible but discountable that floodwater diversion could reduce the duration of breeding pools harboring salamander larvae. A minor reduction in a wet year experiencing flooding is not likely to decrease the probability that larvae would have sufficient time to complete metamorphosis before the pools dry. Thus, indirect effects on California tiger salamanders are likely to be beneficial, and the degree of the effects are likely to vary by individual flood event. The effects resulting from the floodwater diversions are anticipated to be insignificant and discountable. Delivery of diverted floodwaters to entities in the Action Area are not expected to affect California tiger salamander because floodwater deliveries are expected to occur infrequently and sporadically, they are not expected to result in land use conversion, or affect availability of groundwater. Therefore the Proposed Action may affect, but is not likely to adversely affect, California tiger salamanders or critical habitat.

All of the Seville Unit, Cottonwood Creek Unit 5B, and most of Cottonwood Creek Unit 5A are upstream of the confluence of Cottonwood Creek and the St. Johns River and would not be affected by changes in flood flow diversions within the Kaweah/St. Johns river system. Portions

of California tiger salamander critical habitat Unit 5 are within the Cottonwood Creek Unit and are connected to flows in the St. Johns River, and upland habitat within a portion of Cottonwood Creek Unit 5A may receive reduced flood flows as a result of diversions. However, during flooding, Cottonwood and Cross creeks typically carry high flows before pumping occurs and continue to carry high flows when the pumps are operating. This effect may be reduced by Corps-managed releases from the dams that maintain flows within existing channels. Other factors, including the increased storage capacity of the reservoir at Terminus Dam on the Kaweah River, and alterations to the stream channel and levee construction along Cross Creek, would also reduce the frequency and magnitude of diversions. Cross Creek reaches adjacent to vernal pool habitat are deeply incised as a result of prior alterations to the stream channel, which substantially reduces the likelihood of flooding in the Cross Creek vernal pool area regardless of whether diversions occur.

At critical habitat Unit 5A for California tiger salamander, diversions are not likely to preclude over-bank flooding that fills vernal pools and supports critical habitat for this species. Diversions may reduce the volume of floodwater inundating the uplands and may reduce some potential negative effects from too-high flows into vernal pools. Therefore, floodwater diversions would have discountable and insignificant direct and indirect effects, and may affect, but are unlikely to adversely affect, California tiger salamander critical habitat in the floodplains of Cross Creek.

California Condor and Critical Habitat The range of the California condor and the Tejon Ranch critical habitat unit in Kern County occurs within the southern extent of the Action Area. However, the direct effects of floodwater diversion from the Kings, Kaweah/St. Johns, and Tule river systems would be insignificant and discountable because the diversions are not expected to affect the condors' nesting habitats (trees or cliffs). Floodwater diversion's indirect effects of decreasing prey availability would also be insignificant and discountable because floodwater diversion is not expected to affect carrion availability. Delivery of diverted floodwaters to entities in the Action Area are not expected to affect California condors or their critical habitat because deliveries would be infrequent, unpredictable, and would not support land use conversions. Therefore, the Proposed Action may affect, but is not likely to adversely affect, the California condor or its critical habitat.

Southwestern Willow Flycatcher The southwestern willow flycatcher nests on the South Fork Kern River outside the Action Area. It could occur in riparian areas along the Kern River in the Action Area, or along the Kings, Kaweah/St. Johns, and Tule rivers, although no occurrences have been detected to date. However, if the southwestern willow flycatcher used riparian areas along these rivers, it is expected that floodwater diversions from the Kings, Kaweah/St. Johns, and Tule river systems would not affect riparian habitat for the species because the diversions would occur infrequently (i.e., every 5-7 years) and would not preclude flooding in these river systems. Similarly, floodwater deliveries would also occur infrequently and would not cause land use conversions. Discharge to the lower Kern River requires approval by the Kern River Watermaster. Discharges to the river would be infrequent and would not be likely to raise water levels or increase flows to a level that would affect nesting by southwestern willow flycatchers, should nesting occur sometime in the future along this stretch of the river. Therefore, the Proposed Actions may affect but would not adversely affect the southwestern willow flycatcher.

Valley Elderberry Longhorn Beetle Elderberry shrubs, which provide habitat for the valley elderberry longhorn beetle, occur near three of the four pumping stations that would be used to divert floodwaters under the Proposed Action. The three stations are the Alta 76 Pump Station on the Kings River, and Wasteway Pump Station Nos. 1 and 2 on the Kaweah/St. Johns river system.

Under the Proposed Action, no new construction activities will occur at any of the pump stations. The structural elements of each pump station, including discharge pipes, are currently in place. The only on-site activities that will occur under the Proposed Action are the installation of engines, fuel tanks, and other equipment prior to operation of the pump stations; operation of the pump stations, as necessary; and periodic maintenance of the pumps, all of which will occur within the confines of the fenced areas enclosing the pump stations. No ground disturbances will occur outside the fenced pump station areas. No pesticides or chemical sprays that could result in the poisoning of individual beetles or their host plant will be used.

Delivery of Non-CVP water to entities in the Action Area are not expected to affect elderberry shrubs or valley elderberry longhorn beetles because floodwater deliveries are expected to occur infrequently and sporadically, they are not expected to result in land use conversion, or affect availability of groundwater.

The Proposed Action will have discountable and insignificant direct or indirect effects on individual valley elderberry longhorn beetles and elderberry shrubs. The Proposed Action's includes avoidance and minimization measures (See Appendix C) for elderberry shrubs. With enaction of these, the Proposed Action may affect, but is not likely to adversely affect, the valley elderberry longhorn beetle.

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp and Critical Habitat
Diversions may affect the volume of floodwater flowing across the floodplains of Cross Creek and the Tule River, and thus may affect vernal pool fairy shrimp and vernal pool tadpole shrimp and their habitat. Areas along Cross Creek downstream from the confluence of the Kaweah/St. Johns River and Cottonwood Creek, and along the lower reaches of the Tule River, are the only portions of the Action Area where floodwater diversions could affect these species. The potential direct and indirect effects are described below.

Vernal pools fill with rainwater during fall and winter and can be populated by vernal pool crustaceans within a matter of days. In wet weather years, vernal pools fill and become populated with vernal pool species without over-bank flows from Cross Creek or the Tule River. During flooding, both drainages carry high flows before the proposed pumping would occur and would continue to do so when the proposed pumps are operating. Floodwater diverted from these systems is not required to support populations of vernal pool fairy shrimp and vernal pool tadpole shrimp. In addition, large volumes of water flowing across the floodplain can be detrimental to these species because flowing water can wash away the egg bank (Service 1994). Floodwater inundation of pools can also result in sedimentation of pools; changes in water chemistry (oxygen concentration, water temperature, salinity levels, conductivity, concentration of dissolved solids, and pH); and exposure to predators such as fish and crayfish.

Conversely, flooding is a natural occurrence, and floodwaters can benefit vernal pool crustaceans. Vernal pool fairy shrimp and vernal pool tadpole shrimp persist and often thrive in areas that are periodically flooded. Historically, flooding may have been an important factor in the dispersal of vernal pool crustaceans, and altered flood regimes threaten vernal pool crustaceans and their habitat (Service 2002b). Overbank flooding along intermittent drainages can supplement water in some vernal pools (Hanes et al. 1990 in Service 1994), which can prolong the period of inundation and provide additional time for vernal pool fairy shrimp and vernal pool tadpole shrimp to complete their reproductive cycles. However, vernal pools can fill and dry several times in a single season and produce more than one hatch of vernal pool crustaceans, and diversions during flooding events are not expected to affect the likelihoods of such occurrences. It is more likely that diversions would benefit vernal pool fairy shrimp and vernal pool tadpole shrimp by preventing and minimizing pool sedimentation; changes in oxygen concentration, water temperature, and water chemistry; and exposure to predators such as fish and crayfish.

Delivery of diverted floodwaters to entities in the Action Area are not expected to affect vernal pool fairy shrimp and tadpole shrimp because floodwater deliveries are expected to occur infrequently and sporadically, they are not expected to result in land use conversion, or affect availability of groundwater.

Therefore given the discountable, insignificant, and potentially beneficial nature of these direct and indirect effects, the Proposed Action may affect, but is not likely to adversely affect, vernal pool fairy shrimp and vernal pool tadpole shrimp. Floodwater diversions are not likely to preclude over-bank flooding that fills vernal pools and supports vernal pool fairy shrimp and vernal pool tadpole shrimp. Floodwater diversions would likely reduce the volume of floodwater inundating the uplands and may be beneficial when vernal pool flows are either too high or too fast. Therefore, the Proposed Action may affect, but is not likely to adversely affect, vernal pool fairy shrimp and vernal pool tadpole shrimp.

A portion of Unit 27A critical habitat for vernal pool fairy shrimp is located southeast of Corcoran in the floodplain of the Tule River and could be indirectly affected by decreased over-bank flood flows, as a result of diversions. In the St. Johns River, portions of critical habitat units for vernal pool fairy shrimp (Unit 26A) and the vernal pool tadpole shrimp (Unit 18A) are connected to flows in the St. Johns River, although most of the units are upstream of the confluence of Cottonwood Creek and the St. Johns River and would not be affected by changes in flood flows. However, portions of critical habitat Unit 26A and Unit 18A Cross Creek, downstream of the confluence of Cottonwood Creek and the St. Johns River, could experience small reductions in flood flows as a result of diversions. This effect may be reduced by the interrelated effects of Corps-managed dam releases, to maintain flows within existing channels. Other interrelated effect factors, including the increased storage capacity of the reservoir at Terminus Dam on the Kaweah River and alterations to the stream channel and levee construction along Cross Creek, may also reduce the frequency and magnitude of diversions. Cross Creek reaches adjacent to vernal pool habitat are deeply incised as a result of alterations to the stream channel, which substantially reduces the likelihood of flooding in the Cross Creek vernal pool area regardless of whether floodwater diversions occur.

At each of the abovementioned units of designated critical habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp, diversions are not likely to preclude over bank flooding that fills vernal pools and supports critical habitat for these species. Diversions may reduce the peak volumes of floodwater inundating the uplands and may therefore decrease potential adverse effects from too-high flows into vernal pools. Therefore, the Proposed Action may affect, but is not likely to adversely affect, vernal pool fairy shrimp and vernal pool tadpole shrimp critical habitat in the floodplains of Cross Creek and the Tule River.

Buena Vista Lake Shrew and Critical Habitat The Buena Vista Lake shrew and critical habitat only occurs in Kern County. Therefore, floodwater diversions from the Kings, Kaweah, and Tule River systems, which would only affect lands in Kings, Tulare, and Fresno Counties would not affect the Buena Vista Lake shrew or critical habitat. Floodwater deliveries within Kern County would occur infrequently and would not cause land use conversions, so floodwater deliveries would not cause habitat loss through land use conversions. Therefore, the Proposed Action may affect but would not adversely affect the Buena Vista Lake shrew and its critical habitat.

Hoover's Spurge and San Joaquin Valley Orcutt Grass and Critical Habitat Diversions may affect the volume of floodwater flowing across the floodplains of Cross Creek downstream from the confluence of the Kaweah/St. Johns River and Cottonwood Creek, and thus may affect Hoover's spurge and San Joaquin Valley Orcutt grass. Critical habitat for Hoover's spurge and San Joaquin Valley Orcutt grass occurs north of the Kaweah River. Areas along Cross Creek downstream from the confluence of the Kaweah/St. Johns River and Cottonwood Creek are the only portions of the Action Area where floodwater diversions could affect these species or critical habitat. However, diversions are not likely to preclude over-bank flooding that fills vernal pools and supports these species and critical habitat. Delivery of diverted floodwaters to entities in the Action Area are not likely to affect Hoover's spurge and San Joaquin Valley Orcutt grass and critical habitat because floodwater deliveries are expected to occur infrequently and sporadically, they are not expected to result in land use conversion, or affect availability of groundwater. Therefore, the Proposed Action may affect, but is not likely to adversely affect, Hoover's spurge and San Joaquin Valley Orcutt grass or critical habitat for these species.

Other Plant Species In addition to environmental consequences described above for listed species and their designated critical habitats, consequences for other listed species also could occur. California jewel-flower, Kern mallow, San Joaquin woolly-threads, Bakersfield cactus, and San Joaquin adobe sunburst, occur in chenopod scrub and valley and foothill grasslands in the Action Area. These species would not likely be directly affected by floodwater diversion; threats are from reduced groundwater, agriculture, urban development, and grazing. The Proposed Action would not directly affect any of these threats, and for land use in particular, because entities that take delivery must not use the diverted water in a way that changes land use. However, the Proposed Action could indirectly affect groundwater storage if the floodwater is used to recharge those supplies, which could indirectly benefit plants. Alternatively, to the degree that open space is preserved and supported (e.g. indirectly through supporting agriculture lands), activities such as dumping, human foot traffic, off-road recreation, herbicide application with coincident drift, and ground disturbance, coincidentally could affect plants restricted to remaining open space lands. These effects would be greatly restricted in area, infrequent, and

because they would weakly be linked to uncommon floodwater diversions, they would not be likely to adversely affect California jewel-flower, Kern mallow, San Joaquin woolly-threads, Bakersfield cactus, and San Joaquin adobe sunburst.

Besides affects to plant species that were described immediately above, the Proposed Action could affect certain listed animals and their designated critical habitat, although the effects would be expected to be minor.

Blunt-nosed Leopard Lizard, Fresno Kangaroo Rat, Giant Kangaroo Rat, Tipton Kangaroo Rat, San Joaquin Kit Fox The blunt-nosed leopard lizard, giant kangaroo rat, Tipton kangaroo rat, and San Joaquin kit fox occur within the Action Area. Fresno kangaroo rat is last known to have inhabited the Alkali Sink Preserve, on lands adjacent to Fresno Slough, which could be affected by hydrologic connection to Mendota Pool/Fresno Slough through rare overbank flooding, although this is highly unlikely and therefore discountable. Blunt-nosed leopard lizard, giant kangaroo rat, Tipton kangaroo rat, and San Joaquin kit fox would not likely be affected by floodwater diversions of from the Kings, Kaweah/St. Johns, and Tule river systems because they are upland species that occur in open, sparsely vegetated areas, grasslands, or scrub communities that are not subject to seasonal flooding. Seasonal flooding can be detrimental to these species because they occupy burrows that could be flooded during high over bank flows. Although infrequent, diversions may occasionally benefit these species by minimizing flooding in their habitats. Therefore, the floodwater diversions may have direct and possibly beneficial effects on the blunt-nosed leopard lizard, giant kangaroo rat, Tipton kangaroo rat, and San Joaquin kit fox. Fresno kangaroo rat could similarly potentially benefit from reduced flooding, although flooding from Mendota Pool/Fresno Slough is highly unlikely and therefore discountable.

Floodwater deliveries would also occur infrequently and would not cause land use conversions, so floodwater deliveries would not cause habitat loss through land use conversions. Therefore, the Proposed Action may affect but would likely not adversely affect blunt-nosed leopard lizard, giant kangaroo rat, Tipton kangaroo rat, and San Joaquin kit fox, or the Fresno kangaroo rat.

Critical habitat for Fresno kangaroo rat Critical habitat for Fresno kangaroo rat includes lands hydrologically connected to Mendota Pool/Fresno Slough. Diversions that would affect flooding of critical habitat are highly unlikely to occur or to affect critical habitat and therefore are discountable and insignifcant. Deliveries of floodwaters would not affect critical habitat.

Giant Garter Snake The giant garter snake occurs in Fresno County, from the vicinity of Mendota, north through the Central Valley to the vicinity of Chico, Butte County. The Proposed Action will have no direct or indirect effects on areas below the diversion points on the Kaweah/St. Johns and Tule river systems because those areas are outside the range of giant garter snakes and during the period covered by the Proposed Action, it is not likely that the species would occupy these areas. The Proposed Action will have discountable and insignificant direct and indirect effects on giant garter snakes due to diversion of floodwaters from the Kings River in Fresno County because floodwater diversions and floodwater deliveries will be infrequent and negligible and so would not affect aquatic habitat that is needed to support the species. In addition, delivery of Non-CVP water to entities in the Action Area are not likely to

affect giant garter snake because floodwater deliveries are expected to occur infrequently and sporadically, they are not expected to result in land use conversion, or affect availability of groundwater. Therefore, the Proposed Action may affect, but is not likely to adversely affect, the giant garter snake.

Potential Interrelated Effects Any changes to Terminus Dam, Pine Flat Dam, and Success Dam, such as raising or lowering of the dams, would be interrelated to the Proposed Action as these changes could impact the amount of floodwater available in the respective rivers. As described in Section 3.1, capacity was increased for Terminus Dam and decreased for Success Dam, thereby reducing potential for flooding in the Kaweah/St. John River and increasing flood potential in the Tule River.

Cumulative Impacts

Numerous activities continue to eliminate habitat for listed and proposed threatened and endangered species in the Tulare Basin. Habitat loss and degradation affecting both animals and plants continue as a result of urbanization, oil and gas development, road and utility ROW management, flood control projects, climate change, grazing by livestock, and agricultural practices. The conversion of native habitats within the Tulare Basin has caused the decline of numerous species, some to the extent that they have received protection under the ESA (Service 1998). Land conversion continues within the Tulare Basin, but the majority of this conversion is now from irrigated farmland to other uses, primarily urban (CDC 2000).

The Proposed Action may have an indirect and beneficial effect on groundwater if entities use diverted floodwaters for groundwater recharge, but the floodwater diversions would be too infrequent and unpredictable to support land use conversion. Land use conversion due to the Proposed Action's increase in groundwater recharge and availability is discountable and insignificant.

Reclamation and the Service have jointly developed an ESA compliance strategy intended to minimize further losses within the CVP service areas and to offset impacts from ongoing CVP operations. Reclamation and the Service continue to implement the commitments and conservation measures in the biological opinions issued for CVP operations and contract renewals including several provisions that preclude the conversion of threatened and endangered species habitat to agricultural uses within the boundaries of entities that receive CVP water. The contribution of the Proposed Action to these operations is anticipated to be negligible or non-existent, and future conditions for listed or proposed species would not be expected to differ significantly, with or without the Proposed Action.

3.5 Cultural Resources

Cultural resources is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. The National Historic Preservation Act (NHPA) of 1966 is the primary Federal legislation that outlines the Federal Government's responsibility to cultural resources. Section 106 of the NHPA requires the Federal Government to take into consideration the effects of an undertaking on cultural resources listed on or eligible for inclusion in the National Register

of Historic Places (National Register). Those resources that are on or eligible for inclusion in the National Register are referred to as historic properties.

The Section 106 process is outlined in the Federal regulations at 36 Code of Federal Regulations (CFR) Part 800. These regulations describe the process that the Federal agency (Reclamation) takes to identify cultural resources and the level of effect that the proposed undertaking will have on historic properties. In summary, Reclamation must first determine if the action is the type of action that has the potential to affect historic properties. If the action is the type of action to affect historic properties, Reclamation must identify the area of potential effects (APE), determine if historic properties are present within that APE, determine the effect that the undertaking will have on historic properties, and consult with the State Historic Preservation Office, to seek concurrence on Reclamation's findings. In addition, Reclamation is required through the Section 106 process to consult with Indian Tribes concerning the identification of sites of religious or cultural significance, and consult with individuals or groups who are entitled to be consulting parties or have requested to be consulting parties.

3.5.1 Affected Environment

The CVP, one of the Nation's major water conservation developments, extends from the Cascade Range in the north to the semi-arid but fertile plains along the Kern River in the south. The FKC is part of Reclamation's Friant Division of the CVP. Friant Dam is located on the San Joaquin River, 25 miles northeast of Fresno, California. Completed in 1942, the dam is a concrete gravity structure, 319 feet high, with a crest length of 3,488 feet. Construction of the canal began in 1945 and was completed in 1951. The FKC carries water over 151.8 miles in a southerly direction from Millerton Lake to the Kern River, four miles west of Bakersfield. The water is used for supplemental and new irrigation supplies in Fresno, Tulare, Kings, and Kern counties (Reclamation 2011).

Reclamation is in the process of nominating the CVP to the National Register. As part of the CVP, the FKC has been found eligible for inclusion in the National Register under Criterion A for its association with the irrigation and agricultural development of California.

3.5.2 Environmental Consequences

No Action

Under the No Action Alternative, there are no impacts to cultural resources since there would be no change in operations and no ground disturbance. Conditions related to cultural resources would remain the same as existing conditions.

Proposed Action

The Proposed Action is the type of activity that has no potential to affect historic properties pursuant to the regulations at 36 CFR Part 800.3(a)(1). There would be no modification of water conveyance facilities and no activities that would result in ground disturbance. Because there is no potential to affect historic properties, no cultural resources would be impacted as a result of implementing the Proposed Action. See Appendix D for cultural resources determination.

Cumulative Impacts
The Proposed Action does not require new facilities or infrastructure, and would not contribute to cumulative impacts to archaeological or historical resources.

3.6 Indian Sacred Sites

Executive Order 13007 requires Federal land managing agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites. "Sacred Sites" means any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian Tribe, or Indian individual determined to be an appropriate authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion.

There would be no modification of water conveyance facilities and no activities that would result in ground disturbance under the No Action and Proposed Action alternatives; therefore, neither restriction of access to nor adverse effects to the physical integrity of any sacred sites would occur. As such, there will be no direct, indirect, or cumulative impacts to Indian sacred sites as a result of either the No Action or Proposed Action alternatives.

3.7 Indian Trust Assets

ITA are legal interests in assets that are held in trust by the United States Government for federally recognized Indian tribes or individuals. The trust relationship usually stems from a treaty, executive order, or act of Congress. The Secretary of the interior is the trustee for the United States on behalf of federally recognized Indian tribes. "Assets" are anything owned that holds monetary value. "Legal interests" means there is a property interest for which there is a legal remedy, such a compensation or injunction, if there is improper interference. Assets can be real property, physical assets, or intangible property rights, such as a lease, or right to use something. ITA cannot be sold, leased or otherwise alienated without United States' approval. Trust assets may include lands, minerals, and natural resources, as well as hunting, fishing, and water rights. Indian reservations, rancherias, and public domain allotments are examples of lands that are often considered trust assets. In some cases, ITA may be located off trust land.

Reclamation shares the Indian trust responsibility with all other agencies of the Executive Branch to protect and maintain ITA reserved by or granted to Indian tribes, or Indian individuals by treaty, statute, or EO.

3.7.1 Affected Environment
The nearest ITA is the Santa Rosa Rancheria approximately 13 miles north of the Proposed Action area.

3.7.2 Environmental Consequences

No Action
Additional floodwater from the Kings, St. John's and Tule rivers might flow into the Tulare Lake Basin which may or may not affect ITA.

Proposed Action
There would be no impact to ITA as there are none in the Proposed Action area. See Appendix D for ITA determination.

Cumulative Impacts
There are no ITA in the action area; therefore, the Proposed Action when added to previous and reasonably foreseeable banking activities do not contribute to cumulative impacts to ITA. There may or may not be cumulative impacts to ITA from flooding in the Tulare lake bed under the No Action Alternative.

3.8 Environmental Justice

EO 12898 (February 11, 1994) mandates Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

3.8.1 Affected Environment
Tulare Basin counties rely to a large extent, either directly or indirectly, on agriculture for employment. Between 49.3 and 58.3 percent of the population within Fresno, Kern, Kings, and Tulare counties is of Hispanic or Latino origin, which compares to about one-third for the state as a whole (Table 3-11). The market for seasonal workers on local farms also draws thousands of migrant workers, commonly of Hispanic origin from Mexico and Central America, increasing populations within these small communities during peak harvest periods.

Table 3-11 Tulare Basin County 2009 Estimated Demographics

	Total Population	White (not Hispanic)	Black or African American	American Indian	Asian	Native Hawaiian/ Pacific Islander	Hispanic
Fresno County	915,267	34.6%	5.8%	2%	9%	0.2%	49.3%
Kern County	807,407	40.3%	6.5%	1.8%	4.1%	0.2%	47.9%
Kings County	148,764	36.9%	8.1%	2.2%	3.4%	0.3%	49.9%
Tulare County	429,668	35.0%	2.1%	1.9%	3.6%	0.2%	58.3%
California	36,961,664	41.7%	6.6%	1.2%	12.7%	0.4%	37%
Source: U.S. Census Bureau 2011							

3.8.2 Environmental Consequences

No Action
Additional floodwater from the Kings, St. John's and Tule rivers could flow into the Tulare Lake Basin causing damage to crops and reducing job opportunities for minority and low-income farm laborers. Consequently, there could be adverse impacts to minority and disadvantaged populations which would be inconsistent with EO 12898.

Proposed Action

The Proposed Action would provide an option for some amount of flood protection within the Tulare Lake bed and reduce adverse impacts to minority or low-income farm laborers. In addition, use of this water within CVP and Non-CVP contractor service areas could provide additional beneficial impacts to minority or low-income populations as supplemental water would be used to maintain agricultural production within these areas as well as M&I.

Cumulative Impacts

The Proposed Action is an intermittent action that is expected to occur every three or so years over the 25 year contract period. Use of this floodwater within contractor service areas could provide some cumulatively beneficial impacts to minority or low-income populations as it would be used as a supplemental water supply for existing agricultural lands and for M&I purposes.

3.9 Socioeconomic Resources

3.9.1 Affected Environment

For the Tulare Lake Region, the unemployment rate is higher than in urban areas (Table 3-12), attributed to a large seasonal labor market and limited availability of employment in other industries. Unemployment for Fresno, Kern, Kings, and Tulare counties ranged from 10 to 12.9 percent in 2009 (U.S. Census Bureau 2009) but has since risen to between 15.5 to 16.7 percent in 2011 (Table 3-12). In addition, all four counties have per capita incomes approximately $9,000 to $12,000 lower than the State per capita income (Table 3-12).

Table 3-12 Tulare Basin County 2011 Preliminary Monthly Labor Force Data

	Labor Force	Employed	Per Capita Income[1]	Unemployment Rate
Fresno County	437,400	364,400	$20,375	16.7%
Kern County	373,600	315,700	$19,939	15.5%
Kings County	60,800	51,000	$17,416	16.1%
Tulare County	209,600	174,700	$17,865	16.6%
California	18,131,700	15,874,800	$29,020	12.4%

Source: EDD 2011 and U.S. Census Bureau 2011
[1]Amounts are based on 2009 numbers as the most recent data available from the U.S. Census Bureau.

3.9.2 Environmental Consequences

No Action

Floodwater in the Tulare Lake Basin could cause temporary crop damage, affect agricultural operations, including the planting of crops, affect the seasonal demand for farm laborers and affect enterprises supporting agricultural production.

Proposed Action

All required pumping and conveyance facilities have been constructed and would not be modified under either the No Action or Proposed Action alternatives. All introduced Non-CVP water would be disposed of within existing facilities and requires no new construction. The population and land conversion trends previously described are expected to continue with or without implementing the Proposed Action. The Non-CVP water introduced under the Proposed Action would be intermittent, unpredictable and small in comparison to demand. However, floodwater would be diverted by CVP or Non-CVP contractors downstream of RD770 pump-in

locations to supplement diminished water supplies providing slight beneficial socioeconomic impacts within their service areas.

Diverted or discharged water could recharge the groundwater locally and be extracted during dry periods to meet a small fraction of future demands. Uses of this Non-CVP water could include irrigation, groundwater recharge, wetland enhancement and restoration, or M&I uses. However, Reclamation does not have approval authority for subsequent diversions or uses of this Non-CVP water once it is discharged from the FKC. Pumping the flood flows would provide an economic benefit to landowners in the Tulare Lake Basin. Reductions in costs for repairing public facilities, public services and emergency resources from potential floodwater damages would also occur on a small local scale.

Cumulative Impacts

The Proposed Action may provide some slight cumulatively beneficial impacts to socioeconomic resources within the service areas of contractors that divert this floodwater; however, the availability of this Non-CVP water is infrequent, unreliable and small compared to the existing water demand. Consequently, no long-term or reliable water supply that supports growth or contributes to cumulative impacts on population or housing would result from this action.

The Proposed Action has no negative effect on socioeconomic resources and has a small positive effect. The Proposed Action, when added to other local, state and federal actions would not result in significant impacts to socioeconomic resources. This Non-CVP water would provide local recharge to the groundwater within the Proposed Action area providing a slight benefit to groundwater users.

The cost for emergency services would likely increase under the No Action Alternative due to damage from flooding; however, costs would likely be reduced under the Proposed Action. This benefit would be on a small scale and is contingent upon available capacity in the FKC and the ability to dispose of Non-CVP water. Overall, the Proposed Action would not contribute to adverse cumulative impacts to socioeconomic resources within the Proposed Action area.

3.10 Air Quality

Section 176 (C) of the Clean Air Act [CAA] (42 U.S.C. 7506 (C)) requires any entity of the federal government that engages in, supports, or in any way provides financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable State Implementation Plan (SIP) required under Section 110 (a) of the Federal CAA (42 U.S.C. 7401 (a)) before the action is otherwise approved. In this context, conformity means that such federal actions must be consistent with SIP's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of those standards. Each federal agency must determine that any action that is proposed by the agency and that is subject to the regulations implementing the conformity requirements would, in fact conform to the applicable SIP before the action is taken.

On November 30, 1993, the Environmental Protection Agency (EPA) promulgated final general conformity regulations at 40 CFR 93 Subpart B for all federal activities except those covered

under transportation conformity. The general conformity regulations apply to a proposed federal action in a non-attainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutant caused by the Proposed Action equal or exceed certain *de minimis* amounts thus requiring the federal agency to make a determination of general conformity.

3.10.1 Affected Environment

The Proposed Action area lies within the San Joaquin Valley Air Basin (SJVAB) under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). The pollutants of greatest concern in the San Joaquin Valley are carbon monoxide (CO), ozone (O_3), O_3 precursors such as volatile organic compounds (VOC), inhalable particulate matter between 2.5 and 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$).

The SJVAB has reached Federal and State attainment status for CO, nitrogen dioxide (NO_2), and sulfur dioxide (SO_2). Although Federal attainment status has been reached for PM_{10} the State has not and both are in non-attainment for O_3 and $PM_{2.5}$ (Table 3-13). There are no established standards for nitrogen oxides (NO_x); however, NO_x does contribute to NO_2 standards (SJVAPCD 2011).

Table 3-13 San Joaquin Valley Attainment Status

Pollutant	California Attainment Status	National Attainment Status
O_3	**Nonattainment**	**Nonattainment**
CO	Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
PM_{10}	**Nonattainment**	Attainment
$PM_{2.5}$	**Nonattainment**	**Nonattainment**
Source: CARB 2011; SJVAPCD 2011; 40 CFR 93.153		

3.10.2 Environmental Consequences

No Action

Pumping facilities would not operate and air quality would not be affected.

Proposed Action

The 25 portable diesel and electric pumps are registered at the local and/or state level, have emission standards established within the registration requirement and the emissions are accounted for in the current emission inventory. The federal Title V Program does not apply to these pumps because the diesel engines are classified as non-road portable and would only operate for up to four to five months during years when Non-CVP water is pumped. CVP and Non-CVP contractor turnouts are gravity-fed and would not result in additional pumping.

The 25-year license issued by Reclamation stipulates that RD770 shall comply with all applicable air pollution laws and regulations of the United States, the State of California and local authorities. Electric and diesel-powered pumps would be used to pump water from the Kings, St. John's and Tule Rivers. Although RD770's diversion pumps have never been used simultaneously during past pump-in events and their infrequent use occurs during weather

conditions unfavorable for O_3 production, estimated emission calculations were based on the use of a 300 horsepower diesel engine running constantly over a five month period (Table 3-14).

Table 3-14 Calculated Annual Pump Emissions

Pollutant	Federal Status	*de minimis* (tons/year)	Calculated project emissions (tons/year)
VOC (as an ozone precursor)	Nonattainment serious 8-hour ozone	50	0.87
NO_x (as an ozone precursor)	Nonattainment serious 8-hour standard	50	7.92
PM_{10}	Attainment	100	Not calculated
CO	Attainment	100	Not calculated
Source: SJVAPCD 2011; 40 CFR 93.153			

Estimated emissions are well below the *de minimis* standards of the SJVAPCD; therefore, a conformity analysis is not required and there would be no adverse impacts to air quality.

Cumulative Impacts

No construction would be required by the action, nor would the number of pump stations or engines increase. The existing portable diesel pumps are already accounted for in the current emission inventory. Therefore, the Proposed Action would not cumulatively affect air quality.

3.11 Global Climate

Climate change refers to significant change in measures of climate (e.g., temperature, precipitation, or wind) lasting for decades or longer. Many environmental changes can contribute to climate change [changes in sun's intensity, changes in ocean circulation, deforestation, urbanization, burning fossil fuels, etc.] (EPA 2011a)

Gases that trap heat in the atmosphere are often called greenhouse gases (GHG). Some GHG, such as carbon dioxide (CO_2), occur naturally and are emitted to the atmosphere through natural processes and human activities. Other GHG (e.g., fluorinated gases) are created and emitted solely through human activities. The principal GHG that enter the atmosphere because of human activities are: CO_2, methane, nitrous oxide, and fluorinated gasses (EPA 2011a).

During the past century humans have substantially added to the amount of GHG in the atmosphere by burning fossil fuels such as coal, natural gas, oil and gasoline to power our cars, factories, utilities and appliances. The added gases, primarily CO_2 and methane, are enhancing the natural greenhouse effect, and likely contributing to an increase in global average temperature and related climate changes. At present, there are uncertainties associated with the science of climate change (EPA 2011b).

3.11.1 Affected Environment

More than 20 million Californians rely on the SWP and CVP. Increases in air temperature may lead to changes in precipitation patterns, runoff timing and volume, sea level rise, and changes in the amount of irrigation water needed due to modified evapotranspiration rates. These changes may lead to impacts to California's water resources and project operations.

While there is general consensus in their trend, the magnitudes and onset-timing of impacts are uncertain and are scenario-dependent (Anderson et al. 2008).

California Assembly Bill 32, the Global Warming Solutions Act of 2006, mandates the reduction of GHG emissions in California to 1990 levels by the year 2020. Currently there are no established significance thresholds for GHG in the SJVAB or in California.

3.11.2 Environmental Consequences

No Action

Pumping facilities would not operate and there would be no contributions to global climate change due to GHG emissions.

Proposed Action

The introduction of Non-CVP water into the FKC would require the use of diesel and electric pumps. These pumps would produce CO_2 emissions which would contribute to GHG emissions within the San Joaquin Valley. However, pump-in events would be infrequent and for short periods of time. Estimated CO_2 emissions from the 25 pumps run constantly over a five month period can be found in Table 3-15.

Table 3-15 Estimated CO_2 Emissions

Pumping Station	Number of Pumps	Annual Kilowatt Hours	CO_2 emissions (metric tons)
Kings River	6	3,600	15
St. John's River	12	3,600	30
Tule River	7	3,600	17.5
Total	**25**	**10,800**	**62.5**
Source: EPA 2011c			

Calculated CO_2 emissions are well below the EPA's threshold for annually reporting GHG emissions (25,000 metric tons/year), which is a surrogate for a threshold of significance (EPA 2009). Accordingly, the Proposed Action would result in below *de minimis* impacts to global climate change.

Cumulative Impacts

GHG emissions are considered to be cumulatively adverse impacts; however, the estimated CO_2 emissions for the Proposed Action is roughly 62.5 metric tons per year, which is well below the 25,000 metric tons per year threshold for reporting GHG emissions. As a result, the Proposed Action is not expected to contribute to cumulative adverse impacts to global climate change.

CVP water allocations are made dependent on hydrologic conditions and environmental requirements. Since Reclamation operations and allocations are flexible, any changes in hydrologic conditions due to global climate change would be addressed within Reclamation's operation flexibility and therefore water resource changes due to climate change would be the same with or without the Proposed Action.

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Section 4 Consultation and Coordination

4.1 Public Review Period

Reclamation intends to provide the public with an opportunity to comment on the Draft FONSI and Draft EA during a 30 day public review period.

4.2 Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.)

The Fish and Wildlife Coordination Act (FWCA) requires that Reclamation consult with fish and wildlife agencies (federal and state) on all water development projects that could affect biological resources. The amendments enacted in 1946 require consultation with the Service and State fish and wildlife agencies "whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatever, including navigation and drainage, by any department or agency of the United States, or by any public or private agency under Federal permit or license". Consultation is to be undertaken for the purpose of "preventing the loss of and damage to wildlife resources".

The Proposed Action does not involve any new impoundment, channel deepening, or other control or modification of a stream or body of water as described in the statute, but the movement of Non-CVP floodwater through CVP facilities. Therefore, FWCA does not apply to the Proposed Action. Additionally, Reclamation has been in consultation with the Service through Section 7 of the ESA and has incorporated measures to reduce potential impacts to wildlife resources.

4.3 Endangered Species Act (16 U.S.C. § 1531 et seq.)

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

The Proposed Action would support existing uses and conditions. No native lands would be converted or cultivated with Non-CVP water. The water would not be used for land conversion. The Proposed Action does not interfere with existing deliveries of water for environmental purposes in the Tulare Lake bed. Effects to listed species and critical habitat are not expected, or would be insignificant, or possibly slightly beneficial, and therefore, the Proposed Action may affect but is not likely to adversely affect federally listed threatened or endangered species or their designated habitats. Reclamation has initiated Section 7 consultation with the Service. Reclamation will not finalize the draft EA until consultation with the Service has been completed.

4.4 National Historic Preservation Act (16 U.S.C. § 470 et seq.)

Section 106 of the NHPA requires federal agencies to evaluate the effects of federal undertakings on historical, archaeological and cultural resources. Due to the nature of the Proposed Action, there would be no effect on any historical, archaeological, or cultural resources and no further compliance actions are required.

4.5 Migratory Bird Treaty Act (16 U.S.C. § 703 et seq.)

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

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

4.6 Executive Order 11988 – Floodplain Management and Executive Order 11990-Protection of Wetlands

EO 11988 requires Federal agencies to provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, and health and welfare among other activities. To accomplish these goals agencies are instructed to prepare floodplain assessments for actions located within or affecting flood plains, and similarly, EO 11990 places similar requirements for actions in wetlands. Although the project does reduce potential flood flows which meets the goals of the EO, the project does not affect the flood plain itself and therefore the project does not require Reclamation to take the actions required in EO 11988. The project does not affect wetlands and therefore the project would not affect EO 11990.

4.7 Clean Water Act (33 U.S.C. § 1251 et seq.)

Section 401 of the Clean Water Act (CWA) (33 U.S.C. § 1311) prohibits the discharge of any pollutants into navigable waters, except as allowed by permit issued under sections 402 and 404 of the CWA (33 U.S.C. § 1342 and 1344). If new structures (e.g., treatment plants) are proposed, that would discharge effluent into navigable waters, relevant permits under the CWA would be required for the project applicant(s). Section 401 requires any applicant for an individual Corps dredge and fill discharge permit (Section 404) to first obtain certification from the state that the activity associated with dredging or filling will comply with applicable state effluent and water quality standards. This certification must be approved or waived prior to the issuance of a permit for dredging and filling.

Section 404 of the CWA authorizes the Corps to issue permits to regulate the discharge of "dredged or fill materials into waters of the United States" (33 U.S.C. § 1344).

No activities such as dredging or filling of wetlands or surface waters would be required for implementation of the Proposed Action, therefore permits obtained in compliance with CWA section 404 are not required. In addition, no pollutants would be discharged into any navigable waters under the Proposed Action so no permits under Section 401 of the CWA are required either.

Section 5 List of Preparers and Reviewers

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DRAFT ENVIRONMENTAL ASSESSMENT (07-103)

25-YEAR WARREN ACT CONTRACT AND LICENSE FOR DELTA LANDS RECLAMATION DISTRICT 770

Appendix A
Water quality requirements for the Friant-Kern Canal

January 2012

RECLAMATION

Managing Water in the West

QUALITY ASSURANCE PROJECT PLAN

For Monitoring Non-Project Water in the Friant Division
Water Contract Year 2011

U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
South-Central California Area Office

First Draft (08 April 2011)

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

QUALITY ASSURANCE PROJECT PLAN
For Monitoring Non-Project Water in the Friant Division
Water Contract Year 2011

Friant Division
Central Valley Project, California

Refer correspondence to:

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Approvals:

United States Bureau of Reclamation

Signature: _____
Date: _____

Friant Water Authority

Signature: _____
Date: _____

Revised: 08 April 2011

Table of Contents

QUALITY ASSURANCE PROJECT PLAN
For Monitoring Non-Project Water in the Friant Division
Water Contract Year 2010

1.0 INTRODUCTION

Water districts in the eastern San Joaquin Valley of central California request temporary Warren Act contracts from the US Bureau of Reclamation (Reclamation) to store and convey non-project water in the facilities of the Friant Division[1] of the Central Valley Project (CVP). This is water, such as groundwater or from other rivers, that is not appropriated by the CVP.

Reclamation and the Friant Water Authority have developed a draft policy for accepting non-project water in the Friant Division (Appendix A). The policy includes a list of constituents to be tested in each source of non-project water, maximum contaminant levels for those constituents, and describes a program to monitor the quality of water in the canal to assess and prevent any degradation caused by the non-project water.

This Quality Assurance Project Plan (QAPP) has been written to ensure that the proposed monitoring program will provide accurate and reliable information. Quality Assurance activities, including Quality Control checks, are specified to reduce measurement errors to agreed upon limits and to produce data of acceptable and known quality. Reporting limits, accuracy, precision, completeness, and sensitivity are defined in the QAPP.

This QAPP is restricted to quality assurance procedures necessary for monitoring the effects of conveying non-project water in the Friant Division through February 28, 2012.

[1] Millerton Lake, Friant Dam, Friant-Kern Canal, and the Madera Canal

2.0 PROJECT ORGANIZATION

Contracting Officer	Valerie Curley Contracts Administration Branch US Bureau of Reclamation, Fresno (559) 487-5041
Field Supervisor	Eduardo _____ Friant Water Authority, Lindsay (559) 562-6305
Water Quality Coordinator/ Data Manager	Michael C.S. Eacock US Bureau of Reclamation, Fresno (559) 487-5133
Quality Control Officer	Victor Stokmanis US Bureau of Reclamation, Sacramento (916) 978-5285
Data Base Manager	Satpal Kalsi US Bureau of Reclamation, Sacramento (916) 978-5278
Technical Advisor	John Fields US Bureau of Reclamation, Sacramento (916) 978-5280

3.0 PROBLEM DEFINITION/BACKGROUND

3.1. Background

The Friant Division of the federal Central Valley Project (CVP) delivers water to 1 million acres of highly productive farmland in the San Joaquin Valley of California. The Friant Division is also the sole source of water for several communities in Fresno, Tulare, and Kern Counties.

The source of water for the Friant Division is the melting snow in the San Joaquin River watershed. This water is very pure and generally needs little treatment for domestic use. The region is regularly affected by droughts that reduce the supply of CVP water for the Friant Division.

The Friant Division is located in the San Joaquin Valley of central California. Friant Dam, located northeast of Fresno, impounds the San Joaquin River in Millerton Lake. The 152 mile-long Friant-Kern Canal carries CVP water to farms and communities between the Dam and Bakersfield. The canal is operated and maintained by the Friant Water Authority (Authority) under contract with the U.S. Bureau of Reclamation (Reclamation).

The 37-mile long Madera Canal delivers water from Friant Dam to farmland in Madera and Merced Counties. It is operated by Madera Irrigation District under contract with Reclamation.

The Warren Act of 1911[2] authorizes temporary contracts to impound, store, and carry water in federal irrigation canals when excess capacity is available.

Reclamation has allowed other water to be pumped into its canals by water districts to supplement their CVP supply. This has helped farmers deliver enough water to irrigate and preserve valuable permanent crops like grapes, citrus, and deciduous fruit, and to sustain the local multi-billion dollar farming economy.

Several districts in the Friant Division have rights to additional water to supplement their contractual supply from the CVP. This water is from wells or rivers that cross the Friant Division facilities. These other supplies of water are called “Non-Project Water” because they have not been appropriated by the United States for the purposes of the CVP.

The quality of the non-project water is variable and must be measured to confirm that there will be no harm to downstream water users when it is pumped into the canal.

This Quality Assurance Project Plan will ensure that monitoring data will measure any changes in the quality of CVP water in the Friant-Kern Canal.

[2] Act of February 21, 1911, ch. 141, 36 Stat. 925

3.2. Monitoring Mission and Goals

The mission of this monitoring program is to produce chemical and physical measurements that will determine the quality of the non-project water and ensure that the quality of CVP water is commensurate with the needs and expectations of Friant water users.

The general goals of monitoring are:

- Evaluate the quality of the non-project water compared to established drinking water standards and other standards of concern for agricultural and domestic water users, and

- Confirm that the blend of CVP water and non-project water is suitable for agricultural, municipal, industrial, and environmental uses.

This program will supplement existing programs conducted by Reclamation and the Authority that measure water quality in the Friant Division.

It will be the responsibility of the Districts, the Analytical Laboratory, Reclamation, and the Authority to ensure that adequate and valid data are collected.

3.3. Intended Use of Data

The data will be used by Reclamation and the Authority to monitor the effects of non-project water on the quality of CVP water in the Friant Division.

4.0 PROJECT/TASK DESCRIPTION

4.1. General Overview of Monitoring

This plan covers monitoring of non-project water to be conveyed in the Friant-Kern Canal through February 28, 2012. Table 1 is a general summary of the monitoring locations for this monitoring program. Table 2 is general schedule for the collection of water samples.

4.2. Maximum Contaminant Levels (MCL)

The current water quality standards for accepting non-project water in the Friant Division are based on the Maximum Contaminant Levels and Action Levels specified in the State of California, known as "Title 22" [3]. Table 3 is a list of constituents to be measured in each source of non-project water. Reclamation reserves the right to require stricter limits for certain constituents, such as selenium.

[3] State of California, Code of Regulations, Title 22. Division 4. Environmental Health. Chapter 15. Domestic Water Quality, and Monitoring Regulations (Sections 64401 et seq.), as amended.

4.3. Exceptions to Maximum Contaminant Levels

Reclamation and the Authority may allow certain non-project water to be conveyed in the Friant Division that may contain constituents that exceed the levels listed in Table 3. Reclamation and the Authority will require additional field measurements to confirm that the water in the canal continues to be suitable for downstream users. This will be determined on a case-by-case basis.

4.4. Types of Non-Project Water

Current policy developed by Reclamation and the Authority for accepting non-project water in the Friant Division facilities is included as Appendix 1. The policy recognizes three types of non-project water:

Type A – non-project water that meets all of the current the water quality standards listed in Table 3.

Type B – non-project water that meets most of the current water quality standards listed in Table 3, but may exceed a secondary standard (i.e., turbidity); special in-stream monitoring may be conducted to confirm adequate dilution.

Type C – non-project water that is derived from the San Joaquin River watershed; no analyses are required because this water is physically the same as Project water.

4.5 Types of Analyses

Initial samples will be analyzed for the constituents listed in Table 3.

If necessary, field measurements will be conducted to measure changes in quality within the canal. Samples will be collected upstream and downstream of a non-project water discharge point. Handheld sensors will be used to measure basic physical parameters like salinity, pH, or turbidity.

Laboratory analyses will be conducted as necessary for other parameters that cannot be measured in the field.

5.0 DATA QUALITY OBJECTIVES (DQO)

This Quality Assurance Project Plan addresses data quality objectives for the laboratory analyses and optional field measurements.

5.1. Accuracy

Accuracy describes a measure of the bias inherent in a system or the degree of agreement of a measurement with an accepted true value. In other words, accuracy describes how close the measurement is to its true value. It is most frequently expressed as percent recovery.

Percent recovery: A measure of accuracy determined from comparison of a reported spike/reference value to its true concentration:

$$\% \text{ Recovery} = \{(\text{observed conc.} - \text{sample conc.}) / (\text{true spike conc.})\} \times 100$$

Laboratory and field personnel must confirm the accuracy of their instruments by measuring standard reference solutions or spike samples. These solutions can be purchased from chemical or scientific supply companies. The true value of the standard reference solution or spike sample should be similar to the environmental water. The lab analyst will record accuracy measurements on the Data Quality Form. Accuracy acceptance criteria can be found in Table 7.

5.2. Precision

Precision describes a measurement of mutual agreement (or variability) among individual measurements of the same property, usually under prescribed similar conditions. In other words, precision describes how well repeated measurements agree. Precision is usually expressed in terms of relative percent difference.

Relative percent difference (RPD): A statistic for evaluating the precision of a duplicate set.

For duplicate results X1 and X2:

$$RPD = \{(\text{absolute value}(X1-X2))/((X1+X2)/2)\} \times 100$$

The precision objectives apply to duplicate samples taken during the quarterly Quality Control sessions. The Quality Control Officer will record precision measurements on the Data Quality Form. Precision acceptance criteria can be found in Table 7.

5.3. Completeness

Completeness describes the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal operations. It is usually expressed as a percentage:

$$\% \text{ Completeness} = V/n \times 100$$

where:

V = number of measurements judged valid
n = total number of measurements

Completeness criteria for flow, pH, EC, temperature, and turbidity can be found in Table 8.

5.4. External Quality Assurance Sample Acceptance Criteria

The QA acceptance criteria are either based on control limits established by the Quality Control Officer or the manufacturer's performance testing limits. The following criteria will be used to assess the validity of the data:

Result or Spike Concentration/Precision Reference Certified Value	Precision	Accuracy	Contamination
> 5 x RL	< 20% RPD	80%-120% Recovery or within Manufacturer's Performance Testing Limits	< 2 x RL or < 10% of the lowest production sample result
< 5 x RL	+ 1 x RL	+ 1 x RL or within Manufacturer's Performance Testing Limits	< 2 x RL or < 10% of the lowest production sample result

5.5. Representativeness

Representativeness describes how relevant the data is to the actual environmental condition. Problems can occur if samples are taken in a location that does not describe the area of interest (e.g. in-stream samples must be collected far enough downstream of the point of discharge and when the non-project water is flowing), or samples are not collected, handled, or shipped appropriately, causing conditions in the sample to change (e.g. water chemistry measurements are not taken immediately).

Table 1 is a list of sampling locations that should provide data that best represent the changes in quality caused by the conveyance of the non-project water in the Friant Division.

5.6. Reporting Limit, Sensitivity, and Action Limits

The Reporting Limit is the lowest possible concentration the instrument or equipment can detect. Sensitivity is the ability of the instrument to detect one concentration from the next. Reporting Limits and Sensitivities for field measurements are noted in Table 8. Detection limits specified under Title 22 are included in Table 3.

Method sensitivity should be able to provide reporting limits that are three to five times below the action limit for the parameter.

5.7. Contamination

Blank samples will be incorporated to ensure the laboratory does not introduce contamination to the samples during the preparation or analysis phase. Additionally, equipment blanks and field blanks will be collected in the field. Blank acceptance criteria can be found in Table 9.

5.8. Comparability

Comparability is achieved by collecting the samples in the same manner at the same sites over the life of the project. Furthermore, comparable methods will be used by the laboratories chosen to analyze the samples.

6.0 TRAINING REQUIREMENTS

6.1. Sample Collection

When possible, Reclamation staff will collect the initial samples on non-project water and will deliver the samples to the laboratory. We recommend that Authority staff collect all routine water samples, and conduct field measurements. Tables 4 and 5 are lists of recommended sample containers and preservatives for water samples.

6.2. Laboratory Analyses

No special training of laboratory personnel will be required to conduct this monitoring program.

6.3. Field Measurements

The Quality Control Officer will be available to train Authority staff to conduct the in-stream monitoring prior to the first sampling event and quarterly thereafter. During the training sessions, the Quality Control Officer will evaluate field staff performance and provide a report to the Field Supervisor. If errors in sampling technique are consistently identified, retraining will be scheduled.

The Field Supervisor will be responsible for all field monitoring activities. The Field Supervisor will accompany and evaluate the field crew during the first sampling event.

7.0 DOCUMENTATION AND RECORDS

7.1. Sampling Information

All information regarding sampling will be recorded at the time of sample collection on field data sheets and chain of custody forms (see Section 9).

7.2. Initial Sample of Non-project Water

The initial sample will be collected and analyzed to determine the quality of the non-project water. This sample will be collected in containers using standard protocols specified by the laboratory. When possible, Reclamation staff will collect the initial samples on non-project water and will deliver the samples to the laboratory.

The field sampler generates a chain of custody (COC) form. The COC documents legal custody of the samples from the time of collection to the time of delivery to the laboratory. Information provided on the COC can include the project name, project manager, title and signature of sample collector, name of the laboratory performing the analyses, list of samples by sample ID, date and time the samples were collected, sample matrix type, number of containers per sample ID, parameters and analyses requested, point of contact phone number, and the date, time, and signatures of all parties responsible for receiving and relinquishing the samples from the time of collection to the time of delivery to the laboratory.

7.3. Laboratory Analyses

The Analytical Laboratory will document all information regarding its procedures in accordance with the lab's published Quality Assurance and will submit this documentation to the Quality Control Officer for review. The laboratory produces the analytical report which contains laboratory data results. The analytical report documents the analytical results for each parameter analyzed on each sample submitted. The analytical report generally includes the case narrative, analytical results, RLs for parameters, methods used to analyze the sample, date sample was collected, prepared, and analyzed, and the laboratory's quality control (QC) results.

The Quality Control Officer conducts audits of analytical laboratories every three years. The audit consists of performing a documentation review of the laboratory, submitting performance evaluation (PE) samples to the laboratory, and conducting an on-site system audit of the laboratory.

7.4. Field Measurements

Field staff working for the Authority will record all field measurements on data sheets. The Field Supervisor will review, double-check, and sign each sheet. The Field Supervisor will keep field maintenance logs that detail the dates of equipment inspection, battery replacement and calibrations.

The Authority will store hard copies of the field data sheets and field maintenance logs for ten years from the time they were collected. If data entry is ever performed at another location, duplicate data sheets will be used, with the originals remaining at the Authority's office.

7.5. Field Instrument Calibration Sheet

The instrument calibration sheet documents the information from an initial calibration, performed prior to instrument use, and information from a verification check, performed after all sampling for that day is completed. Information documented on the instrument calibration sheet should include: project name(s), date, time(s), field sampler's name, instrument type, instrument number, standard value, initial value, adjusted value, and post value.

8.0 SAMPLING PROCESS DESIGN

8.1. Background Water Quality

Reclamation will collect monthly samples of CVP water in the FKC below Friant Dam[4], and quarterly samples of water in the canal near its terminus. The sites represent the baseline quality of water in the canal. The quality assurance procedures for this program are described in the Quality Assurance Project Plan for Regional Baseline Water Quality Investigation, to be revised in 2011.

8.2. Non-project Water

The District will provide the Reclamation with a complete analysis of each source of non-project water. Table 3 is a list of constituents to be measured in the non-project water. Table 4 is a list of recommended sample containers and preservatives required for each analysis. These containers should be provided by the Analytical Laboratory with special handling instructions. When possible, Reclamation staff will collect the initial samples of non-project water.

8.3. Field Measurements

When necessary, Reclamation may require further monitoring of each source of non-project water as well as in the canal.

In-stream monitoring: When "Type B" non-project water is being pumped into the canal, Authority field staff will make regular field measurements of water in the canal upstream and downstream of the non-project water discharge pipe(s). The field measurements will characterize the quality of water in the canal, and the identify changes in quality that may be caused by each source of non-project water. Authority field staff may also make regular measurements of water in each active source of "Type B" non-project water.

The in-stream sampling locations are listed in Table 1, based on the following criteria:

- access is safe,

(4) These samples will be taken from the San Joaquin River below Friant Dam under the San JoauqiN River Restoration Program.

- permission to cross private property is granted,
- samples can be easily and safely collected by Authority field personnel,
- each sample will be representative of the non-project water before it will be discharged into the canal, and
- in-canal samples will represent the quality of CVP water upstream and downstream of the discharge point of the non-project water.

9.0 SAMPLE HANDLING AND CUSTODY PROCEDURES

9.1. Sampling Method Requirements

Table 3 lists the constituent of concern and required detection limits for reporting (DLR). The Analytical Laboratory shall use the correct containers, preservatives, and maximum holding times specified for each analytical method. The Analytical Laboratory shall use the appropriate analytical method to achieve the DLR. The Analytical Laboratory shall provide complete documentation to the Contracting Officer regarding the collection and analysis of the non-project water.

When possible, Reclamation staff will collect initial samples of each source of non-project water and will deliver them to the Analytical Laboratory.

Reclamation personnel will collect quarterly samples from the Friant-Kern Canal following the February 2007 Quality Assurance Project Plan for Regional Baseline Water Quality Investigation.

All water samples will be collected using the grab-sample method. A churn splitter or sample bottle (for unfiltered samples) may be used to collect water from the source. Before use, the churn splitter is rinsed three times with environmental water and environmental water is run through the push valve three times.

Non-sterilized and unpreserved sample bottles will be rinsed three times with environmental water prior to collecting each sample.

Sterile bottles and sample bottles which contain preservatives/fixing agents (e.g., acids), must not be rinsed with sample water prior to collecting the sample.

9.2. Sample Handling

9.2.1 Samples for Laboratory Analysis.

Identification information for each sample will be recorded on the COC when the sample is collected. A waterproof-ink marker must be used to write the sample ID number, date, time, preservative used, and parameter(s) to be tested on each sample bottle label. The Quality Control Officer may specify the numbering codes and symbols for these labels.

When possible, Reclamation staff will collect initial samples of each source of non-project water and will deliver them to the Analytical Laboratory.

Water samples will be collected and preserved according to EPA and Standard Methods, or other approved analytical methodology. Upon collection, the water samples must be placed in a cooler at a temperature of four degrees Celsius.

The bottles for samples to be sent to the analytical laboratory will be labeled with:

- project name
- sample identification
- preservative used, if any
- constituent analyses required
- date and time sampled
- sampler's initials

9.2.2 Quality Assurance Reference Samples.
The Quality Control Officer may add double-blind quality assurance reference samples to each batch of samples in accordance with Section 11 of this QAPP. The Quality Control Officer will specify how these samples will be labeled and documented to assure desired results.

The Analytical laboratory will handle the project production samples and the external quality assurance samples in accordance with that laboratory's published sample receiving protocol.

9.2.3 Samples for Field Measurements.
If conventional water quality monitoring tests are conducted in the field, they do not require specific custody procedures since they will, in most cases, be conducted immediately by the same person who performs the sampling. In certain circumstances (such as driving rain or extreme cold), samples may be taken to a safe location for analysis.

9.3. Custody Procedures

9.3.1 Samples for Field Measurements.
For field analyses of water, where no sample is kept, the field data sheet must be completed and kept on file by the Field Supervisor. There is no need for the Chain of Custody form in this case.

9.3.2 Samples for Laboratory Analysis.

When possible, Reclamation staff will collect initial samples of each source of non-project water and will deliver them to the Analytical Laboratory.

When samples are transferred from the one individual to another person or a laboratory, a Chain of Custody form must be used. This form identifies the laboratory, project name, sample number, date and time of collection, sampler's name, sample type, and parameters to be tested.

It also indicates the date and time of transfer, and the name and signature of the sampler and the sample recipient.

When a sample is shipped to an analytical laboratory, the Chain of Custody form must be provided to the laboratory receiving the sample. The Chain of Custody form is placed in a zip-lock plastic bag before being placed in the cooler. The cooler is then sealed by the field sampler. The cooler must be shipped as quickly as possible to the laboratory. A commercial package carrier may be used for overnight shipping.

The original Chain of custody form will be kept on file at the laboratory and a copy sent to the Quality Control Officer.

9.4. Disposal

All analyzed samples or spent chemicals including used reagents, solutions or standards will be collected in a plastic bottle clearly marked “Waste” or “Poison” in accordance with the laboratory’s published procedures. The Quality Control Officer will collect and dispose of remaining standard reference solutions. This waste material will be disposed of according to appropriate state and local regulations.

10.0 ANALYTICAL METHODS REQUIREMENTS

10.1. Laboratory Analytical Methods

Table 3 lists the constituent of concern and required detection limits for reporting (DLR). The Analytical Laboratory shall use the appropriate analytical method to achieve the DLR.

10.2. Laboratory Turn Around Times

Results of analysis should be submitted to the Quality Control Officer within 3 weeks (15 business days) of submitting the samples to the laboratory. The District may request faster analyses at extra cost.

10.3. Field Measurements

Table 6 outlines the field methods to be used, any modifications to those methods, and the appropriate reference to a standard method. A Hydrolab, or equivalent field sensor, will be used to measure the physical parameters (pH, electrical conductivity, and water temperature) of the environmental water. A turbidity meter will be used to measure the turbidity of the environmental water.

If modifications of field methods are required, the Quality Control Officer will determine the comparability of both methods by conducting side-by-side comparisons of the old and new

equipment. If the new method results meet the same precision and accuracy requirements as the approved method, the new method will be accepted.

11.0 QUALITY CONTROL REQUIREMENTS

Quality control samples may be used to ensure valid data are collected. Depending on the parameter, the Quality Control Officer may incorporate blind, quality control samples, which will consist of blanks, duplicates, and spike/reference samples. The quality control samples may be incorporated with each batch of samples of damaging non-project water sent for laboratory analyses. External QC samples will not be incorporated for organic parameters. Table 9 is a summary of validation and verification methods.

11.1. Duplicate Samples

Duplicate samples are prepared by splitting a well homogenized single sample into two or more containers. Duplicate samples are used to evaluate field homogeneity, sample handling, and the precision of laboratory work. They will be collected in the same manner and as close tot he same time as possible as the original sample.

11.2. Spike Sample

A spike samples is prepared by measuring aliquots of known concentrations of specific constituents into a measured volume of the sample. The data from this sample is used to evaluate laboratory accuracy.

11.3. Reference Sample

A reference sample is prepared ahead of time with known concentrations of specific constituents. The data from this sample is used to evaluate laboratory accuracy.

11.4. Blank Sample

A sample consisting of only de-ionized water and any added preservative(s) necessary, depending on the constituent to be analyzed. Blank samples are used to determine contamination. The number of blank samples to be collected will be specified by the Quality Control Officer.

11.5. Travel Blank Samples

Travel blanks will be used to determine if there is any cross-contamination of volatile constituents between sample containers. A sample container with de-ionized water (free of volatile contaminants), is transported tot he site, handled like a sample (but never opened up), and returned tot he lab for analysis. One travel blank will be incorporated for any parameters requiring travel blanks.

11.6. Equipment Blank Samples

Equipment blanks are used to ensure that field equipment used for sampling does not contaminate samples. The field device (churn-splitter, sample hose, etc.) is filled with de-ionized water; this water is transferred to a sample bottle, preserved (if appropriate), and analyzed by the lab.

11.7. Field Blank Samples

Field blanks are needed to assess potential sample contamination levels that occur during field sampling and sample processing. Field blanks of de-ionized water are collected in the field, preserved (if appropriate), and treated the same as other samples collected that day. In most cases, field blanks should be collected at a 5 percent rate. Field blanks are collected for low level mercury and bacterial samples.

11.8. Quality Assurance Samples for Laboratory Analyses

The Quality Control Officer will incorporate external quality assurance samples into batches of samples. The Quality Control Officer will use the results on these samples to confirm the accuracy of data being generated by the laboratory. The types of external Quality Assurance samples incorporated into batches of production samples will depend on the parameter.

Table 7 is a summary of validation and verification methods.

To check laboratory precision, the Quality Control Officer will incorporate duplicate samples at a 10% rate or at least one duplicate sample if fewer than 10 production samples are collected. They duplicate samples will be labeled like production samples so they can pass as double blind samples.

The Quality Control Officer will use spike or reference samples to check laboratory accuracy and contamination. Such samples will be incorporated at a rate of 10% or at least one spike or reference if fewer than 10 production samples are collected and blank samples at a rate of 5% or at least one blank if fewer than 20 production samples are collected. The Quality Control Officer will label the spike, reference, and blank check samples with identifications similar to production samples so they can pass as double blind samples.

The Analytical Laboratory will incorporate its own Quality Control check samples, including spikes, duplicates and blanks, to ensure data reliability according to its published Quality Assurance manual. Laboratory Quality Control check sample results must be reported to the Quality Control Officer as Quality Control summary reports.

11.9. Quality Assurance of Field Measurements

The Quality Control Officer will hold regular meetings with Authority field staff to verify the proper working order of equipment, verify the proper calibration of field instruments, confirm sample collection and monitoring techniques, and determine whether the data quality objectives are being met.

Table 8 summarizes the quality control requirements for field measurements.

12.0 INSTRUMENT/EQUIPMENT TESTING, INSPECTION AND MAINTENANCE

12.1. Laboratory Equipment

The analytical laboratory will inspect and maintain its instruments following the procedures and frequencies stated in the published Quality Assurance Manual and as prescribed the instrument manufacturer. Due to the cost of some laboratory equipment, back-up capability may not be possible. However, commonly replaced parts should be available for rapid maintenance (i.e., batteries, light bulbs, tubing, specific ion electrodes, glassware, pumps, etc.) A separate logbook will be maintained for each piece of equipment by the laboratory. All preventative or corrective maintenance will be recorded. The complete history of maintenance will be available for inspection by the Quality Control Officer.

12.2. Field Equipment

All field equipment will receive preventative maintenance according to the manufacturer's recommended schedule. Each item will be inspected before and after each use for cleanliness, battery strength. Common spare parts will include batteries, light bulbs, tubing, replacement probes, and glassware. After each day of use, all equipment will be re-inspected.

A maintenance log of field equipment will be kept by the Field Supervisor. This log contains new and used field data sheets and it documents and dates field instrument and sampling gear inspections, field instrument calibrations, instrument battery replacements, the dates reagents and standards were replaced, and any problems noted with the instruments, samplers, or reagents and standards. This logbook will be available for review by the Quality Control Officer.

13.0 INSTRUMENT CALIBRATION AND FREQUENCY

All instruments of devices used to measure water quality must be calibrated by the measurement of a standard. Every instrument or device has a procedure for calibration and a special type of standard to verify calibration; these are usually specified by the manufacturer. It is required that records of calibration be kept by the person performing the calibration. This logbook must be available to the Quality Control Officer for review.

13.1. Laboratory Equipment

The analytical laboratory will perform instrument calibrations following the procedures and frequencies stated in the published Quality Assurance Manual for the analytical methods for each parameter.

13.2. Field Equipment

Portable instruments will be calibrated and checked against standards accordingly to the schedule listed in Table 11. The Quality Control Officer will provide conductivity standard solutions, pH buffer solutions, and turbidity reference solutions, and will train field staff to properly operate and maintain the portable equipment.

Calibrations that are performed by the field staff will be recorded on field data sheets and these sheets are archived for five years by the Authority. Unused field data sheets will be kept in the maintenance log where they can be easily accessed before and after equipment use.

13.2.1 Flow

Flow measurement devices will be calibrated by Authority staff according to published standard operating procedures. Flow meters on each non-project water discharge system must be calibrated initially and every three months thereafter by Authority staff or an agreed upon third party.

13.2.2 Electrical Conductivity and pH

The Quality Control Officer will provide conductivity standards and pH buffers, and will train field staff. Field staff must calibrate conductivity and pH meters before each use with standard reference solutions and check them again at end of the day. Conductivity standards will be stored with the cap firmly in place and in a dry place away from extreme heat. Do not re-use pH or conductivity standards.

13.2.3 Temperature

The Quality Control Officer will standardize the temperature measurements by comparing all thermometers to a NIST-certified or calibrated thermometer in ice water and ambient temperature water. Field staff will compare digital thermometers with a mercury thermometer in ice-chilled and ambient temperature water before each field monitoring session.

13.2.4 Turbidity

The Quality Control Officer will provide turbidity reference solutions and will train field staff. Field staff will calibrate portable turbidity meters before each use and check them again at the end of the day with a turbidity reference solution. A Secchi disk may be used instead to measure turbidity; the Quality Control Officer will train field staff how to use and maintain the device.

14.0 INSPECTION/ACCEPTANCE REQUIREMENTS FOR SUPPLIES

Upon receipt, buffer solutions, standards, and reagents will be dated, stored properly, and discarded upon a specified expiration date. Each bottle of solution will be inspected by the Field supervisor for leaks or broken seals, and to compare the age of each reagent to the manufacturer's recommended shelf-life.

Reagents, standards, and solutions are replaced before they exceed manufacturer's recommended shelf life. These shelf lives are typically one to two years. However, specific expiration dates for reagents, standards, and solutions are usually noted on the containers they come in. Reagent, standard, and solution replacement dates will be noted in the maintenance log.

Level 1 certified bottles that have been pre-preserved (when necessary) are used for sample collection. References used for external quality control incorporation have certified values from the vendor. Spike solutions used for external quality control incorporation will be certified to be within 90%-110% recovery of the expected value prior to use.

15.0 LABORATORY DATA MANAGEMENT

The Analytical Laboratory will report directly to the Quality Control Officer. The Quality Control Officer will verify sample identification information, review the chain-of-custody forms, determine if samples were analyzed within their holding times, and perform an appropriate review of the data. The Quality Control Officer will identify quality assurance reference samples to ensure that data quality objectives have been achieved.

The Quality Control Officer will review and approve the laboratory analytical results and enter the data into a spreadsheet (MS Excel) or a database (MS Access). The Quality Control Officer will correct any entry errors by comparing the electronic data to the printed lab data. The Quality Control Officer will sign and archive a copy of the lab data (originals are kept with the Field Supervisor).

The Quality Control Officer will send all approved laboratory data to the Data Manager, who will in turn report the data to the Contracting Officer and the Authority.

The Quality Control Officer will provide all lab data to the State Water Resources Control Board and Regional Water Quality Control Board in electronic form at least once every two years so that it can be included in the 305(b) report. Appropriate quality assurance information may be provided upon request.

16.0 FIELD DATA MANAGEMENT

Field data sheets and field maintenance logs will be filled in by an Authority field staff member and double-checked by the Field Supervisor. The Field Supervisor will sign them and send copies to the Quality Control Officer.

The Quality Control Officer will review and approve the field sheets and enter the data into a spreadsheet (MS Excel) or a database (MS Access). The Quality Control Officer will correct any entry errors by comparing the electronic data to the field data sheets. The Quality Control Officer will sign and archive a copy of the field data sheets (originals are kept with the Field Supervisor).

The Quality Control Officer will send all approved field data to the Data Manager, who will in turn report the data to the Contracting Officer.

The Quality Control Officer will provide all field data to the State Water Resources Control Board and Regional Water Quality Control Board in electronic form at least once every two years so that it can be included in the 305(b) report. Appropriate quality assurance information may be provided upon request.

17.0 ASSESSMENT AND RESPONSE ACTIONS

17.1. Laboratory Analyses

The Quality Control Officer has determined which analytical laboratories are capable of producing reliable analytical results with a three-step audit process of each laboratory through the analysis of performance samples. After demonstrating acceptable results on these performance samples, the Quality Control Officer performed a system audit on the laboratory, consisting of a review of the laboratory's Quality Assurance manual and performance study results for the past three years. The system audit concluded with a visit to the laboratory to confirm that everything is in place to perform the work.

The three-tier audit consists of reviewing the laboratory's QA Manual, reviewing the laboratory's performance evaluation (PE) sample results, and conducting an intensive, on-site, system audit of the laboratory. The laboratory's expertise in conducting analyses, their capability for producing valid data, their ability to effectively support the data, and the integrity of the QA/QC practices are assessed during the on-site audit. Laboratory audits are conducted every three years. The audit reports are issued to the laboratory. The laboratory then issues a response with corrective actions to the Environmental Monitoring Branch. At that time, the Quality Control Officer determines whether or not to approve the laboratory for use and contacts the laboratory with their decision.

17.2. Field Measurements

As part of the standard field protocols, any sample readings out of the expected range will be reported by the field staff to the Field supervisor. A second sample will be taken as soon as possible to verify the condition. If the original measurement is invalid, then it will be noted (flagged) on the data sheet. The Field Supervisor will take further actions to trace the sources of error, and to correct the problems. If the error is a result of improper monitoring procedures,

then the Field Supervisor will re-train monitors until their performance is acceptable. It is the responsibility of the Field supervisor to re-train field staff until performance is acceptable.

The field audit consists of reviewing the SOP, submitting PE samples and reviewing the results, and accompanying the field sampler while they demonstrate the sample collection process. The Quality Control Officer assesses the field sampler's expertise in collecting representative samples. Field audits are conducted every two years. The field audit reports are sent to the field sampler and the Field Supervisor. The Field Supervisor is responsible for issuing corrective actions.

18.0 REPORTS

18.1. Sampling

The District will provide the Quality Control Officer with copies of Chain of Custody forms, field data sheets, and other relevant documentation regarding the collection of samples of each source of non-project water.

18.2. Laboratory Results

The Analytical Laboratory will provide the Quality Control Officer with complete documentation to support its report of water quality analysis, including the results of internal Quality Assurance procedures. The Quality Control Officer will compile all approved laboratory results for the Contracting Officer.

The Quality Control Officer will provide laboratory audit reports to the laboratory director and field audit reports to the sampler and Field Supervisor.

18.3. Flow Data

The Authority will compile flow data for all sources of non-project water into monthly reports for the Contracting Officer. The flow data will be credited to the Contractor under terms of the Operations Contract.

18.4. Field Measurements

The Field Supervisor will compile field water quality measurements of in-stream water and each source of non-project water into monthly reports for the Contracting Officer. The Data Manager will review the field measurements to ensure compliance with water quality objectives.

19.0 DATA REVIEW, VALIDATION AND VERIFICATION

The Quality Control Officer will review and verify all laboratory and field data generated from this project. As a result of this review and verification process, the Quality Control Officer may impose limitations on the use of the data.

When reviewing and validating the external quality assurance samples for this project, the Quality Control Officer will follow protocols outlined in Reclamation's Standard Operating Procedures for Quality Assurance (January 2005). All external Quality Assurance check samples submitted to the laboratory will be blind samples. When the Quality Control Officer incorporates external Quality Assurance check samples into a batch of production samples submitted to a laboratory, the laboratory must meet certain standards of acceptance on these Quality Assurance check samples for the data to be approved as valid. For this project, the standards of acceptability for the external Quality Assurance check samples are summarized in Table 9.

Part of the data review and validation process may involve the re-analysis of external Quality Assurance check samples for project parameters or the whole project for certain parameters if the external Quality Assurance check sample results are not confirmed upon re-analysis.

Due to the short holding times for bacterial and organic samples, no reanalysis is requested if the external QA results or laboratory QC results do not meet the acceptance criteria. Professional judgment is used to decide how to qualify the data.

The laboratory's Quality Control check samples must meet certain levels of acceptability when analyzed with the production samples. These levels of acceptability are established through the use of control charts or set at certain limits found in the methods. Part of the data verification process involves checking these laboratory Quality Control check sample results to ensure they are within acceptable ranges. If a laboratory's Quality Control check sample fails to demonstrate an acceptable result, the anomaly must be explained with a footnote or included in the case narrative section of the data report.

Also, in order to ensure data quality, the Quality Control Officer will assess laboratory data packages to determine if all the samples were analyzed within their holding times and if the required completeness criteria were met.

Field data sheets will be reviewed quarterly by the Quality Control Officer to determine if the data meets the Quality Assurance Project Plan objectives. The Quality Control Officer will also identify outliers, spurious results or omissions to the Field Supervisor, and evaluate compliance with the data quality objectives. The Quality Control Officer will suggest corrective actions that will be implemented by the Field supervisor. If any equipment blank result does not meet the blank acceptance criteria, then the sampler and Field Supervisor will be notified by the Quality Control Officer. The Field Supervisor will determine if corrective actions are necessary.

If all external QA samples and laboratory QC samples meet the acceptance criteria and all samples are analyzed within the holding time, all data will be accepted as valid.

If a result is confirmed after reanalysis, the result will be accepted as valid.

Data will be qualified if results demonstrate unacceptable QA, if the laboratory QC sample results are unacceptable, or if the holding times were exceeded.

The Quality Control Officer will review and validate all sampling and laboratory data reports. After the Quality Control Officer deems the sampling methods and laboratory data to be valid, it will be entered into the Environmental Monitoring Branch database. The Data Management Team will send the results to the Data Manager. The Data Manager will determine the usability of the data.

20.0 RECONCILIATION WITH DATA QUALITY OBJECTIVES

After receiving the laboratory data, the Quality Control Officer will make calculations and determinations for contamination, precision, accuracy, and completeness and he will implement corrective actions if needed. If data quality indicators do not meet the project's specifications, the data may be re-analyzed or discarded and re-sampling may occur. The cause of failure will be evaluated. If the cause is due to equipment failure, calibration/maintenance techniques will be reassessed and improved. If the problem is determined to be a sampling error, team members will be retrained. If the problem is laboratory related, the laboratory program manager will be contacted and corrective actions implemented. Any limitations on data usage will be detailed in both interim and final reports and other documentation as needed.

Any qualified results will be identified to the Environmental Monitoring Branch Data Management Team by completing the Data Requiring Qualifiers and/or Data With Outliers form or the Parameter Not Analyzed Within Holding Time form per Environmental Monitoring Branch protocol. Additionally, if results are qualified, the result will be marked with a footnote on the data table submitted to the Data Manager; the footnote will detail the qualification.

If data does not meet the project's specifications, the following actions will be taken. First, the Field supervisor and the Quality Control Officer will review the errors and determine if the problem is related to equipment failure, calibration/ maintenance techniques, monitoring/sampling techniques or laboratory procedures. The Quality Control Officer will then suggest corrective actions.

If the problem cannot be corrected by training, revision of techniques, replacement of supplies/equipment, or contacting the laboratory manager, the Quality Control Officer and Authority staff will review the DQOs and determine if the DQOs are feasible. If the specific DQOs are not achievable, they will determine whether the specific DQO can be relaxed, or if the parameter should be eliminated from the monitoring program.

Any revisions to DQOs will be appended to this Quality Assurance Project Plan (QAPP) with the revision date and the reason for the modification. The appended QAPP will be sent to the Quality Control Officer who approved and signed this plan. When the appended QAPP is approved, the Field supervisor and Data Manager will work with the Environmental Monitoring Branch Data Management Team to ensure that all data meeting the new DQOs are entered into the Environmental Monitoring Branch database. Archived data can also be entered.

21.0 RECONCILIATION WITH MAXIMUM CONTAMINANT LEVELS

The Data Manager will compare the approved laboratory and field data based on standards and other project criteria listed in Table 3. The Data Manager will inform the Contracting Officer how the District's non-project water is altering the quality of CVP water in the Friant-Kern Canal.

The Data Manager will also determine the individual and cumulative changes in water quality that may be occurring in the canal due to the addition of the District's non-project water. If the District's non-project water is causing the turbidity of CVP water downstream to exceed 5 NTU, or increasing the concentration of any constituent in the downstream CVP water to exceed the Title 22 drinking water standards, the Data Manager will advise the Contracting Officer and the Field Supervisor to terminate or reduce pumping of the District's non-project water in the canal.

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LIST OF TABLES

Appendix 1 -

2011 Policy to Accept Non-Project Water
Friant Division
Water Quality Monitoring Program
Quality Assurance Project Plan

Table 1. Sampling Locations

Friant-Kern Canal Mile Post	Location
(1)	Below Friant Dam
TBD	Upstream sampling site
TBD	Non-project water discharge pipe
TBD	Downstream sampling site
~152.0	near Terminus

(1) San Joaquin River below Friant Dam (Lost Lake Park)
TBD - To be determined by the Contracting Officer

2011 Policy to Accept Non-Project Water
Friant Division
Water Quality Monitoring Program
Quality Assurance Project Plan

Table 2. Water Quality Sampling Schedule

Friant-Kern Canal Mile Post	Location	Complete Laboratory Analyses (2)	Bacterial	Field Measurements
(1)	Below Friant Dam	Monthly	Monthly	Monthly
TBD	Upstream sampling site			TBD
TBD	Non-project water discharge pipe	Annual	Annual	
TBD	Downstream sampling site			TBD
~152.0	near terminus at Kern River	Quarterly	Quarterly	None

Notes:
(1) San Joaquin River below Friant Dam (Lost Lake Park)
(2) Title 22 - California Code of Regulations, Domestic Water Quality Standards
(3) Bacterial - Cryptosporidium, Fecal Coliform, Giardia, Total Coliform
TBD - To be determined by the Contracting Officer
Revised: 4/8/2011

Table 3. Water Quality Constituents

CONSTITUENT OR PARAMETER	Units	California DHS Maximum Contaminant Level (1)	Note	Irrigation Suitablility Standards (2)	Detection Limit for Reporting	Note	CAS Registry Number
Primary Constituents (CCR § 64431)							
Aluminum	µg/L	1,000	1		50	2	7429-90-5
Antimony	µg/L	6	1		6	2	7440-36-0
Arsenic	µg/L	50	16		2	2	7440-38-2
Asbestos	MFL > 10µm	7	1, 18		0.2	2	1332-21-4
Barium	µg/L	1,000	1		100	2	7440-39-3
Beryllium	µg/L	4	1		1	2	7440-41-7
Cadmium	µg/L	5	1		1	2	7440-43-9
Chromium (total)	µg/L	50	1		10	2	7440-47-3
Cyanide	µg/L	150	1		100	2	57-12-5
Fluoride	µg/L	2,000	1, 19		100	2	16984-48-8
Mercury (inorganic)	µg/L	2	1		1	2	7439-97-6
Nickel	µg/L	100	1		10	2	7440-02-0
Nitrate (as NO3)	mg/L	45	1, 20		2	2	7727-37-9
Total Nitrate + Nitrite (as Nitrogen)	mg/L	10	1				
Nitrite (as Nitrogen)	mg/L	1	1		0.4	2	14797-65-0
Selenium	µg/L	50	1		5	2	7782-49-2
Thallium	µg/L	2	1		1	2	7440-28-0
Secondary Constituents (CCR § 64449)							
Aluminum	µg/L	200	6		50	2	7429-90-5
Chloride	mg/L	250	7, 21	107			16887-00-6
Color	units	15	6				
Copper	µg/L	1,000	6				7440-50-8
Foaming agents (MBAS)	µg/L	500	6				
Iron	µg/L	300	6				7439-89-6
Manganese	µg/L	50	6				7439-96-5
Methyl-tert-butyl ether (MtBE)	µg/L	5	6				1634-04-4
Odor - Threshold	threshold units	3	6				
Silver	µg/L	100	6				7440-22-4
Specific conductance (EC)	µS/cm	900	7, 23	700			
Sulfate	mg/L	250	7, 21				14808-79-8
Thiobencarb	µg/L	1	6				28249-77-6
Total dissolved solids (TDS)	mg/L	500	7, 24	450			
Turbidity	NTU	5	6				
Zinc	µg/L	5,000	6				7440-66-6
Other required analyses (CCR § 64449 (b)(2); CCR § 64670)							
Bicarbonate	mg/L		8	92			
Boron	mg/L			1			
Calcium	mg/L		8,12				7440-70-2
Carbonate	mg/L		8				
Copper	mg/L	1.3	14, 22		0.05	12	7440-50-8
Hardness	mg/L		8				
Hydroxide alkalinity	mg/L		8,12				
Lead	µg/L	15	14, 22		5	12	7439-92-1
Magnesium	mg/L		8				7439-95-4
Orthophosphate	mg/L		12				

Table 3. Water Quality Constituents

CONSTITUENT OR PARAMETER	Units	California DHS Maximum Contaminant Level (1)	Note	Irrigation Suitablility Standards (2)	Detection Limit for Reporting	Note	CAS Registry Number
pH	units		8, 12, 25	6.5 - 8.4			
Silica	mg/L		12				
Sodium	mg/L		8	69			7440-23-5
Sodium Adsorption Ratio				3			
Temperature	degrees C		12				
Radiochemistry (CCR § 64442)							
Radioactivity, Gross Alpha	pCi/L	15	3		3	3	
Microbiology							
Cryptosporidium	org/liter	No MCL, measure for presence (surface water only)					
Fecal Coliform	MPN/100ml	No MCL, measure for presence (surface water only)					
Giardia	org/liter	No MCL, measure for presence (surface water only)					
Total Coliform bacteria	MPN/100ml	No MCL, measure for presence (surface water only)					
Organic Constituents (CCR § 64444)							
EPA 504.1 method							
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	4		0.01	5	96-12-8
Ethylene dibromide (EDB)	µg/L	0.05	4		0.02	5	206-93-4
EPA 505							
Chlordane	µg/L	0.1	4		0.1	5	57-74-9
Endrin	µg/L	2	4		0.1	5	72-20-8
Heptachlor	µg/L	0.01	4		0.01	5	76-44-8
Heptachlor epoxide	µg/L	0.01	4		0.01	5	1024-57-3
Hexachlorobenzene	µg/L	1	4		0.5	5	118-74-1
Hexachlorocyclopentadiene	µg/L	50	4		1	5	77-47-4
Lindane (gamma-BHC)	µg/L	0.2	4		0.2	5	58-89-9
Methoxychlor	µg/L	30	4		10	5	72-43-5
Polychlorinated biphenyls	µg/L	0.5	4		0.5	5	1336-36-3
Toxaphene	µg/L	3	4		1	5	8001-35-2
EPA 508 Method							
Alachlor	µg/L	2	4		1	5	15972-60-8
Atrazine	µg/L	1	4		0.5	5	1912-24-9
Simazine	µg/L	4	4		1	5	122-34-9
EPA 515.3 Method							
Bentazon	µg/L	18	4		2	5	25057-89-0
2,4-D	µg/L	70	4		10	5	94-75-7
Dalapon	µg/L	200	4		10	5	75-99-0
Dinoseb	µg/L	7	4		2	5	88-85-7
Pentachlorophenol	µg/L	1	4		0.2	5	87-86-5
Picloram	µg/L	500	4		1	5	1918-02-1
2,4,5-TP (Silvex)	µg/L	50	4		1	5	93-72-1
EPA 524.2 Method (Volatile Organic Chemicals)							
Benzene	µg/L	1	4		0.5	5	71-43-2
Carbon tetrachloride	µg/L	0.5	4		0.5	5	56-23-5
1,2-Dibromoethane	µg/L	0.05			0.5	5	106-93-4
1,2-Dichlorobenzene	µg/L	600	4		0.5	5	95-50-1
1,4-Dichlorobenzene	µg/L	5	4		0.5	5	106-46-7
1,1-Dichloroethane	µg/L	5	4		0.5	5	75-34-3
1,2-Dichloroethane	µg/L	0.5	4		0.5	5	107-06-2
1,1-Dichloroethylene	µg/L	6	4		0.5	5	75-35-4
cis-1,2-Dichloroethylene	µg/L	6	4		0.5	5	156-59-2
trans-1,2-Dichloroethylene	µg/L	10	4		0.5	5	156-60-5

Table 3. Water Quality Constituents

CONSTITUENT OR PARAMETER	Units	California DHS Maximum Contaminant Level (1)	Note	Irrigation Suitablility Standards (2)	Detection Limit for Reporting	Note	CAS Registry Number
Dichloromethane	µg/L	5	4		0.5	5	75-09-2
1,2-Dichloropropane	µg/L	5	4		0.5	5	78-87-5
1,3-Dichloropropene	µg/L	0.5	4		0.5	5	542-75-6
Ethylbenzene	µg/L	300	4		0.5	5	100-41-4
Methyl-tert-butyl ether (MtBE)	µg/L	13	4		3	5	1634-04-4
Monochlorobenzene	µg/L	70	4		0.5	5	108-90-7
Styrene	µg/L	100	4		0.5	5	100-42-5
1,1,2,2-Tetrachloroethane	µg/L	1	4		0.5	5	79-34-5
Tetrachloroethylene (PCE)	µg/L	5	4		0.5	5	127-18-4
Toluene	µg/L	150	4		0.5	5	108-88-3
1,2,4-Trichlorobenzene	µg/L	5	4		0.5	5	120-82-1
1,1,1-Trichloroethane	µg/L	200	4		0.5	5	71-55-6
1,1,2-Trichloroethane	µg/L	5	4		0.5	5	79-00-5
Trichloroethylene (TCE)	µg/L	5	4		0.5	5	79-01-6
Trichlorofluoromethane	µg/L	150	4		5	5	75-69-4
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	1,200	4		10	5	76-13-1
Total Trihalomethanes	ug/L	80	10				
Vinyl chloride	µg/L	0.5	4		0.5	5	75-01-4
Xylene(s)	µg/L	1,750	4		0.5	5	1330-20-7
EPA 525.2 Method							
Benzo(a)pyrene	µg/L	0.2	4		0.1	5	50-32-8
Di(2-ethylhexyl)adipate	µg/L	400	4		5	5	103-23-1
Di(2-ethylhexyl)phthalate	µg/L	4	4		3	5	117-81-7
Molinate	µg/L	20	4		2	5	2212-67-1
Thiobencarb	µg/L	70	4		1	5	28249-77-6
EPA 531.1 Method							
Carbofuran	µg/L	18	4		5	5	1563-66-2
Oxamyl	µg/L	50	4		20	5	23135-22-0
EPA 547 Method							
Glyphosate	µg/L	700	4		25	5	1071-83-6
EPA 548.1 Method							
Endothal	µg/L	100	4		45	5	145-73-3
EPA 549.2 Method							
Diquat	µg/L	20	4		4	5	85-00-7
EPA 613 Method							
2,3,7,8-TCDD (Dioxin)	µg/L	0.00003	4		0.000005	5	1746-01-6

Source Data:

Adapted from Marshack, Jon B. August 2003. A Compilation of Water Quality Goals. Prepared for the California Environmental Protection Agency, Regional Water Quality Control Board. Tables revised August 2007.

References:

(1) State of California, Code of Regulations, Title 22. Division 4. Environmental Health. Chapter 15. Domestic Water Quality, and Monitoring Regulations (Sections 64401 et seq.), as amended.

(2) Ayers, R. S. and D. W. Westcot, Water Quality for Agriculture, Food and Agriculture Organization of the United Nations - Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985).

Table 3b. Unregulated Chemicals (CCR § 64450)

CONSTITUENT OR PARAMETER	Units	Recommended Method	California Department of Health Services Notification Level	Note	Response Level	CAS Registry Number
Boron	mg/L	EPA 200.7	1	9, 17, 28	10	7440-42-8
n-Butylbenzene	µg/L	EPA 524.2	260	17, 28	600	104-51-8
sec-Butylbenzene	µg/L	EPA 524.2	260	17, 28	2,500	135-98-8
tert-Butylbenzene	µg/L	EPA 524.2	260	17, 28	2,500	98-06-6
Carbon disulfide	µg/L		160	17, 28	1,600	
Chlorate	µg/L	EPA 300.1	0.8	17, 28	8	
2-Chlorotoluene	µg/L	EPA 524.2	140	17, 28	1,400	95-49-8
4-Chlorotoluene	µg/L	EPA 524.2	140	17, 28	1,400	106-43-4
Dichlorofluoromethane (Freon 12)	µg/L	EPA 524.2	1,000	9, 17, 28	10,000	75-43-4
1,4-Dioxane	µg/L	SM 8270	3	17, 27, 28	300	123-91-1
Ethylene glycol	µg/L	SM 8015	14,000	17, 28	140,000	107-21-1
Formaldehyde	µg/L	SM 6252	100	17, 28	1,000	50-00-0
n-Propylbenzene	µg/L		260	17, 28	2,600	
HMX	µg/L	SM 8330	350	17, 28	3,500	2691-41-0
Isopropylbenzene	µg/L		770	17	7,700	
Manganese	µg/L		50	17, 28	5,000	
Methyl isobutyl ketone	µg/L		120	17, 28	1,200	
Napthalene	µg/L	EPA 524.2	17	17, 28	170	91-20-3
n-nitrosodiethylamine (NDEA)	µg/L	1625	0.01	17, 28, 37	0	
n-nitrosodimethylamine (NDMA)	µg/L	1625	0.01	17, 27, 28	0	
n-nitroso-n-propylamine (NDPA)	µg/L	1625	0.01	17, 27, 28	1	
Perchlorate	µg/L	EPA 314	6	9, 17, 38	60	13477-36-6
Propachlor	µg/L	EPA 507 or 525	90	17, 28	900	1918-16-7
p-Isopropyltoluene	µg/L	EPA 524.2	770	17	7,700	99-87-6
RDX	µg/L	SM 8330	0.30	17, 27, 28	30	121-82-4
tert-Butyl alcohol (ethanol)	µg/L	EPA 524.2	12	9, 17	1,200	75-65-0
1,2,3-Trichloropropane (TCP)	ug/L	EPA 524.2	0.005	9, 17, 27, 28	1	96-18-4
1,2,4-Trimethylbenzene	µg/L	EPA 524.2	330	17, 28	3,300	95-63-6
1,3,5-Trimethylbenzene	µg/L	EPA 524.2	330	17, 28	3,300	95-63-6
2,4,6-Trinitrotoluene (TNT)	µg/L	SM 8330	1	17, 27, 28	100	
Vanadium	µg/L	EPA 286.1	50	9,17	500	7440-62-2
Chromium VI	µg/L	EPA 200.7	100	9, 17, 26		18540-29-9
Ethyl-tert-butyl-ether	µg/L			9,17		637-92-3
tert-Amyl-methyl-ether (butane)	µg/L	EPA 524.2	170	9,17		994-05-8

Notes for Tables 3a and 3b

State of California, Code of Regulations, Title 22. Division 4. Environmental Health. Chapter 15. Domestic Water Quality, and Monitoring Regulations (Sections 64401 et seq.), as amended.

[1] Table 64431-A. Maximum Contaminant Levels, Inorganic Chemicals
[2] Table 64432-A. Detection Limits for Purpose of Reporting (DLRs) for Regulated Inorganic Chemicals
[3] Table 644442. Radionuclide Maximum contaminant Levels (MCLs) and Detection Levels for Reporting (DLRs) Picocuries per liter; including Radium-226 but excluding Radon and Uranium.
[4] Table 64444-A. Maximum Contaminant Levels Organic Chemicals
[5] Table 64445.1-A. Detection Limits for Reporting (DLRs) for Regulated Organic Chemicals
[6] Table 64449-A. Secondary Maximum Contaminant Levels "Consumer Acceptance Levels"
[7] Table 64449-B. Secondary Maximum Contaminant Levels "Consumer Acceptance Levels"
[8] § 64449(b)(2)
[9] Table 64450. Unregulated Chemicals
[10] Appendix 64481-A. Typical Origins of Contaminants with Primary MCLs
[11] Table 64533-A. Maximum Contaminant Levels and Detection Limits for Reporting Disinfection Byproducts
[12] § 64670.(c)
[13] Table 64678-A. DLRs for Lead and Copper
[14] § 64678 (d)
[15] § 64678 (e)
[16] New Federal standard as of 1/23/2006 in 10 ppb
[17] Dept Health Services Drinking Water Notification Levels (June 2006)
[18] MFL = million fibers per liter; limited to fibers longer than 10 um.
[19] Optimal fluoride level and (range) vary with annual average of maximum daily air temperature; 50.0 to 53.7 degrees F - 1.2 (1.1 to 1.7) mg/L; 53.8 to 58.3 degrees F - 1.1 (1.0 to 1.7) mg/L; 58.4 to 63.8 degrees F - 1.0 (0.9 to 1.5) mg/L; 63.9 to 70.6 degrees F - 0.9 (0.8 to 1.4) mg/L; 70.7 to 79.2 degrees F - 0.8 (0.7 to 1.3) mg/L; 79.3 to 90.5 degrees F - 0.7 (0.6 to 1.2) mg/L.
[20] As NO3; in addition, MCL for total nitrate plus nitrite = 10,000 ug/L (as N).
As nitrogen (N); in addition, limit for total nitrate + nitrite = 10,000 ug/L (as N).
[21] Recommended level; Upper level = 500 mg/L; Short-term level = 600 mg/L.
[22] MCL includes this "Action level" to be exceeded in no more than 10% of samples at the tap.
[23] Recommended level; Upper level = 1600 umhos/cm; Short-term level = 2200 umhos/cm.
[24] Recommended level; Upper level = 1000 mg/L; Short-term level = 1500 mg/L.
[25] This limit has a range of values between the first and second numbers shown.
[26] Agricultural water quality limit
[27] Carcinogen; limit based on cancer risk.
[28] First number is the Notification Level, above which local government notification is required and customer notification is recommended. Second number is the Response Level, at which the drinking water source is recommended to be taken out of service.
[29] Calculated from published Reference Dose using assumptions of 70 kg body weight, 2 liters/day water consumption, and 20% relative source contribution from drinking water. An additional uncertainty factor of 10 used for Class C and S carcinogens. (US EPA IRIS Reference dose as drinking water level
[30] For 1,2- and 1-3-dichlorobenzenes.
[31] The sum of aldicarb, aldicarb sulfoxide and aldicarb sulfone should not exceed 7 ug/L because of similar mod of action. Administrative stay of the effective date.
[32] For total trihalomethanes (sum of bromoform, bromodichloromethane, chloroform and dibromochloromethane); based largely on technology and economics.
[33] For five haloacetic acids (sum of monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid).
[34] Treatment Technique: Not to exceed 0.01% residual when dosed at 20 mg/L for drinking water treatment.
[35] Measured as ClO2. Maximum residual disinfectant level.
[36] Measured as Cl2. Maximum residual disinfectant level.
[37] Cancer risk at Notification Level is 1 in 100,000. 1 in 1,000,000 cancer risk at 0.001 ug/L.
[38] Draft / tentative / provisional

Table 4. Recommended Sample Containers and Preservation

Analysis	Container	Volume (ml)	Preservation	Holding Time	Notes
Primary Constituents (CCR § 64431)					
Aluminum	HDPE	500	HN03, pH <2	6 months	(2)
Antimony	HDPE	500	HN03, pH <2	6 months	(2)
Arsenic	HDPE	500	HN03, pH <2	6 months	(2)
Asbestos	P	1,000	Cool, 4 C	48 hours	
Barium	HDPE	500	HN03, pH <2	6 months	(2)
Beryllium	HDPE	500	HN03, pH <2	6 months	(2)
Cadmium	HDPE	500	HN03, pH <2	6 months	(2)
Chromium (total)	HDPE	500	Cool, 4 C	24 hours	
Cyanide	P	500	Ascorbic Acid and NaOH, pH >12, Cool,	14 days	
Fluoride	P	500	Cool, 4 C	28 days	
Mercury (inorganic)	HDPE	500	HN03, pH <2	28 days	
Nickel	HDPE	500	HN03, pH <2	6 months	(2)
Nitrate (as NO3)	P	500	Cool, 4 C	48 hours	
Total Nitrate + Nitrite (as Nitrogen)	P	500	H2SO4, pH <2, Cool, 4 C	28 days	
Nitrite (as Nitrogen)	P	500	Cool, 4 C	48 hours	
Selenium	HDPE	500	HN03, pH <2	6 months	(2)
Thallium	HDPE	500	HN03, pH <2	6 months	(2)
Secondary Constituents (CCR § 64449)					
Aluminum	HDPE	500	HN03, pH <2	6 months	(2)
Chloride	P	500	Cool, 4 C	28 days	
Color	P	500	Cool, 4 C	48 hours	
Copper	HDPE	1,000	HN03, pH <2	2 weeks	(1)
Foaming agents (MBAS)	P	500	Cool, 4 C	48 hours	
Iron	HDPE	500	HN03, pH <2	6 months	(2)
Manganese	HDPE	500	HN03, pH <2	6 months	(2)
Methyl-tert-butyl ether (MtBE)	G, VOA, TFE-septa cap TFE-septa cap	2 x 40	Unchlorinated: HCl; Cool 4C	14 days	(3), (4)
Odor - Threshold	P	500	Cool, 4 C	24 hours	
Silver	HDPE	500	HN03, pH <2	6 months	(2)
Specific conductance (EC)	P	500	Cool, 4 C	28 days	
Sulfate	P	500	Cool, 4 C	28 days	
Thiobencarb	G, amber, TFE-septa ca TFE-lined cap	1 x 1000	Cool, 4 C	7 days	(4)
Total dissolved solids (TDS)	P	500	Cool, 4 C	7 days	
Turbidity	P	500	Cool, 4 C	48 hours	
Zinc	HDPE	500	HN03, pH <2	6 months	(2)
Other required analyses (CCR § 64449 (b)(2); CCR § 64670)					
Bicarbonate	P	500	Cool, 4 C	14 days	
Calcium	HDPE	500	HN03, pH <2	6 months	(2)
Carbonate	P	500	Cool, 4 C	14 days	
Copper	HDPE	1,000	HN03, pH <2	2 weeks	(1)
Hardness	P	500	HNO3, pH <2, Cool, 4 C	6 months	
Hydroxide alkalinity	P	500	Cool, 4 C	14 days	
Lead	HDPE	1,000	HN03, pH <2	2 weeks	(1)
Magnesium	HDPE	500	HN03, pH <2	6 months	(2)
Orthophosphate	P	500	Cool, 4 C	48 hours	
pH	P,G	500	Cool, 4 C	2 hours	
Silica	P	500	Cool, 4 C	28 days	
Sodium	HDPE	500	HN03, pH <2	6 months	(2)
Temperature					

Table 4. Recommended Sample Containers and Preservation

Analysis	Container	Volume (ml)	Preservation	Holding Time	Notes
Radiochemistry (CCR § 64442)					
Radioactivity, Gross Alpha	P		HN03, pH <2, Cool, 4 C	N/A	
Microbiology					
Cryptosporidium	Bacti Bottle	120	Sterile w/Na2S204	24 hrs	
Fecal Coliform	Bacti Bottle	120	Sterile w/Na2S204	8 hrs	
Giardia	Bacti Bottle	120	Sterile w/Na2S204	24 hrs	
Total Coliform bacteria	Bacti Bottle	120	Sterile w/Na2S204	24 hrs	
Organic Constituents (CCR § 64444)					
EPA 504.1 method	G, VOA, TFE-septa cap	2 x 40	Cool, 4 C	14 days	(3), (4)
EPA 505	G, VOA, TFE-septa cap	2 x 40	Cool, 4 C	7 days	(3)
EPA 508 Method	G, amber, TFE-lined cap	1 x 1000	Cool, 4 C	7 days	
EPA 515.3 Method	G, amber, TFE-lined cap	1 x 250	Cool, 4 C	14 days	
EPA 524.2 Method (Volatile Organic Che	G, VOA, TFE-septa cap	2 x 40	HCl; Cool 4C	14 days	
EPA 525.2 Method	G, amber, TFE-lined cap	1 x 1000	Cool, 4 C	7 days	
EPA 531.1 Method	G, amber, TFE-lined cap	1 x 125	3.6 Monoacetic acid buffer;		
EPA 547 Method	G, amber	1 x 125	Cool, 4 C	6 months	
EPA 548.1 Method	G, amber	1 x 250	Cool, 4 C	7 days	
EPA 549.2 Method	G, amber, silanized	1 x 1000	Cool, 4 C	7 days	
EPA 613 Method	G, amber	2 x 1000	Cool, 4 C	30 days	

Table 5. Recommended Sample Containers and Preservation - Bacterial Organisms

Parameter	Sample Bottle	Typical Sample Volume	Initial Field Preservation	Preferred / Maximum Holding Times
Cryptosporidium	Sterile plastic 10L cubitainer	10 L	Filter 10 L	Non-regulatory purposes: Examine within 1 hour; refrigerate or place on wet ice and process within 6 hours. Chill (do not freeze) to below 10 degrees C; maximum transport time is 6 hours; start analysis within 72 hours
Fecal Coliform	Factory-sealed, pre-sterilized, disposable Whirl-pak bags or sterile plastic sampling bottle	100 mL	Sodium thiosulfate is pre-added to the containers in the laboratory for chlorine elimination. Cool to 4 degrees C, dark.	Non-regulatory purposes: Examine within 1 hour; refrigerate or place on wet ice and process within 6 hours. Chill (do not freeze) to below 10 degrees C; maximum transport time is 6 hours; start analysis within 24 hours
Giardia	Sterile plastic 10L cubitainer	10 L	Filter 10 L	Non-regulatory purposes: Examine within 1 hour; refrigerate or place on wet ice and process within 6 hours. Chill (do not freeze) to below 10 degrees C; maximum transport time is 6 hours; start analysis within 72 hours
Total Coliform	Factory-sealed, pre-sterilized, disposable Whirl-pak bags or sterile plastic sampling bottle	100 mL	Sodium thiosulfate is pre-added to the containers in the laboratory for chlorine elimination. Cool to 4 degrees C, dark.	Non-regulatory purposes: Examine within 1 hour; refrigerate or place on wet ice and process within 6 hours. Chill (do not freeze) to below 10 degrees C; maximum transport time is 6 hours; start analysis within 24 hours

Adapted from BioVir, June 2002, State Board, December 2002, and Reclamation, May 2001.

Table 6. Recommended Field Measurements

Parameter	Sample Bottle	Preferred / Maximum Holding Times
Conductivity	plastic bottle or measure directly	Measure immediately; may refrigerate up to 24 hours
pH	plastic bottle or measure directly	Measure immediately
Temperature	plastic bottle or measure directly	Measure immediately
Turbidity	plastic bottle or measure directly	Measure immediately; may refrigerate up to 24 hours

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Table 7. Laboratory Analytical Methods and Data Quality Objectives

Constituent	Method	Units	Detection Limits	Type	Accuracy %Recovery	Type
Primary Constituents (CCR § 64431)						
Aluminum	EPA 200.8	ug/L	10	Reg	90-110%	Reg
Antimony	EPA 200.8	ug/L	1	Reg	90-110%	Reg
Arsenic	EPA 200.8	ug/L	2	Reg	90-110%	Reg
Asbestos						
Barium	EPA 200.8	ug/L	0.2	Reg	90-110%	Reg
Beryllium	EPA 200.8	ug/L	0.2	Reg	90-110%	Reg
Cadmium	EPA 200.8	ug/L	0.2	Reg	90-110%	Reg
Chromium (total)	EPA 200.8	ug/L	1	Reg	90-110%	Reg
Cyanide	SM 4500 CN E	mg/L	0.01	FGL-36	91-116	FGL-36
Fluoride	EPA 300.0	mg/L	0.1	FGL-36	90-110	Reg
Mercury (inorganic)	EPA 245.1	ug/L	0.01	Reg	85-115%	Reg
Nickel	EPA 200.8	ug/L	1	Reg	90-110%	Reg
Nitrate (as NO3)	EPA 300.0	mg/L	0.4	FGL-36	90-110	Reg
Total Nitrate + Nitrite (as Nitrogen)						
Nitrite (as Nitrogen)	SM 4500 NO2	mg/L	0.1	FGL-36	90-110	Reg
Selenium	EPA 200.8	ug/L	2	Reg	90-110%	Reg
Thallium	EPA 200.8	ug/L	0.2	Reg	90-110%	Reg
Secondary Constituents (CCR § 64449)						
Aluminum	EPA 200.8	ug/L	10	Reg	90-110%	Reg
Chloride	EPA 300.0	mg/L	1	FGL-36	90-110	Reg
Color						
Copper	EPA 200.8	ug/L	1	Reg	90-110	Reg
Foaming agents (MBAS)	SM 5540C	mg/L	0.1	FGL-36	77-109	FGL-36
Iron	EPA 200.7	ug/L	50	Reg	90-110	Reg
Manganese	EPA 200.8	ug/L	0.5	Reg	90-110	Reg
Methyl-tert-butyl ether (MtBE)						
Odor - Threshold	SM 5520B	TON	1	n/a	n/a	n/a
Silver	EPA 200.8	ug/L	1	Reg	90-110%	Reg
Specific conductance (EC)	SM 2510B	umhos/cm	1	FGL-36	95-105	FGL
Sulfate	EPA 300.0	mg/L	20	FGL-36	90-110	Reg
Thiobencarb	EPA 507	ug/L	1	FGL-36	70-130	Reg
Total dissolved solids (TDS)	SM 2540C	mg/L	40	FGL-36	90-110	FGL-36
Turbidity	SM 2130B	NTU	0.2	FGL-36	90-110	Reg
Zinc	EPA 200.7	ug/L	20	Reg	90-110	Reg

Table 7. Laboratory Analytical Methods and Data Quality Objectives

Constituent	Method	Units	Detection Limits	Type	Accuracy %Recovery	Type
Other required analyses (CCR § 64449 (b)(2); CCR § 64670)						
Bicarbonate	SM 2320B	mg/L	10	FGL-3δ	n/a	n/a
Calcium						
Carbonate	SM 2320B	mg/L	10	FGL		
Copper	EPA 200.8	ug/L	1	Reg	90-110	Reg
Hardness	SM 2340B	mg/L	2.5			
Hydroxide alkalinity	SM 2320	mg/L	10	FGL-3δ	90-110	FGL
Lead	EPA 200.8	ug/L	0.2	Reg	90-110%	Reg
Magnesium	EPA 200.7	mg/L	1	Reg	90-110	Reg
Orthophosphate						
pH	SM 4500 HB	mg/L	n/a	FGL-3δ	95-105	Reg
Silica						
Sodium	EPA 200.7	mg/L	1	Reg	90-110	Reg
Temperature						
Radiochemistry (CCR § 64442)						
Radioactivity, Gross Alpha	EPA 900.0	pCi/L	1	Reg	75-125%	Reg
Microbiology						
Cryptosporidium						
Fecal Coliform	SM 9221E	MPN/100mL	1.1		PT Study/Twice per Year	Reg
Giardia						
Total Coliform bacteria	SM 9221A, B	MPN/100mL	1.1		PT Study/Twice per Year	Reg
Organic Constituents (CCR § 64444)						
EPA 504.1 method						
1,2-Dibromo-3-chloropropane	EPA 504	ug/L	0.01	Reg	70-130%	Reg
Ethylene dibromide (EDB)						
EPA 505						
Chlordane	EPA 505	ug/L	0.1	FGL-±	50-150%	FGL-±
Endrin	EPA 505	ug/L	0.01	FGL-3δ	63-141%	FGL-3δ
Heptachlor	EPA 505	ug/L	0.01	FGL-3δ	51-162%	FGL-3δ
Heptachlor epoxide	EPA 505	ug/L	0.01	FGL-3δ	66-134%	FGL-3δ
Hexachlorobenzene	EPA 505	ug/L	0.01	FGL-3δ	65-146%	FGL-3δ
Hexachlorocyclopentadiene	EPA 505	ug/L	0.1	FGL-3δ	57-151%	FGL-3δ
Lindane (gamma-BHC)	EPA 505	ug/L	0.05	FGL-3δ	54-145%	FGL-3δ
Methoxychlor	EPA 505	ug/L	0.1	FGL-3δ	57-163%	FGL-3δ
Polychlorinated biphenyls	EPA 505	ug/L	0.5	FGL-±	50-150%	FGL-±
Toxaphene	EPA 505	ug/L	0.5	FGL-±	50-150%	FGL-±
EPA 508 Method						
Alachlor	EPA 505	ug/L	0.2	FGL-3δ	48-163%	FGL-3a
Atrazine	EPA 507	ug/L	1	FGL-3δ	70-130	Reg
Simazine	EPA 507	ug/L	1	FGL-3δ	70-130	Reg

Table 7. Laboratory Analytical Methods and Data Quality Objectives

Constituent	Method	Units	Detection Limits	Type	Accuracy %Recovery	Type
EPA 515.3 Method						
Bentazon	EPA 515.3	ug/L	2	Reg	70-130 %†	Reg
2,4-D	EPA 515.3	ug/L	2	Reg	70-130 %†	Reg
Dalapon	EPA 515.3	ug/L	5	Reg	70-130 %†	Reg
Dinoseb	EPA 515.3	ug/L	1	Reg	70-130 %†	Reg
Pentachlorophenol	EPA 515.3	ug/L	0.2	Reg	70-130 %†	Reg
Picloram	EPA 515.3	ug/L	1	Reg	70-130 %†	Reg
2,4,5-TP (Silvex)	EPA 515.3	ug/L	1	Reg	70-130 %†	Reg
EPA 524.2 Method (Volatile Organic Chemicals)						
Benzene	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
Carbon tetrachloride	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
1,2-Dibromoethane	EPA 504	ug/L	0.02	Reg	70-130%	Reg
1,2-Dichlorobenzene	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
1,4-Dichlorobenzene	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
1,1-Dichloroethane	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
1,2-Dichloroethane	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
1,1-Dichloroethylene	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
cis-1,2-Dichloroethylene	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
trans-1,2-Dichloroethylene	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
Dichloromethane	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
1,2-Dichloropropane	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
1,3-Dichloropropene	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
Ethylbenzene	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
Methyl-tert-butyl ether (MtBE)	EPA 524.2	ug/L	2	FGL-36	70-130 %†	Reg
Monochlorobenzene	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
Styrene	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
1,1,2,2-Tetrachloroethane	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
Tetrachloroethylene (PCE)	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
Toluene	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
1,2,4-Trichlorobenzene	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
1,1,1-Trichloroethane	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
1,1,2-Trichloroethane	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
Trichloroethylene (TCE)	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
Trichlorofluoromethane	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
1,1,2-Trichloro-1,2,2-trifluoroetl	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
Total Trihalomethanes						
Vinyl chloride	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
Xylene(s)	EPA 524.2	ug/L	0.5	FGL-36	70-130 %†	Reg
EPA 525.2 Method						
Benzo(a)pyrene	EPA 525.2	ug/L	0.1	FGL	70-130 %†	FGL
Di(2-ethylhexyl)adipate	EPA 525.2	ug/L	3	FGL	70-130 %†	FGL
Di(2-ethylhexyl)phthalate	EPA 525.2	ug/L	1	FGL	70-130 %†	FGL
Molinate	EPA 507	ug/L	2	FGL-36	70-130	Reg
Thiobencarb	EPA 507	ug/L	1	FGL-36	70-130	Reg
EPA 531.1 Method						
Carbofuran	EPA 531.1	ug/L	5	FGL-36	70-134%	FGL-36
Oxamyl	EPA 531.1	ug/L	5	FGL-36	73-134%	FGL-36

Table 7. Laboratory Analytical Methods and Data Quality Objectives

Constituent	Method	Units	Detection Limits	Type	Accuracy %Recovery	Type
EPA 547 Method						
Glyphosate	EPA 547	ug/L	20	FGL-±	70-130%	REG
EPA 548.1 Method						
Endothal	EPA 548.1	ug/L	40	FGL-3δ	51-120%	FGL-3δ
EPA 549.2 Method						
Diquat	EPA 549.2	ug/L	2	FGL-3δ	10-120%	FGL-3δ
EPA 613 Method						
2,3,7,8-TCDD (Dioxin)						

Table 8. Field Measurement Parameters, Methods, and Data Quality Objectives

Constituent	Method	Units	Reporting Limit	Sensitivity	Completeness	Corrective Actions
Flow (canal)	Stage in canal	cfs	10	1 cfs	80%	Qualify data or re-measure
Flow (discharge pipe)	Totalizing flow meter on discharge pipe	acre-feet	10	1 cfs	80%	Qualify data or re-measure
pH	Portable pH meter	units	2.0	0.1 unit	80%	Qualify data or re-measure
Electrical Conductivity	Portable EC meter	µS/cm	10	10 µS/cm	80%	Qualify data or re-measure
Temperature	Digital thermometer	degrees F or C	10	1 F or C	80%	Qualify data or re-measure
Turbidity	Portable turbidity meter or Secchi disk	NTU	0.1	0.1 NTU	80%	Qualify data or re-measure

Table 9. Validation and Verification Methods

Type of QA Sample	Verification Method
Duplicates	For values ≥ 5X Reporting Limit, RPD ≤ 20%; For values < 5X Reporting Limit, values may vary ± 1X Reporting Limit
Spikes	Recovery should be 80%-120%; Limit does not apply when sample value exceeds spike concentration by > 5 times
Reference Materials	Recovery should be 80%-120% of certified value for values ≥ 5X Reporting Limit; For values < 5X Reporting Limit, recovery should be ± 1X Reporting Limit from the certified value
Blanks	Blank concentration should be less than 10% of lowest sample concentration or less than two times the reporting limit.

Table 10. Summary of Quality Control Requirements - Field measurements

Parameter	Rinse with Environmental Water or Standard to be Measured	Calibration with Reference Standard	Verification of Calibration with Reference Standard
pH	Before equipment use	Before equipment use	After equipment use
Electrical Conductivity	Before equipment use	Before equipment use	After equipment use
Turbidity	Before equipment use	Before equipment use	After equipment use
Temperature	Before equipment use	Before equipment use	After equipment use

Table 11. Instrument Calibration and Frequency - Field Equipment

Equipment	Calibration Frequency	Standard or Calibration Instrument
pH meter	Every sampling day	pH 7.0 buffer and one other standard
Conductivity meter	Every sampling day	Conductivity standard and distilled water
Turbidity meter	Every sampling day	For clear, ambient conditions, use a 1.0 NTU standard; for turbid conditions, use a 10 NTU standard
Thermometer	Quarterly	Compare with mercury thermometer in ambient water and ice water.

DRAFT ENVIRONMENTAL ASSESSMENT (07-103)

25-YEAR WARREN ACT CONTRACT AND LICENSE FOR DELTA LANDS RECLAMATION DISTRICT 770

Appendix B
Potential Recipients of Non-CVP Floodwater

January 2012

Potential Recipients of RD770 Non-CVP Floodwater

Alpaugh Irrigation District (AID)

AID was formed in 1915 and is located in Tulare County approximately 15 miles south of Corcoran and 15 miles northwest of Delano. AID is comprised of approximately 10,500 acres, of which 5,400 are irrigated. AID's primary source of water is groundwater pumping from 18 wells which deliver approximately 14,000 acre-feet (AF) per year (AFY). AID has approximately 45 miles of unlined canals, approximately 25 miles of pipeline, and three regulating reservoirs. Collectively, the reservoirs cover approximately 800 acres and maximum capacity of 4,000 AF. AID also provides approximately 300 AFY of municipal and industrial (M&I) water supply to the community of Alpaugh which has a population of approximately 1,150. In 1975, AID entered into a contract with the County of Tulare as a subcontractor for 100 AF of Central Valley Project (CVP) water. AID receives its CVP water supplies from the Friant-Kern Canal (FKC) via Deer Creek. AID does not have any other contracts or water rights to surface water supplies. However, during wet years the district has been able to utilize excess waters available in the Homeland Canal located on the westerly side of AID, which if not used, would flow into the historic Tulare Lake. The main crops grown in AID are cotton, alfalfa, barley, and wheat.

Arvin-Edison Water Storage District (AEWSD)

AEWSD is located in Kern County in the southeasterly portion of the San Joaquin Valley. AEWSD was formed in 1942 and currently comprises 132,000 acres, of which 109,230 acres are irrigated. Urbanization has changed approximately 2,500 acres of agricultural lands to M&I. The main crops in AEWSD are grapes, carrots, potatoes, oranges, and wheat.

AEWSD has a 9(d) Repayment Contract with the Bureau of Reclamation (Reclamation) for 40,000 AF of Class 1 and 311,675 AF of Class 2 water supplies. The Class 2 water supply comprises a large fraction of their contract allocation. However, this supply is variable. AEWSD manages this supply by using transfers and exchanges as well as an underlying groundwater reservoir to regulate water availability and to stabilize water reliability by percolating water through various spreading basins. Gravity and pressure fed ponds are filled from surface water supplies in "wet" years, while groundwater wells are used to extract stored water in "dry" years.

In addition, AEWSD engages in "Article 5 exchanges" of CVP water with Cross Valley (CV) Contractors. Historically, up to 128,300 AFY of CV Contractor's CVP water or other water supplies were delivered to AEWSD. This water is diverted from the Sacramento-San Joaquin River Delta (Delta) through the California Aqueduct (Aqueduct) and to the Cross Valley Canal (CVC). In exchange, the Friant CVP water that would have flowed down the Friant-Kern Canal (FKC) to AEWSD is diverted from the FKC by the CV Contractors. Due to the variances in allocations of Friant CVP water, these exchanges may not balance out each year. However, modeling indicates that over the long-term the amounts of water would roughly balance. Two of the CV contractors have terminated their exchange arrangements with AEWSD resulting in up to 70,984 AFY maximum being delivered to the remaining six CV contractors and up to 66,096 AFY of water returned to AEWSD. Over the last five years, on average, approximately 30,000 AFY have been exchanged (from various sources) between AEWSD and CV contractors.

In 1997, AEWSD entered into a 25-year agreement with the Metropolitan Water District of Southern California (MWD), in which the AEWSD agreed to bank approximately 250,000 AF of MWD's State Water Project (SWP) supply for later extraction in drought years. AEWSD has completed construction of an Intertie pipeline connecting the terminus of its canal to the Aqueduct to enhance its water banking and exchange program.

Atwell Island Water District (AIWD)

AIWD is located in the southeastern portion of Tulare Lakebed and is a part of Reclamation's Atwell Island Restoration Project a component of the Farmland Retirement Program. Land within AIWD is currently managed by the Bureau of Land Management for the benefit of native wildlife including mountain plover, Tipton's kangaroo rat, San Joaquin kit fox, tricolored blackbird, burrowing owls, horned lizards, and the blunt-nosed leopard lizard.

AIWD is a County of Tulare subcontractor for 50 AFY CVP water which is conveyed to AIWD from the Deer Creek turnout off the FKC. Extensive conveyances exist within AIWD that are exclusively farmer-owned.

Berrenda Mesa Project

The Berrenda Mesa Project has 250 acres of recharge ponds, capable of recharging about 58,000 AFY. This project is integrated with the Pioneer Project and is operated by Kern County Water Agency (KCWA) and sponsored by Berrenda Mesa Water District (BMWD) with other local agricultural and urban water agency participants. The Project includes a groundwater recharge program that diverts and/or pumps surplus water from the Kern River or CVC into off-channel spreading facilities adjacent to the Kern River. The Project owns 547 acres and presently has 13 extraction wells. The Berrenda Mesa Project has the ability to take RD770 non-CVP floodwater supplies via the FKC through the CVC and Intertie. For purposes of this Environmental Assessment (EA), RD770's non-CVP floodwater would be used for groundwater recharge purposes only since banking is not a component of the Proposed Action

Cawelo Water District (CWD)

CWD is a KCWA member unit and receives 32,000 AF of SWP water through the Aqueduct and the CVC. CWD supplies irrigation water to nearly 45,000 acres of crops including grapes, citrus, almonds and pistachios. CWD is a non-CVP contractor since they have never had a long-term CVP water service contract although they have had a number of temporary contracts. CWD is located in the north-central portion of Kern County, between State Route 65 on the east and State Route 99 on the west and extending from Seventh Standard Road in Bakersfield on the south to McFarland on the north, just easterly of the FKC alignment. CWD's other sources of water include stored Kern River water, oilfield produced water, Poso Creek water, and groundwater. CWD would take delivery of RD770's non-CVP floodwater from the FKC via the CVC turnout and Intertie.

City of Bakersfield's 2800 Acre Groundwater Recharge Project

The City of Bakersfield acquired 2,760 acres of land in and adjacent to the flood plain of the Kern River channel and has developed spreading basins for groundwater recharge on 1,537 acres. Through spreading agreements with the KCWA, the project recharges Kern River, CVP, SWP, and other surface waters. A portion of this water is later extracted to meet urban and agricultural water needs in the area. The project has the ability to take RD770 non-CVP

floodwater supplies via the FKC through the CVC and Intertie. For purposes of this EA, RD770's non-CVP floodwater would be used for groundwater recharge purposes only since banking is not a component of the Proposed Action

City of Lindsay

The City of Lindsay is located on the east side of the San Joaquin Valley in Tulare County near the base of the Sierra foothills. The City of Lindsay has a 9(d) Repayment Contract with Reclamation for 2,500 AFY of Class 1 water used for M&I purposes. CVP water is delivered to the City of Lindsey from the FKC at the Honolulu Street turnout. A water treatment plant is at the same location and provides filtration, chemical additions and chlorination. The City of Lindsey is also a County of Tulare subcontractor for 50 AFY of CVP water. Lindsay, among others, is in a process to have their portion of the County of Tulare contract assigned directly to them.

County of Tulare

The County of Tulare entered into a long-term water service contract with Reclamation in 1975 for 5,308 AFY CVP Delta water (current contract number 14-06-200-8293A-IR12). The County of Tulare has 10 subcontractors that are the recipients of this CVP Delta contract water which include: AID (100 AF), AIWD (50 AF), Hills Valley Irrigation District (HVID – 2,913 AF), City of Lindsay (50 AF), Saucelito Irrigation District (SID – 100 AF), Fransinetto Farms L.L.C. (formerly Smallwood Vineyards – 400 AF), Stone Corral Irrigation District (SCID – 950 AF), Strathmore Public Utility District (Strathmore PUD – 400 AF), Styro-Tek, Inc. (45 AF), and the City of Visalia (300 AF). These subcontractors can take delivery of RD770 non-CVP floodwater from FKC turnouts as agreed upon by the County of Tulare's monthly water delivery schedules.

Delano-Earlimart Irrigation District (DEID)

DEID is located in Tulare and Kern counties on the eastern side of the San Joaquin Valley, approximately 10 miles from the Sierra Nevada foothills. DEID has a 9(d) Repayment Contract with Reclamation for 108,800 AF Class 1 and 74,500 AF Class 2 supplies for agricultural and M&I purposes received off the FKC. When available, the district also receives 215 Water (surplus CVP water) through annual contracts with Reclamation.

DEID delivers surface water to approximately 400 landowners on roughly 56,500 acres of land through a completely piped system consisting of approximately 172 miles of pipeline, 527 irrigation turnouts, and 79 smaller metered deliveries to M&I water users. Currently, DEID provides 99 percent of its water supply for irrigation purposes and less than one percent (200 AFY) to industrial uses. Farmers within DEID pump groundwater from privately-owned wells when surface water supplies are insufficient to meet their irrigation needs.

Exeter Irrigation District (EID)

EID is located in Tulare County on the east side of the San Joaquin Valley, nine miles east of the City of Visalia. EID has a 9(d) Repayment Contract with Reclamation for 11,500 AFY of Class 1 and 19,000 AFY of Class 2 water. The City of Exeter is located within EID. However, EID serves only agricultural water. EID maintains two small balancing or regulating reservoirs with a capacity of less than one AF each.

Hills Valley Irrigation District (HVID)

HVID is located in Fresno County about 20 miles east of Fresno and 5 miles north of Orange Cove with a small portion located in Tulare County. HVID does not maintain a central office or full time staff. The operations and maintenance of the facilities are conducted through a contractual agreement with a private contractor. HVID is a CV CVP contractor with a water service contract (Contract No. 14-06-200-8446A-IR13) for 3,346 AF with Reclamation from the Delta. In addition, HVID is a subcontractor with the County of Tulare for 2,908 AF of CVP Delta water (Contract No. 14-06-200-8293A-IR13).

HVID's distribution system is comprised of approximately 11 miles of pipeline and 3 regulating reservoirs. HVID does not have any groundwater extraction facilities; therefore, landowners must provide their own wells to sustain irrigation during periods when surface water supplies are inadequate. Typically, the landowners with wells extract groundwater in the spring when the groundwater levels are at their highest. The main crops are oranges, prunes/plums and grapes.

Ivanhoe Irrigation District (IID)

IID, formed in 1948, is located in Tulare County on the east side of the San Joaquin Valley approximately 50 miles southeast of Fresno and 8 miles northeast of Visalia. IID is generally located between the St. John's River on the south and Cottonwood Creek on the north. IID has a 9(d) Repayment Contract with Reclamation for 7,700 AFY of Class 1 and 7,900 AFY of Class 2 water for agricultural purposes. On March 1, 2010, IID partially assigned of 7,400 AFY of Class 2 and 1,200 AFY of Class 1 CVP water to Kaweah Delta Water Conservation District (KDWCD). Their remaining CVP allocation is 6,500 AFY of Class 2 and 500 AFY of Class 1.

The district's non-CVP water supplies are diverted from the Kaweah River through the Wutchumna Ditch to the district's diversion facility and are co-mingled with its CVP supply. IID obtains its CVP water supplies through two turnouts on the FKC. The district's distribution system comprises approximately 48 miles of pipeline and three groundwater recharge areas. The three groundwater recharge areas cover approximately 15 acres and are used when surplus water is available. Approximately three miles of a portion of Cottonwood Creek is also used for recharge purposes. IID does not own or operate groundwater extraction facilities.

Kaweah-Delta Water Conservation District (KDWCD)

KDWCD was formed in 1927, under the provisions of California state law known as the Water Conservation Act of 1927, for the purpose of conserving and storing waters of the Kaweah River and for conserving and protecting the underground waters of the Kaweah Delta. Later the Water Conservation Act, as well as the purpose of the KDWCD, was expanded to include power generation and distribution. KDWCD is located in the south central portion of the San Joaquin Valley and lies in both Tulare and Kings Counties. It fully encompasses the growing cities of Visalia, Farmersville and Tulare. The total area of the district is about 337,000 acres with approximately 255,000 acres located in western portion of Tulare County and the balance, or about 82,000 acres, in the northeastern portion of Kings County. KDWCD is comprised of four districts that are entirely or partially within KDWCD boundary. They include: Lakeside Irrigation Water District, Kings County Water District, Corcoran Irrigation District, and Tulare Irrigation District (TID).

District lands are primarily agricultural, although the cities of Visalia and Tulare constitute significant areas of urbanization. Farmersville is the other incorporated area. Smaller unincorporated rural communities include Goshen, Ivanhoe, Waukena, and Guernsey. Numerous public and private entities within the KDWCD's boundaries divert water from the Kaweah River and its distributaries. Nearly all of the lands served with Kaweah River water also use groundwater wells to supply irrigation water, primarily due to the erratic, relatively undependable, nature of flow on the Kaweah River. All M&I water uses within the KDWCD are supplied from groundwater. KDWCD can take delivery of CVP water from the FKC, which passes through the eastern portion of the district.

On March 1, 2010, KDWCD received a partial assignment of 7,400 AFY of Class 2 and 1,200 AFY of Class 1 CVP water from IID for agricultural purposes.

Kern County Water Agency (KCWA)

KCWA, created in 1961 by a special act of the State Legislature, comprises all of Kern County. KCWA holds the master contract with the State of California for delivery of a maximum yearly entitlement of 1,000,949 AF of SWP water supplies to its Member Units located within Kern County.

The CVC serves as KCWA's main conduit for delivery of SWP water to and from the Aqueduct. KCWA and various water districts contracted for the construction and operation of the CVC in the mid-1970s which has the ability to deliver up to 1,830 AF of water per day through seven lift stations. For purposes of this EA, only those KCWA Member Units that can take delivery of RD770's non-CVP floodwater from the FKC turnouts (including the CVC and Intertie) are considered Potential Recipients.

KCWA includes the potential for deliveries of RD770 non-CVP floodwater to Improvement District No. 4 (ID4) a separate function of the KCWA. ID4 provides a supplemental water supply for the Metropolitan Bakersfield area through the utilization of water through the SWP. Water delivered to ID4 is either directly recharged to replenish the underlying groundwater aquifer or delivered to the Henry C. Garnett Water Purification Plant where it is treated and then delivered to water purveyors served by ID4's water purification plant.

Kern Delta Water District (KDWD)

KDWD was formed in December 1965 under Division 13 of the State Water Code for the purposes of protecting the Kern River Water Rights serving certain lands within the District. Although KDWD was formed in a relatively recent period of time, the systems of canals that provide services to customers have existed since the late 1800's. KDWD currently serves State and Kern River Water to approximately 90,000 acres through five different water rights and points of diversion: Kern Island, Buena Vista, Stine, Farmers, and Eastside Canals. The total length of these canals is approximately 126 miles. KDWD also contracts with the KCWA for SWP water. Although cotton and alfalfa/hay still outnumber all other crops in total, the uses of land within the District are diversified. Some of these other crops include: corn, oats, wheat, grapes, a variety of melons, safflower, sod, strawberries, a sizeable amount of fruit trees, walnuts, almonds, pistachios, carrots, potatoes, and tomatoes. KDWD can take delivery of RD770 non-CVP floodwater to the lands it serves via the FKC and the AEWSD Main Intake turnout and canal.

Kern National Wildlife Refuge (KNWR)

KNWR is located 18 miles west of the city of Delano at the southern end of the San Joaquin Valley of California, just south of the Tulare Lake Bed. The refuge consists of 11,249-acres of natural valley grasslands, a relict riparian corridor, and developed marsh.

The Central Valley Project Improvement Act (CVPIA) Public Law 102-575, Title 34, Section 3406 (d)(1) contains provisions that require Reclamation to provide water for certain Federal, State, and private refuges (including KNWR). Pursuant to CVPIA, Level 2 refuge water supply is the minimum amount of water (measured in AF) required for basic development and management of suitable habitat conditions for migrating waterfowl and wildlife. Level 4 refuge water supply is the full amount required at these refuges for optimum development and management of suitable habitat conditions for migrating waterfowl and wildlife. The difference between Level 2 and Level 4 water supplies is referred to as "Incremental Level 4 water", which the CVPIA Water Acquisition Program (WAP) acquires from willing sellers. Level 2 and Incremental Level 4 water supplies are provided from CVP and non-CVP water (existing water rights or entitlement water) sources, respectively.

KNWR's Level 2 water supply of 9,950 AF is available in all years that are rated as better than critically dry, which is typical of most years. In critically dry years, the refuge receives only 75 percent of the Level 2 amount or approximately 7,460 AF. KNWR's Incremental Level 4 water supply is 15,050 AF. In most years, KNWR only receives on average 65 percent of their Level 4 water supply. Reclamation acquires Level 4 water supplies from willing sellers each year.

Kern-Tulare Water District (KTWD)

KTWD provides irrigation water to over 19,000 acres of crops in Kern and Tulare counties. The annual irrigation demand is approximately 54,000 AF, of which approximately 40,000 AF is provided through imported water. The remaining 14,000 AF are from groundwater pumped by water users. At the present time, 99 percent of irrigated lands are permanent plantings. The distribution system consists of 4 pumping plants located along the FKC, 4 regulating reservoirs, 7 re-lift pumping plants, and approximately 70 miles of buried pipelines. In addition, KTWD operates 2 pumping plants located in DEID reservoirs and 1 pumping plant located in a Southern San Joaquin Municipal Utility District (SSJMUD) reservoir.

KTWD has two contracts with Reclamation for a combined total of 53,000 AF from the CVP Delta Supplies (KTWD and Rag Gulch Water District consolidated in 2009). KTWD also has a contract with the City of Bakersfield for an average of 23,000 AFY of Kern River water. CVP water and Kern River water is delivered to KCWA Improvement District No. 4 in exchange for SWP water. The SWP water is conveyed through the CVC to the FKC, where it is either delivered directly to KTWD or exchanged with Friant Division contractors for water available in the FKC. KTWD can receive FKC water from shared turnouts located between mileposts (MP) 111.56 and 151.8 on the FKC.

KTWD also has existing 25-year groundwater banking programs with Rosedale-Rio Bravo Water Storage District and North Kern Water Storage District (NKWSD), respectively. For purposes of this EA, KTWD would not use RD770's non-CVP floodwater for groundwater banking since banking is not a component of the Proposed Action

Kern Water Bank Authority (KWBA)

KWBA is a Joint Powers Authority formed in 1995 pursuant to California Government Code 6500 et seq. KWBA is a public agency that includes as its members several water districts, a water agency, and a mutual water company. KWBA constructed and operates the Kern Water Bank on approximately 20,000 acres on the Kern River alluvial fan in Kern County for the benefit of its members. In proportion to their level of participation in the Kern Water Bank project, KWBA's members have access to recharge, storage, and recovery capacity. Members of KWBA include: Dudley Ridge Water District, KCWA on behalf of ID4, Semitropic Water Storage District (Semitropic), Tejon-Castac Water District, Westside Mutual Water Company, and Wheeler Ridge-Maricopa Water Storage District, none of which are CVP contractors. KWBA has the ability to take RD770 non-CVP floodwater supplies via the FKC through the CVC and Intertie. For purposes of this EA, RD770's non-CVP floodwater would be used for groundwater recharge purposes only since banking is not a component of the Proposed Action.

Lewis Creek Water District (LCWD)

LCWD is located on the east side of the San Joaquin Valley in Tulare County near the base of the Sierra Nevada foothills. LCWD has a 9(d) Repayment Contract with Reclamation for 1,450 AFY of Class 1 agricultural water supply. Agricultural industry within the district is built around citrus (oranges), and twelve orange packing houses, provide the major economic base for the area.

Lindmore Irrigation District (LID)

LID is located in Tulare County at the base of the Sierra Nevada foothills and lies over the Kaweah Basin. LID has a 9(d) Repayment Contract with Reclamation for 33,000 AFY of Class 1 and 22,000 AFY of Class 2 water for agricultural purposes. The safe groundwater yield for LID was calculated in 1987 to be 21,000 AFY. LID operates a conjunctive use program to manage surface and groundwater supplies. LID uses groundwater at the beginning of the growing season to warm the CVP water while filling the district's pipeline system. This reduces maintenance costs and leaks in the concrete irrigation pipes due to contraction of cold water. LID obtains their CVP supplies from four turnouts on the FKC between MP 88.4 and 93.2. LID's conveyance system comprises of 123 miles of pipeline and five reservoirs.

Lindsay-Strathmore Irrigation District (LSID)

LSID was formed in 1915. LSID's original imported water supply was from the Kaweah River through the district's ownership of Wutchumna Water Company stock and 39 deep wells. The supplies from the Wutchumna Water Company range from 5,000 to 14,000 AFY. LSID enters into Warren Act contracts with Reclamation to transport this water within the district using CVP facilities. The groundwater supply is limited to 18,000 AFY. LSID has a 9(d) Repayment Contract with Reclamation for 27,500 AFY of Class 1 agricultural water. LSID obtains their CVP water supplies from its turnout at MP 85.56 of the FKC. The district's distribution system is approximately 115 miles of pipeline and three balancing reservoirs. LSID operates five groundwater wells with a normal production of 1,750 gallons per minute. These wells are not utilized if surface water is available due to the high cost of pumping.

No usable groundwater basin underlies the district. LSID lies too far to the east against the foothills to be influenced by either the Kaweah or Tule Rivers. The district does not operate recharge areas or a conjunctive use program. LSID contractually uses the conjunctive use capacity of the Tulare Irrigation District, a common stockholder in the Wutchumna Water Company, by delivering the district's Kaweah River water through the Wutchumna Ditch to the TID turnout. TID either uses this water for irrigation (in lieu recharge) or direct sinking in their groundwater recharge basins. During "dry" years, TID's farmers utilize the groundwater delivered by LSID. TID returns surface water to LSID through either the FKC or through the Kaweah River system. LSID regularly transfers water to LID, which borders LSID on the west. Approximately 2,500 AFY is transferred to LID during normal water supply years.

Lower Tule River Irrigation District (LTRID)

LTRID's current facilities include approximately 163 miles of unlined earth canals and approximately 47 miles of river channel in Tulare County, California. Groundwater pumping was historically used to meet water demands prior to the creation of LTRID and the importation of supplemental surface water supplies. As a conjunctive use district, water supplies in LTRID include groundwater, water rights on the Tule River, and CVP water under two separate contracts. LTRID has a 9(d) Repayment Contract with Reclamation for 61,200 AFY of Class 1 and 238,000 AFY of Class 2 Friant Division water for agricultural purposes. LTRID also has a CV contract for 31,102 AFY of Delta water supplies.

North-Kern Water Storage District (NKWSD)

NKWSD water distribution system consists of a network of approximately 20 miles of lined canals and 65 miles of unlined canals. NKWSD's primary source of surface water is the Kern River, whose waters have been utilized under a schedule of long-standing diversion rights. This supply has occasionally been supplemented by water from Poso Creek, which transverses the northern portion of NKWSD. Poso Creek contributes to the underlying groundwater supply primarily through infiltration. While NKWSD is not a long-term CVP contractor, it has intermittently purchased and diverted "surplus" CVP water from Millerton Lake. Groundwater is used to satisfy all irrigation water requirements in excess of available surface water supplies.

Historical water supplies to NKWSD from the Kern River have ranged from less than 10,000 AFY to nearly 400,000 AFY. As a result of this highly variable water supply, NKWSD has developed an extensive groundwater recharge and extraction program using the groundwater reservoir to regulate its water supplies. NKWSD has successfully operated this program for over 50 years and seeks to enhance its existing program by expanding its exchange capabilities with other water agencies. For purposes of this EA, NKWSD would not use RD770's non-CVP floodwater for banking since banking is not a component of the Proposed Action.

Orange Cove Irrigation District (OCID)

OCID is located in Fresno and Tulare Counties and was formed in 1937. OCID has a 9(d) Repayment Contract with Reclamation for 39,200 AFY of Class 1 water for agricultural purposes. The district obtains their CVP water supplies from 15 diversion points on the FKC between MP 35.87 to 53.32. OCID's distribution system is 105 miles of pipeline and one regulating reservoir with a capacity of 8 AF. OCID does not supply any M&I water.

A groundwater basin is almost non-existent under OCID. The area immediately east of Smith Mountain and the area in the vicinity of Navelencia contain basin water. The majority of wells are located in this area. The safe yield has been determined to be 28,000 AFY. OCID does not operate any groundwater wells or recharge facilities due to the existing groundwater conditions. OCID provides approximately 1.4 AF per acre. Therefore, the balance of crop needs is made up from precipitation and groundwater pumping. The landowners in OCID manage the groundwater supplies through conjunctive use practices. OCID transfers unused water supplies out to other districts for storage and groundwater banking. OCID is pursuing partners for a long-term transfer program or groundwater banking program to balance water in wet and dry years. For purposes of this EA, RD770's non-CVP floodwater would be used for groundwater recharge purposes only since banking is not a component of the Proposed Action.

Pioneer Groundwater Banking Project

The Pioneer Project is a groundwater recharge and recovery project sponsored by KCWA which is located on the Kern River alluvial fan in Kern County. In 1992, KCWA purchased 2,253 acres of land to develop additional water recharge and banking facilities along the Kern River. KCWA's Pioneer Project has 1,200 acres of recharge ponds and an annual groundwater recharge capacity of approximately 146,000 AF. The Pioneer Project has 11 other local Kern County agricultural and urban water agency participants. The Pioneer Project provides for the coordinated operation of existing groundwater recharge and recovery facilities for the beneficial purposes of groundwater replenishment, recharge, storage, conservation, and recovery of surface water supplies. The Pioneer Project has the ability to take RD770 non-CVP floodwater supplies via the FKC through the CVC and Intertie. For purposes of this EA, RD770's non-CVP floodwater would be used for groundwater recharge purposes only since banking is not a component of the Proposed Action.

Other sources of water for KCWA's groundwater recharge programs include SWP water and Article 21 water, Friant Division Section 215 water, high flow Kern River supplies, and small amounts of minor stream flows.

Pixley Irrigation District (PXID)

PXID, formed in 1959, is located in Tulare County and bisected by State Route 99. The City of Pixley is located within the PXID's boundaries; however, PXID does not serve the City of Pixley. PXID currently comprises 69,550 acres, of which 48,302 are irrigated. Deer Creek flows westerly through the entire length of PXID. The FKC is located between one to five miles east of PXID's boundary.

Groundwater is the primary water supply available to lands within PXID. Privately owned wells currently provide water to all irrigated lands within the PXID. Approximately 31,957 acres of lands rely totally on groundwater pumping for irrigation. PXID has a 9(d) Repayment Contract with Reclamation for 31,102 AFY. PXID obtains their CVP supplies through four turnouts on the FKC into Deer Creek. PXID has 45 miles of unlined canals that convey water and provide groundwater recharge. PXID maintains and operates nine recharge and regulating basins covering approximately 330 acres. It is estimated that a third of the water imported by PXID has been directly recharged into the underground reservoir by PXID operations since PXID's inception.

Pixley National Wildlife Refuge (Pixley NWR)

Pixley NWR consists of 6,833 acres of valley grassland and wetland habitats located in southwestern Tulare County within the triangle formed by the towns of Stoil, Pixley, and Earlimart. It is bounded by Deer Creek on its south side.

Historically, due to the lack of a dependable water source, the refuge could not provide quality waterfowl habitat. It wasn't until 1992, when Congress passed the CVPIA that the refuge was provided with a reliable annual water allocation. Through a partnership with Ducks Unlimited in 1994, one deep ground water production well was installed that produces sufficient water for the refuge to flood and maintain approximately 300 acres of seasonal wetlands. In 2011, two new ground water production wells are being installed that together with the existing well would provide up to approximately 2,000 AFY. Pixley NWR's total CVPIA allocation is 6,000 AF (1,280 AF of Level 2 water and 4,720 AF of Incremental Level 4 water). Although no suitable canals or pipelines directly connect the refuge to the FKC, the refuge can receive water from the FKC through Deer Creek.

All wetlands at the refuge are seasonal in nature. Fall flood-up begins in mid-August and reaches a peak by October. Habitat is maintained through February after which a slow draining of the wetland begins. Selected units are irrigated during the late spring and early summer months to encourage plants to grow to provide food for wintering and migrating birds the following fall. Moist soil areas of Pixley NWR are covered by shallow water depths (less than 6-inches deep). They are maintained by irrigation in the late spring and summer to encourage food plant growth. Once every five years, moist soil units undergo a removal of all vegetation and a re-working of the soil to improve aeration and fertility.

Porterville Irrigation District (PID)

PID is located in Tulare County and was formed in 1949. PID has a 9(d) Repayment Contract with Reclamation for 16,000 AFY of Class 1 and 30,000 FY of Class 2 CVP water for agricultural purposes only. PID has an entitlement of 10,000 AFY of water supply from the Tule River. PID owns approximately four miles of pipeline and one percolation basin that serves 854 acres in one Improvement District and 3.3 miles of open ditch that serves 1,266 acres in a second Improvement District. PID obtains their CVP supplies from six diversion points on the FKC.

In addition to the district-owned facilities, PID has entered into agreements with LTRID and other entities to utilize non-district owned facilities to convey PID's water. PID also delivers its Tule River water through facilities owned by the Porter Slough Ditch Company, the Hubbs-Miner Ditch Company, the Rhodes-Fine Ditch Company and the Gilliam-McGee Ditch Company. These facilities consist of approximately 13 miles of unlined ditch within PID. PID also owns a portion of the water conservation space behind Success Dam. This storage space is used to store water rights water owned by ditch companies with which PID has operating agreements.

Rosedale Rio Bravo Water Storage District (RRBWSD)

RRBWSD, located west of the City of Bakersfield, was established in 1959 to develop a groundwater recharge program to offset overdraft conditions in the regional Kern County aquifer. RRBWSD currently manages approximately 300,000 AF of stored groundwater in

the underlying aquifer, which has an estimated total storage capacity in excess of 930,000 AF. RRBWSD acquires water from the Kern River, FKC (when available), and the SWP through a water supply contract with KCWA. RRBWSD would take delivery of RD770's non-CVP floodwater from the FKC via the CVC turnout and Intertie. For purposes of this EA, RRBWSD would not use RD770's non-CVP floodwater for banking since banking is not a component of the Proposed Action.

Saucelito Irrigation District (SID)

SID was formed in 1941. Deer Creek, an intermittent stream, crosses the district for about 5 miles from its southern boundary, but there are no district diversions off Deer Creek. SID has a 9(d) Repayment Contract with Reclamation for 21,200 AFY Class 1 and 32,800 AFY of Class 2 water for agricultural purposes. SID is also a County of Tulare subcontractor for 100 AFY.

SID also engages in exchanges with other CV contractors. SID obtains its CVP water supplies from four diversion points on the FKC between MP 11.64 and 107.35 and Deer Creek diversion at MP 102.69. The district's distribution system is 55 miles of pipeline with one recharge pond that covers approximately 0.5 acre.

SID has five individual water users that have rights in Popular Irrigation Company of 9.5 shares at 55 AF per share from Mole Ditch. Deer Creek provides groundwater recharge in wet years.

Semitropic Water Storage District

In 1995, Semitropic began implementation of the Semitropic Groundwater Banking and Exchange Program (Program). The Program is a long-term water storage program designed to recharge groundwater and reduce overdraft, increase operational reliability and flexibility, and optimize the distribution and use of available water resources between Semitropic and potential banking partners. Under the Program, the banking partner would deliver a portion of its excess SWP, CVP or other surface water supplies to Semitropic during periods when such water is available. Semitropic may use this water in lieu of pumping groundwater for irrigation or directly recharge the underlying groundwater basin. For purposes of this EA, Semitropic would not use RD770's non-CVP floodwater for banking since banking is not a component of the Proposed Action.

Shafter-Wasco Irrigation District (SWID)

SWID was formed in 1937 and is located in Kern County about 20 miles northwest of Bakersfield. SWID has a 9(d) Repayment Contract with Reclamation for 50,000 AFY of Class 1 and 39,600 AFY of Class 2 water for agricultural purposes only. The long-term average CVP water supply delivered to SWID is about 69,000 AF. The district does not have any other long-term surface water supplies. SWID obtains its CVP water supplies from two turnouts on the FKC at MP 134.4 and 137.2. The district's distribution system is 0.3 miles of lined canals and 117 miles of pipeline. SWID does not own or operate any water storage facilities or groundwater extraction facilities. Landowners must provide wells to meet irrigation demands when SWID does not have adequate surface water supplies available. SWID has historically transferred water to KTWD and banked and exchanged water with NKWSD. For purposes of this EA, NKWSD would not use RD770's non-CVP floodwater for banking since banking is not a component of the Proposed Action.

Southern San Joaquin Municipal Utility District (SSJMUD)
SSJMUD was formed in 1935 and is located in Kern County, approximately 75 miles southeast of Fresno and 30 miles northwest of Bakersfield. SSJMUD has a 9(d) Repayment Contract with Reclamation for 97,000 AFY of Class 1 and 50,000 AFY of Class 2 water for agricultural purposes. The district does not have other long-term surface water supplies. SSJMUD obtains its CVP water supplies from nine diversion points on the FKC between MP 119.6 and 130.4. The district's distribution system is 158 miles of pipeline. SSJMUD operates 11 regulating reservoirs that provide groundwater recharge. Poso Creek and other smaller foothill drainages also provide recharge to the groundwater. The district does not own and operate groundwater extraction facilities. Landowners must rely on well water to irrigate during times when SSJMUD does not have surface water supplies available to meet irrigation demands. SSJMUD does not typically transfer water in or out.

Stone Corral Irrigation District (SCID)
SCID, formed in 1948, has a 9(d) Repayment Contract with Reclamation for 10,000 AFY of Class 1 water for agricultural purposes. SCID receives 950 AFY of water through exchange arrangements with CV Contractors. The safe yield for the groundwater supply in SCID is approximately 3,200 AF. SCID obtains the CVP water from the FKC at MPs 57.90, 59.33, 60.90 and 62.68. SCID's conveyance system is 27 miles of pipeline. The main crops are citrus, cotton, deciduous and subtropical fruit trees.

Strathmore Public Utility District (Strathmore PUD)
Strathmore PUD is located in Strathmore, CA and serves the greater Strathmore area, including Strathmore High School and some nearby properties. Strathmore PUD's service area borders the service area of LSID. Strathmore's water supply is obtained through a partnership with LSID in which a portion of LSID's water supply, which includes CVP water, is blended with Strathmore PUD water for treatment at Strathmore PUD's water treatment facility. In return, Strathmore PUD receives a portion of the LSID's CVP allotment. The Strathmore PUD also has an underground water well that is used to supplement the district's surface water supply and as a back-up water supply. Approximately 45 percent of Strathmore PUD's water supply is derived from the well.

Tea Pot Dome Water District (TPDWD)
TPDWD was formed in 1954 and is located in southeastern Tulare County, approximately three miles south of Porterville. TPDWD relies primarily on CVP contract water supplies for irrigation. TPDWD has a 9(d) Repayment Contract with Reclamation for 7,500 AFY of Class 1 water for agricultural. TPDWD does not have any other long-term surface water supplies. The district does not own or operate groundwater recharge or extraction facilities. Landowners pump small amounts of groundwater. TPDWD receives its CVP water supplies from the FKC. The district's distribution system is 20 miles of pipeline.

Terra Bella Irrigation District (TBID)
TBID was formed in 1915 and is located in Tulare County about 75 miles southeast of Fresno and about eight miles south of Porterville. Deer Creek flows westerly and passes through the northern portion of the district. Fountain Spring Gulch flows in a northwest direction, traversing a portion of the district. TBID provides CVP and groundwater for domestic purposes and to the town of Terra Bella. TBID has a 9(d) Repayment Contract with Reclamation for 29,000 AFY of Class 1 water for agricultural and M&I purposes. TBID

receives its CVP water supplies from the FKC at MPs 103.64, MP 102.69 and Deer Creek to a percolation pond. The district's distribution system is 152 miles of pipeline. The district does not have any other long-term surface water supplies.

The district's deep well system is barely adequate to support small winter demands. Historically, there were a total of 83 wells drilled over the years in the district. Currently, TBID owns and operates 10 wells. The district uses three regulating reservoirs during the irrigation season and for storage in the winter. TBID has developed groundwater banking arrangements with other districts. Groundwater banking arrangements have enabled TBID, a groundwater deficient district, to produce crops during drought years. In years when surplus amounts of water are available, TBID transfers water to other districts for direct use, resale, or percolation through recharge basins. The district and LTRID have a long history of water exchanges. TBID transfers water to LTRID and, in turn, LTRID transfers water to TBID in dry years. For purposes of this EA, TBID would not use RD770's non-CVP floodwater for banking since banking is not a component of the Proposed Action.

Tri-Valley Irrigation District (TVWD)

TVWD is located in Fresno County east of Campbell Mountain and delivers water to lands on both sides of State Highway 180. TVWD serves 1,840 irrigable acres and is an original CVC participant. TVWD has a CVP CV water service contract for 1,142 AFY through a 3-party contract (Contract No. 14-06-200-8565A-IR13). The acreage within TVWD is planted exclusively to permanent crops.

Tulare Irrigation District (TID)

TID was formed in 1889 and is located in western Tulare County on the eastside of the San Joaquin Valley. TID provides only agricultural water supplies and does not service the city of Tulare. Water for Tulare is extracted from the ground and furnished through City-owned facilities. TID has a 9(d) Repayment Contract with Reclamation for 30,000 AFY of Class 1 and 141,000 AFY of Class 2 water. The district has pre-1914 water rights on the Kaweah River for approximately 50,000 AFY of water. Groundwater recharge occurs from percolation in the canals and natural channels, and treated M&I effluent. TID has 12 groundwater recharge areas covering a total of 1,110 acres. The district does not operate extraction wells. TID has an existing agreement for LSID to store groundwater and surface water supplies. TID obtains their CVP water supplies from its turnout which is located approximately 14 miles northeast of the district's service area. The water is conveyed in the district's Main Canal. Diversions into this Main Canal include water from the Kaweah and St. John's River. The Packwood Creek diversion system begins at the terminus of the Lower Kaweah River approximately 10 miles northeast of TID. The district's distribution system includes 300 miles of unlined canals, 0.25 mile of lined canal and 30 miles of pipeline.

Westside Mutual Water Company LLC (WMWC)

WMWC is a California limited liability company which does business in Fresno County, California. WMWC was established as a private mutual water company pursuant to Public Utilities Code §2725 to manage the water assets of its members and to provide water to its members at cost. WMWC's members include Paramount Farming Company LLC, Paramount Citrus LLC, and related companies, all of whom are engaged in agricultural business or farming. Many of its members are located in and around California's Central Valley, and in particular, on the west side of the Central Valley. WMWC has access to SWP

Table A supplies through its member's rights and contracts with the agencies that subcontract with the KCWA. WMWC also has access to Kern River water supplies via districts and entities as well as access to groundwater banking facilities located on the Kern Fan. Lands of WMWC members that can access RD770's Non-CVP floodwater from the FKC or the CVC are included as potential recipients. For purposes of this EA, WMWC members would not use RD770's non-CVP floodwater for banking since banking is not a component of the Proposed Action.

DRAFT ENVIRONMENTAL ASSESSMENT (07-103)

25-YEAR WARREN ACT CONTRACT AND LICENSE FOR DELTA LANDS RECLAMATION DISTRICT 770

Appendix C
Valley elderberry longhorn beetle avoidance and minimization measures

January 2012

Valley Elderberry Longhorn Beetle Avoidance and Minimization Measures

Provisions for avoidance and minimization of effects to valley elderberry longhorn beetle and its host plant, as required under the existing "O&M Biological Opinion" (1 -1-04-F-0368; Formal Endangered Species Consultation on the Operations and Maintenance Program Occurring on Bureau of Reclamation Lands within the South-Central California Area Office; Service 2005) or subsequent Biological Opinion(s) would apply to the Proposed Action.

Additionally, a programmatic formal consultation pursuant to section 7 of the Endangered Species Act (ESA) exists in regard to actions that the U.S. Army Corps of Engineers may take on projects with limited impacts on the valley elderberry longhorn beetle or its elderberry host plant within the jurisdiction of the Sacramento Field Office of the U.S. Fish and Wildlife Service (Service). If a project meets the conditions outlined in the programmatic document, or if Service determines that a project will have similar impacts to those described below, the project may be appended to the programmatic document. All projects implemented under the programmatic consultation must meet the following 4 criteria, or be determined by the Service to have impacts similar in nature:

- No designated critical habitat will be affected.
- Fewer than 25 elderberry plants are affected.
- Fewer than 200 elderberry stems measuring 1 inch or greater in diameter exist at ground level in the action area.
- Less than 250 linear feet of undeveloped watercourse exist in the action area.

While it is not Reclamation's intent to append the Proposed Action of issuance of a 25-year Warren Act contract and the issuance of a 25-year license to the District to the programmatic consultation, avoidance and minimization measures incorporated into the Proposed Action are consistent with the programmatic consultation because the Proposed Action area is within the jurisdiction of the Sacramento Field Office of the Service and the potential effects are similar in nature.

Under the Proposed Action, no construction activities will occur at any of the pump stations that would be used to divert floodwaters. The structural elements of each pump station, including discharge pipes, are currently in place. The only on-site activities that would occur under the Proposed Action are the installation of engines, fuel tanks, and other equipment prior to operation of the pump stations; operation of the pump stations, as necessary; and periodic maintenance of the pumps, all of which would occur within the confines of the fenced areas enclosing the pump stations. No ground disturbances would occur outside the fenced pump station areas. No pesticides or chemical sprays that could result in the poisoning of individual beetles or their host plant would be used.

The goal is to avoid and protect habitat and individual valley elderberry longhorn beetles. Buffer avoidance areas include all the area within 100 feet of any elderberry plant with a stem measuring 1-inch or greater at ground level. If complete avoidance within a 100-foot buffer cannot be provided, then the following measures shall be implemented.

Protective measures for activities related to the installation and removal of engines, fuel tanks, and other equipment prior to and after operation of the pump stations within a 100-ft buffer of mature elderberry shrubs shall include:

1. If an existing fence is not present between the host plant and pump station activities, temporary construction fencing shall be constructed to provide a minimum setback of at least 20 feet from the dripline of each potential host elderberry plant.

2. A tailgate education program on the valley elderberry longhorn beetle shall be given to each construction worker and all personnel working within the project area to avoid adverse effects on the beetle.

3. Signs shall be placed every 50 feet along the edge of the existing fence or exclusion fence to help identify the area as a protected area for the valley elderberry longhorn beetle for the duration of the activity.

Avoidance and minimization measures would be implemented if activities occur within the 100-foot buffer zone. These include:

1. Buffer areas must continue to be protected after pump installation, including during maintenance and removal activities. Measures such as protective taping or fencing, signage, and trash removal are prudent and would be implemented as appropriate.

2. No pesticides , fertilizers, or other chemicals that might harm the valley elderberry longhorn beetle or its host plant would be used in the buffer areas, or within 100 feet of any elderberry plant with one or more stems measuring 1-inch or greater in diameter at ground level.

3. Mowing of grasses/ground cover may occur from July through March to reduce fire hazard and protect equipment. No mowing shall be permitted closer than 5 feet from the dripline of elderberry plants.

4. Vibration and dust from the action will be minimized. Vehicles shall not travel more than 5 miles per hour (MPH) when within 150 feet of pump stations and shall not travel more than 15 MPH elsewhere on the Reclamation right-of-way.

5. Whenever practicable, project activities should be conducted outside the February through June period.

6. Whenever practicable, when activities are conducted at the project site from February through June, those activities should be conducted in early morning hours to avoid afternoon periods when valley elderberry longhorn beetles may be more active.

DRAFT ENVIRONMENTAL ASSESSMENT (07-103)

25-YEAR WARREN ACT CONTRACT AND LICENSE FOR DELTA LANDS RECLAMATION DISTRICT 770

Appendix D
Environmental Determinations (Cultural and ITA)

January 2012

Healer, Rain L

From: Barnes, Amy J
Sent: Monday, March 28, 2011 10:58 AM
To: Healer, Rain L
Cc: Perry, Laureen (Laurie) M; Nickels, Adam M; Overly, Stephen A; Bruce, Brandee E; Fogerty, John A; Dunay, Amy L; Goodsell, Joanne E; Siek, Charles R
Subject: EA-07-103 Warren Act Contract and 25 Year License for RD770 (11-SCAO-111)

Tracking #11-SCAO-111

Project: EA-07-103 Warren Act Contract and 25 Year License for RD770

Location: Kings County

The activities associated with Reclamation executing a 25-year Warren Act contract and issuing a 25-year license to Reclamation District 770 (RD770) to convey non-CVP water in Reclamation facilities and use pumping facilities on Reclamation land will have no potential to affect historic properties. Reclamation proposes to execute a contract with RD770 to convey non-CVP water pumped from the Kings, St John's (Kaweah), and Tule Rivers through the FKC for diversion by Friant Division contractors and/or for discharge into the Kern River. The non-CVP water will be introduced through existing turnouts on the Friant-Kern Canal (FKC) at Milepost (MP) 29.10 for the Kings River, at MP 69.45 for the St. John's River, and at MP 95.67 for the Tule River. Transferring non-CVP water will not require modifications to the FKC. Pumping activities will involve installing, operating, and maintaining semi-permanent pumping plants used to move excess water from the Kings, St John's (Kaweah), and Tule Rivers into the FKC. The pumping plants consist of permanent pump footings and existing discharge pipes that were constructed, and are maintained, by RD770 within the FKC right-of-way. The license will allow RD770 to continue using this infrastructure to install and operate temporary portable pump when there is a need to pump water.

As the proposed action has no potential to affect historic properties pursuant to 36 CFR Part 800.3(a)(1), no additional consideration under Section 106 of the National Historic Preservation Act is required.

Thank you for the opportunity to review the proposed action. Please place a copy of this concurrence with the EA administrative record. Please also include the changes to the following EA sections.

3.5.2 Environmental Consequences

Proposed Action
The proposed action is the type of activity that has no potential to affect historic properties pursuant to the regulations at 36 CFR Part 800.3(a)(1). There will be no modification of water conveyance facilities and no activities that will result in ground disturbance. Because there is no potential to affect historic properties, no cultural resources will be impacted as a result of implementing proposed action.

4.2 National Historic Preservation Act (16 USC § 470 et seq.)
Section 106 of the National Historic Preservation Act requires federal agencies to evaluate the effects of federal undertakings on historical, archaeological and cultural resources. Due to the nature of the proposed project, there will be no effect on any cultural resources and no further compliance actions are required.

Amy J. Barnes
Archaeologist
U.S. Bureau of Reclamation

Mid-Pacific Region, MP-153
2800 Cottage Way
Sacramento, CA 95825
916-978-5047
abarnes@usbr.gov

Healer, Rain L

From: Rivera, Patricia L
Sent: Friday, March 25, 2011 12:18 PM
To: Healer, Rain L
Subject: RE: EA-07-103 RD770 for review

Rain,

I reviewed the proposed action to enter into a 25-year Warren Act contract and license with Delta Lands Reclamation District 770 (RD770) to utilize otherwise unused capacity in the Friant-Kern Canal (FKC) to accept Non-Central Valley Project (Non-CVP) floodwater pumped from the Kings, St John's and Tule Rivers. Such floodwater could be diverted by Friant Division, Cross-Valley, and Non-CVP contractors that can take delivery of water from the FKC downstream of the RD770 pump stations which divert this water into the FKC. Delivery of this water would be based on the agreement between Friant Water Authority (FWA) and RD770. Floodwater not diverted from the FKC would be discharged into the Kern River through an existing gate at the terminus of the FKC.

The Non-CVP floodwater would be introduced into the FKC at Milepost (MP) 29.10 for the Kings River (Figure 2-1), MP 69.45 and MP 69.58 for the St. John's River, and MP 95.67 for the Tule River. The maximum amount of Non-CVP floodwater from the three rivers to be conveyed in the FKC in any given year is 250,000 acre-feet (AF). The contract period is under negotiation but would begin June 1, 2011 with a term not to exceed May 31, 2036.

CVP and Non-CVP contractors that currently have the ability to take delivery of water from the FKC downstream of RD770's pump stations are shown in Table 1. Any additional contractors able to take water from the FKC not included in Table 1 or any new facilities installed that are able to move this water in the future would require additional environmental review before participating in the Proposed Action.

Table 1 Potential Recipients of RD770 Floodwater

Alpaugh Irrigation District	Lower Tule River Irrigation District
Arvin-Edison Water Storage District	North Kern Water Storage District
Atwell Island Water District	Orange Cove Irrigation District
City of Lindsay	Pixley Irrigation District
City of Orange Cove	Pixley National Wildlife Refuge
Delano-Earlimart Irrigation District	Porterville Irrigation District
Exeter Irrigation District	Saucelito Irrigation District
Frasinetto Farms (previously Smallwood Vineyards)	Semitropic Water Storage District
Hills Valley Water District	Shafter-Wasco Irrigation District
Ivanhoe Irrigation District	Southern San Joaquin Municipal Utility District
Kaweah Delta-Water Conservation District	Stone Corral Irrigation District
Kern County Water Agency	Strathmore Public Utility District
Kern National Wildlife Refuge	Styro Tech, Inc.
Kern-Tulare Water District	Tea Pot Dome Water District
Lewis Creek Water District	Terra Bella Irrigation District
Lindmore Irrigation District	Tulare Irrigation District
Lindsay-Strathmore Irrigation District	

The proposed action does not have a potential to impact Indian Trust Assets.

Patricia