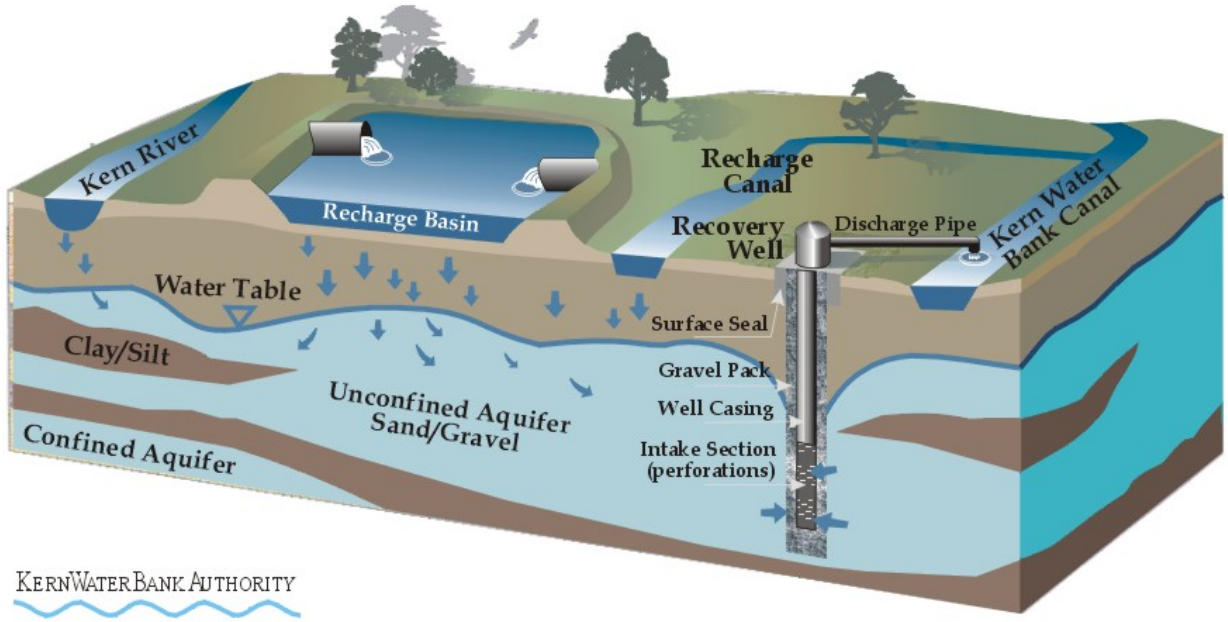
Introduction

Water banking has become a valuable tool in managing water supplies in California. Several successful projects are located in Kern County, California. The purpose of this document is to discuss some of the key components necessary to develop a successful project, with particular emphasis on the Kern Water Bank (KWB) developed by the Kern Water Bank Authority.[1]

What is Water Banking?

Water banking refers to the purposeful storage and later recovery of water from an aquifer. There are two methods to accomplish this: direct recharge and in-lieu recharge. The difference between these methods relates to how the water is placed into storage – recovery for both methods is the same. For direct recharge, surface water supplies are physically added to an aquifer either with recharge ponds or injection wells. The figure below shows how this process is accomplished with recharge ponds. Surface supplies are simply added to shallow basins and the water infiltrates the aquifer. For in-lieu recharge, surface supplies are provided to groundwater users in-lieu of their pumping groundwater. The amount of water that otherwise would have been pumped by the groundwater user then becomes banked groundwater. For both methods, the groundwater is later recovered with recovery wells, as shown below.

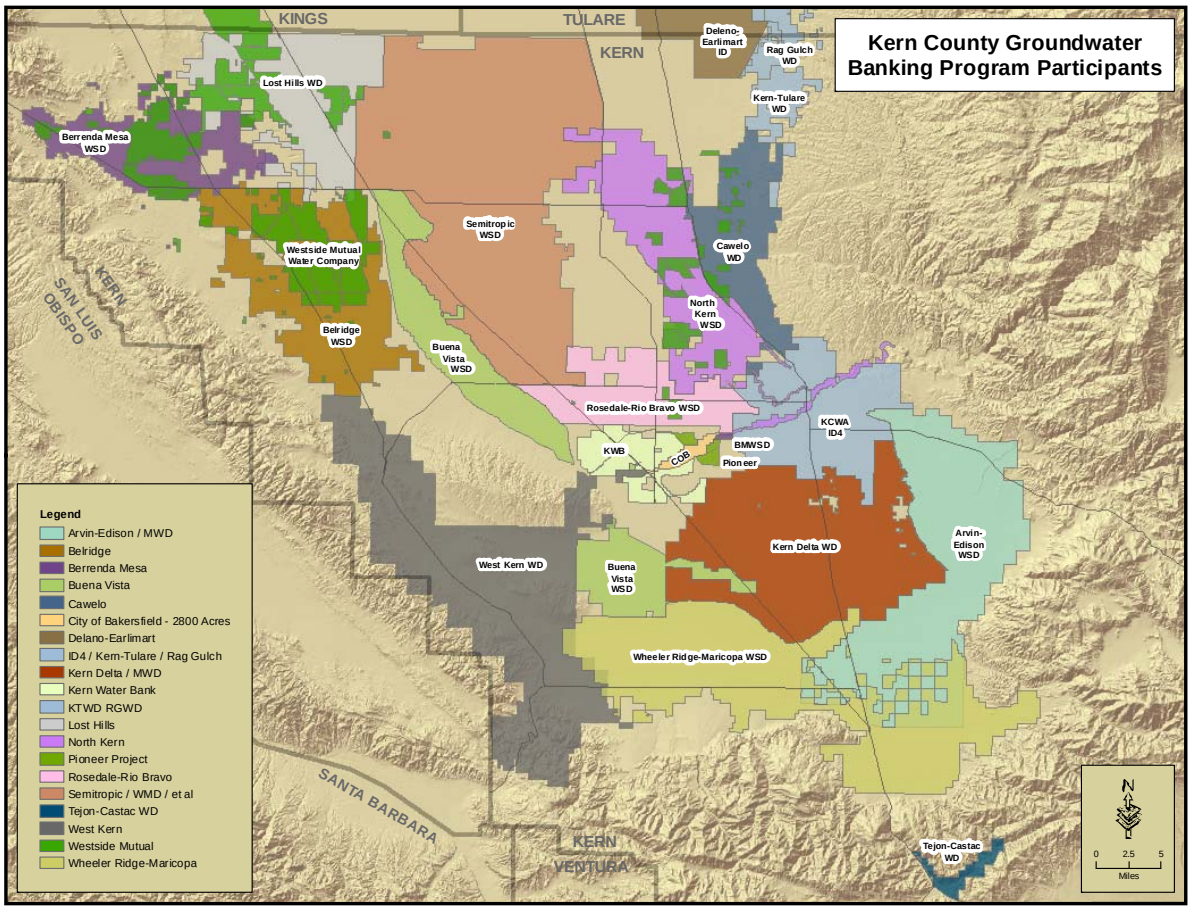


Water Banking Programs in Kern County

Virtually all of the water districts in the San Joaquin Valley portion of Kern County are involved in water banking at some level. Some of these programs are consortiums of Kern County water districts that group together to develop a project to help provide a measure of reliability to their in-district water supplies. On occasion some of these projects may participate in short-term (i.e. single year) water sales to help fund their projects, but the primary purpose of the programs is water supply reliability. This type of project includes the KWB, Berrenda Mesa Project, and

[1] The following information and testimony is provided to the Little Hoover Commission as a public service by Jon Parker of the Kern Water Bank Authority upon the request of the Kern County Water Agency. However, the information and testimony provided do not necessarily constitute the views of, and are not binding on, the Kern Water Bank Authority or any of its members.

Pioneer Project, among others. Other programs are partnerships between Kern County water districts and out-of-county entities. The out-of-county entities provide capital to help construct banking infrastructure, and then bank their own surplus water in the groundwater basin. In return, the participating water districts use the infrastructure and fees collected from their partners to help meet their consumptive use needs. The Arvin-Edison Water Storage District (WDS) and Semitropic WSD programs are this type. Some banking programs are developed solely for long-term water sales, primarily to southern California entities. The joint Buena Vista WSD/Rosedale-Rio Bravo WSD project is this type of program.



The Early Attempted Development of the Kern Water Bank by DWR[2]

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

[2] This section is excerpted from Appendix E, *Study of the Transfer Development and Operation of the Kern Water Bank,* in *Draft Environmental Impact Report, Monterey Amendment to the State Water Project Contracts (Including Kern Water Bank Transfer) and Associated Actions as Part of a Settlement Agreement (Monterey Plus)*, October 2007.

However, the Department encountered many legal, institutional, and political impediments to implementation of a groundwater storage facility on the KFE property. SWP contractors also expressed concerns regarding their ongoing costs for feasibility studies and ownership of the KFE property given their assessment of the likelihood of realizing a functional groundwater storage program. In 1993, uncertainties regarding the proposed groundwater storage facility ultimately convinced the Department to halt feasibility studies and design work on the project.[3] The uncertainties included proposed revisions of Delta water quality standards and measures to protect threatened and endangered species, which affected the SWP's ability to pump water from the Delta for recharge on the KFE property. Expected changes in arsenic standards for drinking water also raised questions regarding the ability of the project to meet water quality standards for pump-in to the California Aqueduct.[4] In addition to environmental and water quality issues, the Department and KCWA could not reach agreement on measures to comply with Water Code Section 11258, which required approval of local agencies for development of the groundwater banks. Later, the Department concluded that these constraints on Delta pumping made development of an SWP groundwater storage facility in the Kern Fan Element infeasible.[5] In 1994, the potential of the Department's proposed KFE for SWP groundwater storage remained unrealized.

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

Development of the Kern Water Bank by KWBA, and Important Considerations for Groundwater Banking

Agreements with Stakeholders

The newly formed KWBA had to overcome the obstacles faced by the Department in developing the KWB on the KFE property. In order to do so, three sets of stakeholders needed to be considered: groundwater basin stakeholders, downstream stakeholders, and wildlife protection stakeholders. Groundwater basin stakeholders are the other users of the aquifer, principally the water districts surrounding the KWB. The downstream stakeholders are the downstream users of conveyance facilities receiving water blends that result from the delivery of recovered water. The wildlife protection stakeholders are the California Department of Fish and Game and the United States Fish and Wildlife Service, which are tasked with administering endangered species laws and regulations. Agreements with all three sets of stakeholders were critical to the development of the KWB. The documents establishing these agreements are, in coincident order, the *Memorandum of Understanding Regarding Operation and Monitoring of the Kern Water Bank Groundwater Banking Program* (KWB MOU; Attachment A), the *Interim Department of Water Resources Water Quality Criteria for Acceptance of Non-project Water into the State Water Project* ("Pump-in Guidelines"; Attachment B), and the *Habitat*

[3] California Department of Water Resources, Bulletin 132-93:11-12, 1995.
[4] Draft DWR memo dated October 6, 1993.
[5] California Department of Water Resources, Bulletin 132-94:26, 1996.

Conservation Plan / Natural Communities Conservation Plan for the Kern Water Bank (HCP/NCCP; available for download at www.kwb.org). Each is discussed below.

KWB MOU

The KWB MOU addressed many of the institutional issues (i.e. Water Code 11258) that DWR struggled with in trying to develop a water bank on the KFE property. The overall objective of the document is that the "… design, operation and monitoring of the Project be conducted and coordinated in a manner to insure that the beneficial effects of the Project to the Project Participants [Member Entities] are maximized but that the Project does not result in significant adverse impacts to water levels, water quality or land subsidence within the boundaries of Adjoining Entitles." The KWB MOU prescribes measures to protect water levels (e.g. providing adequate well spacing, adjusting pumping rates, etc.) and to protect water quality (e.g. giving recharge priority to the best quality water available, removing more salts than are recharged, etc.).

In order to ensure that its goals are met, the MOU provides for the establishment of a Monitoring Committee to review banking operations and the results of an extensive monitoring program.[6] The committee is made up of several basin stakeholders including the Kern County Water Agency and adjoining water districts. The Committee evaluates groundwater information and determines if impacts are likely to occur as a result of project operations. If the Monitoring Committee determines that impacts are likely, then mitigation strategies are developed.

The KWB MOU also prescribes loss factors for banking operations. Evapotranspiration losses are assumed to be 6 percent of the gross amount of all water recharged. This 6 percent loss factor is conservative and provides assurance that banking operations will not recover more water than that actually recharged. The KWB MOU provides that an additional 5 percent loss factor will apply to any sales of water to entities outside of Kern County. This additional water provides an overall benefit to the groundwater basin, and cannot be recovered for other uses. In addition to these losses, 4 percent of the water recharged and stored in the KWB can be purchased by adjoining groundwater districts for overdraft correction purposes to help with their overdraft issues.

Pump-in Guidelines

The Department of Water Resources, the banking entities in Kern County, and the downstream stakeholders in the SWP developed Pump-in Guidelines to protect the quality of the water received by those downstream of banking programs. Although banking programs may not be delivering water to downstream stakeholders (in fact, the KWB does not deliver water to entities south of Kern County) they do receive a blend of aqueduct water and recovered water. Thus the downstream stakeholders could be impacted if the recovered water produces detrimental changes to background SWP water quality. In order to ensure that this does not happen, the Guidelines provide for a two-tiered approach for accepting non-project water into the California Aqueduct. Tier 1 programs have a "no adverse impact" criteria and are tied to historical water quality levels in the California Aqueduct. Programs meeting Tier 1 criteria are simply approved by DWR. Tier 2 programs have water quality levels that exceed the historical water quality levels of one or more constituents in the California Aqueduct and have the potential to cause adverse impacts to state water contractors. Tier 2 programs are referred to a state water contractor facilitation group

[6] The KWB has a network of 57 monitoring wells which are tested regularly by the Monitoring Committee. In addition, the 85 recovery wells are tested pursuant to parameters set by the California Department of Health Services for drinking water wells (Title 22).

for review. The facilitation group reviews the program and, if needed, makes recommendations to DWR.

In practice, the project proponent develops a "pump-in proposal" which documents how much water will be introduced, where the water will be introduced, the quality of the water that will be introduced, and the expected changes in water quality in the aqueduct in response to the program. The facilitation group reviews the proposal, and provides comments as appropriate.[7] Most programs increase the background concentration of one or more constituents in the aqueduct, and are therefore Tier 2 programs. However these same programs (at least on the Kern Fan) typically provide benefits to water quality for other constituents, so that the programs provide an overall benefit, and are therefore approved in a straightforward manner. For Kern County programs, a model that predicts the expected water quality changes in the aqueduct is forwarded to this facilitation group on a weekly basis for the duration of any specific pump-in program.

HCP/NCCP

Over 17,000 acres of the 20,000 acre KFE property was farmed by tenants prior to 1991. However, in response to severe drought conditions, tenant leases were terminated, and KFE lands rapidly reverted to habitat that might support the presence of endangered species. This change created another set of significant hurdles in the development of the KWB on the KFE by KWBA. In order to overcome these hurdles and protect endangered species on the property, the KWBA, the USFWS, and the CDFG developed the KWB HCP/NCCP to preserve and restore habitat for threatened, endangered, and protected species while at the same time permitting for the use of the property for water banking.

The HCP/NCCP permits certain uses for the KWB property and designates general areas and acreages for those uses. Land use designations include recharge ponds, other water banking facilities, compatible habitat, sensitive habitat, mitigation land, farming, and conservation bank. Of the 20,000 acres of KWB lands, only 236 acres have been permanently disturbed for water banking facilities (e.g. wells, levees, roads, canals). The remaining 19,764 acres are upland or wetland habitat.

The HCP/NCCP prescribes mitigation measures (e.g. pre-activity biological surveys, orientation programs, etc.) and annual reporting requirements. The annual report summarizes, among other things, all activities on the KWB, including construction, and operation and maintenance of water recharge and water extraction facilities, reports any Take of Covered Species and Covered Habitat, and the results of any studies that may have been completed.

The Department of Water Resources described the environmental benefits of the KWB as follows: "The creation of the KWB is resulting in the reestablishment and preservation of exceptional wetland and upland habitat that existed historically throughout much of the southwestern San Joaquin Valley. About 17,000 of the 20,000 acres that comprise the KFE property were farmed intensively prior to 1991. Now, the water conservation activities of the KWB are re-creating intermittent wetland habitat. Willows, cottonwoods, sedges, and other wetland vegetation are reemerging, and the recharge basins and basin edges are providing nesting and foraging habitat for waterfowl and other birds. To date, more than 40 species of

[7] A proposal from 2004 is included as Attachment C to illustrate the extensive nature of the data and supporting analyses provided to DWR and the downstream stakeholders.

waterfowl have been sighted on the KFE property, including Caspian terns, the white-faced ibis, double-crested cormorants, and white pelicans.

Recharge activities only occur on about one third of the KFE property; upland habitat is becoming reestablished on the remaining two thirds of the property. Vegetation management in these areas is focusing on regenerating native grasses and plants that help to promote the threatened and endangered species associated with this area. This upland habitat is supporting large populations of raptors, kangaroo rats, rabbits, badgers, bobcats, and coyotes. Of particular importance are the populations of Tipton kangaroo rats, burrowing owls, and tri-colored blackbirds."[8]

Physical Attributes

The physical attributes that are conducive to water banking include a suitable aquifer and access to conveyance facilities. The Kern River Alluvial Fan is particularly well suited to water banking. Infiltration rates typically average about 0.3 feet per day, the upper 1,000 feet of the aquifer consists of 50 to 70% sand or more, there are no laterally extensive confining or perching layers present, specific yield is about 20%, and transmissivity range can easily exceed 200,000 gallons per day/foot. The result is that the KWB can recharge up to 460,000 AF per year, recover up to 240,000 AF per year, and store well over 1 million AF of water.

In addition to the hydrogeologic aquifer attributes discussed above, the geochemical attributes of an aquifer are extremely important for water banking programs. Poor quality groundwater has the potential to degrade the good quality of recharged water - in some cases making it unsuitable for its intended purpose. Fortunately, the geochemical attributes of the Kern River Alluvial Fan are excellent. The blended water recovered from all of the projects is of excellent quality. For example, for the 2004 Pump-in Proposal (Attachment C) the concentration of total dissolved solids (TDS) was 225 mg/ℓ.

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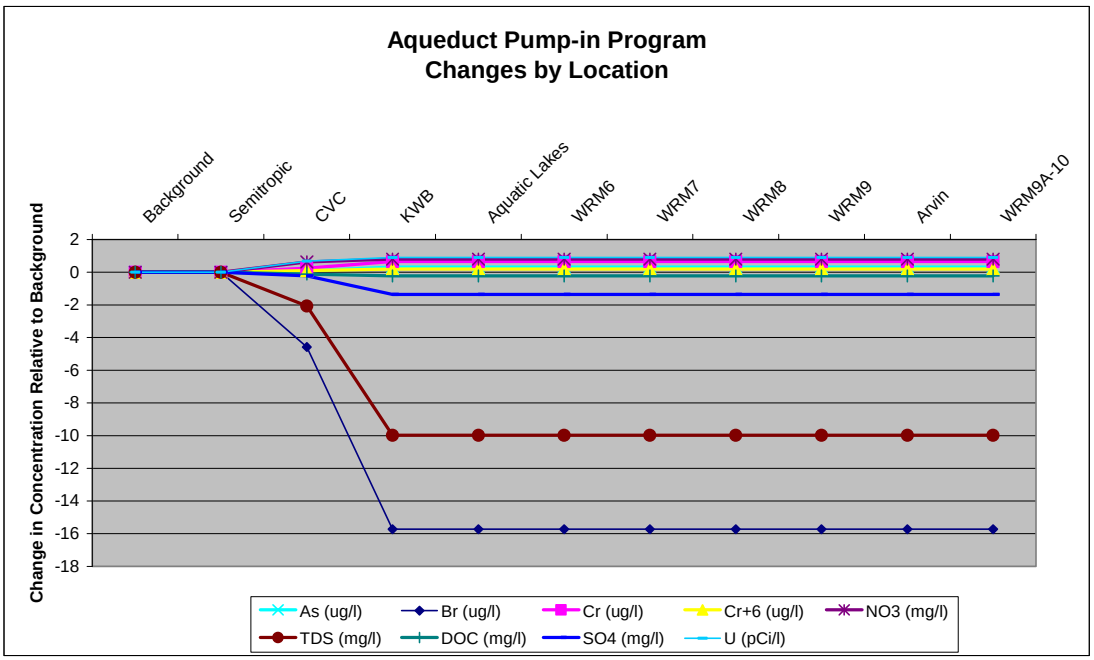
[8] Appendix E, *Study of the Transfer Development and Operation of the Kern Water Bank,* in *Draft Environmental Impact Report, Monterey Amendment to the State Water Project Contracts (Including Kern Water Bank Transfer) and Associated Actions as Part of a Settlement Agreement (Monterey Plus)*, October 2007.

Water quality is critical to a banking program because, in some cases, *the concentration of certain constituents must be even lower than drinking water standards*. Downstream stakeholders may rely on a water supply to blend down the concentration of a constituent present in other supplies. If the concentration of that particular constituent is increased, even though the resultant concentration is well below a drinking water standard, the blending operation will not be as effective. Thus, the quality of recovered water needs to be compared to background concentrations in conveyance facilities, rather than drinking water standards. The figure below shows the changes in the concentrations of several constituents relative to background conditions in the California Aqueduct which resulted from a KWB pump-in program. As can be seen, the concentration of many constituents increases or decreases slightly, whereas the concentration of TDS and bromide[9] decreases more significantly.



Conveyance facilities are critical in delivering water to and from a banking project, and ready access to surplus water supplies is necessary to establish bank accounts prior to times of shortages. The KWB is uniquely located with respect to conveyance facilities. The California Aqueduct passes the western boundary of the property, the Central Valley Project's Friant-Kern Canal can deliver water to local canals connected to the KWB, and the Kern River flows through KWB lands. These three features can deliver surplus supplies from the Sacramento River, San Joaquin River, and Kern River watersheds, respectively.

The delivery of recovered water to KWB participants is accomplished by direct deliveries via the California Aqueduct or by exchange deliveries. Exchange delivers can occur in two ways. In the first way, a participant upstream of the KWB takes water from the aqueduct and the KWB returns a like amount downstream. More important are exchange deliveries using San Luis Reservoir to regulate supplies. The KWB participants' demands are mostly agricultural with peak demands in the summer. In order to meet peaking demands in drought years, the KWB

[9] Bromide contributes to undesirable disinfection by-products with some common treatment technologies. Reducing background bromide and organic carbon concentrations can be very beneficial to downstream stakeholders.

pumps water during off-season periods and, though an operational exchange, either stores water in San Luis Reservoir prior to peaking needs or later replenishes water borrowed from San Luis Reservoir during peak demands. For these exchanges to work, downstream demands have to exceed pump-in rates year round, and problems with San Luis low point must be avoided. This type of exchange allows the KWB to be much more effective in meeting participant needs.

Water Banking Costs

KWBA participants retired 45,000 AF of SWP Table A allotment with a market value of approximately $1,000/AF at or about the time of the transfer of the KFE. In addition, KWBA has invested approximately $35 million in banking facilities (e.g. wells, pipelines, pond levees, a canal, pump stations, and a turn-out/turn-in to the California Aqueduct). Presently, KWBA's annual administrative budget is about $1.6 million, the cost to recharge water is about $13/AF, and the cost to recover water is about $70/AF.

Comparisons to Surface Storage

Water banking projects can have several advantages over surface reservoirs. Diamond Valley Reservoir stores 800,000 AF and cost $1.9 billion to construct. KWB stores well over 1 million AF of water and cost about $75 million, so initial banking project costs can be much lower. Another advantage is that once water is recharged into a water bank, evaporation no longer occurs whereas surface evaporation losses in a reservoir can be several feet per acre per year. Water banks also create a much smaller footprint on habitat than a reservoir. As noted earlier, only a few hundred acres of the 20,000 acre KWB are permanently disturbed – the balance is wetland or upland habitat.

There are also several potential disadvantages. Perhaps the biggest is the limited recharge capacity of banking projects. Floodwater flows can be very high, and the more measured infiltration rate of banking projects precludes them from capturing all of these very high flows. Return rates are also more measured, and not well-suited to demands that fluctuate significantly during the year. Thus surface storage is critical for capturing and regulating high flood flows, and regulating water from recovery programs. Energy costs for surface reservoirs will also typically be lower.

Attachment A

MEMORANDUM OF UNDERSTANDING

REGARDING OPERATION AND MONITORING OF THE KERN WATER BANK GROUNDWATER BANKING PROGRAM

This Memorandum of Understanding is entered into the 26th day of October, 1995, by and among DUDLEY RIDGE WATER DISTRICT, KERN COUNTY WATER AGENCY, SEMITROPIC WATER STORAGE DISTRICT, TEJON CASTAC WATER DISTRICT & WESTSIDE MUTUAL WATER COMPANY, LLC, and WHEELER RIDGE-MARICOPA WATER STORAGE DISTRICT, which have collectively formed the KERN WATER BANK AUTHORITY ("KWBA") hereinafter collectively referred to as "Project Participants," and BUENA VISTA WATER STORAGE DISTRICT ("BVWSD"), ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT ("RRBWSD"), KERN DELTA WATER DISTRICT ("KDWD"), HENRY MILLER WATER DISTRICT ("HMWD"), and WEST KERN WATER DISTRICT ("WKWD"), hereinafter collectively referred to as "Adjoining Entities."

RECITALS

WHEREAS, Project Participants expect title to that certain real property more particularly shown on the map attached hereto as Exhibit "A" and incorporated herein by this reference ("Project Site") to be transferred to the KWBA as provided for in the "Statement of Principles . . . for the Development, Operation and Maintenance of the Kern Fan Element of the Kern Water Bank" ("Statement of Principles") agreed to March 30, 1995; and

WHEREAS, the KWBA intends to develop and improve the Project Site as necessary to permit the importation, percolation and storage of water in underground aquifers for later extraction, transportation and use for the benefit of Project Participants, all as more fully described in Exhibit "B" attached hereto and incorporated herein by this reference ("Project"); and

WHEREAS, Adjoining Entities encompass lands and/or operate existing projects lying adjacent to the Project Site as shown on said Exhibit A; and

WHEREAS, in recent years, water banking, extraction and transfer programs in Kern County have become increasingly numerous and complex; and

WHEREAS, it is appropriate and desirable to mitigate or eliminate any short-term and long-term significant adverse impacts of new programs upon potentially affected projects and landowners within the boundaries of Adjoining Entities; and

WHEREAS, Adjoining Entities and Project Participants desire that the design, operation and monitoring of the Project be conducted and coordinated in a manner to insure that the beneficial effects of the Project to the Project Participants are maximized but that the Project does not result in significant adverse impacts to water levels, water quality or land subsidence within the boundaries of Adjoining Entities, or otherwise interfere with the existing and ongoing programs of Adjoining Entities;

NOW THEREFORE, BE IT RESOLVED that, based upon the mutual covenants contained herein, the parties hereto agree as follows:

1. Project Design and Construction. Project Participants have completed a preliminary design of the Project described in Exhibit B hereto representing the maximum facilities for the Project. Said preliminary design has been reviewed and approved by the Parties hereto. The KWBA intends to, and if it does so will, construct all or a portion of the Project

consistent with such preliminary design. Any major modifications of the facilities and/or significant changes from that described in Exhibit B and in the environmental documentation for the Project will be subject to additional environmental review pursuant to CEQA and will be subject to review of the Monitoring Committee prior to implementation.

2. Project Operation. The Project shall be operated to achieve the maximum water storage and withdrawal benefits for Project Participants consistent with avoiding, mitigating or eliminating, to the greatest extent practicable, significant adverse impacts resulting from the Project. To that end, the Project shall be operated in accordance with the Statement of Principles and the following Project Objectives and the Minimum Operating Criteria:

a. Project Objectives. Consistent with the Project Description, the Project Participants will make a good faith effort to meet the following objectives, which may or may not be met:

(1) The Parties should operate their projects in such manner as to maintain and, when possible, enhance the quality of groundwater within the Project Site and the Kern Fan Area, as shown at Exhibit C.

(2) If supplies of acceptable recharge water exceed recharge capacity, all other things being equal, recharge priority should be given to the purest or best quality water.

(3) Each project within the Kern Fan Area should be operated with the objective that the average concentration of total dissolved salts in the recovered water will exceed the average concentration of total dissolved salts in the recharged water, at a minimum, by a percentage equal to or greater than the percentage of surface recharge losses. The average shall be calculated from the start of each Project.

(4) To maintain or improve groundwater quality, recovery operations should extract poorer quality groundwater where practicable. Blending may be used to increase

extraction of lesser quality groundwater unless doing so will exacerbate problems by generating unfavorable movement of lesser quality groundwater. It is recognized that the extent to which blending can help to resolve groundwater quality problems is limited by regulatory agency rules regarding discharges into conveyance systems used for municipal supplies, which may be changed from time to time.

(5) All groundwater pumpers should attempt to control the migration of poor quality water. Extensive monitoring will be used to identify the migration of poor quality water and give advance notice of developing problems. Problem areas may be dealt with by actions including, but not limited to:

(a) limiting or terminating extractions that tend to draw lesser quality water toward or into the usable water areas;

(b) increasing extractions in areas that might generate a beneficial, reverse gradient;

(c) increasing recharge within the usable water area to promote favorable groundwater gradients.

(6) It is intended that all recovery of recharged water be subject to the so-called "golden rule." In the context of a banking project, the "golden rule" means that, unless acceptable mitigation is provided, the banker may not operate so as to create conditions that are worse than would have prevailed absent the project giving due recognition to the benefits that may result from the project, all as more fully described at paragraph 2(b)12 below.

(7) The Project should be developed and operated so as to prevent, eliminate or mitigate significant adverse impacts. Thus, the Project shall incorporate mitigation measures as necessary. Mitigation measures to prevent significant adverse impacts from occurring include but are not limited to the following: (i) spread out recovery area; (ii) provide

buffer areas between recovery wells and neighboring overlying users; (iii) limit the monthly, seasonal, and/or annual recovery rate; (iv) provide sufficient recovery wells to allow rotation of recovery wells or the use of alternate wells; (v) provide adequate well spacing; (vi) adjust pumping rates or terminate pumping to reduce impacts, if necessary; (vii) impose time restrictions between recharge and extraction to allow for downward percolation of water to the aquifer; and (viii) provide recharge of water that would otherwise not recharge the Kern Fan Basin. Mitigation measures that compensate for unavoidable adverse impacts include but are not limited to the following: (i) with the consent of the affected overlying user, lower the pump bowls or deepen wells as necessary to restore groundwater extraction capability to such overlying user; (ii) with the consent of the affected overlying user, provide alternative water supplies to such overlying user; and (iii) with the consent of the affected overlying user, provide financial compensation to such overlying user.

b. Minimum Operating Criteria.

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

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

(a) participate with other groundwater pumpers to investigate the source of the contamination;

(b) work with appropriate authorities to ensure that the entity or individual, if any, responsible for the contamination meets its responsibilities to remove the contamination and thereby return the Project Site to its full recharge and storage capacity;

(c) operate the Project in cooperation with other groundwater pumpers to attempt to eliminate the migration of contaminated water toward or into usable water quality areas.

(3) Operators of projects within the Kern Fan Area will avoid operating recharge projects in a fashion so as to significantly diminish the natural, normal and unavoidable recharge of water native to the Kern Fan Area as it existed in a pre-project condition. If and to the extent this occurs as determined by the Monitoring Committee, the parties will cooperate to provide equivalent recharge capacity to offset such impact.

(4) The mitigation credit for fallowed Project land shall be .3 acre-feet per acre per year times the amount of fallowed land included in the Project Site in the year of calculation (which for the present approximately 19,890 acre Project Site is 5,967 acre-feet per year).

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

(6) Each device proposed to measure recharge water to be subsequently recovered and/or recovery of such water will be initially evaluated and periodically reviewed by the Monitoring Committee. Each measuring device shall be properly installed, calibrated, rated, monitored and maintained by and at the expense of the owner of the measuring device.

(7) It shall be the responsibility of the user to insure that all measuring devices are accurate and that the measurements are provided to the Monitoring Committee at the time and in the manner required by the Monitoring Committee.

(8) A producer's flow deposited into another facility, such as a transportation canal, shall be measured into such facility by the operator thereof and the measurement reported to the Monitoring Committee at the time and in the manner required by such Monitoring Committee.

(9) The Monitoring Committee or its designee will maintain official records of recharge and recovery activities, which records shall be open and available to the public. The Monitoring Committee will have the right to verify the accuracy of reported information by inspection, observation or access to user records (i.e., P.G.&E. bills). The Monitoring Committee will publish or cause to be published annual reports of operations.

(10) Losses shall be assessed as follows:

(a) Surface recharge losses shall be fixed and assessed at a rate of 6% of water diverted for recharge.

(b) To account for all other actual or potential losses (including migration losses), a rate of 4% of water placed in a bank account shall be deducted to the extent that the Project Participant has been compensated within three (3) years following the end of the calendar year in which the water was banked at the SWP Delta Water Rate charged by DWR at

the time of payment; provided further, however, that the water purchased and subtracted from a groundwater bank account pursuant to this provision shall only be used for overdraft correction.

(c) An additional 5% loss shall be assessed against any water diverted to the Project Site for banking by, for, or on behalf of any out-of-County person, entity or organization and/or against any banked water sold or transferred to any out-of-County person, entity or organization (except current SWP Ag Contractors).

(d) All losses provided for herein represent amounts of water that are non-bankable and non-recoverable by Project Participants.

(11) Recovery of banked water shall be from the Project Site and recovery facilities shall be located therein. Recovery from outside the Project Site may be allowed with the consent of the District or entity having jurisdiction over the area from which the recovery will occur and upon review by the Monitoring Committee.

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

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

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

3. Project Monitoring. Adjoining Entities agree to participate in a comprehensive monitoring program and as members of a Monitoring Committee, as hereinafter more particularly described, in order to reasonably determine groundwater level and water quality information under Project and non-Project conditions. The monitoring program will more particularly require the following:

a. Monitoring Committee. A Monitoring Committee shall be established, comprised of one representative of each of the Adjoining Entities (initially 5) and one representative of each of the Project Participants (initially 6). The Committee shall:

(1) Engage the services of a suitable independent professional groundwater specialist who shall, at the direction of the Committee, provide assistance in the performance of the tasks identified below;

(2) Meet and confer monthly or at other intervals deemed to be appropriate in furtherance of the monitoring program;

(3) Establish a groundwater evaluation methodology or methodologies;

(4) Prepare a monitoring plan and two associated maps, "Well Location, Water Quality Network," and "Well Location, Water Level Network," which plan and maps depict the location and types of wells anticipated to be used in the initial phase of groundwater monitoring (said plan and maps are expected to be modified from time to time as the monitoring program is developed and operated);

(5) Specify such additional monitoring wells and ancillary equipment as are deemed to be necessary or desirable for the purposes hereof;

(6) Prepare annual water balance studies and other interpretive studies, which will designate all sources of water and the use thereof within the study area;

(7) Develop criteria for determining whether excessive mounding or withdrawal is occurring or is likely to occur in an area of interest;

(8) Annually or as otherwise needed determine the impacts of the Project on each of the Adjoining Entities by evaluating with and without Project conditions; and

(9) Develop procedures, review data, and recommend Project operational criteria for the purpose of identifying, verifying, avoiding, eliminating or mitigating, to the extent practicable, the creation of significant imbalances or significant adverse impacts.

b. Collection and Sharing of Data. The Adjoining Entities will make available to the Monitoring Committee copies of all relevant groundwater level, groundwater quality, and other monitoring data currently collected and prepared by each. KWBA shall annually report, by areas of interest, water deliveries for banking and other purposes and groundwater withdrawals.

c. Monitoring Costs.

(1) The cost of constructing monitoring wells and ancillary equipment, as identified in Exhibit B, shall be borne by Project Participants. The cost of any additional monitoring wells and ancillary equipment shall be borne as may be determined by separate agreement of the Project Participants and Adjoining Entities.

(2) Each of the parties shall be responsible for the personnel costs of its representative on the Monitoring Committee. In addition, the Adjoining Entities shall be responsible for all costs of monitoring operations and facilities within their respective boundaries and the Project Participants shall be responsible for all costs of monitoring operations and facilities within the Project Site.

(3) All other groundwater monitoring costs, including employment of the professional groundwater specialist, collection, evaluation and analyses of data as adopted by the Monitoring Committee, shall be allocated among and borne by the parties as follows: Project Participants = 50%; Adjoining Entities = 50%. Cost sharing among Project Participants shall be as agreed by them. Cost sharing among Adjoining Entities shall be as agreed by them. Any additional monitoring costs shall be determined and allocated by separate agreement of those parties requesting such additional monitoring.

(4) It is intended that one Monitoring Committee shall deal with all projects operating within the Kern Fan Area. If, as and when existing or additional projects are brought within the purview of the Monitoring Committee, the participants in said projects and the adjoining entities for said projects may join the Monitoring Committee and, upon doing so, shall share in the costs of monitoring operations on the same basis as provided herein for the original parties.

4. Modification of Project Operations. The Monitoring Committee may make recommendations to the KWBA and Project Participants, including without limitation recommendations for modifications in Project operations based upon evaluation(s) of data which indicate that excessive mounding or withdrawal is occurring or is likely to occur in an area of interest. The Monitoring Committee and its members shall not act in an arbitrary, capricious or unreasonable manner.

5. Dispute Resolution.

a. Submission to Monitoring Committee. All disputes regarding the operation of the Project or the application of this agreement, or any provision hereof, shall first be submitted to the Monitoring Committee for review and analysis. The Monitoring Committee shall meet and review all relevant data and facts regarding the dispute and, if possible, recommend a fair and equitable resolution of the dispute. The Monitoring Committee and its members shall not act in an arbitrary, capricious or unreasonable manner. In the event that (1) the Monitoring Committee fails to act as herein provided, (2) any party disputes the Monitoring Committee's recommended resolution or (3) any party fails to implement the Monitoring Committee's recommended resolution within the time allowed, any party to this agreement may seek any legal or equitable remedy available as hereinafter provided.

b. Arbitration. If all of the parties agree that a factual dispute exists regarding any recommendation of the Monitoring Committee made pursuant hereto, or implementation thereof, such dispute shall be submitted to binding arbitration before a single neutral arbitrator appointed by unanimous consent and, in the absence of such consent, appointed by the presiding judge of the Kern County Superior Court. The neutral arbitrator shall be a registered civil engineer, preferably with a background in groundwater hydrology. The arbitration shall be called and conducted in accordance with such rules as the contestants shall agree upon, and, in the

absence of such agreement, in accordance with the procedures set forth in California Code of Civil Procedure section 1282, et seq. Any other dispute may be pursued through a court of competent jurisdiction as otherwise provided by law.

c. Burden of Proof. In the event of arbitration or litigation under this Agreement, all parties shall enjoy the benefit of such presumptions as are provided by law but, in the absence thereof, neither party shall bear the burden of proof on any contested legal or factual issue.

d. Landowner Remedies. Nothing in this agreement shall prevent any landowner within the boundaries of any party from pursuing any remedy at law or in equity in the event such landowner is damaged as a result of projects within the Kern Fan Area.

6. Term. This agreement shall commence on the day and year first above written and shall continue in force and effect until terminated by (1) operation of law, (2) unanimous consent of the parties, or (3) abandonment of the Project and a determination by the Monitoring Committee that all adverse impacts have been fully eliminated or mitigated as provided in this agreement.

7. Complete Agreement/Incorporation Into Banking Agreements. This agreement constitutes the whole and complete agreement of the parties regarding Project operation, maintenance and monitoring. Project Participants shall incorporate this agreement by reference into any further agreement they enter into respecting banking of water in or withdrawal of water from the Project Site.

8. Future Projects. With respect to any future project within the Kern Fan Area, the Parties hereto shall use good faith efforts to negotiate an agreement substantially similar in substance to this MOU.

9. Notice Clause. All notices required by this agreement shall be sent via first class United States mail to the following and shall be deemed delivered three days after deposited in the mail:

Project Participants

Dale Melville
Dudley Ridge Water District
286 W. Cromwell Avenue
Fresno, California 93711-6162

William Taube
Wheeler Ridge-Maricopa
Water Storage District
P.O. Box 9429
Bakersfield, CA 93389-9429

Tom Clark
Kern County Water Agency
P.O. Box 58
Bakersfield, California 93312

Bill Phillimore
Westside Mutual Water Company
33141 Lerdo Highway
Bakersfield, California 93302-0058

Will Boschman
Semitropic Water District
P.O. Box Z
Wasco, California 93280

Dennis Mullins
Tejon-Castac Water District
P.O. Box 1000
Lebec, CA 93243

Bill Phillimore, Chairman
Kern County Water Bank Authority
c/o YOUNG WOOLDRIDGE
1800 - 30th Street, Fourth Floor
Bakersfield, CA 93301

Adjoining Entities

Martin N. Milobar
Buena Vista Water Storage District
P.O. Box 756
Buttonwillow, CA 93206

Hal Crossley
Rosedale-Rio Bravo
Water Storage District
P.O. Box 867
Bakersfield, CA 93302-0867

L. Mark Mulkay
Kern Delta Water District
501 Taft Highway
Bakersfield, CA 93307

Joe Lutje
Henry Miller Water District
P.O. Box 9759
Bakersfield, CA 93389

Jerry Pearson
West Kern Water District
P.O. Box MM
Taft, CA 93268-0024

Notice of changes in the representative or address of a Party shall be given in the same manner.

10. California Law Clause. All provisions of this agreement and all rights and obligations of the parties hereto shall be interpreted and construed according to the laws of the State of California.

11. Amendments. This agreement may be amended by written instrument executed by all of the parties. In addition, recognizing that the parties may not now be able to contemplate all the implications of the Project, the parties agree that on the tenth anniversary of implementation of the Project, if facts and conditions not envisioned at the time of entering into this agreement are present, the parties will negotiate in good faith amendments to this agreement. If the parties cannot agree on whether conditions have changed necessitating an amendment and/or upon appropriate amendments to the agreement, such limited issues shall be submitted to an arbitrator or court, as the case may be, as provided above.

12. Successors and Assigns. This agreement shall bind and inure to the benefit of the successors and assigns of the parties.

13. Severability. The rights and privileges set forth in this agreement are severable and the failure or invalidity of any particular provision of this agreement shall not invalidate the other provisions of this agreement; rather all other provisions of this agreement shall continue and remain in full force and effect notwithstanding such partial failure or invalidity.

14. Force Majeure. All obligations of the parties shall be suspended for so long as and to the extent the performance thereof is prevented, directly or indirectly, by earthquakes, fires, tornadoes, facility failures, floods, drownings, strikes, other casualties, acts of God, orders of court or governmental agencies having competent jurisdiction, or other events or causes beyond the control of the parties. In no event shall any liability accrue against a party, or its

officers, agents or employees, for any damage arising out of or connected with a suspension of performance pursuant to this paragraph.

IN WITNESS WHEREOF the parties have executed this agreement the day and year first above written at Bakersfield, California.

PROJECT PARTICIPANTS

DUDLEY RIDGE WATER DISTRICT

BY: _____
Dale Melville, Manager

BY: _____

WHEELER RIDGE-MARICOPA WATER STORAGE DISTRICT

BY: _____
William Taube, Engineer/Manager

BY: _____

SEMITROPIC WATER STORAGE DISTRICT

BY: _____
Wil Boschman, Engineer/Manager

BY: _____

KERN COUNTY WATER AGENCY

BY: _____
Adrienne J. Mathews, President

BY: October 26, 1995

WESTSIDE MUTUAL WATER COMPANY

BY: _____
Bill Phillimore, Executive Vice-President

BY: _____

TEJON-CASTAC WATER DISTRICT

BY: _____
Dennis Mullins, President

BY: _____

KERN WATER BANK AUTHORITY

BY: _____
Bill Phillimore, Chairman

BY: _____

ADJOINING ENTITIES

BUENA VISTA WATER STORAGE DISTRICT

BY: _____
Martin Milobar, Engineer-Manager

BY: _____

WEST KERN WATER DISTRICT

BY: _____
Bob G. Bledsoe, President

BY: _____

ROSEDALE RIO BRAVO WATER STORAGE DISTRICT

BY: _____
Hal Crossley, Manager

BY: _____

KERN DELTA WATER DISTRICT

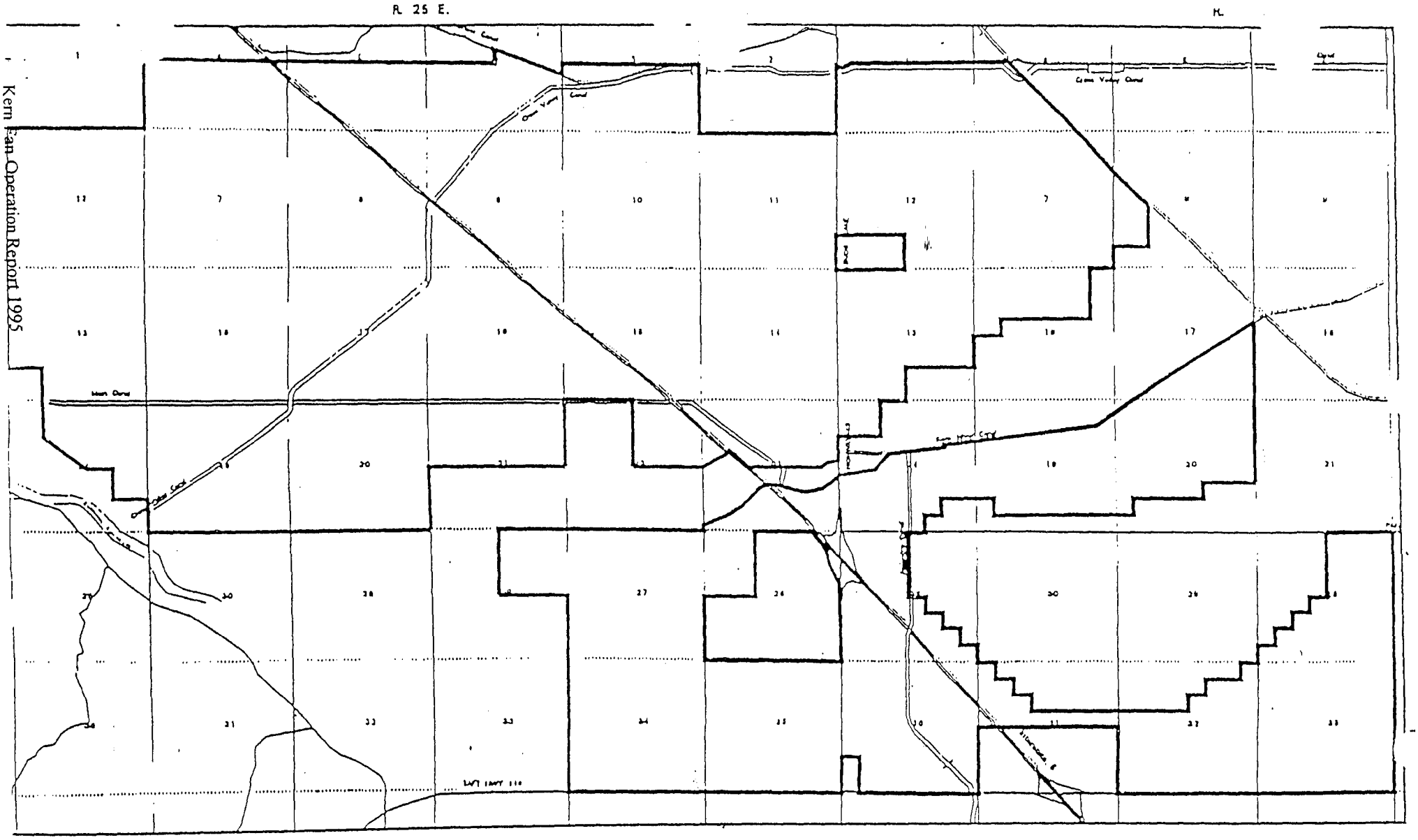
BY: _____
L. Mark Mulkay, Engineer-Manager

BY: _____

HENRY MILLER WATER DISTRICT

BY: _____
Joe Lutje, Manager

BY: _____


R. 25 E.
Kern Canal
Cross Valley Canal
Kern River Canal
Kern River Canal
Kern River

PROJECT DESCRIPTION

Purposes

The primary water management objective of the Kern Water Bank (KWB) is to enhance water supplies for SWP contractors and entities in Kern County. Water would be stored in aquifers during times of surplus and either recovered during times of shortage or remain in the ground to assist with overdraft correction.

Sources of Water

It is anticipated that water from numerous sources will be recharged on the property in cooperation with the water rights holders and the approval of the necessary authorities. Such sources include: the Kern River, Friant-Kern, SWP, CVP, flood water and other sources that may be available from time to time.

Facilities

To achieve its water management objectives, the KWB will require the construction of recharge ponds, water conveyance facilities, and water wells. The ponds will be created by constructing low levees along contours. The ponds bottoms would be left, as far as possible, in their natural condition. The habitat surrounding and between ponds may be modified and enhanced depending on the outcome of negotiations with resources agencies and other habitat management objectives.

Of the 19,883 acres that presently constitute the Kern Water Bank property, approximately 5,000 acres are proposed for routine recharge, although, during high flow conditions, additional acreage may be utilized which would also serve to prevent flooding elsewhere in the Valley. In the wettest of years, it is hoped that close to a million acre feet can be recharged on the property. The ponds would be formed by constructing approximately 35 miles of levees with a maximum height of 3 feet.

It is proposed that water would be conveyed to and from the property using available capacity in any of the canals and conveyance facilities that may serve the property including: the Cross Valley Canal, the Friant Kern Canal, the California Aqueduct, the Pioneer Canal, the River Canal, the Kern River, Buena Vista's Main Canal and the Alejandro Canal. In each case the permission of the relevant authority will be sought for the use of each facility. It is also proposed to build a new canal that would link the River Canal to the California Aqueduct and would convey water to and from the property. Additionally, it is proposed that a diversion and conveyance facility be constructed that would divert water from the Kern River to the eastern end of the property. Such a conveyance facility would probably cross the north Pioneer property and, as such, is subject to approval from the KCWA and the City of Bakersfield.

Fifty-seven water wells currently exist on the property. Another 43 may be added before the project is complete to provide adequate recovery capacity and the necessary operational flexibility to avoid or minimize adverse impacts. Once build out of the recovery facilities is complete, the

recovery capacity will be maintained by constructing new wells to replace the capacity of older wells as they fail. New wells shall be placed no closer than one third mile from any functioning wells off the property. Wells on the property shall be located and operated so as to prevent significant non-mitigable adverse impacts to neighboring land owners.

Operation

The project shall be managed by the Kern Water Bank Authority. Day-to-day operation of the project may be contracted to other parties. Operation of the project shall be coordinated with adjoining projects.

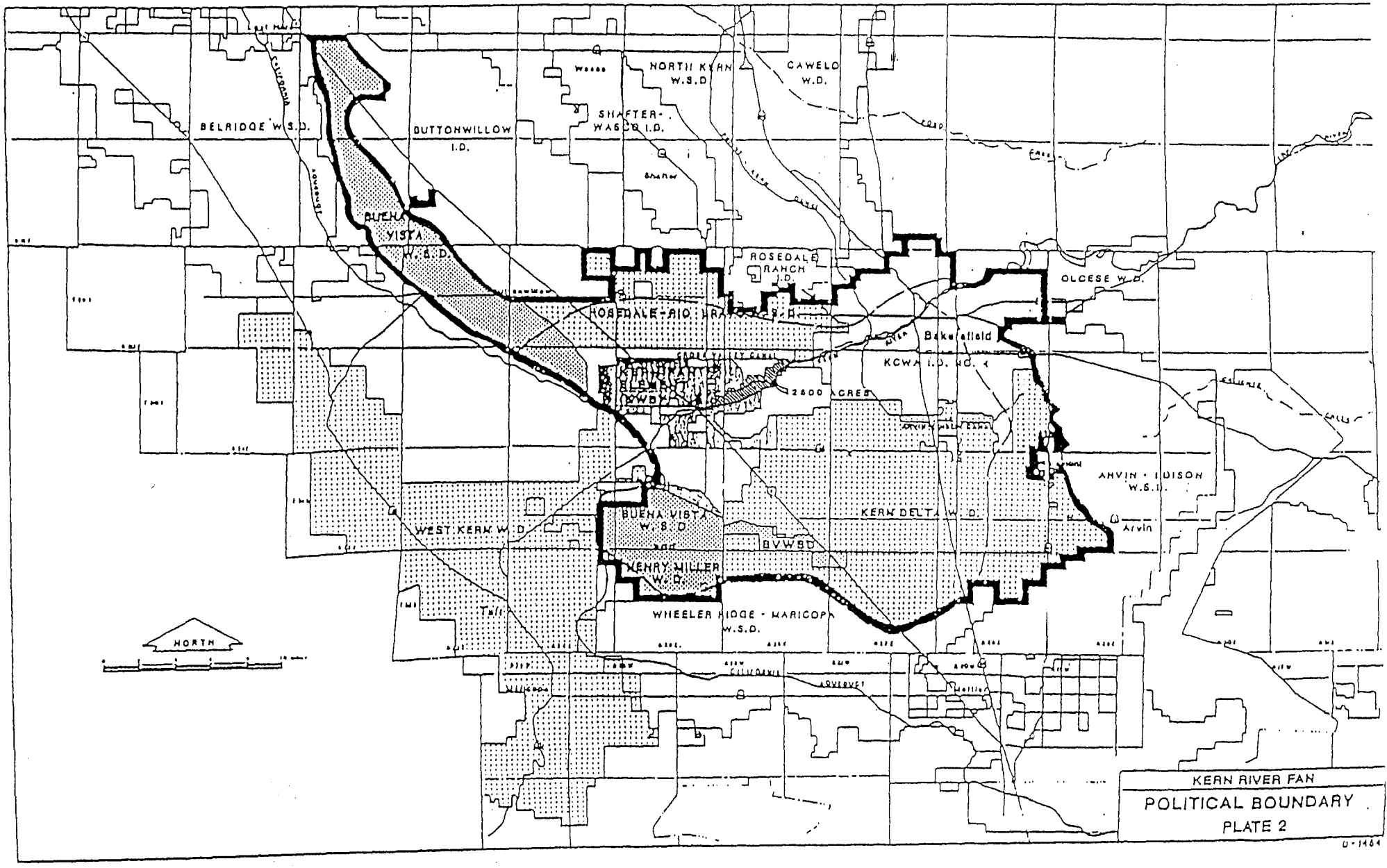

BELRIDGE W.S.D.
BUTTONWILLOW I.D.
NORTH KERN W.S.D.
CAWELO W.D.
SHAFTER-WASCO I.D.
BUENA VISTA W.S.D.
ROSEDALE RANCH I.D.
ROSEDALE-RIO BRAVO W.S.D.
OLCESE W.D.
Bakersfield
KCWA I.D. NO. 4
2500 ACRES
BVWSD
ARVIN-EDISON W.S.D.
Arvin
KERN DELTA W.D.
WEST KERN W.D.
BUENA VISTA W.S.D.
BVWSD
HENRY MILLER W.D.
WHEELER RIDGE - MARICOPA W.S.D.
NORTH
KERN RIVER FAN
POLITICAL BOUNDARY
PLATE 2

EXHIBIT C

Attachment B

INTERIM
DEPARTMENT OF WATER RESOURCES WATER QUALITY CRITERIA FOR ACCEPTANCE OF NON-PROJECT WATER INTO THE STATE WATER PROJECT
MARCH 1, 2001

In accordance with the Water Code, non-project water may be conveyed, wheeled, or transferred in the State Water Project provided that water quality is protected.

GENERAL PROVISIONS

The proponent of any non-project water input proposal shall demonstrate that the water is of consistent, predictable, and acceptable quality.

The Department of Water Resources shall consider all non-project water input proposals based upon the criteria established in this document.

DWR will consult with State Water Project contractors and the Department of Health Services on drinking water quality issues relating to non-project water as needed to assure the protection of SWP water quality.

Nothing in this document shall be considered as authorizing the objectives of Article 19 of the water supply contracts or drinking water maximum contaminant levels to be exceeded.

These criteria shall not constrain DWR's ability to operate the SWP for its intended purposes or to protect its integrity during emergencies. There shall not be any adverse impacts to SWP water deliveries, operations or facilities.

DWR will use a two-tier approach for accepting non-project water into the California Aqueduct. Tier 1 programs have a "no adverse impact" criteria and shall be tied to historical water quality levels in the California Aqueduct. Programs meeting Tier 1 critieria shall be approved by DWR. Tier 2 programs, have water quality levels that exceed the historical water quality levels in the California Aqueduct and have the potential to cause adverse impacts to state water contractors. Tier 2 programs shall be referred to a state water contractor facilitation group for review. The facilitation group would review the program and if needed make recommendations to DWR to use during consideration of the project.

SPECIFIC PROVISIONS

Tier 1

Under Tier 1, all constituents of non-project water shall not exceed the historical water quality levels measured at the O'neill Forebay Outlet (formerly Check 13) on the SWP as measured by DWR's water quality monitoring program (Table 1).

Blending of multiple water sources prior to inflow into the SWP is acceptable. As part of a non-project water proposal, water may be introduced into the aqueduct that by itself might cause the ambient baseline to be exceeded, provided that the sum total of all introduced waters from a defined project do not exceed the historical baseline for the Aqueduct on an instantaneous flow weighted basis. Blending (mixing) within the aqueduct must be between and cannot overlap any active municipal and industrial delivery locations, without approval of DWR. The proponent shall demonstrate by model or an approach acceptable to DWR and the state water contractor facilitation group, that the water is adequately mixed before reaching the first M&I customer.

Non-project water proposals meeting Tier 1 water quality standards shall be approved by DWR without further review by other agencies except as is required by law. However, upon approval by DWR of any pumpin under Tier 1, the state water contractor facilitation group will be notified by DWR of the action.

Tier 2

Non-project water exceeding Tier 1 standards or contributing to aqueduct levels that exceed the historical water quality baseline may be considered for input into the SWP on a case-by-case basis by the SWP contractors and DWR. Proposals that would impact SWP water quality delivered to downstream state water contractors will be reviewed by state water contractors. The intent is that proposals that produce an overall net water quality benefit will be approved.

A state water contractor non-project inflow ***facilitation group*** will be established and will review all requests for non-project inflow that do not meet the Tier 1 water quality criteria. This group will consist of representatives from each state water contractor, that chooses to participate. DWR may participate as an observer. The group will consider the merits, impacts, mitigation, cost/benefits or other issues of each Tier 2 non-project water proposal(s) and provide recommendations to DWR. The DWR will consider the ***facilitation group*** and any individual SWP contractor recommendations in reviewing the proposal. DWR will make the final decision to approve, modify or deny the non-project water proposal. Any decision must be in compliance with law and existing contracts.

The **facilitation group** would consider the range of potential impacts along with potential benefits, mitigation, and other issues associated with the program.

A consensus recommendation from the facilitation group would be sought regarding a potential exceedance of the historical water quality levels. In the absence of consensus from the **facilitation group**, DWR will base its decision on the merits of the program and its ability to provide overall benefits to the state water project.

WATER QUALITY CHANGES

Once a program for delivery of non-project water to the Aqueduct has been approved, an annual review of the program with the state water contractors will occur.

As needed, DWR, DHS or state water contractors may recommend changes or additions to these water quality criteria governing non-project water proposals. Proposed changes or additions will be reviewed by the ***facilitation group*** prior to consideration by DWR.

MONITORING

Non-project inflow proponents are responsible for monitoring the quality of the water at the point of introduction into the Aqueduct for the duration of the program.

IMPLEMENTATION

DWR will develop procedures to implement these criteria.

Table 1 HISTORICAL WATER QUALITY CONDITIONS 1988-2001 AT O'NEILL FOREBAY OUTLET (mg/L)

Metals, Minerals and others					
	Mean	**Min**	**Max**	**Stand Dev**	**Count**
Aluminum	0.029	0.004	0.527	0.050	137
Antimony	0.005*	0.005*	0.005*	0.000	10
Arsenic	0.002	0.001*	0.004	0.000	215
Barium	0.050*	0.037	0.068	0.002	139
Beryllium	0.001*	0.001*	0.001*	0.000	11
Bromide	0.21	0.05	0.54	0.11	121
Cadmium	0.004	0.001*	0.005	0.002	139
Chromium	0.005*	0.005*	0.011	0.001	189
Copper	0.005	0.001*	0.028	0.003	214
Fluoride	0.09	0.01*	0.40	0.05	225
Iron	0.049	0.005*	0.416	0.058	214
Manganese	0.007	0.003	0.06	0.004	17
Mercury	0.0008	0.0002*	0.0010	0.0004	163
Nickel	0.002	0.001*	0.004	0.001	11
Nitrate	3.5	0.6	9.6	1.8	192
Nitrate-Nitrite	0.6	0.1	1.2	0.3	22
Nitrite	0.5	0.3	1.1	0.2	21
Selenium	0.001*	0.001*	0.001*	0	208
Silver	0.004	0.001*	0.005	0.002	139
Sulfate	43	16	99	15	228
Total Organic Carbon	4	3	10	2	131
Zinc	0.009	0.005*	0.210	0.016	206

* These values represent reporting limits, actual values would be lower.

Pesticides, herbicides and synthetic organic chemicals are not detected in water samples at this location. Therefore, historical conditions are considered to be represented by less than detection levels for these compounds.

Salinity Criteria 1979-2000 (specific conductance, us/cm)

Year Type*	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wet	454	401	393	363	355	351	338	340	299	302	350	343
Near Normal*	474	430	511	302	415	520	462	371	430	474	528	623
Dry	566	510	472	469	403	424	441	486	613	498	715	495
Critical	673	728	642	578	548	597	586	609	648	668	604	756

* Year type is based on water year classification, below normal and above normal have been combined into one designation as near normal.

Attachment C

Kern County Water Agency
P.O. Box 58
Bakersfield, CA 93302-1400
661-634-1400

Kern Water Bank Authority
P.O. Box 80607
Bakersfield, CA 93380-0607
661-399-8735

To: Mr. Dan Flory, State Water Project Analysis Office
Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

From: Jonathan D. Parker, KWBA & Rick Iger, KCWA

Date: June 11, 2004

Subject: 2004 Pump In Program Project Description

The Kern Water Bank Authority (KWBA) and Kern County Water Agency (KCWA) request the approval of the Department of Water Resources (DWR) to deliver local non-project water into the California Aqueduct. Based on the current SWP allocation of 65%, we may need to begin deliveries to the Aqueduct on June 16, 2004. The following information describes our proposed program, and is consistent with DWR's *"Implementation Procedures for the Review of Water Quality from Non-Project Water Introduced into the State Water Project."*

Project Contacts:

Kern Water Bank Authority
Jon Parker, General Manager
PO Box 80607
Bakersfield CA 93308-0607
Office: 661-391-3742
Fax: 661-399-9751
Mobil: 661-303-7069
e-mail: jparker@kwb.org

Kern County Water Agency
Rick Iger, Eng. & Op. Manager
PO Box 58
Bakersfield CA 93302-0058
Office: 661-634-1469
Fax: 661-634-1428
Mobil: 661-303-1538
e-mail: riger@kcwa.com

Kern Fan Recovery Facilities Locations, Other Water Sources and SWP Inlet Locations
The KWBA and KCWA propose pumping groundwater recovery wells located on the Kern Fan between Bakersfield and Tupman including the Kern Water Bank's property, the KCWA Pioneer Property, the Berrenda Mesa Project, the City of Bakersfield 2800 Acres and various private lands surrounding these projects. The pumped water will be delivered to the California Aqueduct via either the Cross Valley Canal (California Aqueduct Pool 28) or the Kern Water Bank Canal (California Aqueduct Pool 29). These delivery points are located approximately 500 feet apart, and no M&I turn-outs are located between these two locations. The water pumped into the Aqueduct will be conveyed to users downstream of Pool 29 and exchanged with users upstream. The attached map shows the locations of all wells that may be pumped as part of the program and the locations of the canal turn-ins.

Operations
The scale of a pump-in program in 2004 is evolving as users are evaluating their demands. In any given month, the KWBA and KCWA could pump as many as 138 wells at a combined rate of about 800 cfs. The maximum monthly recovery capacity of the well program would therefore be about 48,000 AF. At

this time, we anticipate a much smaller summer program wherein we deliver about 90 cfs to the Aqueduct, followed by a winter recovery program wherein we deliver about 350 cfs. The quality of the non-project water is shown on the attached water quality blending report. Weekly reports which provide daily water quality and flow information, for both the initial program and as wells are brought into service, will be provided to DWR and the Facilitation Group by the Kern County Water Agency. More detailed schedules are being developed and will be provided as soon as the programs are finalized. In addition, scheduled changes in operations will be provided to DWR three days in advance. KCWA and KWBA are anticipating continuing discussions with MWD to enable scheduling deliveries into January and February 2005. This type of operation has demonstrated significant water quality benefits.

Pump-in Facilities
The program's water will be delivered to the Aqueduct via the Cross Valley Canal and Kern Water Bank Canal. The turn-ins for both canals are operated and metered by the DWR.

Water Quality Data and Monitoring
The quality of the delivered water is excellent. The program will decrease the concentrations of total dissolved solids (TDS), bromide, total organic carbon (TOC) or dissolved organic carbon (DOC), and sulfate in water delivered to downstream users. There will be slight increases in concentrations of arsenic, nitrate, chromium, and uranium. The Facilitation Group has reviewed water quality data provided by the Kern Water Bank and Kern County Water Agency during 2001 and 2002 and approved recovery programs in both years. Since the magnitude of pumping in 2004 could be similar to 2001, the water quality benefits are expected to be similar and could be enhanced if pumping is moved to the winter months.

The KWBA and KCWA have and will continue to test all of their wells for Title 22 constituents in compliance with a specific protocol developed by the Department of Health Services for Kern Fan wells supplying water to an M&I purveyor in the Bakersfield area (see Attachment A). Laboratory reports documenting this sampling are provided in the attached CD and hard copies of the data have been previously distributed to DWR and members of the Facilitation Group. Testing for constituents of concern (As, Br, Cr+6, NO3, SO4, TOC, TDS, U) will be conducted at the delivery points at start-up and at least quarterly thereafter for the duration of the program. Testing may also be conducted in the Aqueduct upstream of the delivery points to help better document background conditions. Changes in water quality for the Kern Fan Programs component of the Kern County pump-in program are predicted in Attachment B. As discussed above, decreases in TDS, bromide, and sulfate, and slight increases in arsenic, nitrate, chromium, and uranium, are expected.

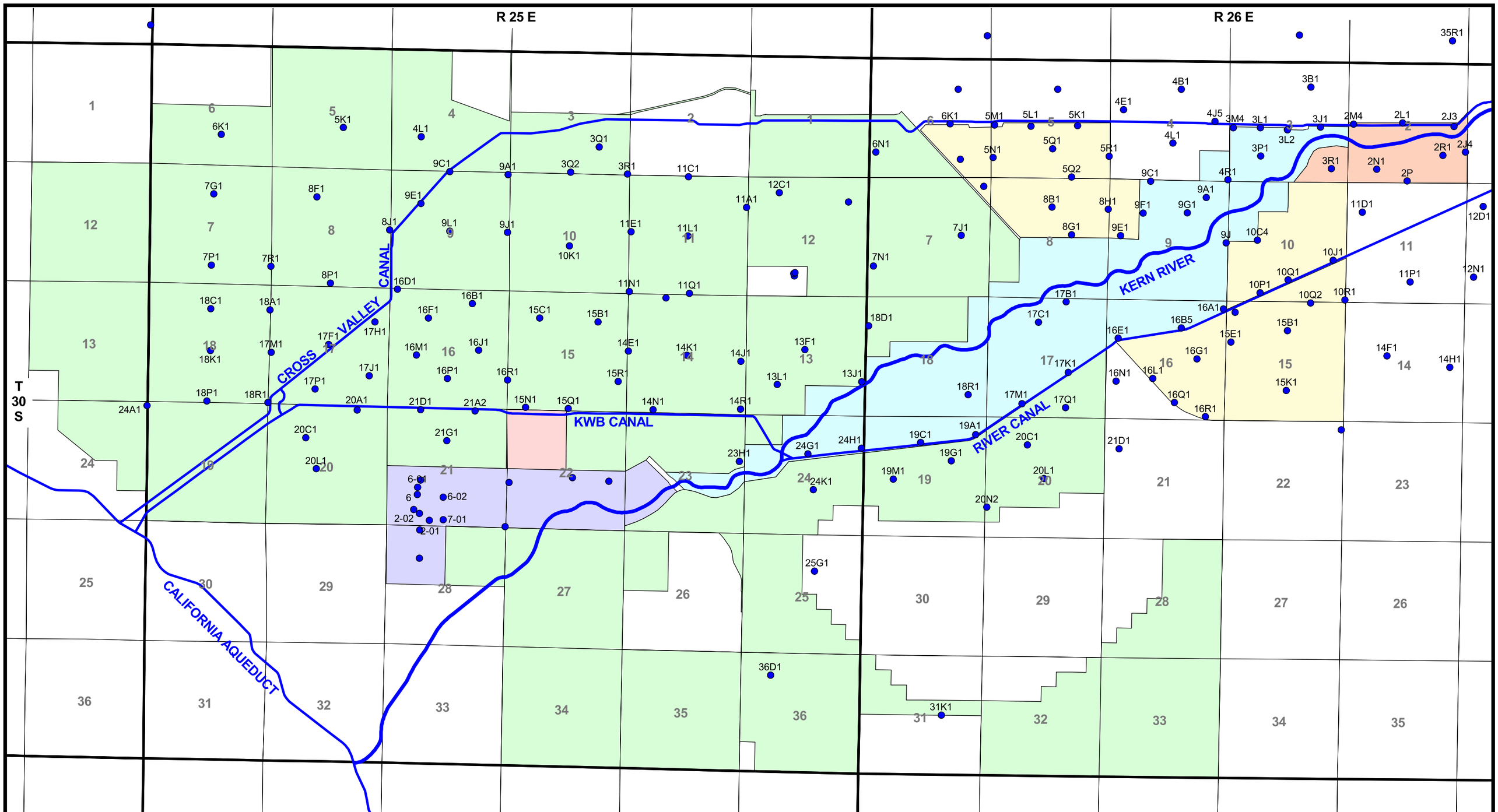
Environmental Issues
There are no relevant environmental issues associated with the proposed pump-in program. The KWBA and KCWA only recover water banked by its participants after accounting for appropriate losses. Therefore, groundwater overdraft will not occur as a result of the proposed program. No significant subsidence is expected as a result of the program either. An extensometer operated by the DWR will monitor subsidence throughout the program.

Endangered species are located throughout the Kern Water Bank, but none should be impacted by the proposed program. The KWBA operations are conducted under the requirements of a Habitat Conservation Plan developed for the Kern Water Bank and with the close cooperation of the US Fish and Wildlife Service and the California Department of Fish and Game. The Pioneer, Berrenda Mesa and 2800

Acres have been determined to be free of any endangered species except for the San Joaquin Kit Fox, which can be avoided during operations. The other projects are within the metro Bakersfield Habitat Conservation Plan, which address avoidance and mitigation for Kit Fox.

Attachments:

Map of facilities
Attachment A DHS Protocol
Attachment B Blending Model
CD w/ KWBA quality data



Recovery Wells

Rivers / Canals

Berrenda Mesa WSD

Buena Vista WSD

City of Bakersfield

Kern Water Bank

Pioneer Project

West Kern Water District

Kern Fan Recovery Facilities

N

KERN WATER BANK AUTHORITY

NEW WELL WATER QUALITY MONITORING SCHEDULE

Attachment C-6a

Community System, > 3300 population, groundwater/agricultural (CLGA)

UPDATED JANUARY 1999

This Monitoring Schedule is effective for the period January 1, 1999 - December 31, 2001.
This schedule supersedes all previous monitoring schedules.

Chemical - Title 22 Section	MCL (mg/l)	EPA Method	Frequency
Primary Inorganics - Section 64432			
Aluminum	1		Every 3 years
Antimony	0.006		Every 3 years
Arsenic	0.05		Every 3 years
Barium	1		Every 3 years
Beryllium	0.004		Every 3 years
Cadmium	0.005		Every 3 years
Chromium	0.05		Every 3 years
Cyanide	0.2		Waived
Mercury	0.002		Every 3 years
Nickel	0.1		Every 3 years
Selenium	0.05		Every 3 years
Thallium	0.002		Every 3 years
Lead	Lead Rule		Every 3 years
Fluoride - Section 64432			
Fluoride	1.4 - 2.4		Every 3 years
Asbestos - Section 64432.2			
Asbestos - Source Water	7 MFL		Waived
Asbestos - Distribution System sampling if Asbestos-Cement pipe used	7 MFL		Every 9 years if Aggressive Index ≤ 11.5
Nitrate/Nitrite - Section 64432.1			
Nitrate (as NO3)*	45		Annually if < 23 mg/l*
Nitrite (as nitrogen)**	1		Every 3 years if <0.5 mg/l**
Nitrate + Nitrite (sum as nitrogen)	10		N/A
Secondary Standards - Table 64449-A			
Aluminum	0.2		Every 3 years
Color	15		Every 3 years
Copper	1		Every 3 years
Corrosivity	non-corrosive		Every 3 years
Foaming Agents	0.5		Every 3 years
Iron	0.3		Every 3 years
Manganese	0.05		Every 3 years
Methyl-tert-butyl ether (MTBE)	**0.005**	**502.2, 524.2**	**Every 3 years**
Odor	3		Every 3 years
Silver	0.1		Every 3 years
Thiobencarb	0.001		Waived
Turbidity	5		Every 3 years
Zinc	5		Every 3 years
General Minerals - Section 64449			
Bicarbonate	N/A		Every 3 years
Carbonate	N/A		Every 3 years
Hydroxide Alkalinity	N/A		Every 3 years
Calcium	N/A		Every 3 years
Magnesium	N/A		Every 3 years
Sodium	N/A		Every 3 years
Hardness	N/A		Every 3 years
pH	N/A		Every 3 years
Secondary Standards - Table 64449-B			
TDS	500-1000;1500		Every 3 years
Specific Conductance	900-1600; 2200		Every 3 years
Chloride	250-500;600		Every 3 years
Sulfate	250-500;600		Every 3 years

MCL = Maximum Contaminant Level

***Nitrate** sampling shall be increased to quarterly following any result ≥ 23 mg/l.
This may be reduced to annual, upon request, if all 4 quarterly results are < 45 mg/l.

****Nitrite** sampling shall be increased to quarterly following any result ≥ 0.5 mg/l.
This may be reduced to annual, upon request, if all 4 quarterly results are < 1.0 mg/l.

BSL/WQMONITORING/99WAIVER/99CLGA.XLS 1/99

NEW WELL WATER QUALITY MONITORING SCHEDULE

Community System, > 3300 population, groundwater/agricultural (CLGA)

UPDATED JANUARY 1999

Chemical - Title 22 Section	MCL (mg/l)	EPA Method	Frequency**
VOCs - Table 64444-A (a)			
Benzene	0.001	502.2, 524.2	2 consec quarters, then every 3 years
Carbon Tetrachloride	0.0005	502.2, 524.2	2 consec quarters, then every 3 years
1,2-Dichlorobenzene	0.6	502.2, 524.2	2 consec quarters, then every 3 years
1,4-Dichlorobenzene	0.005	502.2, 524.2	2 consec quarters, then every 3 years
1,1-Dichloroethane	0.005	502.2, 524.2	2 consec quarters, then every 3 years
1,2-Dichloroethane	0.0005	502.2, 524.2	2 consec quarters, then every 3 years
1,1-Dichloroethylene	0.006	502.2, 524.2	2 consec quarters, then every 3 years
cis-1,2-Dichloroethylene	0.006	502.2, 524.2	2 consec quarters, then every 3 years
trans-1,2-Dichloroethylene	0.01	502.2, 524.2	2 consec quarters, then every 3 years
Dichloromethane	0.005	502.2, 524.2	2 consec quarters, then every 3 years
1,2-Dichloropropane	0.005	502.2, 524.2	2 consec quarters, then every 3 years
1,3-Dichloropropene	0.0005	502.2, 524.2	2 consec quarters, then every 3 years
Ethylbenzene	0.7	502.2, 524.2	2 consec quarters, then every 3 years
Methyl-tert-butyl ether (MTBE)	**To be adopted in '99**	**502.2, 524.2**	2 consec quarters, then every 3 years
Monochlorobenzene	0.07	502.2, 524.2	2 consec quarters, then every 3 years
Styrene	0.1	502.2, 524.2	2 consec quarters, then every 3 years
1,1,2,2-Tetrachloroethane	0.001	502.2, 524.2	2 consec quarters, then every 3 years
Tetrachloroethylene (PCE)	0.005	502.2, 524.2	2 consec quarters, then every 3 years
Toluene	0.15	502.2, 524.2	2 consec quarters, then every 3 years
1,2,4-Trichlorobenzene	0.07	502.2, 524.2	2 consec quarters, then every 3 years
1,1,1-Trichloroethane	0.2	502.2, 524.2	2 consec quarters, then every 3 years
1,1,2-Trichloroethane	0.005	502.2, 524.2	2 consec quarters, then every 3 years
Trichloroethylene (TCE)	0.005	502.2, 524.2	2 consec quarters, then every 3 years
Trichlorofluoromethane	0.15	502.2, 524.2	2 consec quarters, then every 3 years
1,1,2-Trichloro-1,2,2-Trifluoroethane	1.2	502.2, 524.2	2 consec quarters, then every 3 years
Vinyl Chloride	0.0005	502.2, 524.2	2 consec quarters, then every 3 years
Xylenes (total)	1.75	502.2, 524.2	2 consec quarters, then every 3 years
SOCs - Table 64444-A (b)			
Alachlor	0.002	505, 508	2 consec quarters, then every 3 years
Atrazine	0.003	505, 507, 508.1, 525.2	2 consec quarters, then every 3 years
Bentazon	0.018		2 consec quarters, then WAIVED
Benzo(a)pyrene	0.0002		Waived
Carbofuran	0.018		2 consec quarters, then WAIVED
Chlordane	0.0001		Waived
2,4-D	0.07		2 consec quarters, then WAIVED
Dalapon	0.2		Waived
Dibromochloropropane (DBCP)	0.0002	504.1, 551	2 consec quarters, then every 3 years
Di(2-ethylhexyl)adipate	0.4		Waived
Di(2-ethylhexyl)phthalate	0.004		Waived
Dinoseb	0.007		Waived
Diquat	0.02		Waived
Endothall	0.1		2 consec quarters, then WAIVED
Endrin	0.002		Waived
Ethylene Dibromide (EDB)	0.00005	504.1, 551	2 consec quarters, then every 3 years
Glyphosate	0.7		Waived
Heptachlor	0.00001		Waived
Heptachlor Epoxide	0.00001		Waived
Hexachlorobenzene	0.001		Waived
Hexachlorocyclopentadiene	0.05		Waived
Lindane	0.0002		Waived
Methoxychlor	0.04		2 consec quarters, then WAIVED
Molinate	0.02		Waived
Oxamyl	0.2		Waived
Pentachlorophenol	0.001		2 consec quarters, then WAIVED
Picloram	0.5		Waived
Polychlorinated Biphenyls	0.0005		Waived
Simazine	0.004	505, 507, 508.1, 525.2	2 consec quarters, then every 3 years
Thiobencarb	0.07		Waived
Toxaphene	0.003		Waived
2,3,7,8-TCDD (Dioxin)	0.00000003		Waived
2,4,5-TP (Silvex)	0.05		Waived

**This frequency applies only to chemicals for which previous results have shown no detectable results (ND).
Contact DWFOB for a special monitoring schedule when positive results are found.

NEW WELL WATER QUALITY MONITORING SCHEDULE
Community System, > 3300 population, groundwater/agricultural (CLGA)
UPDATED JANUARY 1999

Chemical - Title 22 Section	MCL (mg/l)	EPA Method	Frequency
Unregulated VOCs - Table 64450-A			
Bromobenzene	N/A		Waived
Bromodichloromethane	N/A		Waived
Bromoform	N/A		Waived
Bromomethane	N/A		Waived
Chlorodibromomethane	N/A		Waived
Chloroethane	N/A		Waived
Chloroform	N/A		Waived
Chloromethane	N/A		Waived
2-Chlorotoluene	N/A		Waived
4-Chlorotoluene	N/A		Waived
Dibromomethane	N/A		Waived
1,3-Dichlorobenzene	N/A		Waived
Dichlorodifluoromethane	N/A		Waived
1,3-Dichloropropane	N/A		Waived
2,2-Dichloropropane	N/A		Waived
1,1-Dichloropropene	N/A		Waived
1,1,1,2-Tetrachloroethane	N/A		Waived
1,2,3-Trichloropropane	N/A		Waived
Unregulated VOCs & SOCs - Table 64450-B			
Bromacil	**N/A**	**507**	2 consec quarters, then every 5 years
Bromochloromethane	N/A		Waived
n-Butylbenzene	N/A		Waived
sec-Butylbenzene	N/A		Waived
tert-Butylbenzene	N/A		Waived
Chlorothalonil	N/A		Waived
Dimethoate	N/A		Waived
Diuron	**N/A**	**632**	2 consec quarters, then every 5 years
Ethyl-tertiary-butyl ether (ETBE)	N/A		Sample only if MTBE is detected
Hexachlorobutadiene	N/A		Waived
Isopropylbenzene	N/A		Waived
p-Isopropyltoluene	N/A		Waived
Naphthalene	N/A		Waived
1-Phenylpropane	N/A		Waived
Prometryn	N/A		Waived
Tertiary-amyl-methyl ether (TAME)	N/A		Sample only if MTBE is detected
1,2,3-Trichlorobenzene	N/A		Waived
1,2,4-Trimethylbenzene	N/A		Waived
1,3,5-Trimethylbenzene	N/A		Waived
Unregulated SOCs - Table 64450-C			
Aldicarb	N/A		Waived
Aldicarb sulfone	N/A		Waived
Aldicarb sulfoxide	N/A		Waived
Aldrin	N/A		Waived
Butachlor	N/A		Waived
Carbaryl	N/A		Waived
Dicamba	N/A		Waived
Dieldrin	N/A		Waived
3-Hydroxycarbofuran	N/A		Waived
Methomyl	N/A		Waived
Metolachlor	N/A		Waived
Metribuzin	N/A		Waived
Propachlor	N/A		Waived
Unregulated Inorganics - Table 64450-D			
Perchlorate	N/A		Waived
Radioactivity - Section 64441			
Gross Alpha	15 pCi/L		4 quarters every 4 years
Radium 226 + 228***	3 pCi/L		Only when GA > 5 pCi/L***
Uranium***	20 pCi/L		Only when GA > 5 pCi/L***
Man Made Radioactivity - Section 64443			
Tritium	20000 pCi/L		Not Required
Strontium	8 pCi/L		Not Required
Gross Beta	50 pCi/L		Not Required

***Sampling for **Radium 226, 228** and **Uranium** is required only when the Gross Alpha exceeds 5 pCi/L.

Pump-In Program Water Quality Analysis
Table of Contents

Pump-in Program Blending Calculations 2

Charts
- Aqueduct Program
  - Summary of Changes 4
  - Changes by Location 5
  - Monthly Changes Relative to Background 6
  - Well Contribution by Project and Changes in TDS 7
- CVC Program - Summary of Changes 8
- Well Manifold Constituent Summary 9

Aqueduct and CVC Flow Data 10

Turnout Flow Data, CVC Demand and Alejandro Demand 11

Well Data by Pool 12

Aqueduct Background Scenarios 18

Pump-in Program Blending Calculations

Background Conditions

Values in blue are for user entry.
Values in black are calculated results or labels.

Choose a model background scenario here, and/or enter data below.

Ambient Model			Allocation					
Year Type	Annual Average	Monthly Average	2001	20%	25%	30%	35%	40%
Critical	○	○	○	○	○	○	○	○
Dry	○	○	45%	50%	55%	60%	65%	
2001	○	○	○	○	○	○	○	

Year Type: Dry Allocation: 65%

		Demand	Constituent Concentrations								
			As	Br	Cr	Cr+6	NO3	TDS	DOC	SO4	U
	Units	cfs	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	pCi/l
MCL			10	None	50	None	45	500	None	250	20
Aqueduct											
January		5086	2.0	210	1.0	1.0	3.5	340	4.0	43	2.0
February		2535	2.0	210	1.0	1.0	3.5	306	4.0	43	2.0
March		2538	2.0	210	1.0	1.0	3.5	283	4.0	43	2.0
April		4076	2.0	210	1.0	1.0	3.5	281	4.0	43	2.0
May		4154	2.0	210	1.0	1.0	3.5	242	4.0	43	2.0
June		4082	2.0	210	1.0	1.0	3.5	254	4.0	43	2.0
July		4319	2.0	210	1.0	1.0	3.5	265	4.0	43	2.0
August		4238	2.0	210	1.0	1.0	3.5	292	4.0	43	2.0
September		4329	2.0	210	1.0	1.0	3.5	368	4.0	43	2.0
October		3315	2.0	210	1.0	1.0	3.5	299	4.0	43	2.0
November		3091	2.0	210	1.0	1.0	3.5	429	4.0	43	2.0
December		2353	2.0	210	1.0	1.0	3.5	297	4.0	43	2.0
Kern River (into RC)		0	-	-	-	-	-	-	-	-	-
Kern River (into CVC)*		0	-	-	-	-	-	-	-	-	-
Friant (into CVC)*		0	-	-	-	-	-	-	-	-	-

* These Kern River & Friant flows modeled into CVC Pool 5. Enter Kern River and Friant data on "Well Data by Pool" sheet.

Manifold Blends

Manifold		Inflow	As	Br	Cr	Cr+6	NO3	TDS	DOC	SO4	U
		cfs	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	pCi/l
Semitropic		0	-	-	-	-	-	-	-	-	-
CVC Pool 1		51	4.0	151	1.9	1.93	9.5	214	0.6	39	5.8
CVC Pool 2		31	4.2	194	1.8	1.52	9.3	254	1.4	40	8.7
CVC Pool 3		19	2.0	424	5.3	1.65	12.7	295	0.9	32	9.7
CVC Pool 4		131	2.3	136	3.0	1.52	7.8	238	1.1	28	10.4
CVC Pool 5 & 6		111	3.6	130	1.1	0.83	3.4	137	1.4	14	2.4
CVC Subtotals	East	0	-	-	-	-	-	-	-	-	-
	West	343	3.1	157	2.2	1.36	7.0	206	1.2	26	6.9
River Canal		222	3.7	141	3.2	1.58	6.7	193	1.2	28	6.3
KWB Canal		289	3.7	204	1.8	1.59	11.9	270	0.6	45	14.5
Aquatic Lakes		0	-	-	-	-	-	-	-	-	-
WRM6		0	-	-	-	-	-	-	-	-	-
WRM7		0	-	-	-	-	-	-	-	-	-
WRM8		0	-	-	-	-	-	-	-	-	-
WRM9		0	-	-	-	-	-	-	-	-	-
WRM9A-10		0	-	-	-	-	-	-	-	-	-
WRMWSD Subtotal		0	-	-	-	-	-	-	-	-	-
Arvin-Edison		0	-	-	-	-	-	-	-	-	-
Well Blend in Aqueduct			3.5	169	2.3	1.50	8.6	225	1.0	33	9.3

Note: Enter Aquatic Lakes, Semitropic and Arvin data on "Well Data by Pool" sheet.

Month Modeled: June

Pump-in Program Blending Calculations

Pump-in Blend for Month: 6 ◉ Recalculate Blends

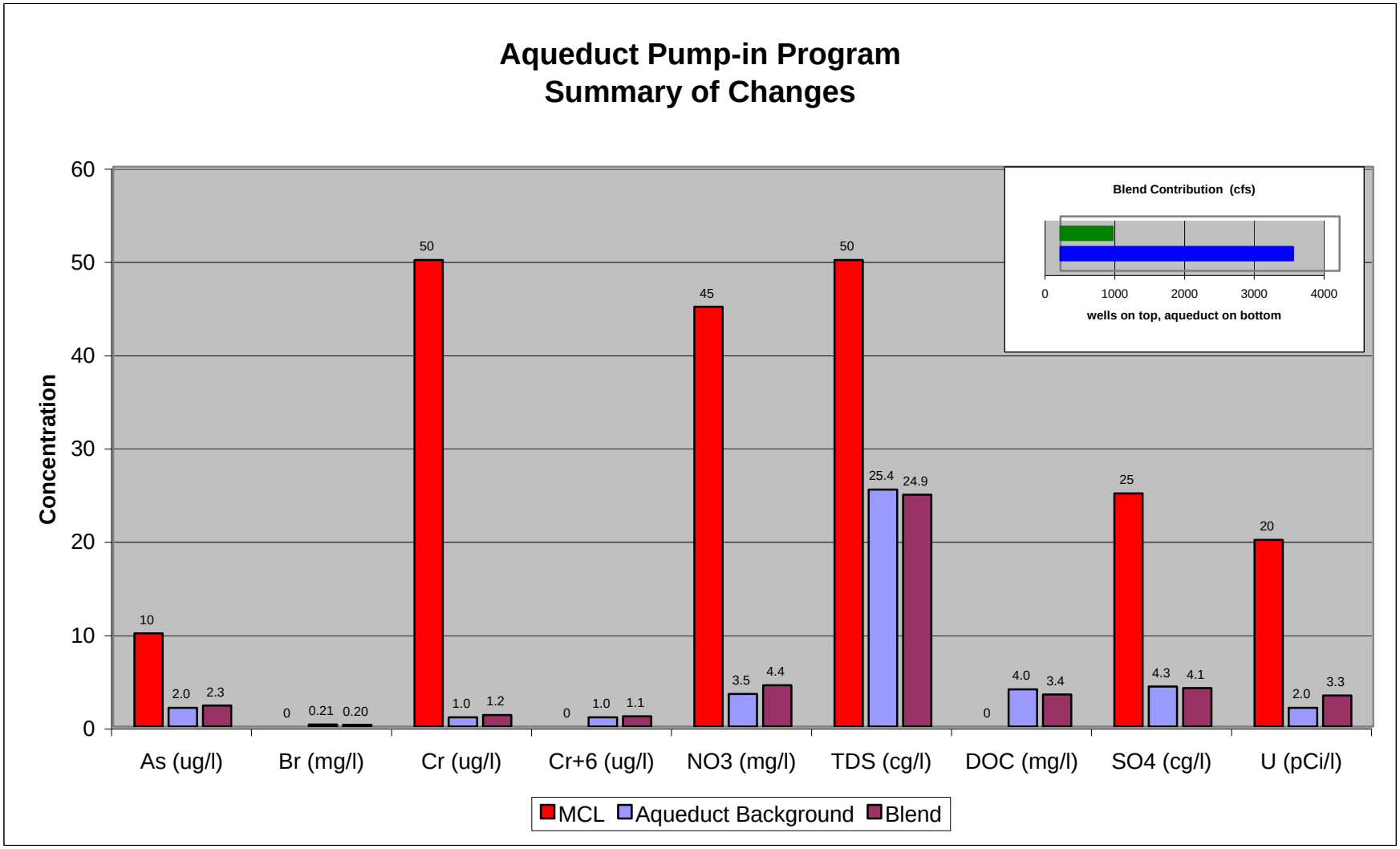
		Total Flow	Constituent Concentrations								
			As	Br	Cr	Cr+6	NO3	TDS	DOC	SO4	U
	Units	cfs	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	pCi/l
	MCL		10	None	50	None	45	500	None	250	20
Alejandro Blend		0	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
CVC Blend		0	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Change		0	NA	NA	NA	NA	NA	NA	NA	NA	NA
% of the MCL		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aqueduct Blends											
Background		4606	2.0	210	1.0	1.00	3.5	254	4.0	43	2.0
After Semitropic		4295	2.0	210	1.0	1.00	3.5	254	4.0	43	2.0
After CVC		4151	2.1	206	1.1	1.03	3.8	250	3.8	42	2.4
After KWB		4662	2.3	202	1.2	1.09	4.4	249	3.4	41	3.3
After Aquatic Lakes		4578	2.3	202	1.2	1.09	4.4	249	3.4	41	3.3
After WRMWSD 6		4404	2.3	202	1.2	1.09	4.4	249	3.4	41	3.3
After WRMWSD 7		4331	2.3	202	1.2	1.09	4.4	249	3.4	41	3.3
After WRMWSD 8		4275	2.3	202	1.2	1.09	4.4	249	3.4	41	3.3
After WRMWSD 9		4245	2.3	202	1.2	1.09	4.4	249	3.4	41	3.3
After Arvin-Edison		4245	2.3	202	1.2	1.09	4.4	249	3.4	41	3.3
After WRMWSD 9A-10		4116	2.3	202	1.2	1.09	4.4	249	3.4	41	3.3
Total Change		-490	0.3	-8	0.2	0.1	0.9	-5.4	-0.6	-1.8	1.3
% of the MCL		NA	23%	NA	2%	NA	10%	50%	NA	16%	17%

Downstream Aqueduct Blend by Month

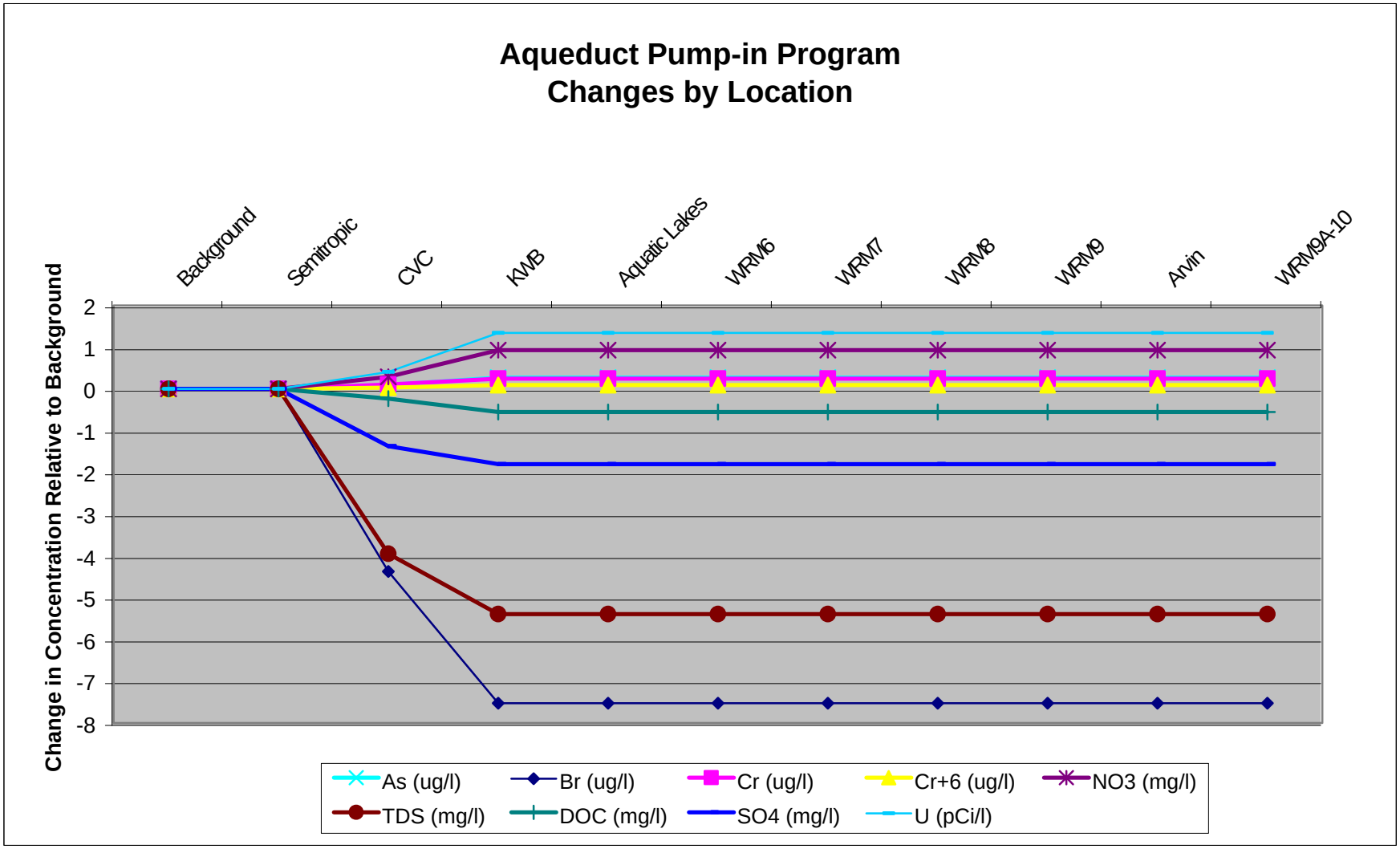
Month	Total Flow	As	Br	Cr	Cr+6	NO3	TDS	DOC	SO4	U
		ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	pCi/l
January	5088	2.2	203	1.2	1.08	4.3	321	3.5	41	3.2
February	2537	2.5	197	1.4	1.16	5.2	279	3.0	40	4.4
March	2555	2.5	197	1.4	1.15	5.1	265	3.1	40	4.2
April	4101	2.3	202	1.3	1.10	4.5	270	3.4	41	3.5
May	4180	2.3	202	1.3	1.09	4.5	239	3.4	41	3.4
June	4116	2.3	202	1.2	1.09	4.4	249	3.4	41	3.3
July	4368	2.3	203	1.2	1.09	4.4	258	3.5	41	3.3
August	4287	2.3	203	1.2	1.09	4.4	280	3.5	41	3.3
September	4346	2.3	202	1.3	1.09	4.4	341	3.4	41	3.4
October	3331	2.4	200	1.3	1.12	4.7	281	3.3	41	3.8
November	3094	2.4	199	1.4	1.13	4.9	374	3.2	40	4.0
December	2355	2.5	195	1.5	1.18	5.3	271	2.9	40	4.6

Note: Run "Recalculate Blends" macro to recalculate all time-dependant values.

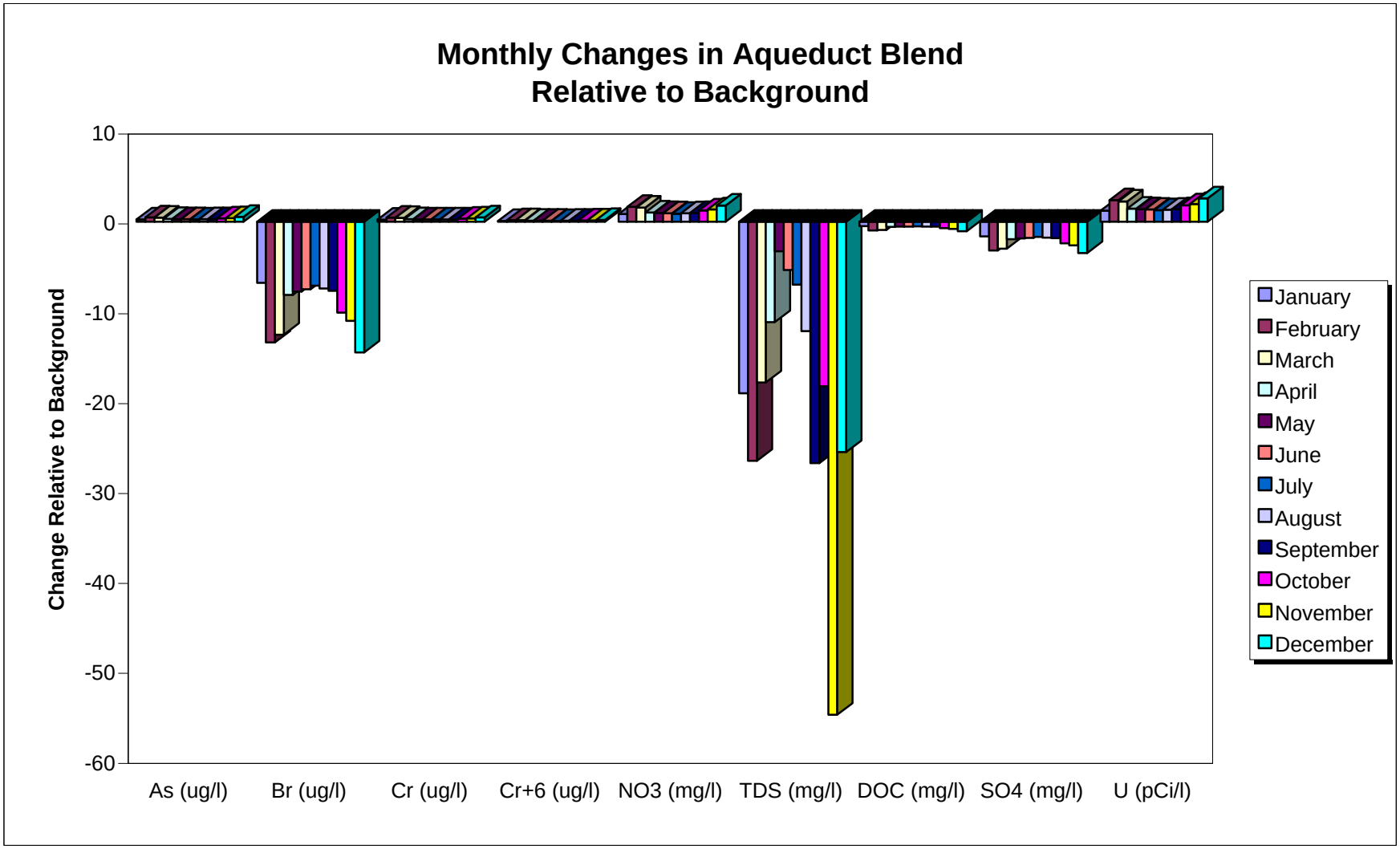
Type Year: **Dry**



Month Modeled: **June**
Type Year: **Dry**



Month Modeled: **June**
Type Year: **Dry**



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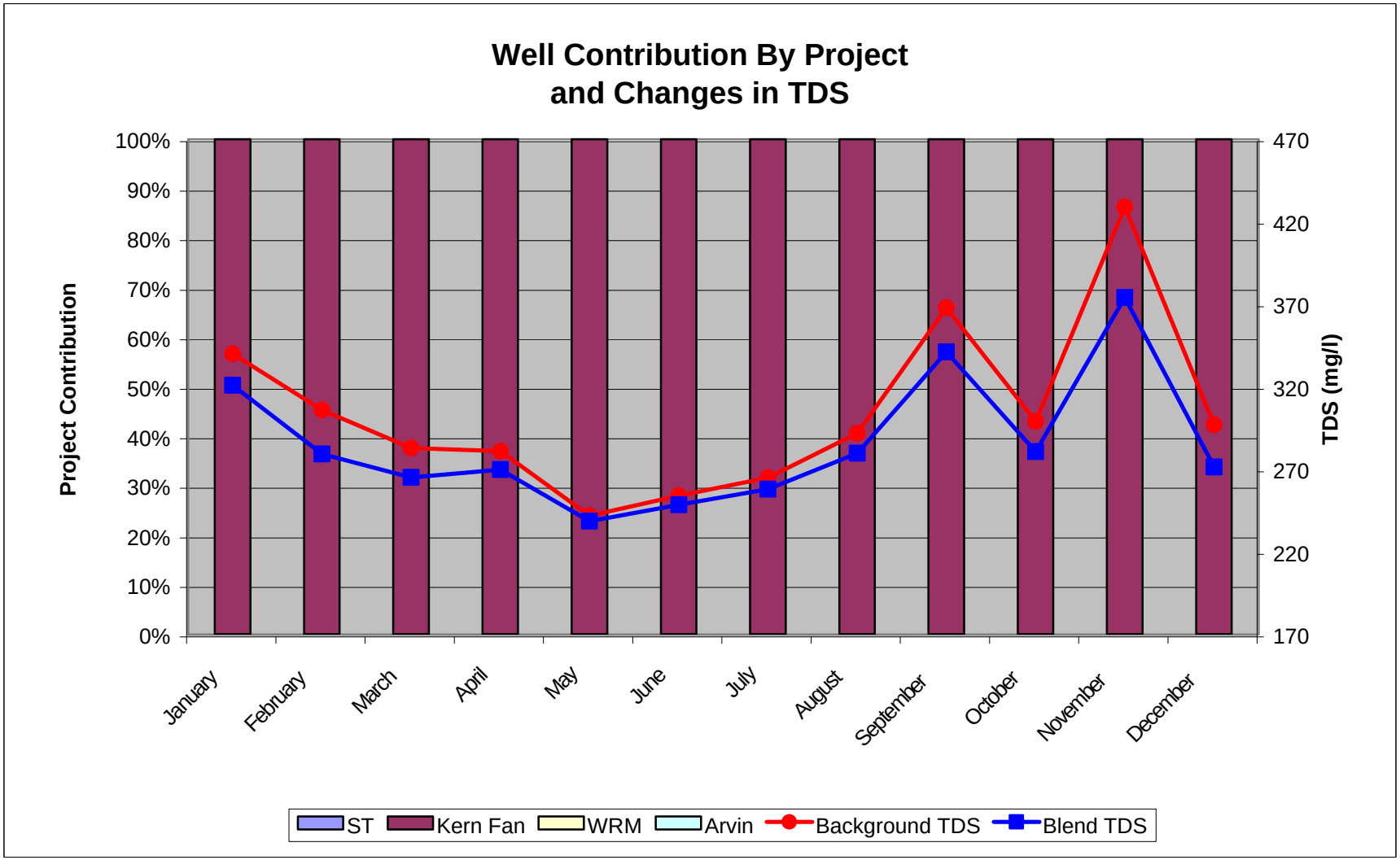
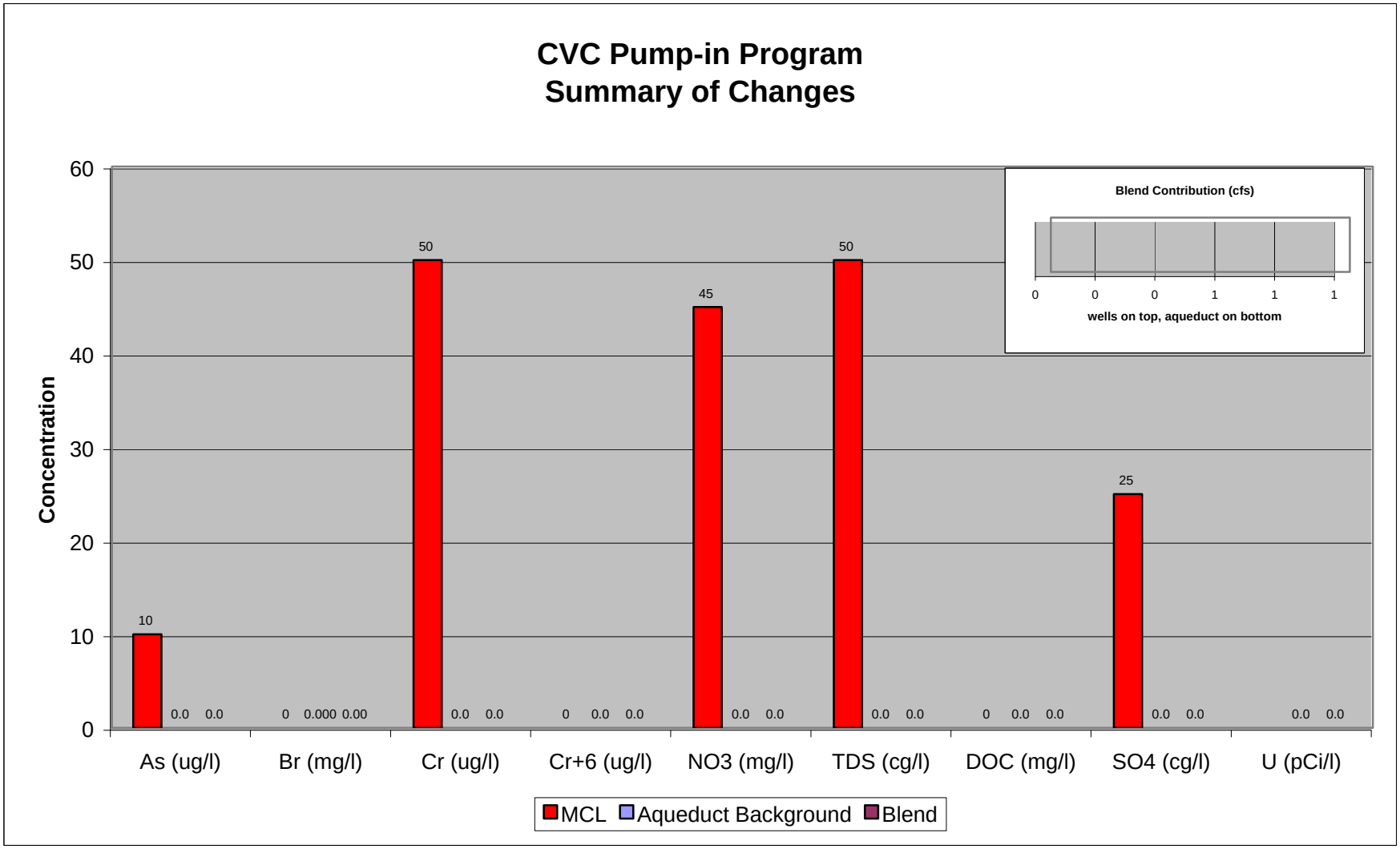
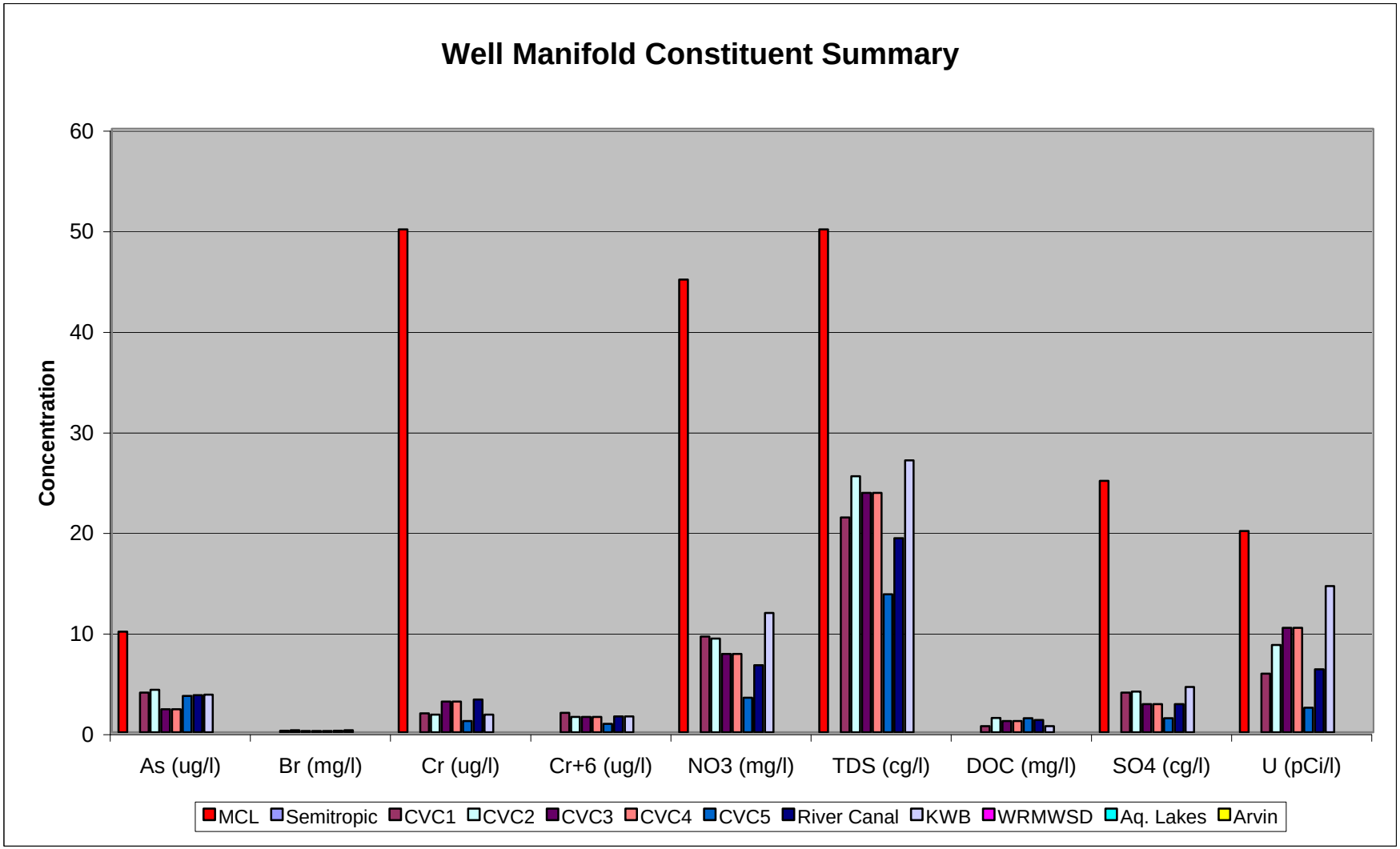


Type Year: **Dry**



Month Modeled: **June**
Type Year: **Dry**



Month Modeled: **June**

Aqueduct and CVC Flow Data

Month Modeled: **June**
Type Year: **Dry**

Aqueduct Flow Summary

Note: All values are calculated results or labels. No user entry required.

Turnout/in	Flow		Base Flow Contribution						Cumulative Flow
			Total Flow		% Well Contribution by Project				
	In	Out	Aqueduct	Wells	ST	Kern Fan	WRM	Arvin	
Background	4606	0	4606	0					4606
Semitropic	0	311	4295	0	0%				4295
Belridge	0	289	4006	0	0%				4006
Buena Vista	0	197	3809	0	0%				3809
CVC	343	0	3809	343	0%	100%			4151
KWB	510	0	3809	853	0%	100%			4662
BV/HM	0	84	3740	838	0%	100%			4578
Aquatic Lakes	0	0	3740	838	0%	100%			4578
WRMWSD 2-5	0	161	3608	808	0%	100%			4416
WRMWSD 6	0	13	3598	806	0%	100%	0%		4404
WRMWSD 7	0	73	3538	792	0%	100%	0%		4331
WRMWSD 8	0	56	3493	782	0%	100%	0%		4275
WRMWSD 9	0	30	3468	777	0%	100%	0%		4245
Arvin-Edison	0	0	3468	777	0%	100%	0%	0%	4245
WRMWSD 9A-10	0	129	3363	753	0%	100%	0%	0%	4116
WRMWSD 11-15	0	34	3335	747	0%	100%	0%	0%	4082

Totals	In	Out	Demand
	5459	1377	4082

% Project Contribution by Month

Month	Project			
	ST	Kern Fan	WRM	Arvin
January	0%	100%	0%	0%
February	0%	100%	0%	0%
March	0%	100%	0%	0%
April	0%	100%	0%	0%
May	0%	100%	0%	0%
June	0%	100%	0%	0%
July	0%	100%	0%	0%
August	0%	100%	0%	0%
September	0%	100%	0%	0%
October	0%	100%	0%	0%
November	0%	100%	0%	0%
December	0%	100%	0%	0%

CVC Flow Summary

CVC Demand:		0.0	
Upstream Supply		0	
		Well Flow	
Plant	Rate	West	East
PP1	0	51	0
PP2	0	31	0
PP3	0	19	0
PP4	0	131	0
PP5	0	111	0
Well flow in CVC		343	0

Turnout Flow Data, CVC Demand, and Alejandro Demand

Turnout	Flow Rate (cfs)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Semitropic	122	54	0	0	0	311	375	302	0	0	0	0
Belridge	31	81	99	98	191	289	344	252	132	80	27	16
Buena Vista	6	0	0	0	0	197	306	130	0	0	0	0
BV/HM	41	0	42	0	0	84	82	11	0	0	0	0
WRMWSD 2-5	8	32	67	71	105	161	169	159	77	44	26	12
WRMWSD 6	1	2	5	5	8	13	13	14	7	4	1	1
WRMWSD 7	5	11	26	29	44	73	74	79	39	21	7	3
WRMWSD 8	7	12	29	38	48	56	58	48	33	21	16	11
WRMWSD 9	4	6	15	21	26	30	31	26	18	11	9	6
Arvin-Edison	0	0	0	0	0	0	0	0	0	0	0	0
WRMWSD 9A-10	7	11	49	45	93	129	126	98	34	33	25	24
WRMWSD 11-15	2	2	16	25	26	34	49	49	17	16	3	2
CVC Demand	0	0	0	0	0	0	0	0	0	0	0	0
Alejandro Demand	0	0	0	0	0	0	0	0	0	0	0	0

Turnout	Projected Delivery (AF)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Semitropic (10A)	7500	3000	0	0	0	18500	22994	18500	0	0	0	0
Belridge & WK (11B;12D)	2254	5300	7130	6838	13790	20226	24830	18194	9237	5810	1915	1174
Buena Vista (12E)	394	0	0	0	0	11750	18750	7990	0	0	0	0
BV/HM & WK (13B)	2500	0	2593	0	0	5000	5000	650	0	0	0	0
WRMWSD 2-5 (14A&B)	466	1785	4092	4197	6452	9596	10358	9776	4581	2674	1523	762
WRMWSD 6 (14B)	50	106	284	298	469	760	795	852	405	227	71	36
WRMWSD 7 (14B)	284	609	1624	1705	2680	4344	4547	4872	2314	1299	406	203
WRMWSD 8 (14C)	455	650	1755	2275	2925	3315	3575	2925	1950	1300	975	650
WRMWSD 9 (14C)	245	350	945	1225	1575	1785	1925	1575	1050	700	525	350
Arvin-Edison	0	0	0	0	0	0	0	0	0	0	0	0
WRMWSD 9A-10 (15A)	400	600	3000	2700	5700	7700	7700	6000	2000	2000	1500	1500
WRMWSD 11-15 (16A)	100	100	1000	1500	1600	2000	3000	3000	1000	1000	200	100

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Flow for : June

Well	Project	Pool	On?	Flow	As	Br	Cr	Cr+6	NO3	TDS	DOC	SO4	U
				Units>	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	pCi/l
	Kern (into RC)			0	3.0	20	10.0	1.0	2.0	135	2.2	11	1.4
	Kern (into CVC)			0	3.0	20	10.0	1.0	2.0	135	2.2	11	1.4
	Friant (into CVC)			0	2.0	100	10.0	1.0	2.0	36	2.2	2	5.3
	Aquatic Lakes			0	6.5	291	5.0	1.0	0.8	350	4.2	42	5.0
	Semitropic			0	7.8	209	10.5	6.4	5.3	398	2.1	84	2.2
	Arvin-Edison			0	5.0	140	2.0	1.0	10.0	250	0.5	25	5.0
30S/25E-36D01	KWBA	Alejandro	No	0.0	1.8	70	< 2.0	1.90	3.6	200	0.6	28	< 2.0
30S/24E-24A01	KWBA	CVC Pool 1	No	0.0	< 1.0	350	< 1.0	0.20	10.1	1100	0.8	500	56.6
30S/25E-06K01	KWBA	CVC Pool 1	Yes	7.7	4.8	86	2.1	2.30	6.2	220	1.1	55	< 2.0
30S/25E-07G01	KWBA	CVC Pool 1	Yes	7.8	4.6	87	2.2	2.30	10.7	210	< 0.5	56	2.9
30S/25E-08F01	KWBA	CVC Pool 1	Yes	4.9	6.7	89	1.0	1.50	7.0	165	< 0.5	29	< 2.0
30S/25E-08J01	KWBA	CVC Pool 1	Yes	4.4	6.6	140	1.4	1.80	8.7	220	< 0.5	41	8.8
30S/25E-15B01	KWBA	CVC Pool 1	Yes	5.3	3.6	210	1.9	2.20	5.7	160	< 0.5	19	2.4
30S/25E-15C01	KWBA	CVC Pool 1	Yes	5.2	2.0	350	2.2	2.20	8.1	220	< 0.5	24	1.7
30S/25E-16B01	KWBA	CVC Pool 1	Yes	5.0	< 1.0	200	< 2.0	1.10	17.2	300	0.7	48	13.5
30S/25E-16D01	KWBA	CVC Pool 1	Yes	6.3	1.4	110	2.2	1.80	11.9	210	< 0.5	35	16.0
30S/25E-16F01	KWBA	CVC Pool 1	Yes	4.5	5.3	160	1.4	1.70	11.0	220	< 0.5	33	4.9
30S/25E-19G01	KWBA	CVC Pool 1	No	0.0	< 1.0	130	< 2.0	1.60	4.8	510	0.9	210	14.0
30S/25E-04L01	KWBA	CVC Pool 2	Yes	6.3	5.8	170	< 1.0	0.80	4.8	225	< 0.5	29	5.8
30S/25E-05K01	KWBA	CVC Pool 2	Yes	6.0	7.5	100	1.3	1.30	6.2	195	1.4	29	2.8
30S/25E-09C01	KCWA 12	CVC Pool 2	Yes	4.0	< 2.0	200	3.0	1.20	4.9	310	5.4	56	4.1
30S/25E-09E01	KCWA 13	CVC Pool 2	Yes	3.5	3.0	200	2.0	1.60	11.9	290	1.4	62	5.8
30S/25E-09J01	KWBA	CVC Pool 2	Yes	5.5	1.7	290	< 2.0	2.30	10.2	280	< 0.5	35	13.1
30S/25E-09L01	KWBA	CVC Pool 2	Yes	5.2	3.7	220	1.8	2.00	19.1	265	< 0.5	47	19.6
30S/25E-12C01	KWBA	CVC Pool 3	Yes	4.0	< 1.0	990	2.2	2.70	17.2	500	< 0.5	40	16.1
30S/26E-06K01	BK 7	CVC Pool 3	Yes	7.5	< 2.0	200	< 10.0	1.60	13.5	228	1.4	28	7.1
30S/26E-06N01	KWBA	CVC Pool 3	Yes	7.0	2.5	340	< 2.0	1.10	9.2	250	< 0.5	31	8.9
30S/26E-03L01	KCWA 4	CVC Pool 4	Yes	4.9	< 2.0	< 100	1.0	< 0.50	3.6	150	< 0.5	13	7.0

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30S/26E-03L02	KCWA 5	CVC Pool 4	Yes	4.6	< 2.0	< 100	1.0	1.60	3.3	150	1.4	21	3.4
30S/26E-03M04	KCWA 3	CVC Pool 4	Yes	4.9	< 2.0	< 100	1.0	1.60	4.0	200	1.4	21	8.4
30S/26E-03P01	KCWA 2	CVC Pool 4	Yes	4.9	< 2.0	< 100	< 0.5	1.60	3.0	170	< 0.5	14	5.9
30S/26E-04B01	BH 2	CVC Pool 4	Yes	2.9	< 2.0	100	< 1.0	1.60	9.2	220	1.4	25	5.5
30S/26E-04E01	BH 3	CVC Pool 4	Yes	3.5	< 2.0	< 100	< 1.0	1.60	8.7	230	1.4	26	4.7
30S/26E-04J05	KCWA 6	CVC Pool 4	Yes	5.3	< 2.0	< 100	1.0	1.60	3.8	240	< 0.5	29	16.4
30S/26E-04L01	BH 4	CVC Pool 4	Yes	4.0	< 2.0	100	< 1.0	1.60	4.7	180	1.4	20	5.1
30S/26E-04R01	KCWA 1	CVC Pool 4	Yes	4.8	< 2.0	< 100	2.0	1.60	3.6	250	1.4	27	9.5
30S/26E-05K01	KCWA 14	CVC Pool 4	Yes	6.6	< 2.0	200	2.0	1.60	20.5	270	1.4	39	11.3
30S/26E-05L01	KCWA 15	CVC Pool 4	Yes	6.5	< 2.0	91	1.0	1.60	7.6	210	< 0.5	22	7.1
30S/26E-05M01	KCWA 11	CVC Pool 4	Yes	5.8	< 2.0	100	2.0	1.60	11.9	270	1.4	32	8.0
30S/26E-05N01	BK 8	CVC Pool 4	Yes	6.5	< 2.0	200	< 10.0	1.60	10.5	312	1.4	45	9.8
30S/26E-05Q01	REHAB 1	CVC Pool 4	Yes	6.0	< 2.0	200	2.0	1.60	7.8	260	1.4	30	16.0
30S/26E-05Q02	KCWA 16	CVC Pool 4	Yes	6.6	8.0	200	< 10.0	1.60	12.0	278	1.4	44	21.2
30S/26E-05R01	KCWA 17	CVC Pool 4	Yes	6.1	< 2.0	120	2.0	1.60	17.7	290	< 0.5	38	9.9
30S/26E-08B01	REHAB 2	CVC Pool 4	Yes	6.2	< 2.0	200	< 1.0	1.60	14.7	260	1.4	23	16.3
30S/26E-08G01	KCWA 19	CVC Pool 4	Yes	6.6	< 2.0	200	< 10.0	1.60	8.0	242	1.4	24	10.6
30S/26E-08H01	KCWA 18	CVC Pool 4	Yes	6.8	< 2.0	120	1.0	1.60	7.5	240	< 0.5	26	8.7
30S/26E-09A01	KCWA 8	CVC Pool 4	Yes	5.4	< 2.0	< 100	2.0	1.60	4.3	290	1.4	40	8.7
30S/26E-09C01	KCWA 7	CVC Pool 4	Yes	5.5	< 2.0	< 100	1.0	1.60	0.7	210	1.4	22	15.2
30S/26E-09E01	KCWA 20	CVC Pool 4	Yes	6.6	< 2.0	200	< 10.0	1.60	4.2	216	1.4	22	7.2
30S/26E-09F01	KCWA 9	CVC Pool 4	Yes	5.6	< 2.0	< 100	< 1.0	1.60	2.9	210	1.4	20	13.7
30S/26E-09G01	KCWA 10	CVC Pool 4	Yes	4.8	< 2.0	< 100	< 1.0	< 0.50	4.1	280	< 0.5	33	10.0
29S/27E-31P01	ID4 No. 9	CVC Pool 5	Yes	9.3	4.0	< 100	< 1.0	0.30	3.4	100	8.2	11	0.0
29S/27E-31Q01	ID4 No. 8	CVC Pool 5	Yes	9.4	< 2.0		< 1.0		1.2	100		7	0.3
30S/26E-02J03	BK 3	CVC Pool 5	Yes	5.5	< 2.0	< 100	< 1.0	< 0.50	5.7	150	< 0.5	18	6.8
30S/26E-02J04	BM 1	CVC Pool 5	Yes	5.1	< 2.0	200	< 1.0	1.60	4.6	110	1.4	16	6.7
30S/26E-02L01	BK 2	CVC Pool 5	Yes	5.8	< 2.0	< 100	1.0	1.60	5.4	140	1.4	14	3.1
30S/26E-02M04	BK 1	CVC Pool 5	Yes	5.2	< 2.0	< 100	< 1.0	1.60	3.6	150	1.4	17	2.6

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30S/26E-02N01	BK 5	CVC Pool 5	Yes	5.6	< 2.0	< 100	< 1.0	1.60	3.5	160	1.4	15	3.0
30S/26E-02P01	BM 3	CVC Pool 5	Yes	4.5	2.0	200	< 1.0	1.60	4.4	120	1.4	13	2.5
30S/26E-02R01	BK 6	CVC Pool 5	Yes	6.4	< 2.0	< 100	< 1.0	1.60	3.7	130	1.4	12	2.2
30S/26E-03B01	BH 1	CVC Pool 5	Yes	4.0	< 2.0	100	< 1	1.60	3.6	190	1.4	23	3.7
30S/26E-03J01	ID4 No. 4	CVC Pool 5	Yes	5.0	< 2.0	200	0.30	1.60	2.85	150	1.4	20	6.90
30S/26E-03R01	BK 4	CVC Pool 5	Yes	5.4	< 2.0	< 100	1.0	1.60	4.2	230	1.4	19	3.6
29S/26E-36Q02	ID4 No. 12	CVC Pool 6	Yes	9.5	< 2.0		< 1.0		1.6	110		9	0.8
29S/26E-36R01	ID4 No. 3	CVC Pool 6	Yes	6.0	< 2.0	100	2.0	< 0.50	2.5	170	< 0.5	15	2.4
29S/27E-31J01	ID4 No. 1	CVC Pool 6	Yes	5.6	< 2.0	< 100	1.0	0.20	1.8	120	< 0.5	8	1.4
30S/26E-01B01	ID4 No. 10	CVC Pool 6	Yes	9.4	< 2.0	< 100	1.0	0.10	1.5	120		10	1.6
30S/26E-01E01	ID4 No. 11	CVC Pool 6	Yes	9.5	19.0	< 500	2.0	0.70	6.9	160	< 0.5	21	1.1
30S/25E-03Q01	KWBA	KWB Canal	Yes	6.0	1.2	320	1.5	1.50	9.7	285	0.7	28	19.0
30S/25E-03Q02	KWBA	KWB Canal	Yes	7.0	3.0	320	1.6	1.70	10.6	295	< 0.5	32	11.5
30S/25E-03R01	KWBA	KWB Canal	Yes	7.2	3.1	310	< 1.0	1.40	14.5	345	< 0.5	32	37.7
30S/25E-07P01	KWBA	KWB Canal	Yes	3.6	1.6	130	1.9	1.80	28.6	320	1.3	59	39.9
30S/25E-07R01	KWBA	KWB Canal	Yes	4.1	1.9	110	1.7	1.80	15.4	280	1.6	63	17.8
30S/25E-08P01	KWBA	KWB Canal	Yes	4.0	< 1.0	170	1.5	1.70	20.7	410	0.6	100	12.5
30S/25E-09A01	KWBA	KWB Canal	Yes	4.8	2.0	470	1.8	2.30	8.8	285	< 0.5	33	2.9
30S/25E-10K01	KWBA	KWB Canal	Yes	6.0	34.0	210	< 1.3	1.70	11.0	230	1.3	27	22.8
30S/25E-11A01	KWBA	KWB Canal	Yes	4.8	6.6	96	2.7	3.20	4.4	140	< 0.5	16	< 2.0
30S/25E-11C01	KWBA	KWB Canal	Yes	5.2	1.8	57	3.3	1.60	13.6	530	0.6	53	25.2
30S/25E-11E01	KWBA	KWB Canal	Yes	6.0	1.5	320	< 2.0	1.20	10.6	300	< 0.5	31	14.9
30S/25E-11L01	KWBA	KWB Canal	Yes	3.2	1.1	390	< 2.0	1.60	18.3	310	0.5	34	9.5
30S/25E-11N01	KWBA	KWB Canal	Yes	4.5	2.5	470	< 2.0	2.30	10.2	300	< 0.5	26	8.8
30S/25E-11Q01	KWBA	KWB Canal	Yes	6.8	2.3	470	2.1	2.30	12.3	290	< 0.5	26	< 2.0
30S/25E-13F01	KWBA	KWB Canal	Yes	7.0	3.3	70	2.9	1.50	9.5	170	< 0.5	33	2.6
30S/25E-13J01	KWBA	KWB Canal	Yes	7.0	< 1.0	53	< 2.0	0.80	5.3	210	0.7	22	< 2.0
30S/25E-13L01	KWBA	KWB Canal	Yes	5.0	9.1	51	< 2.0	1.40	3.6	120	< 0.5	18	< 2.0
30S/25E-14E01	KWBA	KWB Canal	Yes	8.8	1.6	610	2.8	3.00	11.1	380	0.7	47	19.9

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30S/25E-14J01	KWBA	KWB Canal	Yes	7.1	9.5	110	2.0	2.00	5.3	160	< 0.5	25	2.8
30S/25E-14K01	KWBA	KWB Canal	Yes	6.0	1.5	830	2.7	4.00	15.5	520	0.6	69.0	12.9
30S/25E-14N01	KWBA	KWB Canal	Yes	5.0	11.0	110	1.6	1.90	7.5	170	< 0.5	27	3.3
30S/25E-14R01	KWBA	KWB Canal	Yes	4.6	11.0	140	1.3	1.30	4.7	180	0.6	23	2.3
30S/25E-15N01	KWBA	KWB Canal	Yes	2.8	13.0	110	1.9	2.30	14.5	240	0.5	44	8.7
30S/25E-15Q01	KWBA	KWB Canal	Yes	5.2	8.4	90	2.1	2.30	8.4	190	< 0.5	32	7.9
30S/25E-15R01	KWBA	KWB Canal	Yes	3.5	1.7	220	< 2.0	2.10	10.6	280	0.6	56	5.3
30S/25E-16J01	KWBA	KWB Canal	Yes	3.0	22.0	210	1.3	1.60	14.5	170	< 0.5	20	11.0
30S/25E-16M01	KWBA	KWB Canal	Yes	6.4	1.4	150	1.5	1.40	9.2	200	< 0.5	29	8.9
30S/25E-16P01	KWBA	KWB Canal	Yes	4.6	1.4	270	2.2	2.30	9.2	240	< 0.5	29	3.0
30S/25E-16R01	KWBA	KWB Canal	No	0.0	2.3	140	3.5	1.60	12.0	180	0.9	30	3.4
30S/25E-17F01	KWBA	KWB Canal	Yes	4.5	1.4	120	< 1.0	0.70	12.8	240	< 0.5	47	21.6
30S/25E-17H01	KWBA	KWB Canal	Yes	11.4	2.0	140	1.5	1.80	11.0	240	< 0.5	44	12.2
30S/25E-17J01	KWBA	KWB Canal	Yes	11.0	1.9	110	1.6	1.40	8.8	190	< 0.5	26	15.7
30S/25E-17M01	KWBA	KWB Canal	Yes	9.5	1.3	130	< 2.0	0.60	21.6	340	< 0.5	64	29.3
30S/25E-17P01	KWBA	KWB Canal	Yes	9.4	2.3	70	1.1	1.30	10.5	180	< 0.5	25	15.5
30S/25E-18A01	KWBA	KWB Canal	Yes	3.7	2.3	130	1.2	1.60	26.9	350	0.8	59	34.1
30S/25E-18C01	KWBA	KWB Canal	Yes	4.4	1.4	100	< 1.0	0.60	28.2	310	< 0.5	71	36.1
30S/25E-18K01	KWBA	KWB Canal	Yes	10.0	1.3	140	< 2.0	0.40	15.4	360	< 0.5	100	18.6
30S/25E-18P01	KWBA	KWB Canal	Yes	6.4	< 1.0	250	< 1.0	0.40	15.4	490	0.7	180	23.8
30S/25E-18R01	KWBA	KWB Canal	Yes	5.6	1.5	170	< 1.0	0.40	16.0	350	< 0.5	110	28.1
30S/25E-19P01	KWBA	KWB Canal	No	0.0	< 8.0	200	< 2.0	1.60	1.6	1190	1.4	440	37.3
30S/25E-20A01	KWBA	KWB Canal	Yes	7.0	1.6	75	< 1.0	0.70	10.4	210	0.6	24	17.8
30S/25E-20C01	KWBA	KWB Canal	Yes	7.0	2.1	190	< 1.0	1.60	8.3	310	0.7	62	8.0
30S/25E-20L01	KWBA	KWB Canal	Yes	7.8	2.8	250	< 1.0	0.60	19.4	330	< 0.5	93	21.3
30S/25E-21A02	KWBA	KWB Canal	Yes	4.0	1.7	99	2.1	2.20	7.0	220	< 0.5	35	21.5
30S/25E-21D01	KWBA	KWB Canal	Yes	8.7	1.5	130	1.3	1.50	6.2	210	0.6	25	11.4
30S/25E-21G01	KWBA	KWB Canal	Yes	6.0	1.9	110	1.9	2.00	10.6	220	< 0.5	34	20.6
30S/25E-23H01	KWBA	KWB Canal	No	0.0	55.0	4300	< 1.0	0.30	1.3	1900	< 0.5	380	< 2.0

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Flow for : June

Well	Project	Pool	On?	Flow	As	Br	Cr	Cr+6	NO3	TDS	DOC	SO4	U
30S/26E-07J01	KWBA	KWB Canal	Yes	5.0	2.1	110	2.6	1.30	8.8	170	< 0.5	21	4.3
30S/26E-07N01	KWBA	KWB Canal	Yes	5.0	1.7	560	< 2.0	2.20	17.2	380	0.6	40	19.3
30S/26E-07Q01	KWBA	KWB Canal	Yes	8.0	5.8	65	2.1	2.00	3.7	170	< 0.5	22	8.3
30S/26E-18B01	KWBA	KWB Canal	No	0.0	8.5	200	10.0	1.60	8.7	207	1.4	28	9.0
30S/26E-18D01	KWBA	KWB Canal	Yes	5.0	1.4	78	< 2.0	1.60	14.4	190	2.6	26	3.6
30S/25E-24G01	OLCESE 8	River Canal	Yes	6.4	2.0	200	4.0	1.60	3.0	160	1.4	19	3.4
30S/25E-24H01	OLCESE 7	River Canal	Yes	6.9	< 2.0	200	2.0	1.60	5.0	210	1.4	26	9.1
30S/25E-24J01	KWBA	River Canal	No	0.0	< 5.0	200	9.2	1.60	15.0	170	1.4	29	9.3
30S/25E-24K01	KWBA	River Canal	Yes	7.0	1.9	45	1.2	1.60	11.0	160	1.0	18	5.2
30S/25E-25G01	SJER	River Canal	No	0.0	999	200	999	1.60	999	999	1.4	999	999
30S/26E-09J01	COB	River Canal	Yes	5.0	< 2.0	200	< 10.0	1.60	5.0	175	1.4	27	6.4
30S/26E-10C04	COB	River Canal	Yes	5.0	14.0	200	< 5.0	1.60	< 1.0	76	1.4	11	6.1
30S/26E-10J01	REHAB 6	River Canal	Yes	5.1	2.4	200	< 10.0	1.60	6.0	175	1.4	25	5.6
30S/26E-10P01	BK 10	River Canal	Yes	6.6	< 2.0	< 100	2.0	1.60	12.0	240	< 0.5	30	9.9
30S/26E-10Q01	BK 11	River Canal	Yes	5.9	2.6	200	< 10.0	1.60	7.2	214	1.4	24	5.1
30S/26E-10Q02	KCWA 21	River Canal	Yes	6.0	5.0	200	2.0	1.60	9.6	230	1.4	35	6.0
30S/26E-10R01	BK 12	River Canal	Yes	5.7	3.1	200	< 10.0	1.60	16.4	202	1.4	49	9.4
30S/26E-11D01	BH 5	River Canal	Yes	4.4	< 2.0	< 100	< 1.0	1.60	10.2	270	1.4	42	6.7
30S/26E-11P01	BH 6	River Canal	Yes	5.0	< 2.0	100	< 1.0	1.60	16.0	280	1.4	56	1.3
30S/26E-12D01	BH 7	River Canal	Yes	5.5	< 2.0	< 100	< 1.0	1.60	2.7	160	1.4	14	1.3
30S/26E-12N01	BH 8	River Canal	Yes	5.3	< 2.0	< 100	< 1.0	1.60	5.7	170	1.4	20	4.7
30S/26E-13G01	BHF	River Canal	No	0.0	999	200	999	1.60	999	999	1.4	999	999
30S/26E-13K01	BHF	River Canal	No	0.0	999	200	999	1.60	999	999	1.4	999	999
30S/26E-14F01	BHF	River Canal	No	0.0	999	200	999	1.60	999	999	1.4	999	999
30S/26E-14H01	BHF	River Canal	No	0.0	999	200	999	1.60	999	999	1.4	999	999
30S/26E-15B01	REHAB 3	River Canal	Yes	5.9	2.0	200	< 1.0	1.60	5.1	170	1.4	24	1.9
30S/26E-15E01	KCWA 22	River Canal	Yes	6.0	9.0	200	< 1.0	1.60	3.8	170	1.4	18	3.1
30S/26E-15K01	REHAB 4	River Canal	Yes	6.0	11.0	200	2.0	1.60	2.9	130	1.4	15	4.2
30S/26E-16A01	COB	River Canal	Yes	5.0	0.0	200	< 10.0	1.60	6.0	173	1.4	25	4.6

Well Data (by pool)

Color Code: Values in black are measured values. Values in blue require user input. 999 indicates no data available.
Values in red are interpolated values. These values allow for the prediction of blends at project completion.
Where the constituent is not detected, the detection limit is used in the blending calculation.

Flow for : June

Well	Project	Pool	On?	Flow	As	Br	Cr	Cr+6	NO3	TDS	DOC	SO4	U
30S/26E-16B05	OLCESE 1	River Canal	Yes	5.3	< 2.0	100	2.0	1.60	4.2	210	1.4	28	6.4
30S/26E-16E01	OLCESE 2	River Canal	Yes	5.7	3.0	100	2.0	1.60	2.9	170	1.4	17	4.3
30S/26E-16G01	REHAB 5	River Canal	Yes	5.4	< 2.0	200	2.0	1.60	6.7	180	1.4	20	4.7
30S/26E-16L01	BK 9	River Canal	Yes	6.5	< 2.0	200	< 10.0	1.60	4.0	173	1.4	30	5.3
30S/26E-16N01	MR	River Canal	No	0.0	999	200	999	999	999	999	1.4	999	999
30S/26E-16Q01	KCWA 23	River Canal	Yes	6.6	9.0	200	2.0	1.60	7.2	190	1.4	29	4.7
30S/26E-16R01	KCWA 24	River Canal	Yes	6.3	8.0	200	3.8	1.60	6.6	170	1.4	26	4.9
30S/26E-17B01	ID4 No. 5	River Canal	Yes	5.0	5.9	200	4.9	1.60	2.4	210	1.4	19	8.9
30S/26E-17C01	ID4 No. 6	River Canal	Yes	5.0	< 2.0	200	3.6	1.60	3.0	220	1.4	24	9.0
30S/26E-17K01	OLCESE 3	River Canal	Yes	6.6	< 2.0	100	1.0	1.60	3.1	200	1.4	23	12.9
30S/26E-17M01	OLCESE 4	River Canal	Yes	7.5	< 2.0	100	1.0	1.60	3.1	200	1.4	31	6.4
30S/26E-17Q01	KWBA	River Canal	Yes	7.0	1.1	78	< 2.0	1.00	7.5	240	0.6	45	11.20
30S/26E-18R01	ID4 No. 7	River Canal	Yes	5.0	10.6	200	1.3	1.60	2.6	210	1.4	23	9.10
30S/26E-19A01	OLCESE 5	River Canal	Yes	7.5	< 2.0	100	2.0	1.60	5.5	220	1.4	24	13.9
30S/26E-19C01	OLCESE 6	River Canal	Yes	7.2	< 2.0	100	2.0	1.60	4.5	200	1.4	22	10.8
30S/26E-19G01	KWBA	River Canal	Yes	7.0	1.2	63	< 2.0	1.60	11.9	220	< 0.5	42	7.97
30S/26E-19M01	KWBA	River Canal	Yes	5.6	4.6	77	< 2.0	2.00	8.1	180	< 0.5	37	< 2.0
30S/26E-20C01	KWBA	River Canal	Yes	7.0	1.5	57	< 2.0	1.00	12.3	230	0.8	41	6.5
30S/26E-20L01	KWBA	River Canal	Yes	6.8	1.8	71	< 2.0	2.00	13.8	190	< 0.5	44	< 2.0
30S/26E-20N02	KWBA	River Canal	Yes	6.0	10.0	44	2.8	1.60	6.2	150	0.6	31	1.8
30S/26E-21D01	MR	River Canal	No	0.0	999	200	999	1.60	999	999	1.4	999	999

Aqueduct Background Scenarios

Ambient Annual Average Model

Year Type: **Critical**

Month	As	Br	Cr	Cr+6	NO3	TDS	DOC	SO4	U
	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	pCi/l
January	2.0	210	1.0	1.00	3.5	377	4	43	2.0
February	2.0	210	1.0	1.00	3.5	377	4	43	2.0
March	2.0	210	1.0	1.00	3.5	377	4	43	2.0
April	2.0	210	1.0	1.00	3.5	377	4	43	2.0
May	2.0	210	1.0	1.00	3.5	377	4	43	2.0
June	2.0	210	1.0	1.00	3.5	377	4	43	2.0
July	2.0	210	1.0	1.00	3.5	377	4	43	2.0
August	2.0	210	1.0	1.00	3.5	377	4	43	2.0
September	2.0	210	1.0	1.00	3.5	377	4	43	2.0
October	2.0	210	1.0	1.00	3.5	377	4	43	2.0
November	2.0	210	1.0	1.00	3.5	377	4	43	2.0
December	2.0	210	1.0	1.00	3.5	377	4	43	2.0
Mean	2.0	210	5.0	NA	3.5	377	43	43	NA
Min	1.0	50	5.0	NA	0.6	245	3	16	NA
Max	4.0	540	11.0	NA	9.6	562	10	99	NA
St. Dev.	0	110	1.0	NA	1.8	76	2	15	NA

Year Type: **Dry**

Month	As	Br	Cr	Cr+6	NO3	TDS	DOC	SO4	U
	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	pCi/l
January	2.0	210	1.0	1.00	3.5	302	4.0	43	2.0
February	2.0	210	1.0	1.00	3.5	302	4.0	43	2.0
March	2.0	210	1.0	1.00	3.5	302	4.0	43	2.0
April	2.0	210	1.0	1.00	3.5	302	4.0	43	2.0
May	2.0	210	1.0	1.00	3.5	302	4.0	43	2.0
June	2.0	210	1.0	1.00	3.5	302	4.0	43	2.0
July	2.0	210	1.0	1.00	3.5	302	4.0	43	2.0
August	2.0	210	1.0	1.00	3.5	302	4.0	43	2.0
September	2.0	210	1.0	1.00	3.5	302	4.0	43	2.0
October	2.0	210	1.0	1.00	3.5	302	4.0	43	2.0
November	2.0	210	1.0	1.00	3.5	302	4.0	43	2.0
December	2.0	210	1.0	1.00	3.5	302	4.0	43	2.0
Mean	2.0	210	5.0	NA	3.5	302	4	43	NA
Min	1.0	50	5.0	NA	0.6	178	3	16	NA
Max	4.0	540	11.0	NA	9.6	434	10	99	NA
St. Dev.	0	110	1.0	NA	1.8	68	2	15	NA

Year Type: **2001** **Check 29**

Month	As	Br	Cr	Cr+6	NO3	TDS	DOC	SO4	U
	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	pCi/l
January	2.4	253	1.0	0.40	3.0	299	3.3	42	2.0
February	2.4	253	1.0	0.40	3.0	299	3.3	42	2.0
March	2.4	253	1.0	0.40	3.0	299	3.3	42	2.0
April	2.4	253	1.0	0.40	3.0	299	3.3	42	2.0
May	2.4	253	1.0	0.40	3.0	299	3.3	42	2.0
June	2.4	253	1.0	0.40	3.0	299	3.3	42	2.0
July	2.4	253	1.0	0.40	3.0	299	3.3	42	2.0
August	2.4	253	1.0	0.40	3.0	299	3.3	42	2.0
September	2.4	253	1.0	0.40	3.0	299	3.3	42	2.0
October	2.4	253	1.0	0.40	3.0	299	3.3	42	2.0
November	2.4	253	1.0	0.40	3.0	299	3.3	42	2.0
December	2.4	253	1.0	0.40	3.0	299	3.3	42	2.0
Mean	2.0	253	5.0	NA	3.0	213	3	42	NA
Min	1.0	50	5.0	NA	0.6	107	3	16	NA
Max	4.0	540	11.0	NA	9.6	560	10	99	NA
St. Dev.	0	110	1.0	NA	1.8	66	2	15	NA

Aqueduct Background Scenarios

Ambient Monthly Average Model

Year Type: **Critical**

Month	As	Br	Cr	Cr+6	NO3	TDS	DOC	SO4	U
	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	pCi/l
January	2.0	210	1.0	1.00	3.5	404	4.0	43	2.0
February	2.0	210	1.0	1.00	3.5	437	4.0	43	2.0
March	2.0	210	1.0	1.00	3.5	385	4.0	43	2.0
April	2.0	210	1.0	1.00	3.5	347	4.0	43	2.0
May	2.0	210	1.0	1.00	3.5	329	4.0	43	2.0
June	2.0	210	1.0	1.00	3.5	358	4.0	43	2.0
July	2.0	210	1.0	1.00	3.5	352	4.0	43	2.0
August	2.0	210	1.0	1.00	3.5	365	4.0	43	2.0
September	2.0	210	1.0	1.00	3.5	389	4.0	43	2.0
October	2.0	210	1.0	1.00	3.5	401	4.0	43	2.0
November	2.0	210	1.0	1.00	3.5	362	4.0	43	2.0
December	2.0	210	1.0	1.00	3.5	454	4.0	43	2.0
Mean	2.0	210	5.0	NA	3.5	382	4	43	NA
Min	1.0	50	5.0	NA	0.6	329	3	16	NA
Max	4.0	540	11.0	NA	9.6	454	10	99	NA
St. Dev.	0	110	1.0	NA	1.8	41	2	15	NA

Year Type: **Dry**

Month	As	Br	Cr	Cr+6	NO3	TDS	DOC	SO4	U
	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	pCi/l
January	2.0	210	1.0	1.0	3.5	340	4.0	43	2.0
February	2.0	210	1.0	1.0	3.5	306	4.0	43	2.0
March	2.0	210	1.0	1.0	3.5	283	4.0	43	2.0
April	2.0	210	1.0	1.0	3.5	281	4.0	43	2.0
May	2.0	210	1.0	1.0	3.5	242	4.0	43	2.0
June	2.0	210	1.0	1.0	3.5	254	4.0	43	2.0
July	2.0	210	1.0	1.0	3.5	265	4.0	43	2.0
August	2.0	210	1.0	1.0	3.5	292	4.0	43	2.0
September	2.0	210	1.0	1.0	3.5	368	4.0	43	2.0
October	2.0	210	1.0	1.0	3.5	299	4.0	43	2.0
November	2.0	210	1.0	1.0	3.5	429	4.0	43	2.0
December	2.0	210	1.0	1.0	3.5	297	4.0	43	2.0
Mean	2.0	210	5.0	NA	3.5	305	4	43	NA
Min	1.0	50	5.0	NA	0.6	242	3	16	NA
Max	4.0	540	11.0	NA	9.6	429	10	99	NA
St. Dev.	0	110	1.0	NA	1.8	59	2	15	NA

Year Type: **2001** **Check 21**

Month	As	Br	Cr	Cr+6	NO3	TDS	DOC	SO4	U
	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	pCi/l
January	2.0	210	1.0	1.0	3.5	340	4.0	43	2.0
February	2.0	210	1.0	1.0	3.5	306	4.0	43	2.0
March	2.0	150	1.0	1.0	5.5	255	5.1	51	2.0
April	2.0	170	1.0	0.2	4.3	288	4.6	60	2.0
May	2.0	210	1.0	0.2	3.2	268	3.4	47	2.0
June	2.0	240	1.0	0.2	2.7	275	2.9	42	2.0
July	3.0	170	1.0	0.2	1.9	263	3.0	37	2.0
August	3.0	250	1.0	0.2	1.4	257	2.5	29	2.0
September	3.0	360	1.0	0.2	1.5	320	2.4	34	2.0
October	3.0	360	1.0	0.2	2.0	335	2.4	38	2.0
November	3.0	390	1.0	0.2	2.4	378	2.7	46	2.0
December	2.0	310	1.0	0.2	4.0	307	2.6	39	2.0
Mean	2.0	253	5.0	NA	3.0	299	3	42	NA
Min	1.0	50	5.0	NA	0.6	255	3	16	NA
Max	4.0	540	11.0	NA	9.6	378	10	99	NA
St. Dev.	0	110	1.0	NA	1.8	42	2	15	NA

Aqueduct Background Scenarios
Downstream Demand

	SWP Allocation										
	2001	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%
Month	Estimated Downstream Demand (cfs)										
Jan	2348	1565	1956	2348	2739	3130	3521	3913	4304	4695	5086
Feb	1170	780	975	1170	1365	1560	1755	1950	2145	2340	2535
Mar	2029	781	976	1172	1367	1562	1757	1953	2148	2343	2538
Apr	1517	1254	1568	1881	2195	2508	2822	3135	3449	3762	4076
May	2238	1278	1598	1917	2237	2556	2876	3195	3515	3834	4154
Jun	1874	1256	1570	1884	2198	2512	2826	3140	3454	3768	4082
Jul	2039	1329	1661	1994	2326	2658	2990	3323	3655	3987	4319
Aug	1889	1304	1630	1956	2282	2608	2934	3260	3586	3912	4238
Sep	2192	1332	1665	1998	2331	2664	2997	3330	3663	3996	4329
Oct	2205	1020	1275	1530	1785	2040	2295	2550	2805	3060	3315
Nov	2113	951	1189	1427	1664	1902	2140	2378	2615	2853	3091
Dec	1504	724	905	1086	1267	1448	1629	1810	1991	2172	2353