NOTE TIME AND DATE

Beaumont Basin Watermaster
MEETING AGENDA
DATE: Tuesday, April 22, 2008
TIME: 1:00 PM
PLACE: BCVWD
560 Magnolia Avenue
Beaumont, CA, 92223

1. Call to Order

2. Roll Call

   A. City of Banning: Jim Earhart
   B. City of Beaumont: Dee Moorjani
   C. Beaumont Cherry Valley Water District: C.J. Butcher
   D. South Mesa Water Company: George Jorritsma
   E. Yucaipa Valley Water District: Joe Zoba

3. Pledge of Allegiance

4. Oral and Written Communication

Anyone wishing to address the Watermaster on any matter not on the Agenda of this meeting may do so now. The oral communications portion of this Agenda is to hear comments. If any question or concern arises related to any issues not on the Agenda, it will be referred to Staff for appropriate response. Anyone wishing to speak on an item on the Agenda may do so at the time the Watermaster considers that item. All persons wishing to speak must fill out a Request to Speak Form and give it to the Clerk at the beginning of the meeting. Forms are available from Clerk upon request. Each speaker is limited to three (3) minutes.

5. Status Reports (verbal Reports)

   A. Salt Mitigation Study
   B. Discussion Regarding Rules and Regulations Regarding Assignment of Unused Overlying Rights per the Judgment

Comment – The purpose of the Beaumont Basin Watermaster Workshop is to review and accept comments from the Watermaster relative to the Draft Nexus Report for the Development of a Salt Mitigation Fee to comply with the Salt Mitigation Requirements of the 2004 Basin Plan Amendment and the Rules and Regulations Regarding Assignment of Unused Overlying Rights per the Judgment

6. Adjournment

WILDERMUTH™
ENVIRONMENTAL INC.

June 19, 2006

San Timoteo Watershed Management Authority
Project Committee No. 1
Attention: J. Andrew Schlange, General Manager
560 Magnolia Avenue
Beaumont, California 92223

SUBJECT: NEXUS REPORT FOR THE DEVELOPMENT OF A SALT MITIGATION FEE TO COMPLY WITH THE SALT MITIGATION REQUIREMENTS OF THE 2004 BASIN PLAN AMENDMENT

Dear Mr. Schlange:

Per the request of Project Committee No. 1, Wildermuth Environmental, Inc. (WEI), in conjunction with Black & Veatch (BV), has completed this nexus report to support the establishment of a fee for new development to comply with the salt mitigation requirements of the 2004 Basin Plan Amendment. The seminal documents that were used to develop this report are:

- *Beaumont Cherry Valley Water District, Final 2005 Urban Water Management Plan,* prepared by Parsons, December 2005.
- 2004 Basin Plan Amendment, Regional Board Resolution R8-2004-001.
- *Draft Technical Memorandum, Salt Mitigation Analysis*, prepared by Black & Veatch, March 2006
- *2005 Update of System Development Fees Report,* prepared by Raftelis Consultants, Inc., December 2005.

Since the April 11, 2006 draft nexus report was produced, the STWMA managers and the Beaumont Basin Watermaster have decided to refer the salt mitigation fee to the Beaumont Basin Watermaster.

THE 2004 BASIN PLAN AMENDMENT

The City of Beaumont (City) and the Beaumont Cherry Valley Water District (BCVWD) are jointly responsible for implementing a salt mitigation program if the following occur:

- The ambient volume-weighted total dissolved solids (TDS) in the Beaumont Management Zone (BMZ) exceeds 320 milligrams per liter (mg/L). The implication of this requirement is that the five-year moving average TDS concentration in artificial recharge must be not be greater than 330 mg/L and that the ten-year moving average TDS concentration in the non-potable supply used for irrigation supply must not be greater than 390 mg/L.
- The five-year moving average TDS concentration in the City's recycled water effluent exceeds 480 mg/L. The implication of this requirement is that the TDS concentration in the City's recycled water effluent must never exceed 490 mg/L. Should the City's recycled water effluent exceed 490 mg/L, it must either be treated to reduce the TDS concentration to 490 mg/L if there is assimilative capacity in the BMZ or treated to

reduce the TDS concentration to 330 mg/L if there is no assimilative capacity in the BMZ.

These conditions are more lenient than they would be if strict adherence to antidegradation policy was used to set the TDS objectives for the BMZ. These conditions reflect a higher TDS objective that was assigned to the BMZ in recognition of the groundwater basin management strategies being implemented by the City and the BCVWD through the STWMA. In addition to the requirements listed above, there may be a salt mitigation requirement if the ambient volume-weighted TDS in the San Timoteo Management Zone (STMZ) exceeds 400 mg/L. Salt mitigation requirements for the BMZ will be mandatory. Because the salt mitigation requirements for the BMZ are greater than those for the STMZ, the salt mitigation fee will be based on compliance with the BMZ conditions. For a detailed understanding of the salt mitigation requirements, please review the 2004 Basin Plan update at the following URL:

http://www.waterboards.ca.gov/santaana/pdf/04-01.pdf

THE SALT MITIGATION STRATEGY

The salt mitigation strategy recommended herein is to assume the worst case, to assume that the ambient volume-weighted TDS in the Beaumont Management Zone (BMZ) will exceed 320 mg/L. The method used to mitigate salt load to the basin and maintain compliance with the Basin Plan is to treat part of the recycled water produced at the City's recycling plant with reverse osmosis (RO). About 2.3 million gallons per day (mgd) of the City's recycled water will be treated with RO and blended with the remaining 5.7 mgd of recycled water to meet the requirements of the Basin Plan. Treating the recycled water will require treating less water than other alternatives and will guarantee simultaneous compliance with the recycled water use limits and discharge to Coopers Creek. For a detailed discussion of the treatment systems and cost, please review the attached BV report (*Technical Memorandum, Salt Mitigation Analysis*, April 5, 2006).

The capital and annual costs associated with salt mitigation are shown for two alternatives in Table 1. The alternatives differ principally in the method of brine discharge from the RO treatment process. The first alternative would dispose of the brine through a new 25-mile, 12-inch pipeline to the Santa Ana Regional Interceptor (SARI) in San Bernardino. The first alternative also assumes the purchase of 0.6 mgd of capacity in the SARI and will include additional treatment and other annual costs related to conveyance and further treatment of the brine discharge by the Orange County Sanitation District prior to ocean discharge. The water lost in the brine, approximately 700 acre-feet per year, will have to be replaced with supplemental water.

The second alternative will recover all of the water in the brine and make it available for use. The waste would be a dry salt (about 80-percent dry) that would be disposed of off-site.

THE SALT MITIGATION FEE

The salt mitigation fee is based on the mitigation of the salt impacts created by new development. The needs to expand the City of Beaumont recycled water plant, to serve recycled water, and to import State Project Water are entirely from new development. The total future water supply capacity is associated with 38,000 new equivalent dwelling units (EDUs) in the BCVWD service area. Therefore the capital cost associated with the salt mitigation requirement will be spread equally among these 38,000 EDUs. The BCVWD would collect this fee and build the treatment facilities when the triggering conditions occur.

The total capital cost, salt mitigation fee, and annual cost for the two alternatives are:

Alternative	Capital Cost	Salt Mitigation Fee[1]	Annual Cost
AWTP, Brine Discharge to SARI Reach V	$55,191,000	$1,452	$5,453,000
AWTP, Zero Liquid Discharge	$30,043,000	$791	$6,072,000

1 – Salt mitigation fee equals the capital cost divided by 38,000 EDUs

The capital cost for brine discharge to the SARI is $25,000,000 more than the zero liquid discharge alternative. However, the annual cost, including debt repayment (20 years at 6 percent) and operations and maintenance costs, is about $600,000 per year more for the zero liquid discharge alternative (due to its larger energy use).

There are significant uncertainties regarding brine discharge to the SARI, which include the availability of SARI capacity and its cost, SARI operations and maintenance costs, OCSD treatment cost, and the reliability of the SARI pipeline. The only uncertainty for the zero liquid discharge alternative is the future cost of power (assumed at $0.14/kwh herein).

RECOMMENDATION

The BCVWD, based on input from the City and its own policies regarding reliability and cost, should select the appropriate alternative. As part of this assessment, we recommend that the BCVWD and the City tour desalter facilities that use the zero-liquid discharge technology. Finally, the Yucaipa Valley Water District is also considering construction of a brine disposal pipeline from its new water treatment plant to the SARI in San Bernardino. The BCVWD and the City should consider the economics of buying into and extending this pipeline if the SARI option is pursued.

As stated above, the STWMA managers and the Beaumont Basin Watermaster have decided to refer the salt mitigation fee to the Beaumont Basin Watermaster. This is because salt loading in the Beaumont Management Zone is due, in part, to all users in the Basin and therefore a more equitable approach would be to develop a fee or assessment that captures all users of the Beaumont Management Zone.

It has been our sincere pleasure to serve Project Committee No. 1 in this investigation. Please call me regarding any questions or concerns.

Sincerely,

Wildermuth Environmental, Inc.

Mark Wildermuth, MS, PE
President/CEO

Encl.
cc STWMA PC1 Commissioners
Joe Aklufi

Table 1
Capital and Annual Costs to Mitigate Salt Impacts from Future Development, Pursuant to the 2004 Basin Plan Amendment[1]

Description	AWTP, Brine Discharge to SARI Reach V	AWTP, Zero Liquid Brine Discharge
	Capital Cost	
AWTP, RO	$6,781,000	$5,865,000
SARI Reach V Connection	$26,550,000	$0
Zero Liquid Discharge	$0	$11,070,000
Recycled Water Storage	$4,227,000	$4,835,000
Subtotal Construction	$37,558,000	$21,770,000
Contingency at 20 percent	$7,512,000	$4,354,000
Total Construction Cost	$45,070,000	$26,124,000
Engineering and Administration at 15 percent	$6,761,000	$3,919,000
Total Capital Cost	$51,831,000	$30,043,000
Value of Lost Water in Brine[2]	$3,360,000	$0
Net Capital Cost	$55,191,000	$30,043,000
	Annual Cost	
AWTP	$480,000	$414,000
SARI Reach V Connection	$286,000	$0
Zero Liquid Discharge	$0	$3,038,000
Value of Lost Water in Brine[2]	$168,000	$0
Total Operations and Maintenance Costs	$934,000	$3,452,000
Annualized Capital Cost at 6 percent and 20-yr Finance Period	$4,519,000	$2,620,000
Total Annual Cost	$5,453,000	$6,072,000

1 -- Capital and annual cost based on Tables 3 and 4 in the BV report

2 -- Capital cost to replace water lost in brine is $5,000 per acre-ft; the commodity cost was assumed to be $250 per acre-ft

TECHNICAL MEMORANDUM
Salt Mitigation Analysis

San Timoteo Watershed Management Authority

B&V Project 143440
April 5, 2006

To: Bill Leever, Project Manager
Wildermuth Environmental, Inc.

From: Andrew Lazenby, Project Engineer
Black & Veatch

Prepared by: Andrew Lazenby
Kristi Kuhlmann

Reviewed by: Dave Argo

1.0 BACKGROUND AND PURPOSE

The San Timoteo Watershed Management Authority (STWMA) was formed in January 2001 by the Beaumont-Cherry Valley Water District (BCVWD), the City of Beaumont (City), the South Mesa Water Company, and the Yucaipa Valley Water District (YVWD). The STWMA formed a stakeholder group to develop a watershed scale water resources management program that would provide a safe and reliable water supply for all users in the watershed.

A task force was formed in the mid 1990's by the Santa Ana Watershed Project Authority (SAWPA) to perform certain investigations that would lead to the establishment of new total inorganic nitrogen (TIN) and total dissolved solids (TDS) objectives for the groundwater basins in the Santa Ana River Watershed. The Regional Water Quality Control Board (RWQCB), water-recycling agencies, and many other entities participate in the Task Force. In a letter to Mr. Gerard Thibeault, Executive Officer at the RWQCB, dated June 26th, 2002, and revised November 10th, 2003, J. Andrew Schlange of STWMA and David Dillon from the City proposed using California Water Code section 13241 and other criteria to establish TDS and TIN objectives in the STWMA area groundwater basins. As a result, the TDS objectives in milligrams per liter (mg/L) for the zones are as follows:

Table 1
Management Zone TDS Objectives

Zone	TDS (mg/L)	
	Current	Objective
Beaumont	293	330
San Timoteo	304	400

The current estimate listed in Table 1 is an estimate of the volume-weighted quality in these management zones in 1997. The TDS objectives are based on the long-term flow-weighted average of waters recharging the basins and will not result in the impairment of beneficial uses within the management zones or downstream water bodies. The TDS objectives listed above were incorporated into the Basin Plan Amendment by the RWQCB effective December 2004.

Facilities to mitigate the accumulation of TDS in the basin groundwater will be required when either of the following occur:

- When the five-year average TDS concentration in recycled water produced at the Beaumont recycling plant is 10 mg/L less than its current TDS limit of 490 mg/L.
- When the volume-weighted TDS concentration in the Beaumont Management Zone rises to within 10 mg/L of the Basin Plan TDS objective of 330 mg/L.

The purpose of this Technical Memorandum (TM) is to develop conceptual facilities and preliminary costs to mitigate TDS, or salt, accumulation in the Beaumont Management Zone (basin). Salt mitigation is essential to assure that the groundwater quality remains at or below the Beaumont Management Zone objective of 330 mg/L TDS. The following sections describe the methodology to mitigate TDS in the basin, facility requirements, and estimated costs for implementation.

2.0 METHODOLOGY

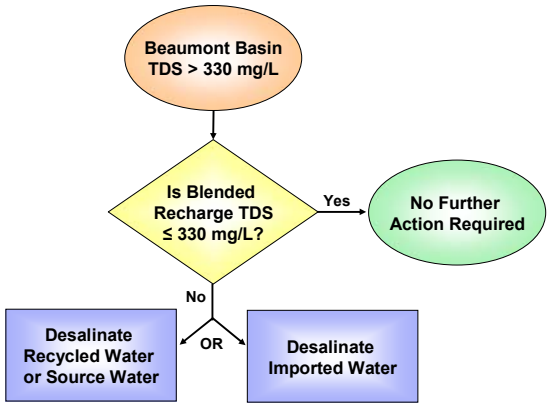
The San Timoteo Watershed Management Program (STWMP) was completed in March 2002. To meet ultimate demands, the water resources management program within the STWMP includes enhanced recharge of native and recycled water, maximizing the direct use of recycled water, and optimizing the use of State Water Project (SWP) water for direct use, recharge, and conjunctive-use.

In the future, to assure that the groundwater quality does not exceed the Beaumont Management Zone objective, desalination of water entering the basin will be required. Three methods to minimize the amount of salts introduced into the basin groundwater include (1) desalination of all water supplies entering the basin, including imported SWP water, (2) desalination of recycled water from the City's wastewater treatment plant (WWTP) effluent for direct use and recharge, or (3) potential salt offset in another basin which is still protective of beneficial use.

Figures 1 and 2 below illustrate two scenarios where mitigation of salt in the basin might be required. In Scenario One, it has been assumed the Management Zone objective of 330 mg/L has been exceeded within the basin. The next step would be to evaluate the TDS concentration of the water used for recharge. The water used for recharge will be a blend of new storm water, SWP water, and recycled water. If the blended recharge TDS concentration is below the Management Zone objective, no mitigation would be required. If, however, the recharge

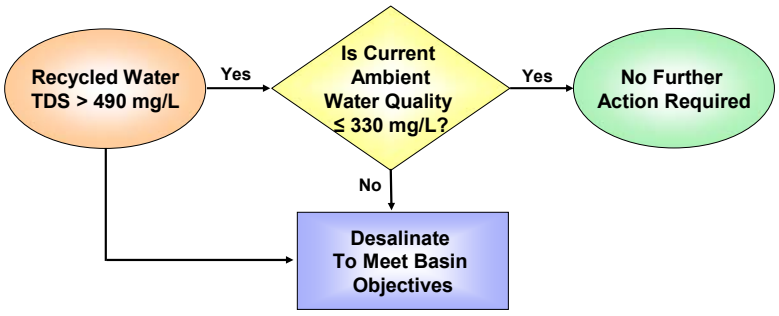
concentration is greater than 330 mg/L, desalination of recycled, source, or imported water should be further evaluated and implemented.

Figure 1
Management Zone Objective TDS Non-compliance
Scenario One



In Scenario Two, the TDS concentration in the City's effluent exceeds an average of 480 mg/L for 12 continuous months. Similar to Scenario One, if the current ambient TDS concentration is less than 330 mg/L, no mitigation may be required.

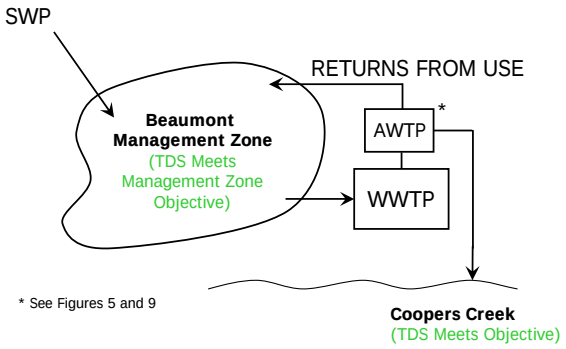
Figure 2
Management Zone Objective TDS Non-compliance
Scenario Two



Per direction of Mark Wildermuth, it has been assumed that 2.0 mgd of WWTP effluent will be discharged to Coopers Creek, a tributary to San Timoteo Creek. Desalination of the WWTP effluent is more favorable since there is a lesser volume of water to be treated and in the future the City may eventually be required to reduce the amount of TDS in the WWTP effluent discharged to the Coopers Creek.

Figure 3 illustrates future conditions if mitigation is implemented through the construction of an Advanced Water Treatment Plant (AWTP) to treat the WWTP effluent. Both the Management Zone objective and the discharge limits would be met.

Figure 3
Ultimate Conditions with Mitigation



3.0 FACILITY REQUIREMENTS

The City and BCVWD have implemented a regional recycled water program capable of delivering any blend of SWP water and recycled water for direct use and/or recharge. As discussed in the previous section, the most feasible alternative for salt mitigation involves desalination of recycled water before it is delivered for direct use or recharge. Microfiltration/ultrafiltration (MF/UF) followed by reverse osmosis (RO) is a widely accepted and cost-effective process used for wastewater desalination. MF/UF would serve as a pretreatment step to the RO process to reduce the potential for membrane fouling. This evaluation assumes that an MF/RO AWTP would be constructed immediately adjacent to the City's WWTP for desalination of recycled water prior to distribution.

3.1 Process Description

A mass balance was performed to calculate the target recycled water TDS concentration that would meet the Beaumont Management Zone basin objective of 330 mg/L, following blending with SWP water for direct use and/or recharge. Constraints for the mass balance included the discharge flow and TDS requirements of 2.0 million gallons per day (mgd) and 330 mg/L, respectively, to Coopers Creek. In addition, based on information provided in BCVWD's 1994 Water System Master Plan Update and the June 26, 2002, letter addressed to the RWQCB regarding new TDS and TIN objectives for the various management zones, the City's WWTP will have an ultimate capacity of 8 mgd and the TDS limit for recycled water recharge is 490 mg/L.

The treatment process at the AWTP would consist of MF/UF followed by RO. Both the MF/UF and RO processes recover a percentage of the influent flows with the remainder as a waste stream. The waste streams are comprised of backwash flows from the MF/UF and brine concentrate flows from the RO. Backwash flows from the MF/UF process can be discharged to the sewer and recycled back to the head of the WWTP. Concentrate flows from the RO process require disposal to a regional collection system separate from the local sewer. Concentrate disposal options are discussed in the next section. The recovery from the MF/UF and RO processes were conservatively assumed as 85 percent and 80 percent, respectively. Table 2 presents the primary process criteria used in evaluation of the AWTP.

Table 2
AWTP Process Criteria

Parameter	Criteria
Water Quality	
WWTP Effluent TDS Limit, mg/L	490
Discharge to Coopers Creek TDS Limit, mg/L	330
RO Permeate TDS, mg/L	50
Flow Rate	
Title 22 WWTP Effluent, mgd	8.0
Minimum Discharge to Coopers Creek, mgd	2.0
Process	
MF/UF Recovery	85%
RO Recovery	80%

Assuming the criteria discussed above, in order to achieve the Beaumont Basin plan water quality objectives, the maximum TDS concentration of the recycled water recharged would be 330 mg/L. When blended with SWP water imported to the basin, the basin objective of 330 mg/L is achieved. To achieve the target concentration of 330 mg/L, only a portion of the flow will require treatment by MF/UF and RO. Also, a portion of the RO permeate would be used to reduce the TDS concentration of the discharge to Coopers Creek.

3.2 Brine Disposal

Three alternatives were evaluated for disposal of salt-laden RO concentrate: (1) truck stored brine to Eastern Municipal Water District (EMWD) for ultimate disposal to the Santa Ana Regional Interceptor (SARI) pipeline operated and maintained by the Santa Ana Watershed Project Authority (SAWPA); (2) construction of a new pipeline and convey concentrate to either Reach IV E or V of the SARI pipeline; and (3) concentrate brine at the AWTP site using zero liquid discharge (ZLD) technology.

3.2.1 Truck Brine to Eastern Municipal Water District

An accepted method of brine disposal for desalination plants not in proximity to a non-reclaimable waste system (NRWS) is to truck brine to a receptor, such as EMWD, for ultimate

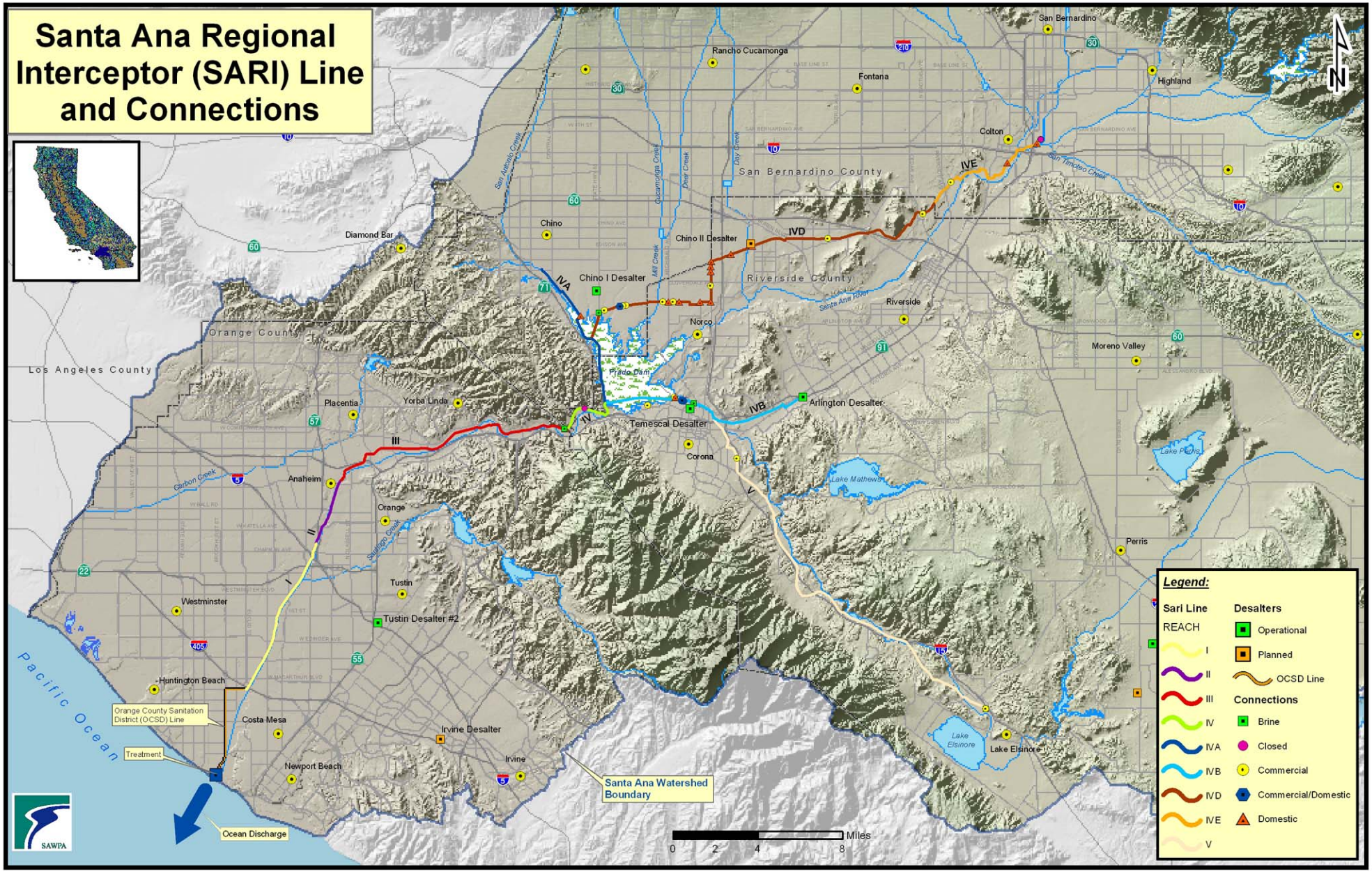
disposal. Typically, waste brine would be stored on site in large-diameter fiberglass-reinforced plastic tanks and emptied via tanker truck as required to maintain adequate storage volume. Based upon the flow schematic, the AWTP would produce approximately 0.62 mgd of brine and, due to the concentrations of sparingly soluble salts in the RO reject, it is not possible to concentrate the brine stream further without a thermal desalination process (see discussion below). Assuming a typical tanker trunk volume of 4,500 gallons (maximum roadway load of 45,000 pounds and saturated salt solution volumetric weight of 10 pounds per gallon), approximately 138 truck-trips would be required each day to disposal of the brine flows when operating at full capacity. Therefore, due to the volume of brine and the high number of trucks required for transport, this alternative would not be a cost-effective method for brine disposal.

To further treat the concentrate and produce low salinity water, the RO process cannot be used directly because of the high concentrations of sparingly soluble salts. The recovery of the RO process (percent of feed water that becomes permeate) is determined based on the concentrations of sparingly soluble salts. These include calcium carbonate, calcium sulfate, barium sulfate, silica, strontium sulfate, and calcium fluoride. As the recovery increases (higher percentage of feed is converted to permeate), the concentration of one or more of the sparingly soluble salts could increase beyond their solubility product, causing them to precipitate on the surface of the membrane. This is commonly referred to as scaling. This would cause increased resistance to flow through the membrane and also some of the scales (for example, silica and sulfate salts such as calcium sulfate and barium sulfate) are difficult to clean requiring replacement of membranes. For these reasons, the RO process alone cannot be used to further concentrate the brine flow. To further reduce the brine flow, a thermal desalination process can be used. This process is discussed in Section 3.2.3 below.

3.2.2 Discharge to Santa Ana Regional Interceptor (SARI)

SAWPA was first formed in 1968 as a planning agency and reformed in 1972 with a mission to plan and build facilities to protect the water quality of the Santa Ana River Watershed. SAWPA is a Joint Powers Authority, classified as a Special District (government agency) in which SAWPA carries out functions useful to its member agencies. SAWPA's member agencies include: EMWD, Inland Empire Utilities Agency (IEUA), Orange County Water District (OCWD), San Bernardino Valley Municipal Water District (SBVMWD), and Western Municipal Water District (WMWD).

The SARI line, a regional brine line, is designed to convey 30 million gallons per day (mgd) of non-reclaimable treated wastewater from the upper Santa Ana River basin to the ocean for disposal. The non-reclaimable wastewater consists of desalter concentrate and industrial wastewater. Domestic wastewater is also received on a temporary basis. The SARI line currently consists of 73 miles of pipeline, as shown on Figure 4. The upstream extension (Reach IV D and IV E) was completed in 1995 to the City of San Bernardino Wastewater Treatment Plant. Reach IV A serves the Chino Basin area and Reach IV B serves the southwestern portion of the City of



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Riverside. Reach V, the most recent extension of 23 miles, was completed in 2002 and is referred to as the Temescal Valley Regional Interceptor (TVRI) line. Brine disposal from the City's AWTP in the Beaumont Basin could be conveyed to either Reach IV E or the TVRI line, as described below.

Connection to Reach IV E

Based on available information, connection to Reach IV E of the SARI pipeline would require a 12-inch pipeline approximately 25 miles in length. Purchasing 0.62 mgd of capacity in the SARI would be adequate to accommodate the waste flows from the AWTP. If necessary, additional SARI capacity could be purchased at the time of construction to allow for expansion of the facility in the future or for potential use by other regional facilities.

An additional opportunity may exist with the Yucaipa Valley Water District (YVWD). It is our understanding that YVWD is constructing a new water treatment plant utilizing nanofiltration (NF) technology, which would require concentrate disposal. YVWD is currently considering a new connection to the SARI pipeline, among other brine disposal alternatives. If this pipeline were implemented, an opportunity may exist to connect the concentrate pipeline from the City's new AWTP to the YVWD pipeline that would ultimately convey both concentrate flows to the SARI pipeline. Cost sharing of the required facilities may be possible and would require coordination between each agency.

Connection to Temescal Valley Regional Interceptor (Reach V)

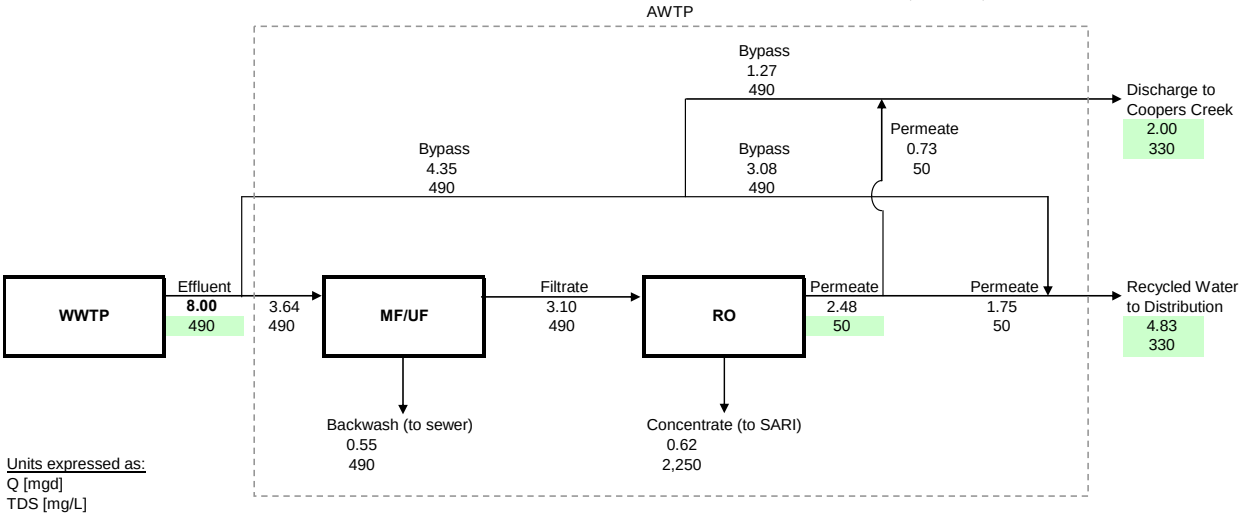
The TVRI extends from the City of Corona through Temescal Canyon and terminates near Lake Elsinore. Based on available information, connection to the TVRI would require a 12-inch pipeline approximately 30 miles in length. Purchasing 0.62 mgd of capacity in the TVRI would be adequate to accommodate the waste flows from the AWTP. The TVRI has a total capacity of 15 mgd. Discussions with SAWPA indicated that EMWD has purchased 4 mgd of the capacity, with plans to expand to 8 or 10 mgd in the future. EMWD currently operates two desalters, Menifee and Perris I, and is currently in the preliminary design phase for the Perris II desalter. Additional agencies in the region may also have capacity rights to discharge to the TVRI.

Similar to the cost-sharing opportunity with YWVD, discussions with EMWD indicated that the District has conceptual plans to extend the brine pipeline north from Sun City (Menifee Desalter) to Highway 74 to accommodate waste flows from future projects. If this pipeline were implemented, an opportunity may exist to include the ATWP waste flow capacity in the design of the new pipeline and facilitate cost sharing of the new facilities.

However, for the purposes of developing brine disposal costs for this evaluation, we have assumed the "worst case" scenario—the City would construct its own pipeline to convey the concentrate flows to the end of the TVRI pipeline near I-15 and Lake Elsinore.

Figure 5 illustrates the flow schematic for the AWTP assuming disposal to SARI.

Figure 5
Advanced Water Treatment Plant Flow Schematic (SARI)



3.2.3 Brine Concentration Using Zero Liquid Discharge (ZLD) Technology

A mechanical vapor compression brine concentrator and crystallizer are currently the most cost effective thermal brine treatment processes for inland desalination with ZLD. This technology has primarily been used in the industrial market, but is making headway in the municipal market. In fact, Black & Veatch is currently participating in an American Waterworks Association Research Foundation (AWWARF) project to develop efficiency enhancements and cost estimates for ZLD technologies. This analysis focuses on the brine concentrator and crystallizer ZLD process.

RO brine is first fed to the brine concentrator where a high percentage of the brine is recovered as a distillate (approximately 95 percent recovery). As discussed in section 3.2.1 above, the percentage of brine that is recovered in the brine concentrator is limited by the precipitation of sparingly soluble salts. A small percentage of the flow fed to the brine concentrator is discharged from the sump to maintain steady-state salinity in the brine concentrator. Figure 6 presents a process schematic of the brine concentrator.

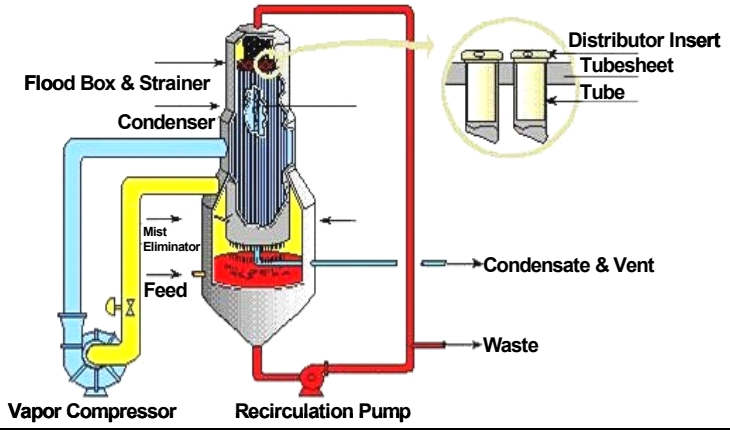


Figure 6 - Brine Concentrator Process Schematic
(graphic courtesy of RCC)

Brine from RO is heated and discharged into the brine concentrator sump. Vapor above the water surface in the brine sump is compressed and pumped to the outside of the condensation tubes. Brine in the sump is pumped to the top of the brine concentrator where it is distributed among condensation tubes. Vapor on the outside of the tubes exchanges heat with the cooler brine inside the tubes and condenses as a distillate. The distillate is collected and discharged (to distribution, San Timoteo Creek, etc.) as a high-quality product water with a TDS<10 mg/L. Some of the brine inside the tubes is vaporized and the remainder falls back to the sump. The salinity of the brine in the sump is maintained below the concentration which would induce scaling by a constant discharge of about 5 percent of the inflow.

The remaining 5 percent (waste flow) from the brine concentrator can be discharged to an evaporation pond or to a crystallizer. Due to the land requirements associated with evaporation ponds, this analysis focuses on use of a crystallizer. The crystallizer is a thermal process unit, similar to the brine concentrator, where the more soluble salts are precipitated. The brine fed to the crystallizer is distilled so that the only products from the crystallizer are distilled water and salts that are approximately 80 percent dry. The salts are conveyed to a filter press where the liquid discharged from the press is returned to the crystallizer and the dewatered salts are stored and trucked off site. Hence, recovery using the crystallizer would be essentially 100 percent. Figure 7 presents a process schematic of the crystallizer.

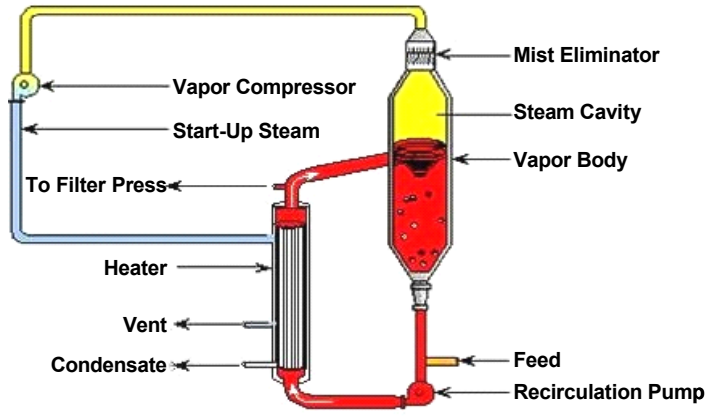


Figure 7 - Crystallizer Process Schematic
(graphic courtesy of RCC)

The crystallization process is similar to that of the brine concentrator. The primary difference between the two is that in the crystallizer brine is pumped under pressure up through the condensation tubes rather than falling down the tubes to inhibit scale formation. A waste stream is drawn off to a filter press for liquid/solid separation.

The solids are a mixture of all salts in the raw water and this solids residual is typically around 80 percent dry. The liquid from the filter press is returned to the crystallizer.

Figure 8 below presents an overall process schematic of the AWTP and ZLD system interface. As shown in the figure, as RO concentrate is fed into the ZLD process, only two effluent streams remain: (1) a high-quality finished water that can be discharged for beneficial use to either the recycled water distribution system or Coopers Creek, and (2) dry salt (approximately 80 percent dry) that is stored on site and trucked off site.

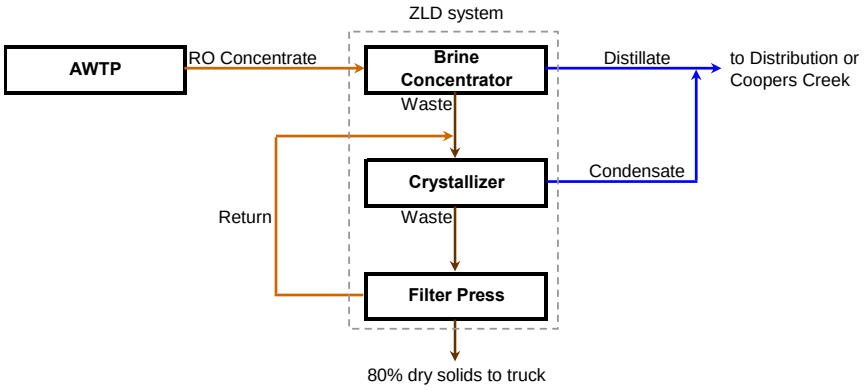
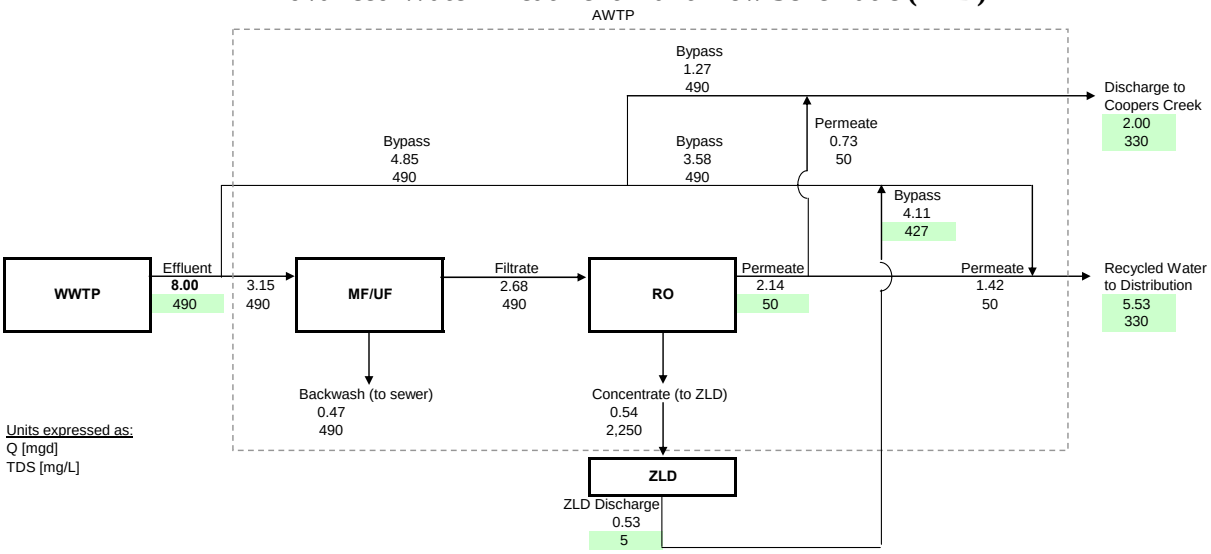


Figure 8 - AWTP/ZLD Process Schematic

The ZLD process described above is a complicated process that is in its infancy in the municipal water treatment market. Because of the concentration factors, expensive materials, high energy requirements, and complicated chemistry, the thermal desalination, or ZLD, technology should be evaluated further. The capacity and cost estimate (provided in the next section), and any further developments in the process can be verified during this more detailed evaluation.

Figure 9 illustrates the flow schematic for the AWTP using ZLD.

Figure 9
Advanced Water Treatment Plant Flow Schematic (ZLD)



4.0 FACILITY COSTS

The subsections below describe the estimated preliminary capital and operation and maintenance (O&M) costs developed for two projects: (1) construction of an AWTP and discharge of brine to the SARI (via Reach V) and (2) construction of an AWTP and treatment of brine on-site using ZLD technology. Preliminary costs for the ATWP were developed from recent construction projects and cost data from other similar projects. Preliminary costs for the ZLD system were developed from recent pilot projects, industrial projects, and continuing research.

4.1 Capital Cost

Table 3 presents the estimated capital cost for the two project options: (1) ATWP and waste disposal facilities to connect to Reach V of the SARI pipeline and (2) construction of an AWTP and treatment of brine on-site using ZLD technology. The capital cost includes a contingency of 20 percent and engineering and administration fees of 15 percent.

Table 3
Capital Cost Summary

Description	AWTP/Discharge to SARI Reach V	AWTP/ZLD
AWTP	*$6,781,000*	*$5,865,000*
Land	43,000	37,000
General Requirements	514,000	445,000
Sitework	514,000	445,000
Building	1,115,000	964,000
MF/UF equipment (installed)	1,548,000	1,339,000
RO equipment (installed)	2,477,000	2,142,000
Electrical_I&C	514,000	445,000
HVAC	56,000	48,000
SARI Connection	*$26,550,000*	--
Brine Pipeline	23,760,000	--
SARI capacity charge	2,789,000	--
SARI Application Fee	1,000	--
ZLD	--	*$11,070,000*
Brine concentrator	--	7,170,000
Crystallizer	--	3,900,000
Recycled Water Storage	*$4,227,000*	*$4,835,000*
Land	604,000	691,000
Storage Tanks	3,623,000	4,144,000
Subtotal Construction Cost	$37,558,000	$21,770,000
Contingency	$7,512,000	$4,354,000
Total Construction Cost	$45,070,000	$26,124,000
Engineering & Administration	$6,761,000	$3,919,000
Total Capital Cost	**$51,831,000**	**$30,043,000**

4.2 Operation & Maintenance Costs

O&M costs were developed for the ATWP, SARI capacity and volumetric fees, and the ZLD system. O&M costs are typically divided into fixed and variable costs. Fixed costs include periodic repairs or replacements of membranes, maintenance supplies and parts, and costs for heating, lighting, and ventilation of the buildings. Variable costs include energy requirements, chemical costs, and capacity fees associated with waste discharge.

Table 4 presents the estimated O&M costs for the two project options: (1) ATWP and waste disposal facilities to connect to Reach V of the SARI pipeline and (2) construction of an AWTP and treatment of brine on-site using ZLD technology.

Table 4
Annual Cost Summary

Description	AWTP/Discharge to SARI Reach V	AWTP/ZLD
AWTP	*$480,000*	*$414,000*
MF/UF process	136,000	117,000
RO process	344,000	297,000
SARI Connection	*$286,000*	--
Brine pipeline maintenance	140,000	--
SARI capacity charge	72,000	--
SARI volumetric charge	74,000	--
ZLD	--	*$3,038,000*
Brine concentrator	--	1,976,000
Crystallizer	--	1,016,000
Solids disposal	--	46,000
Total O&M Cost	$766,000	$3,452,000
Annualized capital cost	$4,519,000	$2,619,000
Total Annual Cost	**$5,285,000**	**$6,071,000**

5.0 RECOMMENDATIONS

Although exceeding the Management Zone objective may not occur in the near future, planning is essential to take advantage of cost sharing opportunities and to secure facilities required for future mitigation. The following recommendations should be considered by STWMA:

- As developed in this analysis, salt mitigation is expensive and should be considered a part of future system development fees.

- Begin preliminary discussions with YVWD and EMWD regarding potential cost sharing opportunities for connection to the SARI pipeline.

- Begin coordination with SAWPA regarding possibility of purchasing SARI capacity in the near future, rather than when the need arises (approximately 0.62 mgd). The SARI has a finite capacity and it would be in STWMA's best interest to secure a portion of its capacity before it becomes unavailable. If the purchased capacity is not needed in the future, it may be possible for STWMA to sell its capacity ownership for a premium.

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Acronyms and Abbreviations

AF	Acre-feet
Basin Plan	Water Quality Control Plan for the Santa Ana River Basin
BCVWD	Beaumont Cherry Valley Water District
BMZ	Beaumont Management Zone
bgs	below ground surface
CEQA	California Environmental Quality Act
cfs	cubic feet per second
DWR	California Department of Water Resources
EBX	East Branch Extension
ENR	Engineering News Record
GIS	Geographic Information System
m^2	square meters
mg/L	milligrams per liter
MWD	Metropolitan Water District of Southern California
mgd	Million gallon per day
MZ	Management Zone
RWQCB	Regional Water Quality Control Board
SARI	Santa Ana Regional Interceptor
SGPWA	San Gorgonio Pass Water Agency
SMWC	South Mesa Water Company
STWMA	San Timoteo Watershed Authority
SWMP	Surface Water Monitoring Program
SWP	State Water Project
TDS	total dissolved solids
TIN	total inorganic nitrogen
US	United States of America
USGS	US Geological Survey
Watermaster	Beaumont Watermaster
WEI	Wildermuth Environmental, Inc.
YVWD	Yucaipa Valley Water District

1.1 BACKGROUND AND OBJECTIVE

Pursuant to the Stipulated Agreement that settled the lawsuit between the San Timoteo Watershed Management Authority (STWMA) and the City of Beaumont, *San Timoteo Watershed Management Authority vs. the City of Beaumont et al* (Case No. RIC 389197), the Beaumont Basin Watermaster (Watermaster) retained Wildermuth Environmental, Inc. (WEI) to perform a salt fee investigation. The stipulation gives the Watermaster the authority to conduct studies of the "hydrologic conditions and operating aspects of the management program for the Basin" (Case No. RIC 389197). Based on the investigations of the San Timoteo Watershed Management Authority (STWMA), Watermaster became concerned that salinity in the Beaumont Basin would increase in the future and that the salinity management plan included in the 2004 Water Quality Control Plan for the Santa Ana Watershed (Basin Plan) would require significant financial resources to be implemented (RWQCB, 2004). The Watermaster, on its own initiative, conducted this investigation to develop a salt mitigation fee assessment program that is based on the cumulative salt loading impacts of the individual appropriator parties to the stipulation. The fee would be used to fund the construction of a desalter or equivalent salt removal programs.

This report documents the investigation. Alternative management strategies and assessment methodologies are articulated in the subsequent sections of this report. This investigation involved the following steps:

- Characterize salt inputs and outputs for the Beaumont Management Zone (BMZ) by source and entity.
- Develop a salt credit/debit accounting system based on projected water supply and management plans.
- Develop salt management strategies and specific alternatives.
- Estimate the cost of each alternative.
- Recommend a salt management alternative and the next steps to be taken by the Watermaster.

1.2 THE SALINITY PROBLEM

Salinity in groundwater has been a major problem throughout history in the southwest and in most locations in the world where human beings have been engaged in water use. The ancient Egyptians and the American Indians of the southwest had to deal with soil salinity problems caused by irrigation and the subsequent degradation of underlying groundwater.

All water contains salts in some concentration, which are usually measured in terms of total dissolved solids (TDS). When water is used, some portion of the water is lost due to consumption and the remainder is returned to the environment. Virtually, all of the salt mass in water that is served for use remains in the water when it is returned to the environment. This means that the salt concentration in water that is returned to the environment is higher than the water that was served. Additional salts are added through use. This process repeats itself throughout all of the pathways that water moves through the hydrologic cycle—from precipitation to final discharge to the ocean.

The degradation of water with salt is a natural process that is accelerated by man. Why the ocean is salty? Precipitation is highly aggressive and leaches some salts from the rocks that compose the land surface. Left alone, this water would eventually discharge to the ocean, bringing with it the salts picked up along the way. Water in the ocean evaporates, becomes water vapor and leaves most of the salt in the ocean. This water vapor has virtually no salt. At some point this water vapor will become precipitation and scavenge trace amounts of salt from the air on the way to the land surface. This cycled has repeated itself countless times in the history of the earth.

In the Santa Ana River Watershed, irrigated agriculture and dairies are responsible for most of the salinity problems related to human water use. The agricultural legacy has left vast quantities of groundwater with high TDS and nitrate concentrations that is unfit for drinking water uses. Irrigation of the urban landscape, the discharge of human waste from municipal recycling plants, and onsite waste disposal systems also contribute to elevated TDS concentration in groundwater.

Salinity in the Santa Ana River Watershed has been the subject of intense study and management. In the early 1960s, the water agencies in the Santa Ana Watershed conducted detailed investigations and developed a salt management program. This salt management program included two major elements: the construction of the Santa Ana Regional Interceptor (SARI) and the importation of bountiful low salinity imported water from the State Water Project (SWP). Figure 1-1 shows the location of the SARI as well as the SWP and related distribution facilities. The operating concept of the salt management plan was to lower the TDS concentration of water supplies in the upper watershed and to discharge high TDS wastewater and groundwater to the SARI. The SARI is a pipeline that conveys high TDS wastewater and brine directly to the coast for treatment and ocean disposal, ensuring that these degraded waters are not in the Santa Ana River discharge that would otherwise be diverted and recharged in the Orange County Groundwater Basin. As of 2007, the SARI has been extended up to the City of San Bernardino. Groundwater desalters have been constructed in the Chino, Arlington, Menifee, and Temescal Basins to treat high TDS groundwater and restore its beneficial uses. These desalters remove salt from groundwater and generate a brine waste. This brine waste is discharged to SARI. This management program has been in place since the early 1970s and currently faces two new challenges: (1) the SARI capacity is rapidly being used up and additional capacity will be required; and (2) SWP water is not as bountiful as first hoped and not as low in TDS as projected in the 1960s.

Figure 1-2 shows the location of the Beaumont, San Timoteo, and Yucaipa Management Zones. Groundwater in the Beaumont and Yucaipa Management Zones currently has low TDS concentrations, about 260 mg/L and 310 mg/L, respectively (WEI, 2005). The City of Beaumont discharges about 3.0 mgd of tertiary-treated recycled water to Coopers Creek, which is within the Beaumont Management Zone and tributary to San Timoteo Creek. The TDS in the City's discharge is about 410 mg/L. The Yucaipa Valley Water District (YVWD) currently discharges about 3.0 mgd of tertiary-treated recycled to San Timoteo Creek within the San Timoteo Management Zone. The TDS in YVWD's discharge is about 480 mg/L. In 2002, the STWMA conducted a TDS investigation and determined that the TDS concentration in the Beaumont and Yucaipa Management Zones would increase over time and far into the future. The TDS concentration projections for the BMZ are shown in Figure 1-3 (STWMA, 2003). Figure 1-3 shows the projected ambient TDS concentration in groundwater for the Beaumont Management Zone for five proposed management plans. The management plan labeled *Case 4 – 4,000 acre-ft of Replenishment of the Yucaipa Management Zone with a 50/50 Mix of Recycled and State Project Water, 10,000 acre-ft of Replenishment of the Beaumont Management Zone with a 50/50 Mix of Recycled and State Project Water, Non-Potable Supply Consists of a 50 /50 Mix of State Project and Recycled Water* was adopted by STWMA and subsequently incorporated into the 2004 Basin Plan Update. The causes of future TDS degradation shown in Figure 1-3 include the consumptive use of water used for irrigation, the export of low TDS water for uses outside of the management zone, and the use of high recycled water. As groundwater degrades and is used for the water supply, degradation intensifies. This feedback loop creates a pernicious cycle that only be broken through the export of salt.

1.3 REPORT ORGANIZATION

This report is comprised of five sections. Each section is listed below and its contents are briefly described:

Section 1 Introduction – this section outlines the project background, purpose, scope, and the organization of the report.

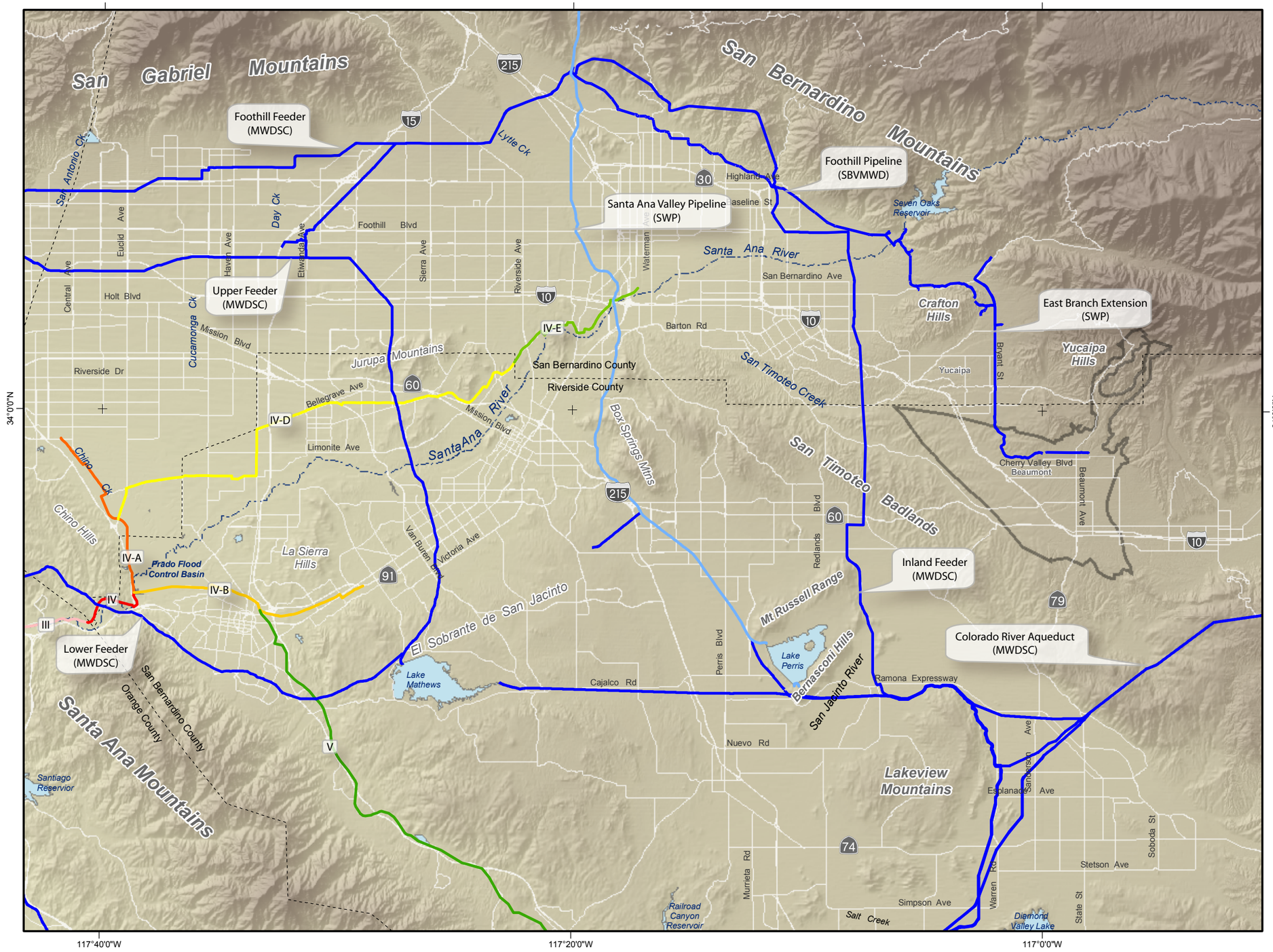
Section 2 Hydrologic and Salt Cycles in the Beaumont Management Zone – this section summarizes the water and salt cycles within the BMZ, considering all source waters, their inflow to the management zone based on water supply plans, and how thereby salt accumulates.

Section 3 Salt Management Strategies – three salt management strategies are outlined in this section, followed by the discussion of three specific alternatives for salt management within the BMZ.

Section 4 Implementation of Alternatives – this section documents a fee for each

management alternative presented in Section 3, followed by recommendations.

Section 5 References – this section lists the references used for this report (not included in draft report).



Legend

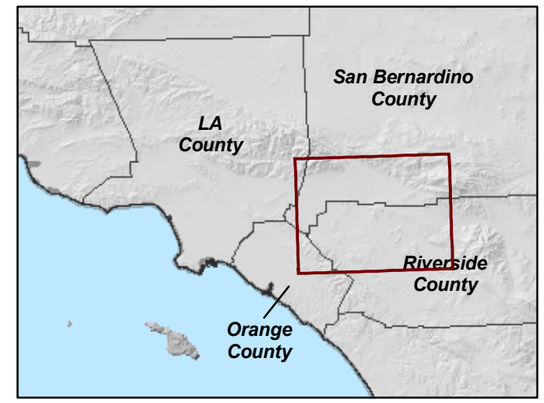
- Beaumont Management Zone
- Lakes and Reservoirs

Imported Water Pipelines

- MWDSC Pipelines
- SWP Pipelines

Santa Ana Regional Interceptor (SARI)

- III — SARI Reach III
- IV — SARI Reach IV
- IV-A — SARI Reach IV-A
- IV-B — SARI Reach IV-B
- IV-D — SARI Reach IV-D
- IV-E — SARI Reach IV-E
- V — SARI Reach V/TVRI Line



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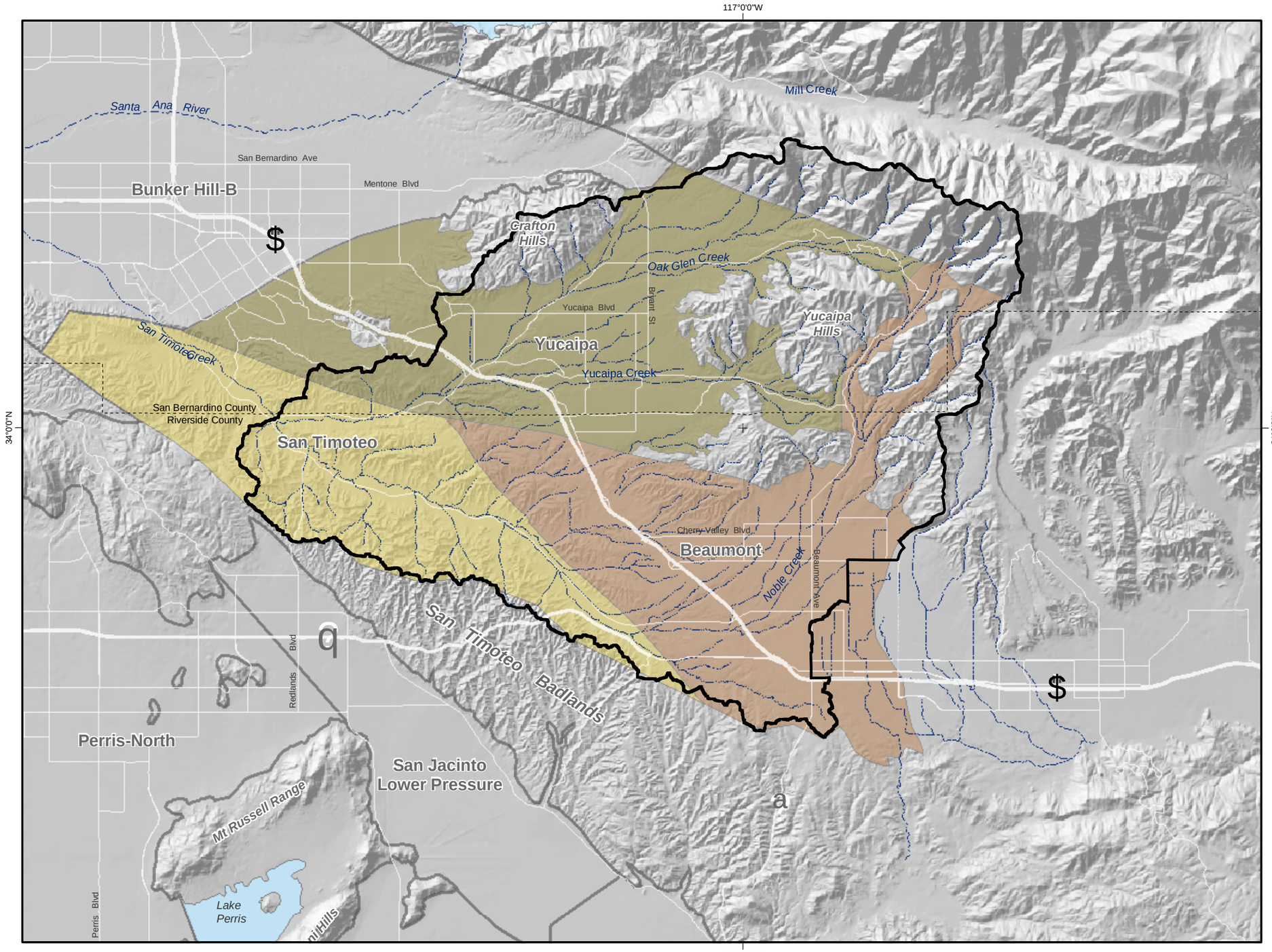
0 2 4 6 8 10 Miles
0 2 4 6 8 10 12 KM

SARI and Imported Water Infrastructure Location Map

Beaumont Watermaster
Salt Mitigation Fee Development Report

Figure 1-1



Basin Plan Management Zones / Water Quality Objectives

Beaumont	TDS = 330 mg/L NO3-N = 5 mg/L
San Timoteo	TDS = 400 mg/L NO3-N = 5 mg/L
Yucaipa	TDS = 370 mg/L NO3-N = 5 mg/L
Others	

Other Features

San Timoteo Watershed
(upstream of confluence with Yucaipa Creek)

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Beaumont Watermaster
Salt Mitigation Fee Development Report

Water Quality Management Zones in the 2004 Basin Plan Update

Figure 1-2

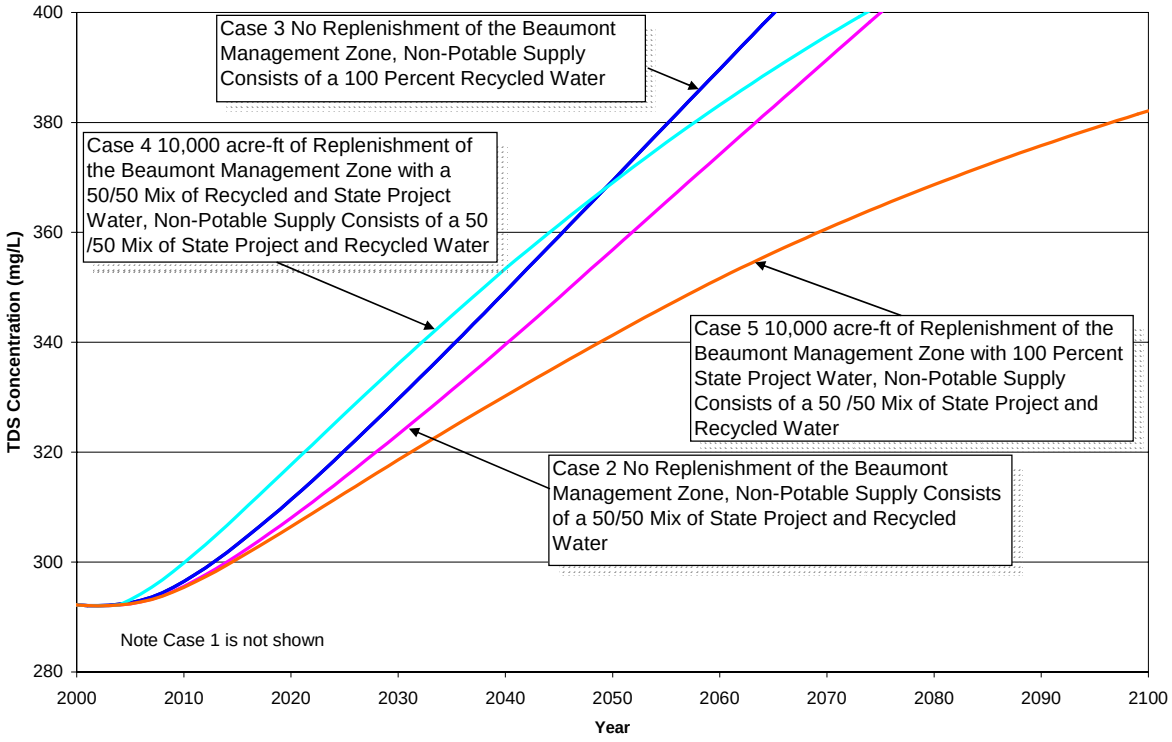


Figure 1-3
Comparison of TDS Concentration Projections for the Beaumont Management Zone for Selected Water Resources Management Cases

Section 2 – Hydrologic and Salt Cycles in the BMZ

Past investigations of salinity conditions often refer to a salt balance or salt budget. The use of these terms has been resisted herein in favor of the term salt cycle. Like the hydrologic cycle, the salt cycle speaks directly to the process of inflows and outflows and changes in storage. The term salt balance gives the impression of equilibrium between the inflow and outflow of salt. Such equilibrium is theoretically impossible. In their pioneering work on salt in the upper Santa Ana Watershed, Water Resources Engineers (WRE) wrote:

> Quality and the flow of water are intimately related through the hydrologic cycle and man's manipulation of it. Thus, quality deterioration may be a consequence of natural fluctuations in hydrologic quantities, excessive pollution of the water environment by man, overuse of the available water supply, or combinations of these. Methods of [water] quality control, therefore, must be directed not only a the regulation of waste accretions to the groundwater basin, but also to the modification of processes and practices that affect the transfer of salt into and within the basin, whether they are natural or the result of man's actions. (WRE, 1969)

Several investigations have been conducted since WRE's original investigation. Most of these investigations identify or track the natural and anthropogenic inflows and outflows from a groundwater basin and attach salt concentrations and related processes to each inflow and outflow.

In this section, the hydrologic components that form the hydrologic cycle are discussed and quantified based on recent detailed modeling work for the Beaumont Basin and the future water supply plans of the parties to the Stipulated Agreement; the salt inflows and outflows associated with these hydrologic components are estimated; and a salt debit and credit system that allocates salt loading liabilities to specific water management activities is developed and described. This salt debit and credit system will be used in subsequent sections to evaluate alternative water management activities that can be accommodated within the future water supply plans of the parties. Salt credits and debits, expressed in tons, will be calculated based on the concentration of the recharge components relative to the TDS objective for the BMZ using the following equation:

$$\text{Credit or Debit} = (TDS_{obj} - TDS_i)/735 \text{ tons}$$

Where:

TDS_{obj}	is the TDS objective in mg/L
TDS_i	is the TDS concentration of the i^{th} recharge or discharge component
735	is conversion factor to the product of acre-ft*mg/L to tons

For discharge components, the credit/debit equation is similar:

$$\text{Credit or Debit} = -(TDS_{obj} - TDS_i)/735 \text{ tons}$$

Credits, reductions in salt loads relative to the TDS objectives, are positive and debits are negative.

The planning period for this investigation is from 2005 through 2030.

2.1 SALT CYCLE

If we treat the BMZ as a system, the inflows and outflows to that system can be defined by Table 2-1. The "deep percolation of precipitation," "subsurface inflow," "subsurface outflow," and "surface water discharge" components are not regulated or managed and are thus not included in the salt debit and credit system. The other components are addressed individually in the subsequent sections.

2.2 IMPORTED WATER RECHARGE

The San Gregorio Pass Water Agency (SGPWA), the local SWP contractor, imports SWP water to the BMZ through the East Branch Extension (EBX) of the California Aqueduct. The EBX, the SWP's most recently constructed facility, conveys water from the Crafton Hills Pump Station through the Crafton Hills Reservoir and Cherry Valley Pump Station to the Noble Creek spreading grounds. EBX Phase 2, which has not been constructed, begins at the Carter Street Valve Facility, crosses the San Bernardino/ Riverside County Line, and extends to the Garden Air Creek Valve Vault Facility in the City of Calimesa. To date, imported water served by the SGPWA is used exclusively for recharge of the BMZ, and by 2030, 30 percent of municipal supply will be served by SWP water, delivered indirectly through groundwater basins or directly from new treatment plants.

The TDS in SWP water varies over time in response to wet and dry years in Northern California. Figure 2-2 shows the monthly SPW water TDS concentration time history measured at the Devil Canyon Afterbay in San Bernardino; TDS concentration increases in dry years and decreases in years with abundant snowmelt. Table 2-2 contains statistics that describe the variability of TDS concentrations in SWP water. The TDS concentration in SWP water has varied from a high of about 430 mg/l to a low of about 75 mg/L, and has a mean concentration of about 240 mg/L. The standard deviation, which is about 80 mg/L, describes the variability of the TDS concentration in relation to the mean concentration. Assuming the TDS measurements are normally distributed, the TDS concentration should range between 160 and 320 mg/L about 66 percent of the time. The coefficient of variance is the ratio of the standard deviation to the mean and is another statistic used to characterize variability in relation to the mean. The median value, the value at which half of the measurements are greater and half are less, of the available TDS data is about 236 mg/L. In addition to showing the time history of TDS measurements, Figure 2-1 shows the relationship of these measurements to the BMZ TDS objective: most of the time, the TDS concentration of SWP water available to the water purveyors in the BMZ is considerably less than the TDS objective (330 mg/L). Thus in most cases, the recharge of SWP water in the BMZ will not cause the TDS concentration to exceed the objective and, on average,

will be beneficial to maintaining the TDS in groundwater below the TDS objective. The locations of existing and potential recharge facilities in the BMZ are shown in Figure 2-3. Facilities that currently recharge SWP water include the Little San Gorgonio Creek Debris Basins and the new Beaumont Cherry Valley Water District (BCVWD) facility located adjacent to Noble Creek.

The SWP has a TDS concentration delivery goal for Southern California of 220 mg/L on average over any 10 year period (DWR, 1962). Short-term variations in TDS can be attributed to salt loading from stream flows, groundwater wheeling, stormwater inflows, and reservoir operations. During droughts, seawater intrusion occurs due to tidal action and lack of fresh water inflow and significantly increases TDS in the San Joaquin Delta. This long-term change is best illustrated in Figure 2-1 during the dry conditions from 1984 through 1992.

The long-term trend for TDS in SWP water at Devils Canyon is increasing. Over the past 25 years, the average TDS has increased approximately 25 mg/L.

To calculate credits and debits, the mean TDS concentration in SWP water is compared to the basin plan objective (330 mg/L). Since the mean TDS concentration for SWP water is less then the basin objective, the long-term recharge of SWP will result in a credit. The average credit for SWP water recharge, expressed as tons of salt, is:

(330 mg/L- 247 mg/L)/735 = 0.118 tons of salt per acre-foot

A credit of 0.118 tons of salt is applied for every acre-foot of SWP water recharged in the BMZ.

2.3 RECYCLED WATER RECHARGE

The BCVWD is proposing to recharge recycled water at its new recharge facility located adjacent Noble Creek in the near future, and this program may be expanded to other facilities in the BMZ. The City of Beaumont is considering similar proposals. The source of recycled water will be the City of Beaumont treatment plant located on Cooper's Creek. The BCVWD constructed backbone recycled water distribution system to convey recycled water from the Beaumont treatment plant throughout its service area, and the City of Beaumont is currently designing the pump station and final connection to the BCVWD system. Recycled water deliveries could begin in spring 2008.

Table 2-1 contains statistics that describe the variability of TDS concentrations in recycled water from the City of Beaumont. The TDS concentration in Beaumont recycled water has varied from a high of about 510 mg/L to a low of about 360 mg/L, and has a mean concentration of about 430 mg/L. The standard deviation is about 40 mg/L. Assuming the TDS measurements are normally distributed, the TDS concentration should range between 360 and 470 mg/L about 66 percent of the time. The median is about 420 mg/L. The

recent TDS concentration time history for the City of Beaumont treatment plant is shown in Figure 2-2 along with the BMZ TDS objective.

The TDS concentration for Beaumont recycled water is always greater then the basin objective. The recharge of Beaumont recycled will always result in a debit. The average debit for Beaumont recycled water recharge, expressed as tons of salt, is:

(330 mg/L- 430 mg/L)/735 = -0.136 tons of salt per acre-foot

A debit of 0.136 tons of salt is applied for every acre-foot of Beaumont recycled water recharged in the BMZ.

2.4 STORMWATER RECHARGE

Stormwater generated from precipitation events in the San Bernardino Mountains, local hills, and the valley floor is discharged to Noble Creek, Little San Gorgonio Creek, and eventually San Timoteo Creek. Some of the runoff generated in the BMZ area is discharged to Smith Creek and out east to San Gorgonio Creek or south to Portrero Creek and the San Jacinto Watershed. Increasing the yield of the BMZ by increasing the capture of storm flow will improve ambient water quality, increase the assimilative capacity of these basins, and reduce the mitigation cost for the use of recycled water. Currently, there are no concerted efforts to harvest this runoff beyond some small stormwater management basins that were constructed by developers. These basins contribute negligible amounts of new stormwater recharge. That said, the STWMA completed a stormwater management plan that contains several stormwater recharge projects in the BMZ, including the BCVWD Noble Creek facility, improvements in Noble Creek, and new flow-through basins on the Smith and San Timoteo Creeks (STWMA, 2006). When completed, these facilities will contribute an average of about 2,500 acre-ft/yr of new stormwater recharge to the BMZ.

The TDS concentration of stormwater in the BMZ has only recently been characterized, which is due entirely to the efforts of STWMA. Twenty-seven stormwater and urban runoff samples were taken from April 2005 through December 2006. Figure 2-3 contains statistics that describe the variability of TDS concentrations in BMZ stormwater. The TDS concentration in stormwater varied from a high of about 300 mg/L to a low of about 170 mg/L, and has a mean concentration of about 220 mg/L. The sample size is too small to compute a meaningful estimate of the median and standard deviation. These samples are not true representative samples of the storm water quality in that they are usually post storm and contain large amounts of urban runoff. The implication of this is that the TDS concentrations in pure storm water are probably significantly less. The average TDS in stormwater was assumed in this investigation to be 150 mg/L in this analysis. The recent TDS concentration time history for the stormwater is shown in Figure 2-3 along with the BMZ TDS objective. The TDS concentration of BMZ stormwater water is considerably less than the TDS objective (330 mg/L). The recharge of stormwater will always result in

a credit.

The average credit for SWP water recharge, expressed as tons of salt, is:

(330 mg/L- 150 mg/L)/735 = 0.245 tons of salt per acre-foot

A credit of 0.245 tons of salt is applied for every acre-foot of stormwater recharged.

2.5 DEEP PERCOLATION OF APPLIED WATER

When water is applied to the land surface for irrigation, some of it percolates below the root zone and eventually becomes groundwater (the deep percolation of applied water), some is taken up by plants and is either transpired or incorporated in the plant tissue, and some is lost through bare soil evaporation. Plant uptake and bare soil evaporation are consumptive uses that leave salt in the residual water that percolates below the root zone. Most irrigation is done with sprinklers, and the combination of sprinkler and cultural practices commonly results in an irrigation efficiency of about 75 percent; that is, about 75 percent of the water applied for irrigation goes to plant uptake and bare soil evaporation, and 25 percent percolates below the root zone and becomes groundwater.

All of the salt and 25 percent of the applied water end up in the groundwater system. As will be demonstrated shortly, this is the most significant source of TDS degradation in the BMZ. If applied water has a TDS concentration of 250 mg/L, the resulting deep percolation of applied water will have a TDS concentration of about 1,000 mg/L. Additional salt is added to this component in the form of excess or unused mineral salts from fertilizers. The additional TDS increment from fertilizers is about 250 mg/L (STWMA, 2002).

The TDS concentration in the deep percolation of applied water is a function of the TDS concentration in water supply, irrigation efficiency, and fertilizer practice. In this investigation, we have assumed that the irrigation efficiency and fertilizer management practices will not change and that the TDS concentration will be a function of the TDS concentration in the water supply only. The deep percolation of applied water will always result in debit because it will always be greater than the TDS objective (330 mg/L). The exact value of the debit will depend on the TDS concentration of the water supply, which, in turn, is a function of the mix of water sources (groundwater, imported water, and recycled water) that are being used by each purveyor. The TDS concentrations in the deep percolation of applied water will be estimated with the model developed for the STWMA maximum benefit proposal that was incorporated into the 2004 Basin Plan.

2.6 GROUNDWATER

BMZ groundwater is the sole water supply for the BCVWD and some private pumpers overlying the BMZ. The City of Banning, the SMWC, and the YVWD augment their

water supplies with groundwater from the BMZ. The TDS concentration of groundwater in the BMZ has only recently been characterized due entirely to the efforts of STWMA. Seventy-two groundwater samples taken over the last five years (2003 through 2007) were used to characterize the ambient TDS concentration. Figure 2-4 shows the location of the BMZ wells that were sampled. Table 2-2 contains statistics that describe the variability of TDS concentrations in BMZ groundwater. The TDS concentration in BMZ groundwater varies spatially from a high of about 855 mg/l to a low of about 160 mg/L and has a mean concentration of about 260 mg/L (WEI, 2005).

The extraction of groundwater with a TDS concentration less than the objective will tend to increase the ambient TDS concentration relative to the objective. Likewise the extraction of groundwater with a TDS concentration greater than the objective will tend to decrease the ambient TDS concentration relative to the objective. Since the mean TDS concentration in groundwater is less then the TDS objective, the extraction of groundwater will cause a debit. The average debit for *current* groundwater extraction, expressed as tons of salt, is about:

$$-(330 \text{ mg/L} - 270 \text{ mg/L})/735 = -0.095 \text{ tons of salt per acre-foot}$$

A debit of -0.095 tons of salt is applied for every acre-foot of groundwater water that is pumped from the BMZ. This will approach zero over time as the TDS concentration in groundwater approaches the TDS objective and will eventually become a credit as the TDS concentration exceed the objective.

2.7 WATER SUPPLY AND SEWERING PLANS

The water supply and sewering plans of the agencies that overlie and/or pump groundwater from the BMZ can be used to project future salt loading to the BMZ. The water supply and sewering plans contain information that can be used to project SWP and recycled water recharge, the TDS concentration and magnitude of the deep percolation of applied water, the stormwater recharge, and the volume of groundwater pumped from the BMZ. For this investigation, it was assumed that the entire BMZ is sewered during the planning period even though there are some areas that are not sewered, such as the Cherry Valley community of interest and some mobile home parks in the western end of the BMZ. It was assumed that these areas will be sewered in the next five years, or in the case of the mobile home parks, that salt contributions are negligible.

WEI obtained water demand projections and supply plans from the BCVWD, the City of Banning, the SMWC, and the YVWD for their service areas. The sources of this information are:

- Beaumont Cherry Valley Water District, Final 2005 Urban Water Management Plan (Parsons, 2005).
- Determination of Maximum Perennial Yield for the City of Banning, Geoscience Support Services, 2003

- 2005 Urban Water Management Plan for the City of Banning, Wildermuth Environmental, Inc., 2005.
- 2005 Urban Water Management Plan for the South Mesa Water Company, South Mesa Water Company, 2005.
- An Excel workbook from Joe Zoba of YVWD, showing the water demands and the supply of imported and recycled waters that is projected to be used in the part of the YVWD within the SGPWA service area (November 2005).

Based on these data and verbal follow-up communications, water supply plans were prepared. These plans are current as of June 2007. The total water demand for each of these agencies is shown in Table 2-3 The YVWD demand pertains only to the part of YVWD that is in Riverside County. The complete water supply plans, in tabular form, are shown in Table 2-4 through Table 2-7 for the BCVWD, Banning, the SMWC, and the YVWD, respectively.

The recharge of SWP water is projected to increase from zero acre-ft/yr in 2005 to about 10,000 acre-ft/yr by 2030. The use of recycled water is projected to increase from zero acre-ft/yr in 2005 to about 7,500 acre-ft/yr by 2030. Groundwater pumping from the BMZ is projected to increase from about 9,000 acre-ft/yr in 2005 to about 23,500 acre-ft/yr in 2030.

2.8 SALT LOADING BASED ON WATER SUPPLY PLANS

The salt flux tool that was developed and applied for STWMA's maximum benefit proposal was adapted for use in this investigation (STWMA, 2002). The associated *constantly-stirred reactor model* that simulates the change in TDS in groundwater was not used. The salt flux tool was developed to characterize salt inputs and outputs for the BMZ by hydrologic component and agency and modified to track long-term salt credits and debits relative to the Basin Plan objective.

The salt flux tool is based on the 25-year water supply plans and the five-year mean TDS values for each water supply source. The following assumptions are built into the salt flux tool:

- 250 mg/L TDS increment is added through outdoor use.
- 50 percent of the water supplied for domestic use is for irrigation.
- 75 percent of outdoor use is lost to consumptive use and 25 percent returns to groundwater.
- Each Watermaster party's operations can be applied as a percent of total operations based on the percentage of their service areas that overlie the BMZ:
    - 68.4 percent BCVWD
    - 15.9 percent City of Banning
    - 11.3 percent YVWD
    - 4.5 percent SMWC

The salt flux tool is flexible: the water supply mix can be changed over time or changed to describe different water supply alternatives, and the TDS concentration of non-groundwater source waters can be varied over time or among alternatives to represent salt management strategies. It provides a way to quickly estimate how salt management strategies play out in the future.

The salt flux tool incorporates the water supply plans of each agency overlies the BMZ. Each water supply source is tracked with its TDS concentration to determine if a credit or debit should be applied. This process is demonstrated in Figure 2-5. Table 2-12 provides a summary of annual and cumulative credits and debits by Watermaster party. Detailed credit and debit tracking are shown in Table 2-8 through Table 2-11 for the BCVWD, Banning, the SMWC and the YVWD, respectively.

Table 2-12 shows that all of the agencies have salt debits. Moreover, from Table 2-12, the relative debits can be estimated as follows: the BCVWD has an average debit of about 87 percent, followed by Banning at 8 percent, the YVWD at 3 percent, and the SMWC at 2 percent. The BCVWD has the largest share of the salt debit because, as indicate above, it overlies the majority of the BMZ (approximately 70 percent) and therefore has the largest impact on the BMZ from the deep percolation of applied water (which includes recycled water) and recycled water recharge. The BCVWD credit for recharging SWP water is offset by its debit for the pumping of groundwater.

Table 2-1
Inflow and Outflow Components of the BMZ

Input	Output
Deep percolation of precipitation	Surface water discharge
Subsurface inflow	Subsurface outflow
Imported water recharge	Groundwater pumping
Stormwater recharge	
Recycled water recharge	
Deep percolation of applied water	

Table 2-2
BMZ Water Supply TDS Summary Statistics

Source	Min (mg/L)	Mean (mg/L)	Max (mg/L)	Median (mg/L)	Standard Deviation (mg/L)
Recycled Water	360	428	510	420	37
Groundwater	160	270	856	260	92
SPW (25yr)	74	247	428	236	77
Stormwater	170	219	300	--	--

Table 2-3
Water Demand Projection for BMZ Purveyors through 2030

Year	BCVWD	Banning	SMWC	YVWD	Total
2005	8,800	9,484	2,500	2,100	22,884
2010	22,300	12,501	2,740	3,668	41,209
2015	27,900	15,518	3,200	5,236	51,854
2020	29,300	18,535	3,560	6,804	58,199
2025	30,000	21,552	3,900	8,372	63,824
2030	30,500	24,569	4,300	9,940	69,309

Table 2-4
Water Demand and Water Supply Plan for the Beaumont Cherry Valley Water District Service Area
(acre-ft/yr)

Year	Demands[1,2]			Supplies[1]																
					Beaumont Basin Rights and Production[3]												Direct Use of Non-Potable Water			
						Additions to Pumping Right per the 2004 Adjudication														
	Potable	Non Potable	Total Demand	Recycled Water Production Available for Use	Rights Per 2004 Adjudication[3]	Noble Creek Recharge Project	New Urban Storm Water Recharge & OSWD	Recycled Water Recharge[4]	SWP Water Purchased for Recharge	Appropriator Water Transfer	Total Additions to Pumping Right	Annual Production Right per 2004 Adjudication	Annual Production	Over (Under) Production	Volume in BCVWD Storage Account[5]	Edgar Canyon	Recycled	Imported SWP Water[6]	Total	Total Supply
(1)	(2)	(3)	(4) =(2)+(3)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13) =(6)+(12)	(14)	(15) =(14)-(13)	(16)	(17)	(18)	(19)	(20)	(21) =(14)+(17)+(20)
2005	8,854	0	8,854	1,120	8,816	0	200	0	0	0	200	9,016	7,054	(1,962)	4,084	1,800	0	0	0	8,854
2006	11,052	0	11,052	2,219	8,969	0	200	0	3,500	0	3,700	12,669	9,252	(3,417)	7,501	1,800	0	0	0	11,052
2007	11,750	0	11,750	2,568	9,014	0	200	0	6,000	1,500	7,700	16,714	9,950	(6,764)	14,265	1,800	0	0	0	11,750
2008	12,180	5,440	17,620	2,783	11,975	0	200	0	6,000		6,200	18,175	10,380	(7,795)	22,060	1,800	2,720	2,720	5,440	17,620
2009	14,040	5,560	19,600	3,713	12,200	2,000	1,760	933	6,000		10,693	22,893	12,240	(10,653)	32,713	1,800	2,780	2,780	5,560	19,600
2010	15,900	6,400	22,300	4,643	12,143	2,000	1,760	1,443	6,000		11,203	23,346	14,100	(9,246)	41,959	1,800	3,200	3,200	6,400	22,300
2011	16,940	6,480	23,420	5,163	12,085	2,000	1,760	1,923	6,000		11,683	23,768	15,140	(8,628)	50,587	1,800	3,240	3,240	6,480	23,420
2012	17,980	6,560	24,540	5,683	12,027	2,000	1,760	2,403	6,000		12,163	24,190	16,180	(8,010)	58,598	1,800	3,280	3,280	6,560	24,540
2013	19,020	6,640	25,660	6,203	11,969	2,000	1,760	2,883	6,000		12,643	24,613	17,220	(7,393)	65,990	1,800	3,320	3,320	6,640	25,660
2014	20,060	6,720	26,780	6,723	5,167	2,000	1,760	3,363	6,000		13,123	18,290	18,260	(30)	66,020	1,800	3,360	3,360	6,720	26,780
2015	21,100	6,800	27,900	7,243	5,167	2,000	1,760	3,843	6,000		13,603	18,770	19,300	530	65,491	1,800	3,400	3,400	6,800	27,900
2016	21,340	6,840	28,180	7,363	5,167	2,000	1,760	3,904	6,000		13,664	18,831	19,540	709	64,782	1,800	3,420	3,420	6,840	28,180
2017	21,580	6,880	28,460	7,483	5,167	2,000	1,760	3,904	6,000		13,664	18,831	19,780	949	63,833	1,800	3,440	3,440	6,880	28,460
2018	21,820	6,920	28,740	7,603	5,167	2,000	1,760	3,904	6,000		13,664	18,831	20,020	1,189	62,644	1,800	3,460	3,460	6,920	28,740
2019	22,060	6,960	29,020	7,723	5,167	2,000	1,760	3,904	6,000		13,664	18,831	20,260	1,429	61,215	1,800	3,480	3,480	6,960	29,020
2020	22,300	7,000	29,300	7,843	5,167	2,000	1,760	3,904	6,000		13,664	18,831	20,500	1,669	59,546	1,800	3,500	3,500	7,000	29,300
2021	22,440	7,000	29,440	7,913	5,167	2,000	1,760	3,904	6,000		13,664	18,831	20,640	1,809	57,737	1,800	3,500	3,500	7,000	29,440
2022	22,580	7,000	29,580	7,983	5,167	2,000	1,760	3,904	6,000		13,664	18,831	20,780	1,949	55,788	1,800	3,500	3,500	7,000	29,580
2023	22,720	7,000	29,720	8,053	5,167	2,000	1,760	3,904	6,000		13,664	18,831	20,920	2,089	53,699	1,800	3,500	3,500	7,000	29,720
2024	22,860	7,000	29,860	8,123	5,167	2,000	1,760	3,904	6,000		13,664	18,831	21,060	2,229	51,470	1,800	3,500	3,500	7,000	29,860
2025	23,000	7,000	30,000	8,193	5,167	2,000	1,760	3,904	6,000		13,664	18,831	21,200	2,369	49,102	1,800	3,500	3,500	7,000	30,000
2026	23,100	7,000	30,100	8,243	5,167	2,000	1,760	3,904	6,000		13,664	18,831	21,300	2,469	46,633	1,800	3,500	3,500	7,000	30,100
2027	23,200	7,000	30,200	8,293	5,167	2,000	1,760	3,904	6,000		13,664	18,831	21,400	2,569	44,064	1,800	3,500	3,500	7,000	30,200
2028	23,300	7,000	30,300	8,343	5,167	2,000	1,760	3,904	6,000		13,664	18,831	21,500	2,669	41,395	1,800	3,500	3,500	7,000	30,300
2029	23,400	7,000	30,400	8,393	5,167	2,000	1,760	3,904	6,000		13,664	18,831	21,600	2,769	38,626	1,800	3,500	3,500	7,000	30,400
2030	23,500	7,000	30,500	8,443	5,167	2,000	1,760	3,904	6,000		13,664	18,831	21,700	2,869	35,757	1,800	3,500	3,500	7,000	30,500

1 -- Demands and Supplies as per December 2005 Urban Water Management Plan with minor changes to reflect compliance with 2004 Basin Plan and Beaumont Basin Stipulated Agreement

2 -- Includes all production from BCVWD and excludes overlier pumpers

3 -- Strict interpretation of the Beaumont Basin Adjudication approved by the Court in 2004 and assumes that overliers will either be converted to non-potable supplies provided by BCVWD or that their demands will have been replaced by appropriative uses. See Table 4.

4 -- Assumes that recycled water will be available in 2008 and that 1 mgd of discharge to Coopers Creek will be maintained.

5 -- Assumes that water stored in BCVWD storage account is allowed to accrue and be available during shortages on SWP or for lease/assignment to other parties.

6 -- Assumes that raw State Project Water from SGPWA existing Table "A" allocation will be used to supplement recycled water to meet non-potable demands.

Table 2-5
Water Demand and Water Supply Plan for the City of Banning Service Area
(acre-ft/yr)

Year	Demands[1]	Supplies[1]															
		Recycled Water Production Available for Use	Beaumont Basin Rights and Production[2]							Banning Storage Unit			Cabazon Storage Unit[6]	Banning Canyon[6]	Recycled Water	Total Supply
			Rights Per 2004 Stipulated Agreement	New Urban Storm Water Recharge[3]	SWP Water Purchased for Recharge[4]	Appropriator Water Transfer	Annual Production Right per 2004 Adjudication	Annual Production	Over (Under) Production	Volume in Banning Storage Account[5]	West	East	Total				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10) = (9)-(8)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18) = (9)+(14) + (15) (16)+ (17)
2005	9,282	2,916	6,517	0	0	0	6,517	1,780	(4,737)	7,635	1,340	219	1,559	0	5,943	0	9,282
2006	10,238	3,394	6,630	0	0	0	6,630	1,858	(4,772)	12,408	1,402	612	2,014	0	6,366	0	10,238
2007	10,570	3,560	6,516	0	1,000	1,500	9,016	2,617	(6,399)	18,806	1,075	967	2,042	0	5,911	0	10,570
2008	11,214	3,882	6,345	0	2,000		8,345	3,494	(4,851)	23,657	942	1,322	2,264	0	5,455	0	11,214
2009	11,857	4,204	6,116	0	3,000		9,116	1,121	(7,995)	31,653	810	1,677	2,487	2,050	5,000	1,200	11,857
2010	12,501	4,526	6,043	300	4,000		10,343	1,242	(9,100)	40,753	677	2,032	2,709	2,050	5,000	1,500	12,501
2011	13,105	4,828	5,969	300	4,000		10,269	1,735	(8,534)	49,287	690	2,070	2,760	2,050	5,000	1,560	13,105
2012	13,708	5,129	5,895	300	4,000		10,195	2,227	(7,968)	57,255	703	2,108	2,811	2,050	5,000	1,620	13,708
2013	14,311	5,431	5,822	300	4,000		10,122	2,719	(7,402)	64,658	716	2,147	2,862	2,050	5,000	1,680	14,311
2014	14,915	5,733	793	300	4,000		5,093	3,212	(1,881)	66,539	728	2,185	2,913	2,050	5,000	1,740	14,915
2015	15,518	6,034	793	300	4,000		5,093	3,704	(1,389)	67,928	741	2,223	2,964	2,050	5,000	1,800	15,518
2016	16,121	6,336	793	300	4,000		5,093	4,176	(917)	68,845	754	2,262	3,016	2,050	5,000	1,880	16,121
2017	16,725	6,638	793	300	4,000		5,093	4,648	(445)	69,290	767	2,300	3,067	2,050	5,000	1,960	16,725
2018	17,328	6,939	793	300	4,000		5,093	5,119	26	69,264	780	2,339	3,119	2,050	5,000	2,040	17,328
2019	17,932	7,241	793	300	4,000		5,093	5,591	498	68,766	793	2,378	3,170	2,050	5,000	2,120	17,932
2020	18,535	7,543	793	300	4,000		5,093	6,063	970	67,796	806	2,417	3,222	2,050	5,000	2,200	18,535
2021	19,138	7,844	793	300	4,000		5,093	6,555	1,462	66,333	818	2,455	3,273	2,050	5,000	2,260	19,138
2022	19,742	8,146	793	300	4,000		5,093	7,048	1,955	64,379	831	2,493	3,324	2,050	5,000	2,320	19,742
2023	20,345	8,448	793	300	4,000		5,093	7,540	2,447	61,932	844	2,531	3,375	2,050	5,000	2,380	20,345
2024	20,948	8,749	793	300	4,000		5,093	8,032	2,939	58,992	857	2,570	3,426	2,050	5,000	2,440	20,948
2025	21,552	9,051	793	300	4,000		5,093	8,525	3,432	55,560	869	2,608	3,477	2,050	5,000	2,500	21,552
2026	22,155	9,353	793	300	4,000		5,093	9,018	3,925	51,636	882	2,646	3,528	2,050	5,000	2,560	22,155
2027	22,759	9,654	793	300	4,000		5,093	9,510	4,417	47,218	895	2,684	3,578	2,050	5,000	2,620	22,759
2028	23,362	9,956	793	300	4,000		5,093	10,003	4,910	42,308	907	2,722	3,629	2,050	5,000	2,680	23,362
2029	23,965	10,258	793	300	4,000		5,093	10,496	5,403	36,905	920	2,760	3,679	2,050	5,000	2,740	23,965
2030	24,569	10,560	793	300	4,000		5,093	10,989	10,196	26,710	933	2,798	3,730	2,050	5,000	2,800	24,569

1 -- Water Demands and Supplies adapted from City of Banning Urban Water Management Plan (2005).

2 -- Strict interpretation of the Beaumont Basin Adjudication approved by the Court in 2004.

3 -- Smith Creek Recharge Project

4 -- Water will be either recharged in Beaumont Basin, served from a treatment plant, or some combination of both.

5 -- Assumes that water stored in Banning storage account is allowed to accrue and be available during shortages on SWP or for lease/assignment to other parties.

6 -- from Geoscience Report

Table 2-6
Water Demand and Water Supply Plan for the South Mesa Water Company
(acre-ft/yr)

Year	Demands[1]			Supplies[1]											
	Potable	Non Potable	Total	Recycled Water Production Available for Use	Beaumont Basin Rights and Production[2]					Imported SPW from SGPWA for Direct Potable Use	Non Potable Water Supply		Yucaipa Area Groundwater Basins	Total Supply
					Rights per 2004 Adjudication	SMWC Beaumont Pumping for use in SGPWA Area[3]	Over (Under) Production	Appropriator Water Transfer	Volume in SMWC Storage Account[4]		Imported SWP Water from SGPWA	Recycled Water		
(1)	(2)	(3)	(4) = (2)+(3)	(4)	(5)	(6)	(7) =(6)-(5)	(8)	(9)	(10)	(11)	(12)	(13)	(14) = (6)+(10)+(11)+(12)+(13)
2005	2,500	0	2,500	0	2,587	636	(1,951)	0	4,048	0	0	0	1,864	2,500
2006	2,548	0	2,548	0	2,632	645	(1,987)	0	6,035	0	0	0	1,903	2,548
2007	2,596	0	2,596	0	2,587	600	(1,987)	(3,000)	5,022	0	0	0	1,996	2,596
2008	2,644	0	2,644	0	2,519	600	(1,919)		6,940	0	0	0	2,044	2,644
2009	2,692	0	2,692	0	2,428	600	(1,828)		8,768	0	0	0	2,092	2,692
2010	2,740	0	2,740	0	2,399	600	(1,799)		10,567	0	0	0	2,140	2,740
2011	2,810	22	2,832	0	2,370	600	(1,770)		12,337	0	0	22	2,210	2,832
2012	2,880	44	2,924	0	2,340	600	(1,740)		14,077	0	0	44	2,280	2,924
2013	2,950	66	3,016	0	2,311	600	(1,711)		15,788	0	0	66	2,350	3,016
2014	3,020	88	3,108	0	315	315	0		15,788	0	0	88	2,705	3,108
2015	3,090	110	3,200	0	315	315	0		15,788	1,120	0	110	1,655	3,200
2016	3,155	117	3,272	0	315	315	0		15,787	1,120	0	117	1,720	3,272
2017	3,220	124	3,344	0	315	315	0		15,787	1,120	0	124	1,785	3,344
2018	3,285	131	3,416	0	315	315	0		15,787	1,120	0	131	1,850	3,416
2019	3,350	138	3,488	0	315	315	0		15,787	1,120	0	138	1,915	3,488
2020	3,415	145	3,560	0	315	315	0		15,787	1,120	0	145	1,980	3,560
2021	3,474	154	3,628	0	315	315	0		15,786	1,232	0	154	1,927	3,628
2022	3,533	163	3,696	0	315	315	0		15,786	1,344	0	163	1,874	3,696
2023	3,592	172	3,764	0	315	315	0		15,786	1,456	0	172	1,821	3,764
2024	3,651	181	3,832	0	315	315	0		15,786	1,568	0	181	1,768	3,832
2025	3,710	190	3,900	0	315	315	0		15,786	1,680	0	190	1,715	3,900
2026	3,779	201	3,980	0	315	315	0		15,785	1,792	0	201	1,672	3,980
2027	3,848	212	4,060	0	315	315	0		15,785	1,904	0	212	1,629	4,060
2028	3,918	222	4,140	0	315	315	0		15,785	2,016	0	222	1,587	4,140
2029	3,987	233	4,220	0	315	315	0		15,785	2,128	0	233	1,544	4,220
2030	4,056	244	4,300	0	315	315	0		15,785	2,240	0	244	1,501	4,300

1 -- Water Demands and Supplies from SMWC 2005 Urban Water Management Plan prepared by Water Systems Consulting, August 2005.

2 -- Strict interpretation of the Beaumont Basin Adjudication approved by the Court in 2004.

3 -- Per direction form George Jorritsma

4 -- Assumes that water stored in SMWC storage account is allowed to accrue and be available during shortages on SWP or for lease/assignment to other parties.

Table 2-7
Water Demand and Water Supply Plan for the Yucaipa Valley Water District Area in the SGPWA Service Area
(acre-ft/yr)

Year	Demands[1]			Supplies[1]														
					Beaumont Basin Rights and Production[2]									Non Potable Water				
	Potable	Non Potable	Total	Recycled Water Production Available for Use	Rights Per 2004 Stipulated Agreement	SWP Water Purchased for Recharge	Annual Production Right per 2004 Adjudication	YVWD Beaumont Pumping for use in SGPWA Area[3]	YVWD Beaumont Pumping Exported from SGPWA Area[3]	Total	Over (Under) Production	Volume in YVWD Storage Account[4]	Imported SWP Water from SGPWA for Direct Potable Use	Imported SWP Water from SGPWA	Recycled Water	Yucaipa Area Groundwater Basins[5]	Total Supply
(1)	(2)	(3)	(4) = (2)+(3)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12) =(11)-(8)	(13)	(14)	(15)	(16)	(17)	(18) = (9)+(14)+(15)+(16)+(17)
2005	1,500	0	1,500	750	2,816	0	2,816	140	1,134	1,274	(1,542)	2,545	0	0	0	1,360	1,500
2006	1,600	0	1,600	800	2,865	0	2,865	200	1,827	2,027	(838)	3,383	0	0	0	1,400	1,600
2007	1,400	300	1,700	700	3,015	0	3,015	300	2,000	2,300	(715)	4,098	400	100	200	700	1,700
2008	1,700	450	2,150	850	3,134	0	3,134	350	2,000	2,350	(784)	4,882	600	335	115	750	2,150
2009	2,000	600	2,600	1,000	3,228	0	3,228	400	2,000	2,400	(828)	5,710	800	450	150	800	2,600
2010	2,250	750	3,000	1,125	3,388	0	3,388	463	2,000	2,463	(925)	6,635	1,000	565	185	787	3,000
2011	2,500	900	3,400	1,250	3,549	0	3,549	463	2,000	2,463	(1,086)	7,720	1,100	675	225	937	3,400
2012	2,750	1,050	3,800	1,375	3,709	0	3,709	463	2,000	2,463	(1,246)	8,967	1,200	780	270	1,087	3,800
2013	3,000	1,200	4,200	1,500	3,870	0	3,870	463	2,000	2,463	(1,407)	10,374	1,300	900	300	1,237	4,200
2014	3,250	1,350	4,600	1,625	1,697	0	1,697	463	2,000	2,463	766	9,608	1,550	1,015	335	1,237	4,600
2015	3,500	1,500	5,000	1,750	1,697	0	1,697	463	2,000	2,463	766	8,842	1,800	1,125	375	1,237	5,000
2016	3,750	1,650	5,400	1,875	1,697	0	1,697	463	2,000	2,463	766	8,076	2,050	1,235	415	1,237	5,400
2017	4,000	1,800	5,800	2,000	1,697	0	1,697	463	2,000	2,463	766	7,310	2,300	1,350	450	1,237	5,800
2018	4,250	1,950	6,200	2,125	1,697	0	1,697	463	2,000	2,463	766	6,544	2,550	1,465	485	1,237	6,200
2019	4,500	2,100	6,600	2,250	1,697	0	1,697	463	2,000	2,463	766	5,779	2,800	1,575	525	1,237	6,600
2020	4,685	2,250	6,935	2,343	1,697	0	1,697	463	2,000	2,463	766	5,013	2,985	1,685	565	1,237	6,935
2021	4,870	2,400	7,270	2,435	1,697	0	1,697	463	2,000	2,463	766	4,247	3,170	1,800	600	1,237	7,270
2022	5,055	2,550	7,605	2,528	1,697	0	1,697	463	2,000	2,463	766	3,481	3,355	1,915	635	1,237	7,605
2023	5,240	2,700	7,940	2,620	1,697	0	1,697	463	2,000	2,463	766	2,715	3,540	2,025	675	1,237	7,940
2024	5,425	2,850	8,275	2,713	1,697	0	1,697	463	2,000	2,463	766	1,949	3,725	1,850	1,000	1,237	8,275
2025	5,610	3,000	8,610	2,805	1,697	0	1,697	463	2,000	2,463	766	1,183	3,910	1,665	1,335	1,237	8,610
2026	5,795	3,150	8,945	2,898	1,697	0	1,697	463	2,000	2,463	766	418	4,095	1,480	1,670	1,237	8,945
2027	5,980	3,300	9,280	2,990	1,697	348	2,045	463	2,000	2,463	418	0	4,280	1,295	2,005	1,237	9,280
2028	6,165	3,450	9,615	3,083	1,697	766	2,463	463	2,000	2,463	(0)	0	4,465	1,110	2,340	1,237	9,615
2029	6,350	3,600	9,950	3,175	1,697	766	2,463	463	2,000	2,463	(0)	0	4,650	925	2,675	1,237	9,950
2030	6,535	3,750	10,285	3,268	1,697	766	2,463	463	2,000	2,463	(0)	0	4,750	825	2,925	1,322	10,285

1 -- Water Demands and Supplies from YVWD projections supplied by Joe Zoba on January 19, 2007

2 -- Strict interpretation of the Beaumont Basin Adjudication approved by the Court in 2004 and assumes that overliers will either be converted to non-potable supplies provided by YVWD or that their demands will have been replaced by appropriative uses.

3 -- Assumes that YVWD will pump about 500 acre-ft/yr from the Beaumont Basin for use in SGPWA service area and will pump 2000 acre-ft/yr from the Beaumont Basin for export from the SGPWA to SBVMWD service area

4 -- Assumes that water stored in YVWD storage account is allowed to accrue and be available during shortages on SWP or for lease/assignment to other parties.

5 -- SMWC Production from Calimesa Basin.

Table 2-8
Beaumont Cherry Valley Water Distict Salt Tracking through 2030

Year	Potable supplies			Non-Potable Supplies		Stormwater	Recharge		Annual Total	Cummulative Total
	Annual Production		Imported Water	Non-Pot (Recycled DU)	Non-Pot (SPW DU)		SPW Recharge	Recycled Recharge		
	GW Extraction	GW Return	SPW Return	Recycled Direct Use	SPW Direct Use					
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
2005	(875)	(577)	-	-	-	19	-	-	(1,434)	(1,434)
2006	(1,078)	(711)	-	-	-	19	473	-	(1,296)	(2,730)
2007	(1,119)	(738)	-	-	-	19	710	-	(1,128)	(3,858)
2008	(1,160)	(765)	(155)	(661)	(309)	19	710	-	(2,321)	(6,179)
2009	(1,349)	(889)	(155)	(661)	(309)	350	710	(110)	(2,413)	(8,592)
2010	(1,514)	(999)	(182)	(777)	(364)	350	710	(170)	(2,946)	(11,538)
2011	(1,613)	(1,064)	(184)	(787)	(369)	350	710	(234)	(3,191)	(14,729)
2012	(1,712)	(1,129)	(187)	(797)	(373)	350	710	(298)	(3,436)	(18,165)
2013	(1,811)	(1,195)	(189)	(806)	(378)	350	710	(362)	(3,681)	(21,846)
2014	(1,910)	(1,260)	(191)	(816)	(382)	350	710	(426)	(3,926)	(25,771)
2015	(2,010)	(1,325)	(193)	(826)	(387)	350	710	(490)	(4,171)	(29,942)
2016	(2,032)	(1,340)	(195)	(831)	(389)	350	710	(503)	(4,230)	(34,172)
2017	(2,055)	(1,355)	(196)	(835)	(391)	350	710	(517)	(4,290)	(38,462)
2018	(2,078)	(1,371)	(197)	(840)	(394)	350	710	(521)	(4,340)	(42,802)
2019	(2,101)	(1,386)	(198)	(845)	(396)	350	710	(521)	(4,386)	(47,188)
2020	(2,124)	(1,401)	(199)	(850)	(398)	350	710	(521)	(4,432)	(51,620)
2021	(2,137)	(1,409)	(199)	(850)	(398)	350	710	(521)	(4,454)	(56,074)
2022	(2,150)	(1,418)	(199)	(850)	(398)	350	710	(521)	(4,476)	(60,551)
2023	(2,164)	(1,427)	(199)	(850)	(398)	350	710	(521)	(4,499)	(65,049)
2024	(2,177)	(1,436)	(199)	(850)	(398)	350	710	(521)	(4,521)	(69,570)
2025	(2,190)	(1,445)	(199)	(850)	(398)	350	710	(521)	(4,543)	(74,113)
2026	(2,200)	(1,451)	(199)	(850)	(398)	350	710	(521)	(4,559)	(78,671)
2027	(2,210)	(1,457)	(199)	(850)	(398)	350	710	(521)	(4,574)	(83,246)
2028	(2,219)	(1,463)	(199)	(850)	(398)	350	710	(521)	(4,590)	(87,836)
2029	(2,229)	(1,470)	(199)	(850)	(398)	350	710	(521)	(4,606)	(92,442)
2030	(2,238)	(1,476)	(199)	(850)	(398)	350	710	(521)	(4,622)	(97,064)

Table 2-9
City of Banning Salt Tracking through 2030

Year	Potable supplies			Non-Potable Supplies		Stormwater	Recharge		Annual Total	Cummulative Total
	Annual Production		Imported Water	Non-Pot (Recycled DU)	Non-Pot (SPW DU)		SPW Recharge	Recycled Recharge		
	GW Extraction	GW Return	SPW Return	Recycled Direct Use	SPW Direct Use					
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
2005	(146)	(22)	-	-	-	-	-	-	(168)	(168)
2006	(240)	(37)	-	-	-	-	-	-	(277)	(446)
2007	(99)	(15)	-	-	(26)	-	118	-	(22)	(468)
2008	(153)	(24)	-	-	(53)	-	237	-	7	(461)
2009	(93)	(14)	-	(68)	(79)	-	355	-	101	(361)
2010	(118)	(18)	-	(85)	(106)	7	473	-	153	(208)
2011	(165)	(25)	-	(88)	(106)	7	473	-	95	(113)
2012	(212)	(33)	-	(92)	(106)	7	473	-	38	(75)
2013	(259)	(40)	-	(95)	(106)	7	473	-	(20)	(95)
2014	(306)	(47)	-	(98)	(106)	7	473	-	(77)	(172)
2015	(353)	(54)	-	(102)	(106)	7	473	-	(135)	(307)
2016	(398)	(61)	-	(106)	(106)	7	473	-	(191)	(498)
2017	(443)	(68)	-	(111)	(106)	7	473	-	(248)	(746)
2018	(488)	(75)	-	(115)	(106)	7	473	-	(304)	(1,050)
2019	(532)	(82)	-	(120)	(106)	7	473	-	(360)	(1,410)
2020	(577)	(89)	-	(124)	(106)	7	473	-	(417)	(1,827)
2021	(624)	(96)	-	(128)	(106)	7	473	-	(474)	(2,301)
2022	(671)	(103)	-	(131)	(106)	7	473	-	(532)	(2,832)
2023	(718)	(110)	-	(135)	(106)	7	473	-	(589)	(3,421)
2024	(765)	(118)	-	(138)	(106)	7	473	-	(647)	(4,068)
2025	(812)	(125)	-	(141)	(106)	7	473	-	(704)	(4,772)
2026	(859)	(132)	-	(145)	(106)	7	473	-	(762)	(5,534)
2027	(906)	(139)	-	(148)	(106)	7	473	-	(819)	(6,353)
2028	(953)	(146)	-	(152)	(106)	7	473	-	(877)	(7,230)
2029	(1,000)	(154)	-	(155)	(106)	7	473	-	(934)	(8,164)
2030	(1,047)	(161)	-	(158)	(106)	7	473	-	(992)	(9,155)

Table 2-10
South Mesa Water Company Salt Tracking through 2030

Year	Potable supplies			Non-Potable Supplies		Stormwater	Recharge		Annual Total	Cummulative Total
	Annual Production		Imported Water	Non-Pot (Recycled DU)	Non-Pot (SPW DU)					
	GW Extraction	GW Return	SPW Return	Recycled Direct Use	SPW Direct Use		SPW Recharge	Recycled Recharge		
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
2005	(61)	(3)	-	-	-	41	-	-	(23)	(23)
2006	(57)	(2)	-	-	-	42	-	-	(17)	(40)
2007	(57)	(2)	-	-	-	42	-	-	(17)	(58)
2008	(57)	(2)	-	-	-	42	-	-	(17)	(75)
2009	(57)	(2)	-	-	-	42	-	-	(17)	(92)
2010	(57)	(2)	-	-	-	42	-	-	(17)	(110)
2011	(57)	(2)	-	(0)	-	41	-	-	(19)	(129)
2012	(57)	(2)	-	(1)	-	40	-	-	(20)	(149)
2013	(57)	(2)	-	(1)	-	39	-	-	(21)	(170)
2014	(30)	(1)	-	(1)	-	44	-	-	12	(158)
2015	(30)	(1)	(4)	(2)	-	20	-	-	(17)	(175)
2016	(30)	(1)	(4)	(2)	-	20	-	-	(17)	(192)
2017	(30)	(1)	(4)	(2)	-	20	-	-	(18)	(210)
2018	(30)	(1)	(4)	(2)	-	19	-	-	(18)	(228)
2019	(30)	(1)	(4)	(2)	-	19	-	-	(18)	(247)
2020	(30)	(1)	(4)	(2)	-	19	-	-	(19)	(265)
2021	(30)	(1)	(5)	(2)	-	16	-	-	(22)	(287)
2022	(30)	(1)	(5)	(3)	-	14	-	-	(25)	(313)
2023	(30)	(1)	(5)	(3)	-	11	-	-	(29)	(341)
2024	(30)	(1)	(6)	(3)	-	8	-	-	(32)	(373)
2025	(30)	(1)	(6)	(3)	-	5	-	-	(35)	(408)
2026	(30)	(1)	(7)	(3)	-	3	-	-	(38)	(447)
2027	(30)	(1)	(7)	(3)	-	(0)	-	-	(42)	(489)
2028	(30)	(1)	(8)	(4)	-	(3)	-	-	(45)	(534)
2029	(30)	(1)	(8)	(4)	-	(6)	-	-	(49)	(582)
2030	(30)	(1)	(8)	(4)	-	(8)	-	-	(52)	(634)

Table 2-11
Yucaipa Valley Water District Tracking through 2030

Year	Potable supplies			Non-Potable Supplies		Stormwater	Recharge		Annual Total	Cummulative Total
	Annual Production		Imported Water	Non-Pot (Recycled DU)	Non-Pot (SPW DU)					
	GW Extraction	GW Return	SPW Return	Recycled Direct Use	SPW Direct Use		SPW Recharge	Recycled Recharge		
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
2005	(13)	(1)	-	(12)	(6)	-	-	-	(32)	(32)
2006	(31)	(3)	-	(17)	(8)	-	-	-	(60)	(92)
2007	(49)	(5)	(0)	(22)	(10)	-	-	-	(87)	(179)
2008	(67)	(7)	(0)	(14)	(6)	-	-	-	(94)	(273)
2009	(85)	(9)	-	(16)	(8)	-	-	-	(117)	(390)
2010	(100)	(11)	(0)	(19)	(9)	-	-	-	(138)	(528)
2011	(100)	(11)	(2)	(21)	(10)	-	-	-	(144)	(672)
2012	(100)	(11)	(4)	(24)	(11)	-	-	-	(149)	(821)
2013	(100)	(11)	(6)	(26)	(12)	-	-	-	(155)	(976)
2014	(44)	(5)	(13)	(29)	(13)	-	-	-	(104)	(1,080)
2015	(44)	(5)	(15)	(31)	(15)	-	-	-	(109)	(1,189)
2016	(44)	(5)	(16)	(34)	(16)	-	-	-	(115)	(1,303)
2017	(44)	(5)	(18)	(36)	(17)	-	-	-	(120)	(1,423)
2018	(44)	(5)	(20)	(39)	(18)	-	-	-	(125)	(1,549)
2019	(44)	(5)	(22)	(41)	(19)	-	-	-	(131)	(1,680)
2020	(44)	(5)	(23)	(44)	(20)	-	-	-	(136)	(1,816)
2021	(44)	(5)	(25)	(46)	(22)	-	87	-	(55)	(1,871)
2022	(44)	(5)	(27)	(49)	(23)	-	91	-	(57)	(1,928)
2023	(44)	(5)	(29)	(51)	(24)	-	91	-	(62)	(1,989)
2024	(44)	(5)	(30)	(54)	(25)	-	91	-	(67)	(2,057)
2025	(44)	(5)	(32)	(56)	(26)	-	91	-	(73)	(2,130)
2026	(44)	(5)	(34)	(59)	(27)	-	91	-	(78)	(2,208)
2027	(44)	(5)	(36)	(61)	(29)	-	91	-	(84)	(2,292)
2028	(44)	(5)	(37)	(64)	(30)	-	91	-	(89)	(2,381)
2029	(44)	(5)	(39)	(66)	(31)	-	91	-	(95)	(2,476)
2030	(44)	(5)	(41)	(69)	(32)	-	91	-	(100)	(2,576)

Table 2-12
BMZ Salt Credit and Debit Summary Table

Year	BCVWD		Banning		South Mesa WC		YVWD	
	Annual Salt Credit (Debit) Mass (Tons)	Cum. Salt Credit (Debit) Mass (Tons)	Annual Salt Credit (Debit) Mass (Tons)	Cum. Salt Credit (Debit) Mass (Tons)	Annual Salt Credit (Debit) Mass (Tons)	Cum. Salt Credit (Debit) Mass (Tons)	Annual Salt Credit (Debit) Mass (Tons)	Cum. Salt Credit (Debit) Mass (Tons)
2005	(1,434)	(1,434)	(168)	(168)	(49)	(49)	(32)	(32)
2010	(2,946)	(11,538)	153	(208)	(42)	(260)	(138)	(528)
2015	(4,171)	(29,942)	(135)	(307)	(85)	(500)	(109)	(1,189)
2020	(4,432)	(51,620)	(417)	(1,827)	(90)	(941)	(136)	(1,816)
2025	(4,543)	(74,113)	(704)	(4,772)	(133)	(1,521)	(73)	(2,130)
2030	(4,622)	(97,064)	(992)	(9,155)	(178)	(2,320)	(100)	(2,576)

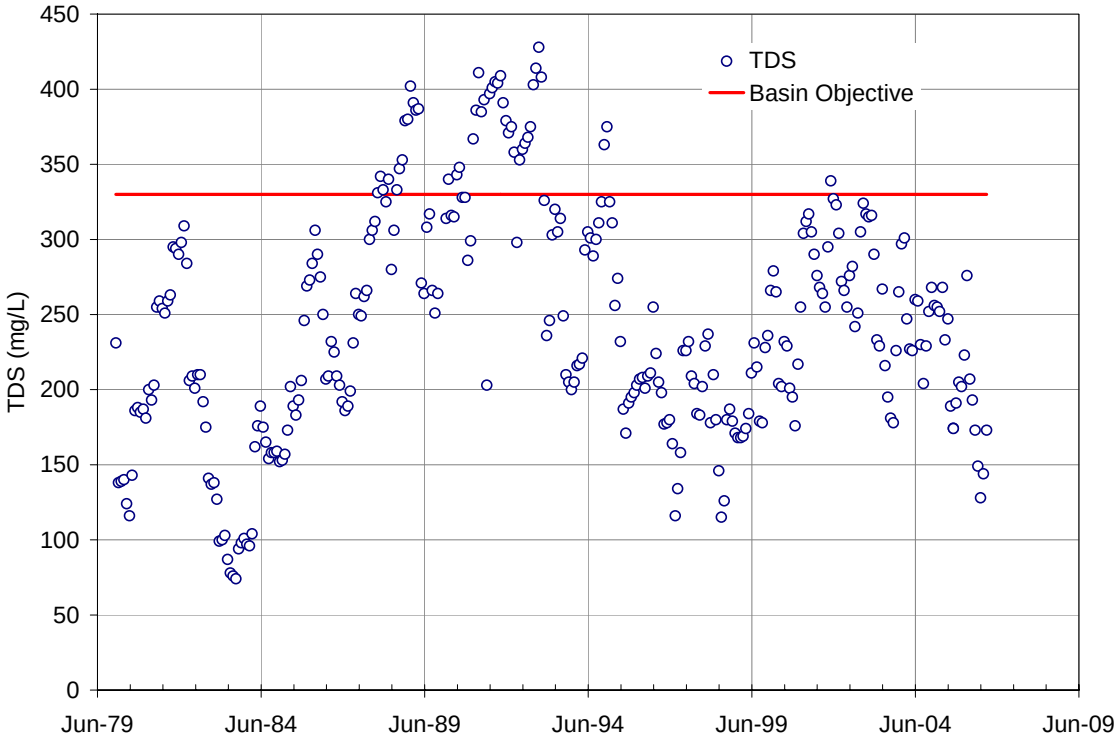


Figure 2-1
Monthly Devils Canyon TDS Relative to the Basin Objective of 330 mg/L

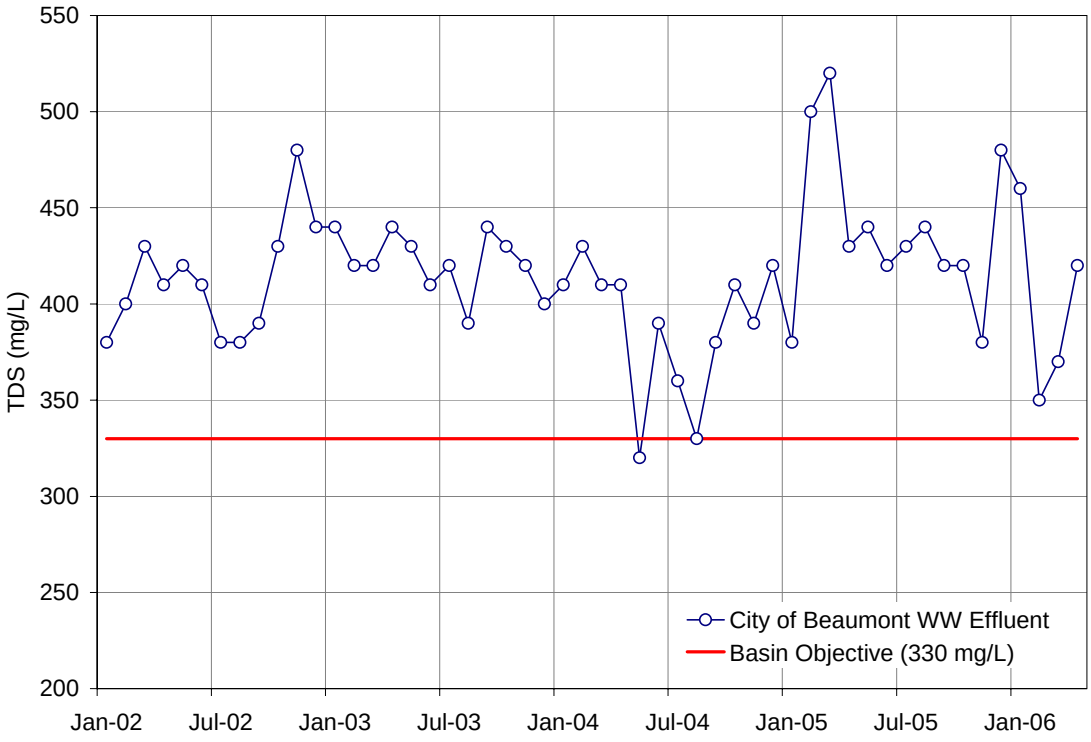


Figure 2-2
City of Beaumont Recycled Water TDS

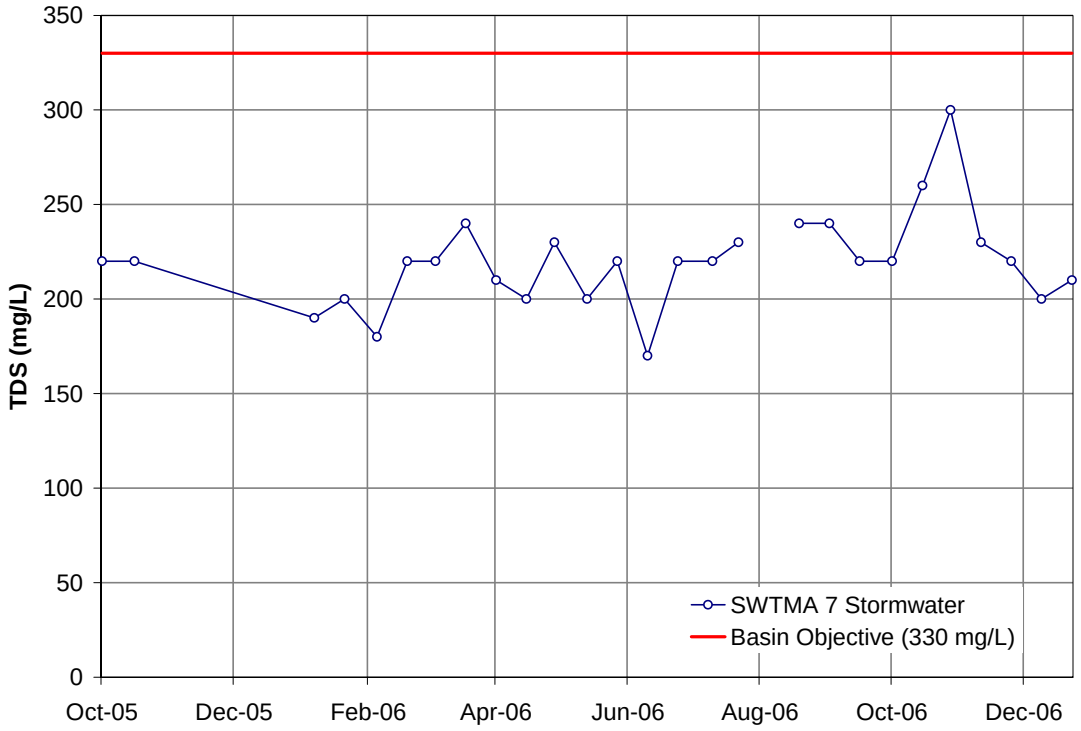


Figure 2-3
STWMA 7 Stormwater TDS

117°0'0"W

Mentone Blvd

Crafton Hills

Oak Glen Creek

Bryant St

Yucaipa Blvd

Yucaipa

Yucaipa Hills

Yucaipa Creek

34°0'0"N

San Timoteo

Cherry Valley Blvd

Beaumont

Beaumont Ave

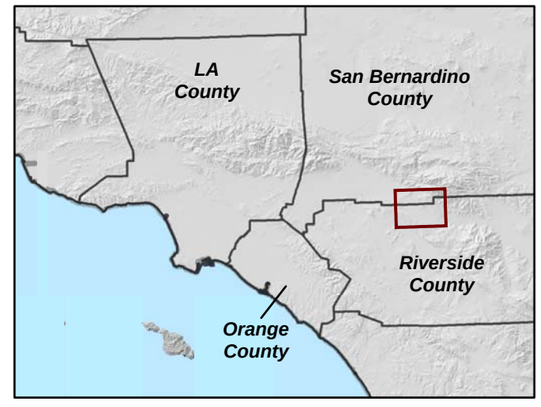
Noble Creek

San Timoteo Badlands

117°0'0"W

Legend

- San Timoteo Watershed (upstream of confluence with Yucaipa Creek)
- Beaumont Management Zone
- TDS Sampled Well



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File: Figure_2.mxd

0 1 2 3 4 Miles

0 2 4 6 KM

Location of Wells Sampled in the Beaumont Manangment Zone

Beaumont Watermaster

Salt Mitigation Fee Development Report

Figure 2-4

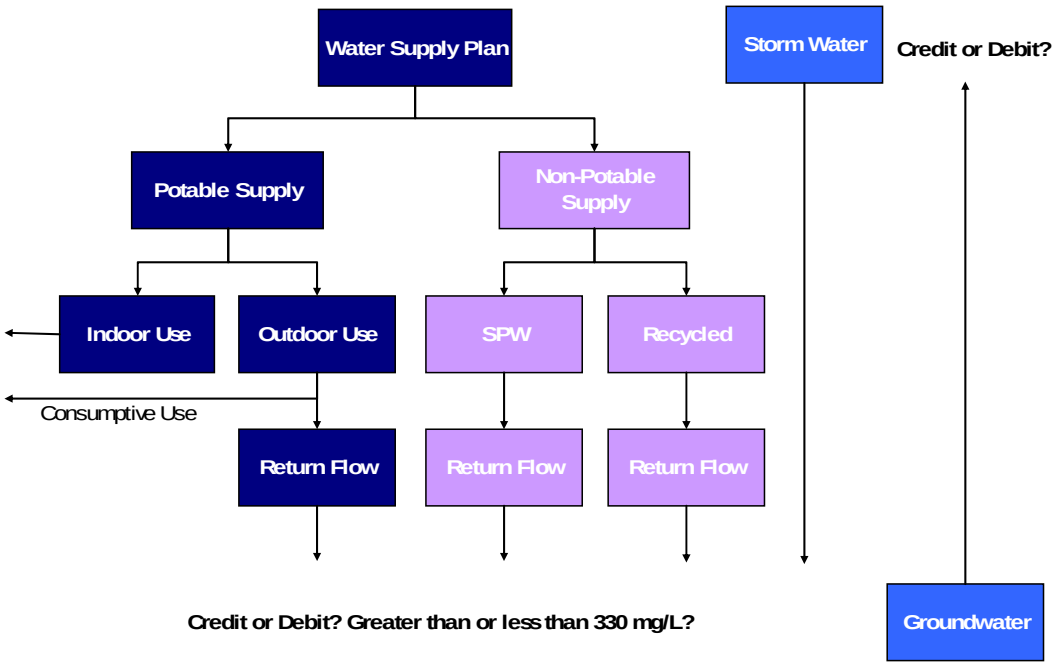


Figure 2-5
Credit and Debit Calculation Flow Chart

Section 3 – Salt Management Strategies

One of the goals of this study was to develop salt management strategies that could be employed to reduce salt loads and subsequently delay the construction of desalters as far out into the future as possible. Three basic components were investigated: source water management, waste increment management, and desalting. These salt management components are described below. Later in this section, these components are incorporated into salt management strategies. In Section 4, the costs of these strategies are described, and the application of the credit and debit methodology is proposed to implement the strategies developed in this section.

3.1 SOURCE WATER TDS MANAGEMENT

To determine the most effective source water strategies, a sensitivity analysis was conducted on all water supply sources. This analysis involved changing the TDS concentration for each water source by -30 percent, -10 percent, +10 percent, and +30 percent. The changes in TDS concentration were compared to the total of the credits and the debits. The results of this analysis are briefly summarized in Table 3-1 and shown graphically in Figure 3-1. Table 3-1 indicates that the salt balance in the BMZ is very sensitive to groundwater pumping and groundwater water quality. If the TDS concentration of the groundwater were changed by a few percent, the result could be thousands of tons of salt.

Based on these results and the process of constructing the model, the following conclusions and management strategies have been determined.

- The accumulation of salt debits is very sensitive to the TDS concentration of groundwater. The TDS concentration of groundwater is a dependent variable, which means that the TDS concentration is a result of natural and human activities, and there is almost no flexibility to change its concentration. When groundwater is extracted and the TDS is less than the basin objective there is a debit; the purveyor is penalized for using groundwater with a TDS concentration less than the objective. For Banning, the SMWC, and the YVWD, the strategy implication is to pump groundwater with a TDS concentration greater than the objective from the BMZ and to use it outside of the BMZ. There is no strategy implication for the BCVWD because there is no salt outlet from the BMZ.

- The accumulation of salt debits is sensitive to imported water. Imported water is typically available at a TDS concentration lower than the basin objective. Instead of recharging imported water every year pursuant to their water supply plans, the agencies should recharge SWP water when its TDS concentration is lowest. This strategy would require more recharge capacity in the BMZ than suggested in the water supply plans of the agencies, and it would require large conveyance capacity

in the East Branch Extension. The magnitude of these requirements is described later in this section. Low TDS SWP water could also be used in lieu of low TDS groundwater thereby leaving low TDS groundwater in place. This would require the construction of a treatment plant to treat the imported water to drinking water standards and the ability to switch between treated SWP water when its TDS concentration is lower and groundwater when the SWP water TDS concentration is higher. This means that there would be redundant water supplies and that either supply could be idled when the other supply is being used.

- The accumulation of salt debits is sensitive to the aggregate source water TDS concentration due to consumptive use and its effects on the TDS concentration of the deep percolation of applied water and recycled water. The higher the TDS in the source water, the greater the TDS concentration in the deep percolation of applied water and in recycled water that is used for recharge and irrigation. The strategy implication for all of the agencies is always to strive to manage their source water supplies to serve water with the lowest TDS concentrations.

3.2 WASTE INCREMENT MANAGEMENT

The waste increment is the increment of TDS that is added to water as it is used and treated for use as recycled water. The magnitude of the waste increment is dependent upon the use of the water. Waste increments associated with domestic uses are smaller than waste increments of industrial uses. The area tributary to the City of Beaumont wastewater treatment plant is entirely within the BCVWD service area. The waste increment for the City of Beaumont/BCVWD area is about 170 mg/L, based on the difference between the five-year mean effluent TDS concentration of 414 mg/L (2002-2005) and the comparable period mean TDS concentration in the BCVWD supply of 260 mg/L. The waste increment is likely to increase over time due to conservation (low water usage toilets, faucets, appliances, etc) and the proliferation of self-regenerative water softeners.

The management goal for the waste increment is to reduce it to the lowest level possible. The following actions can be taken to manage the waste increment:

- Identify high TDS dischargers in the sewered area and require these entities to pre-treat their wastewater prior to discharging it to the sewer system.
- With proper demonstrations, enact ordinances to ban the installation of self-regenerative water softeners. Create incentive programs to promote the removal of self self-regenerative water softeners and/or their replacement with replaceable ion-exchange canisters that are regenerated outside of the BMZ.

A separate detailed investigation would be required to fully understand the magnitude of the salt contribution of industrial discharges and self-regenerative water softeners. Based on a recent Inland Empire Utilities Agency study, the contribution by water softeners is about 20 mg/L (IEUA, 2006). In the salt management alternatives articulated below, two

alternative waste increments will be assumed: (1) maintain the increment at the current level of 170 mg/L and (2) reduce the increment by 20 mg/L, which is the assumed equivalent of eliminating all self-regenerative water softeners.

3.3 DESALTING

At some point in time, there will be an absolute requirement for desalting. Pursuant to the STWMA's maximum benefit proposal (STWMA, 2002) for the BMZ and as codified in the 2004 Basin Plan Amendment, there should be no discharge of BMZ groundwater or recycled water from the BMZ. The only permissible salt outlets are groundwater that is pumped and exported from the BMZ by Banning, the SMWC, and the YVWD. These outlets have been shown to be inadequate in maintaining the TDS concentration below the objective (STWMA, 2002).

In 2006, the STWMA conducted a salt mitigation study, investigating the type of desalting necessary and the cost to implement a desalting program (WEI, 2006). The method used to mitigate the salt load of the basin and maintain compliance with the Basin Plan involves treating part of the recycled water produced at the City of Beaumont's recycling plant with reverse osmosis (RO). It was assumed in that study that desalting would be required in 2030. About 2.3 mgd of the City's recycled water would have to be treated with RO and blended with the remaining 5.7 mgd of recycled water to meet the Basin Plan requirements. The treatment of recycled water requires the treatment of less water than other alternatives and guarantees simultaneous compliance with the recycled water use limits and for discharge to Coopers Creek. The brine from the RO process was assumed to be discharged through a new pipeline at the existing City recycling plant to San Bernardino where said pipeline would connect to the SARI pipeline that discharges to the Orange County Sanitation District's treatment plant in Fountain Valley.

For this investigation, the desalting alternative discussed in the 2006 STWMA report was assumed. The capital and operating costs were updated in spring 2007. Nevertheless, this is not the only desalter that will be required: additional desalting will be required after 2030. The STWMA report has been included as Appendix A to this report.

3.4 SALT MANAGEMENT ALTERNATIVES

Three alternatives were developed for analysis:

- Alternative 1 – Implement the future water supply plan with the addition of recycled water desalting when required pursuant to maximum benefit obligations. This is the same desalting plan described in the 2006 STWMA report.
- Alternative 2 – Implement a modified water supply plan that involves the recharge of State Water Project water only when the TDS concentration is significantly less than the TDS objective in the BMZ, a reduction in waste increments by 20 mg/L, and the deferment of desalting until required pursuant to maximum benefit obligations. The intent is to either eliminate the need for desalters or to delay the

construction of desalters far into the future.

- Alternative 3 – This alternative is the same as Alternative 2, yet instead of desalting recycled water, this alternative involves desalting the source water that is provided to municipal water users for potable uses. The required desalting facilities would be constructed when required pursuant to maximum benefit obligations. The intent is to either eliminate the need for desalters or to delay the construction of desalters far into the future; however, the magnitude and cost of this desalting program would be much greater than either Alternatives 1 or 2.

For all alternatives, the *constantly stirred reactor model* (CSRM) from the STWMA's maximum benefit proposal (STWMA, 2002) was used to determine the delay of desalter construction that would be achieved by the non-desalter management alternatives. The water supply plans articulated in Section 2.7 were incorporated into the CSRM, which resulted in slightly different TDS projections than reported in the STWMA's maximum benefit proposal. The subsequent subsections describe the details of the alternatives and the TDS concentration projections for these alternatives through 2030.

3.4.1 Alternative 1 – Implement the Future Water Supply Plan with Desalting of Recycled Water Pursuant to STWMA's Maximum Benefit Obligations

In this alternative, the water supply plans described in Section 2.7 would be implemented. Groundwater and surface water would be monitored to determine compliance with the Basin Plan objectives for ambient groundwater and for surface water discharges from the City of Beaumont's recycling plant.

The CSRM projections for the STWMA's maximum benefit proposal (STWMA, 2002) indicated that desalting would be required in about 2030. Nevertheless, the CSRM projections prepared for this investigation suggest that desalting of Beaumont's recycled water effluent would be required by 2016. This projection is shown in Figure 3-2.

3.4.2 Alternative 2 – Optimize the Use of Non Desalting Salt Management Strategies Prior to Desalting Recycled Water

In this alternative, the water supply plans described in Section 2.7 would be implemented, but the recharge of SWP water would be modified to reduce the TDS concentration of the water recharged in the BMZ. This alternative was specifically requested by the Watermaster and is required in the 2004 Basin Plan amendment to the extent that it is practical in the 2004 Basin Plan amendment. This change in SWP water recharge was assumed to be in operation by 2015 to coincide with the completion of EBX2. Groundwater and surface water would be monitored to determine compliance with the Basin Plan objectives for ambient groundwater and for surface water discharges from the City of Beaumont's recycling plant.

Hydrologic conditions within the state of California predominately drive the quality of SWP water: the TDS concentration tends to decrease following periods of high precipitation and increase during droughts. Figure 3-4 is a scatter plot with a linear regression of the TDS concentration and the previous year's percent of normal snowfall for the State of California. Because the TDS concentration of SWP water is related to the previous year's precipitation, the Watermaster could program the recharge with SWP water to occur when the TDS concentration is less than a specific value. Figure 3-5 is a cumulative distribution TDS concentration at Devil's Canyon over the last 25 years. This relationship is listed in tabular form in Table 3-2. Typically, the TDS concentration of SWP water is below the basin objective; although at times, the TDS concentration is much less than the objective. For example, 20 percent of the TDS concentration measurements taken over the last 25 years have indicated a TDS concentration less tan 193 mg/L. The recharge of SWP water during these periods of lower than average TDS is thought to have a significant effect on the BMZ TDS concentration.

Three sub-alternatives were evaluated with the CSRM. Alternative 2A would limit the recharge of SWP water into the Beaumont Basin to when the TDS concentration in SWP water is less than or equal to 190 mg/L. This alternative takes advantage of the lower TDS that has historically occurred about 20 percent of the time. The volume of water recharged would be equal to the volume required in the water supply plans described in Section 2. The EBX and BMZ recharge facilities would be used about 20 percent of the time to recharge the BMZ. This would require that the Watermaster would have to have access to 100 cfs (14,500 acre-ft/yr) capacity in the EBX and the BMZ recharge facilities assuming 2020 demands. These deliveries would exceed the EBX capacity of 48 cfs and would require that other potential users reduce their demands to zero during when recharge deliveries are being made to the BMZ. The existing recharge capacity in the BMZ is limited to the new BCVWD recharge facility that will likely have a recharge capacity of 25 to 30 cfs. New recharge facilities totaling about 130 cfs will be required, the equivalent of 4 new BCVWD recharge facilities. Note that the EBX capacity is limited to 48 cfs when EBX2 is completed. Using the CSRM, the TDS concentration for the BMZ is projected to reach about 580 mg/L by 2030 or exceed the BMZ objective by about 280 mg/L. Desalting recycled water effluent was projected to be necessary in 2018 just two later than required in Alternative 1. Lowering the TDS concentration in the SPW recharge had little practical effect in this alternative.

Alternative 2B would limit the recharge of SWP water into the Beaumont Basin to when the TDS concentration in SWP water is less than or equal to 190 mg/L as per Alternative 2A except that the volume of recharge would be set to a value that would be required so that the ambient TDS concentration in the BMZ does not exceed the basin objective (330 mg/L). CSRM results showed that by recharging about 1.9 million acre-ft over the period 2015 through 2030 would maintain the ambient TDS concentration in the BMZ at or below 330 mg/L. The EBX and BMZ recharge facilities would be used about 20 percent of the time to recharge the BMZ. This would require that the Watermaster would have to have access to 870 cfs capacity in the EBX and the BMZ recharge facilities assuming 2020 demands. These deliveries would exceed the EBX capacity of 48 cfs and would require

that other potential users reduce their demands to zero during when recharge deliveries are being made to the BMZ. The existing recharge capacity in the BMZ is limited to the new BCVWD recharge facility that will likely have a recharge capacity of 25 to 30 cfs. New recharge facilities totaling about 850 cfs will be required, the equivalent of 28 new BCVWD recharge facilities.

Alternative 2C is identical to 2B except it uses a TDS concentration of 150 mg/L as the maximum TDS concentration in SWP water. CSRM results showed that by recharging about 1.6 million acre-ft over the period 2015 through 2030 would maintain the ambient TDS concentration in the BMZ at or below 330 mg/L. The EBX and BMZ recharge facilities would be used about 10 percent of the time to recharge the BMZ. This would require that the Watermaster would have to have access to 1460 cfs capacity in the EBX and the BMZ recharge facilities assuming 2020 demands. These deliveries would exceed the EBX capacity of 48 cfs and would require that other potential users reduce their demands to zero during when recharge deliveries are being made to the BMZ. The existing recharge capacity in the BMZ is limited to the new BCVWD recharge facility that will likely have a recharge capacity of 25-30 cfs. New recharge facilities totaling about 1,440 cfs will be required, the equivalent of 56 new BCVWD recharge facilities.

3.4.3 Alternative 3 Optimize the Use of SWP for Recharge and Desalting Potable Water

Alternative 3 is similar to Alternative 2A except potable water is desalted instead of recycled water. This means that groundwater is desalted prior to being discharged into the water conveyance system. The water supply plans from Section 2.6 were modified and used for this alternative. As in Alternative 2A, SWP water is recharged when the TDS concentration is 190 mg/L or less. The need for desalting will be triggered when the TDS concentration in the City of Beaumont's recycled water surpasses the Basin Plan commitment of 480 mg/L which should occur well before the ambient TDS concentration in BMZ groundwater reaches 330 mg/L. The drinking water supply would be desalted such that the resulting recycled water TDS concentration is maintained below 480 mg/L. The CSRM projections prepared for this alternative suggest that desalting could be required by 2018 just two later than required in Alternative 1. The ambient TDS concentration projection for the BMZ is shown in Figure 3-2.

3.4.4 Summary of Alternatives

Figure 3-2 provides a graphical comparison of the projected BMZ ambient TDS concentration for each alternative. Alternatives 2B and 2C control the degradation of ambient groundwater TDS concentration; however, they are also the least feasible in that they require the substantial physical expansion of the EBX al the way back to the Devil Canyon afterbay and recharge capacity; and complex water banking arrangements with other SWP contractors that would enable the Watermaster to recharge massive amounts of water in a short time. Alternative 3 combines the recharge of SWP water when the TDS

concentration is less than 190 mg/L and the desalting of groundwater. It is plagued with the same SWP delivery limitations as Alternatives 2A, 2B and 2C. The projected ambient TDS concentration is similar to Alternatives 1 and 2A. The desalting requirements in terms of capacity and locations and brine management will be much larger and costlier than the desalting of recycled water assumed in Alternatives 1 and 2A.

Alternative 1 is the only alternative to advance to cost estimation because it is physically feasible and will have the lowest over all cost over the planning period.

3.5 COST ESTIMATES

Reconnaissance-level costs estimates were prepared based on facilities and operational assumptions embedded in Alternative 1. As stated above only Alternative 1 was physically feasible. The desalting facilities will be constructed in the out years, as many as 30 to 40 years from now. The long-term inflation rate for construction costs was assumed to be identical to the long term discount rate.

3.5.1 Alternative 1 – Implement the Future Water Supply Plan with Desalting of Recycled Water Pursuant to STWMA's Maximum Benefit Obligations

Alternative 1 requires the construction of a desalter at the City of Beaumont treatment plant that is identical to the desalter facility assumed in the 2006 STWMA report for the alternative with brine discharge to the SARI. Table 3-3 contains the capital and operations and maintenance costs for this alternative. The capital cost was originally developed by Black and Veatch for the 2006 STWMA report. Certain capital components were escalated to spring 2007 costs using the Engineering News Record construction cost index. In current dollars, the total capital cost for this alternative is about $59 million.

Table 3-1
Supply Water Sensitivity Analysis Results

Source	Salt Credit (Debit) with a 1 Percent Decrease in Source Water TDS[1]	Sensitivity
Groundwater	(1,880) Tons	High
Imported	690 Tons	Moderate
Recycled	660 Tons	Moderate
Stormwater	180 Tons	Low

1. Based on a 25 year model

Table 3-2
Probability of SWP Water Quality

TDS (mg/L)	Probability Water Quality is < TDS
164	10%
193	20%
216	30%
236	40%
252	50%
271	60%
290	70%
312	80%
343	90%
428	99%

Table 3-3
Capital and Annual Costs to Desalt Recycled Water in Alternatives 1 and 3[1]

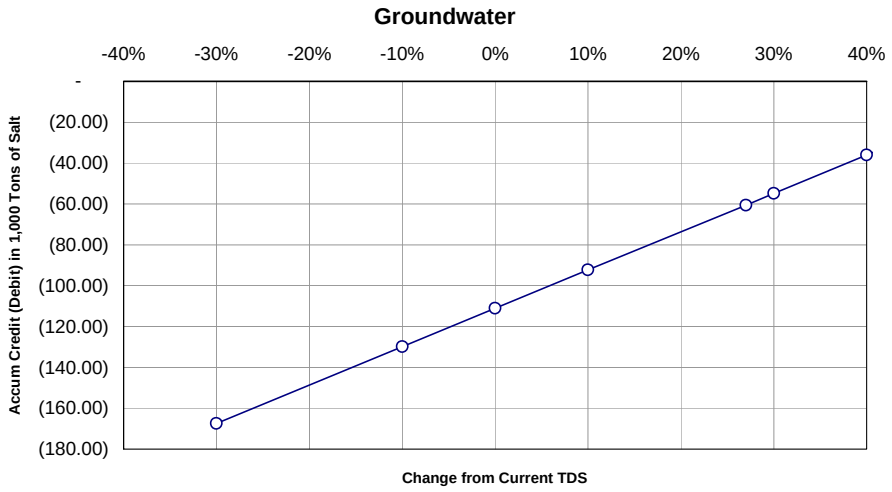
Description	AWTP, Brine Discharge to SARI Reach V
Capital Cost	
AWTP, RO	$7,263,000
SARI Reach V Connection	$28,438,000
Recycled Water Storage	$4,528,000
Subtotal Construction	$40,229,000
Contingency at 20 percent	$8,046,000
Total Construction Cost	$48,275,000
Engineering and Administration at 15 percent	$7,242,000
Total Capital Cost	$55,517,000
Value of Lost Water in Brine[2]	$3,360,000
Net Capital Cost	$58,877,000
Annual Cost	
AWTP	$515,000
SARI Reach V Connection	$307,000
Value of Lost Water in Brine[2]	$180,000
Total Operations and Maintenance Costs	$1,002,000
Annualized Capital Cost at 4.5 percent and 30-yr Finance Period[3]	$3,409,000
Total Annual Cost	$4,411,000

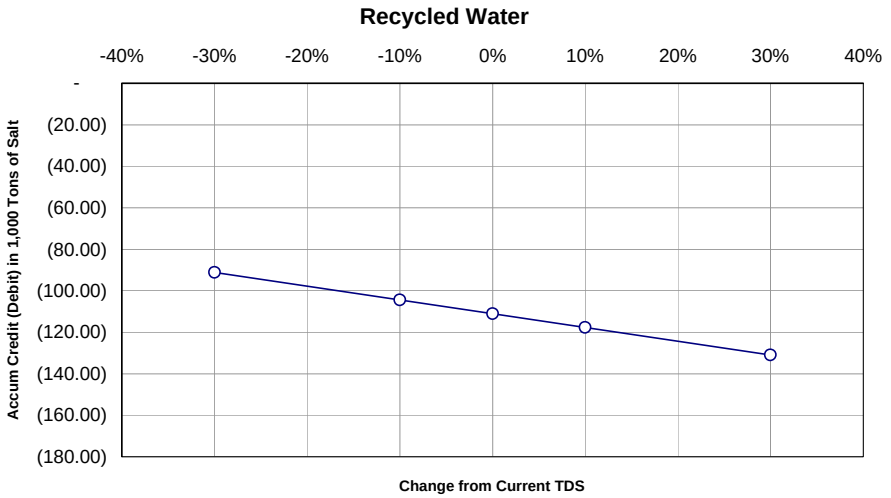
1 -- Capital and annual cost based on Table 1 2006 STWMA report escalated 7.1 percent.

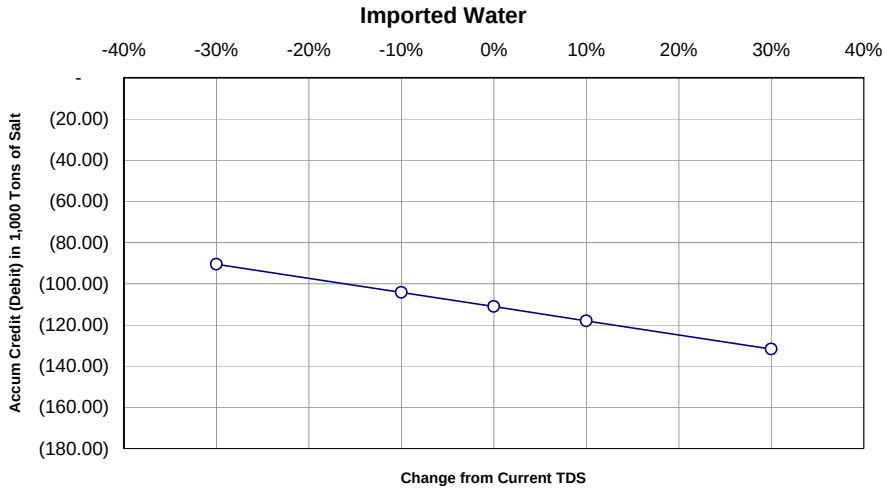
2 -- Capital cost to replace water lost in brine is $5,000 per acre-ft; the commodity cost was assumed to be $250 per acre-ft

3 -- Based on 30-year AMT-free municipal bond at 4.5 percent

Figure 3-1
Supply Water Quality Sensitivity







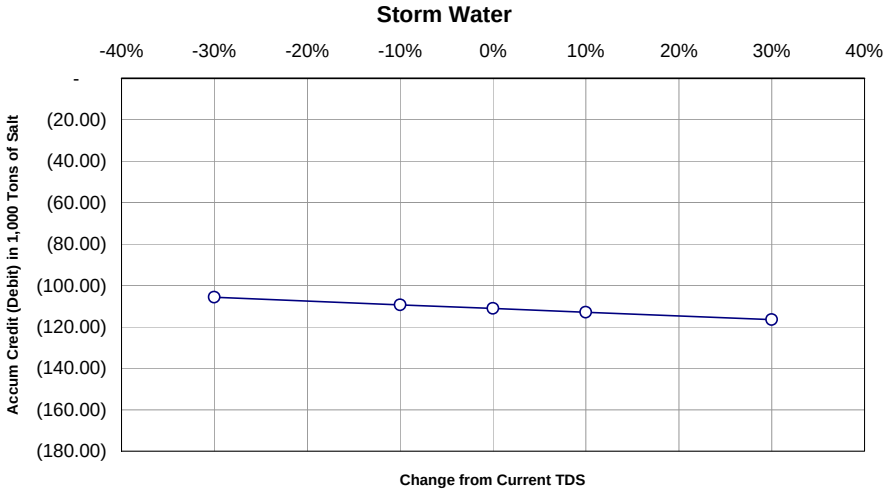
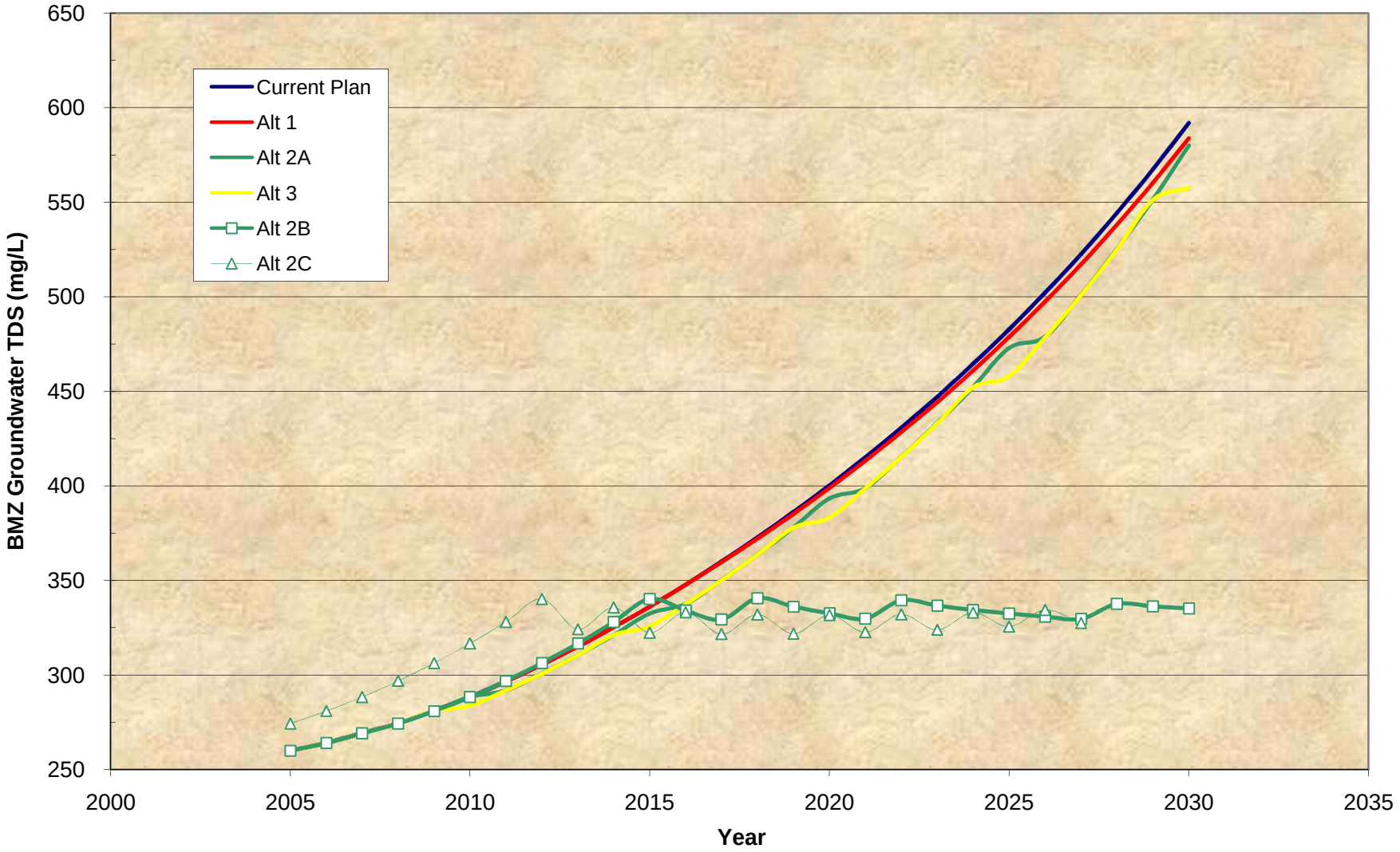


Figure 3-2
Comparison of TDS Concentration Projections for the Beaumont Management Zone
For Selected Water Resources Management Cases



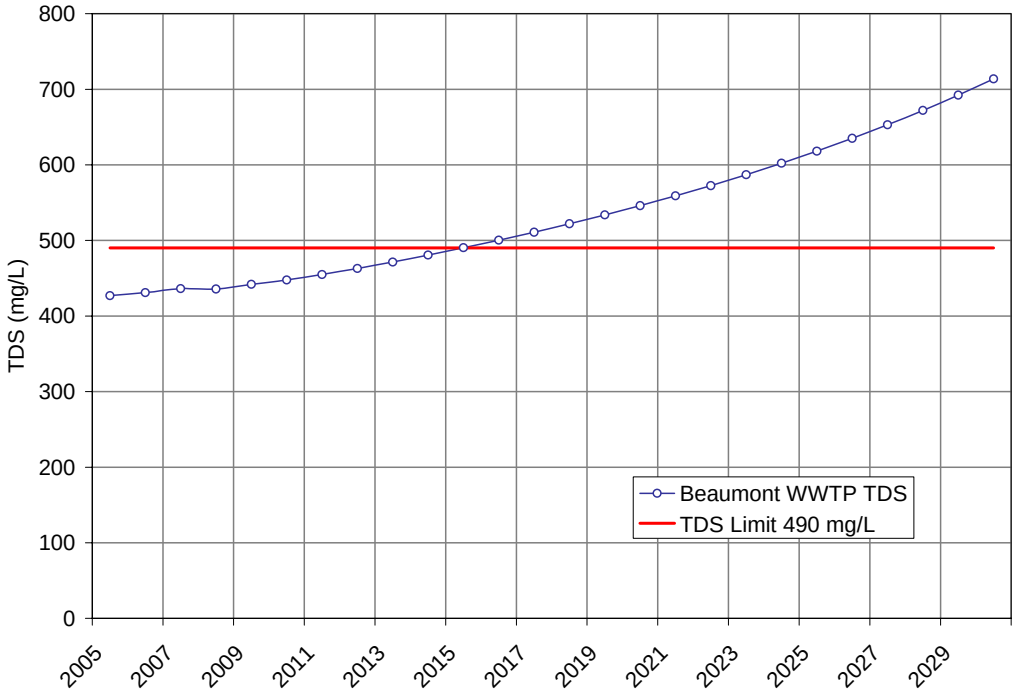


Figure 3-3
Beaumont Wastewater Treatment Effluent TDS (Existing Water Supply Plan)

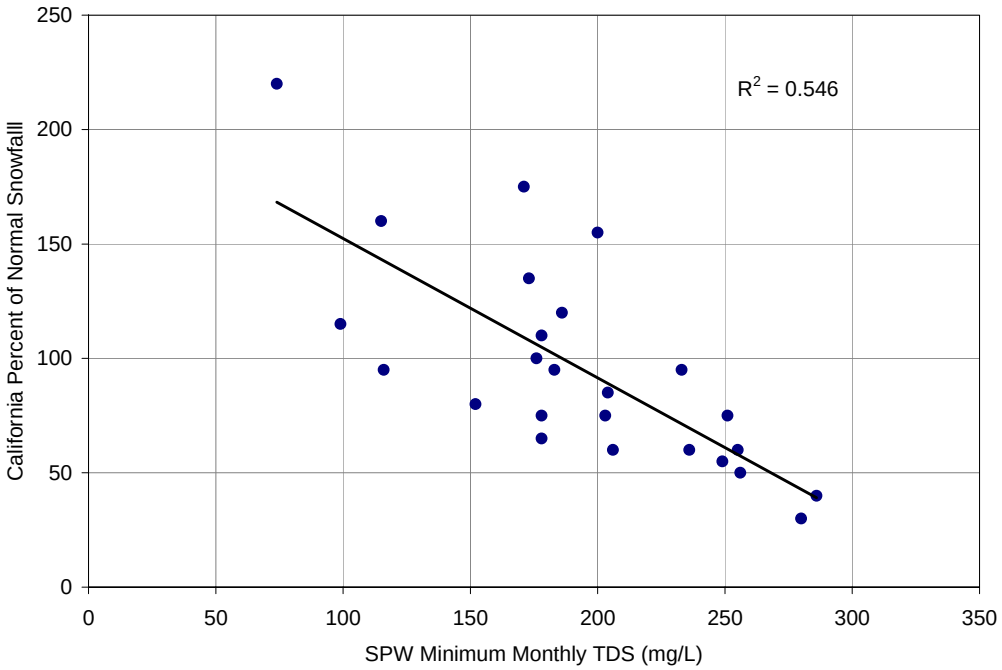


Figure 3-4
California Normal Snowfall and Monthly Minimum SWP TDS measurements (CDEC, 2006)

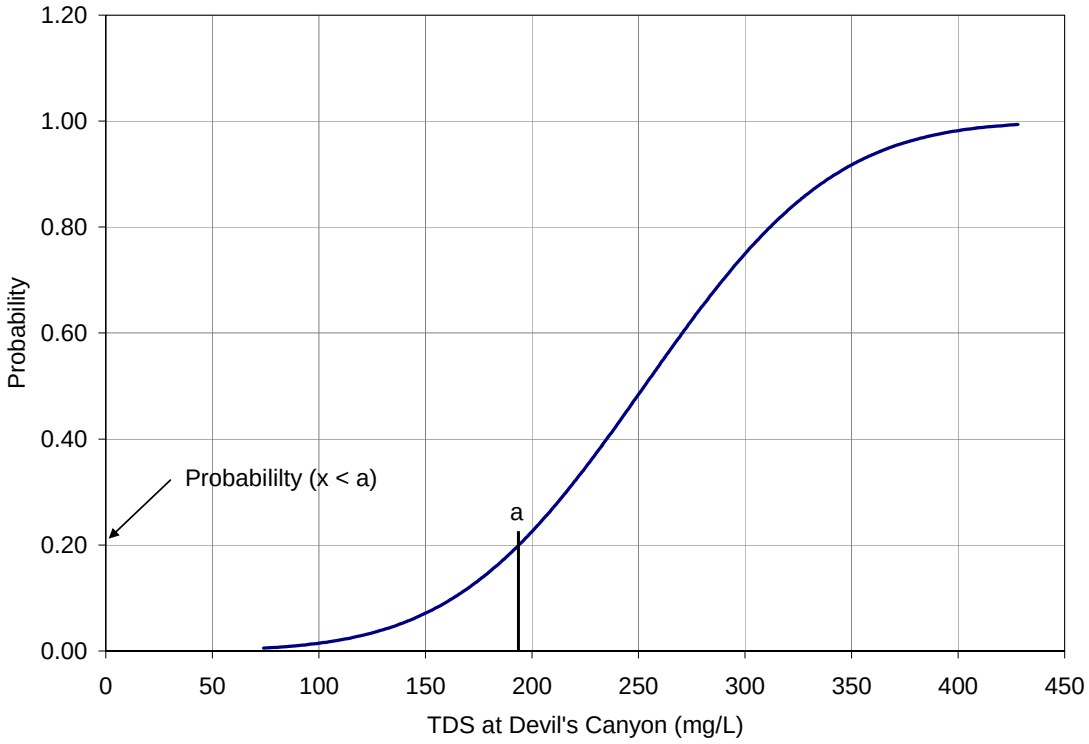


Figure 3-5
Cumulative Distribution of TDS at Devil's Canyon

4.1 SALT MITIGATION FEES FOR EACH ALTERNATIVE

Table 4-1 summarizes the allocation of salt debits for each agency, the projected salt mitigation cost, and the allocation of said cost for each alternative. Because the BCVWD overlies the majority of the BMZ and enjoys the greatest use of the basin, , it incurs the greatest allocation of future salt mitigation costs at about 87 percent, followed by Banning at eight percent, the YVWD at three percent, and the SMWC at two percent.

4.2 RECOMMENDED SALT MITIGATION FEES

It is not possible to predict with certainty the year in which the desalter will need to be built, the technology that will be used, and the cost. Nevertheless, it is absolutely certain that desalters will have to be built and that salt from the BMZ will be exported through a brine line or by trucks. The decision faced by each appropriator party to the Beaumont Judgment is whether (1) to create a mitigation fee today and require current rate payers to pay these fees for a future desalter that will be required due to the degradation they cause or (2) to wait and develop the funding when the desalters are needed and have future rate payers pay for the cost of the degradation caused by their predecessors. Future rate payers will be required to pay for and build additional desalters beyond those described herein.

The salt management problem is real, very expensive, and politically challenging. Choosing to assess current rate payers today for a future desalter seems fair since the current rate payers are causing the problem that needs to be mitigated. The liability for current rate payers is essentially limited to the capital cost of the desalter with future rate payers having to pay for the operations and maintenance. These same future rate payers will also need to pay a salt mitigation fee for additional desalter capacity.

The salt problems described in this investigation are not unique to the BMZ: they have already occurred in other Santa Ana River watershed management zones that have long agricultural legacies, such as the Arlington, Chino, Menifee, Perris, Riverside, San Jacinto and Temescal management zones. The buildup of salt in groundwater will be ubiquitous in the southwest over the next 30 years. The competition for state and federal funding to build facilities will be fierce.

For reasons of fairness and expediency, it is recommended that the Watermaster and the parties to the Beaumont Judgment develop a salt mitigation assessment that captures the projected capital cost of Alternative 1 (Table 4-1) and that the fees assessed on each appropriator party be based on actual water management behavior. If the parties manage their water supplies as suggested in their water supply plans, the early assessments would be as shown in Table 4-2.

In implementation, an entity such as the Watermaster or STWMA would collect the information necessary to compute the salt mitigation fee on an annual basis and include this fee in as a special annual assessment in the Watermaster budget. The Watermaster would collect these fees in arrears. The parties in turn would develop their own programs to collect these fees. For example, it would be fairly simple for the parties to develop a nexus between new development and salt loading and thereby incorporate a salt mitigation fee into their sewer or water connection fees. The Watermaster would invest the salt mitigation fees and hold them in trust until it was time to design and build the desalter.

4.3 NEXT STEPS

The STWMA, the Beaumont Watermaster and the appropriator parties need to it, review the findings of this report, discuss it with their governing bodies, and consider how they will fund the salt fee assessment.

Should the STWMA and the Watermaster accept the recommendation made above, they will need to develop a set of accounting rules and procedures to compute the salt fee assessment and construct an annual assessment. Presumably, these rules and procedures will take a few iterations before they are approved.

The STWMA and the Watermaster should, using these rules and procedures, determine the annual salt fee assessment for each appropriator party and include this assessment in the subsequent year's budget. For example, the STWMA and the Watermaster would assess the salt mitigation for fiscal 2007/08 in the budget for the fiscal 2009/10 for each Party. In this example, the STWMA and the Watermaster would start collecting the information required to assess the parties on July 1, 2008 for salt loading activities that occurred in fiscal 2007/08. The salt loading assessments for 2007/08 would be determined during fiscal 2008/09 and be included in the budget for 2009/10.

Periodically, the STWMA or Watermaster should re-evaluate the desalter facility assumptions used to set the annual salt mitigation fee and revise the fee based on the best current information available. The maximum time between evaluations should be five years.

Table 4-1

Summary of the Allocation of Salt Debits and Annual Salt Mitigation Fees for 2008 through 2010

Agency	Accumulation of Debits 2008/09 and 2009/10		Present Value Capital Cost for Alt 1 Future Water Supply Plan with Desalting of Recycled Water, Constructed in 2030	Annual Assessment by Watermaster
	Cumulative Debits	Share		
BCVWD	5,590	89%	$52,659,589	$2,393,618
Banning	310	5%	$2,920,299	$132,741
SMWC	90	1%	$847,829	$38,538
YVWD	260	4%	$2,449,283	$111,331
Totals	6,250	100%	$58,877,000	$2,676,227

1 – Assumes the entire capital cost is captured by assessments over the 22 year period of 2008/09 through 2029/30.

Section 5 - References

(To be included in the final report)

Appendix A

Nexus Report for the Development of a Salt Mitigation Fee to Comply with the Salt Mitigation Requirements of the 2004 Basin Plan Amendment

Appendix B

Engineering News Record Construction Cost Index

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NO FILING FEE REQUIRED PER GOVERNMENT CODE, SEC. 6103

FILED
SUPERIOR COURT OF CALIFORNIA
COUNTY OF RIVERSIDE

FEB - 4 2004

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF RIVERSIDE, RIVERSIDE COURT

SAN TIMOTEO WATERSHED MANAGEMENT AUTHORITY, a public agency,

Plaintiff,

vs.

CITY OF BANNING, a municipal corporation; BEAUMONT-CHERRY VALLEY WATER DISTRICT, an irrigation district; YUCAIPA VALLEY WATER DISTRICT, a county water district; PLANTATION ON THE LAKE LLC, a California limited liability company; SHARONDALE MESA OWNERS ASSOCIATION, an unincorporated association; SOUTH MESA MUTUAL WATER COMPANY, a mutual water company; CALIFORNIA OAK VALLEY GOLF AND RESORT LLC, a California limited liability company; OAK VALLEY PARTNERS LP, a Texas limited partnership; SOUTHERN CALIFORNIA SECTION OF THE PROFESSIONAL GOLFERS ASSOCIATION OF AMERICA, a California corporation; SUNNY-CAL EGG AND POULTRY COMPANY, a California corporation; MANHEIM, MANHEIM & BERMAN, a California General Partnership; WALTER M. BECKMAN, individually and as Trustee of the BECKMAN FAMILY TRUST dated December 11, 1990; THE ROMAN CATHOLIC BISHOP of San Bernardino,

CASE NO. RIC 389197

JUDGMENT PURSUANT TO STIPULATION ADJUDICATING GROUNDWATER RIGHTS IN THE BEAUMONT BASIN

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a California corporation; MERLIN PROPERTIES, LLC; LEONARD M. STEARNS and DOROTHY D. STEARNS, individually and as Trustees of the LEONARD M. STEARNS FAMILY TRUST OF 1991; and DOES 1 through 500, inclusive,

Defendants.

I. INTRODUCTION

1. Pleadings, Parties and Jurisdiction

The complaint herein was filed on February 20, 2003, seeking an adjudication of water rights, injunctive relief and the imposition of a physical solution. The defaults of certain defendants have been entered, and certain other defendants dismissed. Other than defendants who have been dismissed or whose defaults have been entered, all defendants have appeared herein. This Court has jurisdiction of the subject matter of this action and of the parties herein.

2. Stipulation for Judgment

Stipulation for Entry of Judgment has been filed by and on behalf of all defendants who have appeared herein.

3. Definitions

As used in this Judgment, these terms shall have the following meanings:

A. Appropriator or Appropriator Parties: the pumpers identified in Exhibit "C" attached hereto.

B. Appropriator's Production Right: consists of an Appropriator's share of Operating Yield, plus (1) any water acquired by an Appropriator from an Overlying Producer or other Appropriator pursuant to this Judgment, (2) any water

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withdrawn from the Appropriator's storage account, (3) and New Yield created by the Appropriator.

C. Appropriative Water: the amount of Safe Yield remaining after satisfaction of Overlying Water Rights.

D. Appropriative Water Right: each Appropriator's share of Appropriative Water, such share expressed as a percentage as shown on Exhibit "C".

E. Beaumont Basin or Beaumont Storage Unit: the area situated within the boundaries shown on Exhibit "A" attached hereto.

F. Conjunctive Use: the storage of water in a Groundwater Basin for use at a later time.

G. Groundwater: water beneath the surface of the ground within the zone below the water table in which soil is saturated with water.

H. Groundwater Basin: an area underlain by one or more permeable formations capable of furnishing a substantial water supply.

I. Groundwater Storage Agreement: a standard form of written agreement between the Watermaster and any Person requesting the storage of Supplemental Water.

J. Groundwater Storage Capacity: the space available in a Groundwater Basin that is not utilized for storage or regulation of Safe Yield and is reasonably available for Stored Water and Conjunctive Use.

K. Minimal Producer: any Producer who pumps 10 or fewer acre feet of Groundwater from the Beaumont Basin per year.

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L. New Yield: increases in yield in quantities greater than historical amounts from sources of supply including, but not limited to, capture of available storm flow, by means of projects constructed after February 20, 2003, as determined by the Watermaster.

M. Operating Yield: the maximum quantity of water which can be produced annually by the Appropriators from the Beaumont Basin, which quantity consists of Appropriative Water plus Temporary Surplus.

N. Overdraft: a condition wherein the total annual production from a Groundwater Basin exceeds the Safe Yield thereof.

O. Overlying Parties: the Persons listed on Exhibit "B", who are owners of land which overlies the Beaumont Basin and have exercised Overlying Water Rights to pump therefrom. Overlying Parties include successors in interest and assignees.

P. Overlying Water Rights: the quantities decreed to Overlying Parties in Column 4 of Exhibit "B" to this Judgment.

Q. Overproduction: by an Appropriator, measured by an amount equal to the Appropriator's actual annual production minus the Appropriator's Production Right. By a new overlying producer, an amount equal to what the overlying producer pumped during the year.

R. Party (Parties): any Person(s) named in this action, or who has intervened, or has become subject to this Judgment either through stipulation, trial or otherwise

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S. Person: any individual, partnership, association, corporation, governmental entity or agency, or other organization.

T. Physical Solution: the physical solution set forth in Part V of this Judgment.

U. Produce, Producing, Production, Pump or Pumping: the extraction of groundwater.

V. Producer or Pumper: any Person who extracts groundwater.

W. Recycled Water: has the meaning provided in Water Code Section 13050(n) and includes other nonpotable water for purposes of this Judgment.

X. Safe Yield: the maximum quantity of water which can be produced annually from a Groundwater Basin under a given set of conditions without causing a gradual lowering of the groundwater level leading eventually to depletion of the supply in storage. The Safe Yield of the Beaumont Basin is 8650 acre feet per year in each of the ten (10) years following entry of this Judgment.

Y. San Timoteo Watershed Management Authority: a joint powers public agency whose members are the Beaumont-Cherry Valley Water District, the City of Beaumont, the South Mesa Mutual Water Company and the Yucaipa Valley Water District.

Z. Stored Water: Supplemental Water stored in the Beaumont Basin pursuant to a Groundwater Storage Agreement with the Watermaster.

AA. Supplemental Water: water imported into the

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Beaumont Basin from outside the Beaumont Basin including, without limitation, water diverted from creeks upstream and tributary to Beaumont Basin and water which is recycled and useable within the Beaumont Basin.

BB. Temporary Surplus: the amount of groundwater that can be pumped annually in excess of Safe Yield from a Groundwater Basin necessary to create enough additional storage capacity to prevent the waste of water.

CC. Watermaster: the Person appointed by the Court to administer and enforce the Physical Solution.

4. List of Exhibits

The following exhibits are attached to this Judgment and made a part hereof:

Exhibit "A" -- "Location Map of Beaumont Basin"
Exhibit "B" -- "Overlying Owners and Their Water Rights"
Exhibit "C" -- "Appropriators and Their Water Rights"
Exhibit "D" -- "Legal Description of Lands of the Overlying Parties"
Exhibit "E" -- "Location of Overlying Producer Parcels and Boundary of the Beaumont Basin"

II. INJUNCTIONS

1. Injunction Against Unauthorized Production of Beaumont Basin Water

Each party herein is enjoined, as follows:

A. Overlying Parties: Each defendant who is an Overlying Party, and its officers, agents, employees, successors and assigns, is hereby enjoined and restrained from producing groundwater from the Beaumont Basin in any five-year period hereafter in excess of five times the share of the Safe Yield assigned to the Overlying Parties as set

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forth in Column 4 of Exhibit "B", as more fully described in the Physical Solution.

B. Appropriator Parties: Each defendant who is an Appropriator Party, and its officers, agents, employees, successors and assigns, is hereby enjoined and restrained from producing groundwater from the Beaumont Basin in any year hereafter in excess of such party's Appropriator's Production Right, except as additional annual Production may be authorized by the provisions of the Physical Solution.

2. Injunction Against Unauthorized Storage or Withdrawal of Stored Water

Each and every Party, and its officers, agents, employees, successors and assigns, is hereby enjoined and restrained from storing Supplemental Water in the Beaumont Basin for withdrawal, or causing withdrawal of water stored by that Party, except pursuant to the terms of a written Groundwater Storage Agreement with the Watermaster and in accordance with Watermaster Rules and Regulations. Any Supplemental Water stored in the Beaumont Basin, except pursuant to a Groundwater Storage Agreement, shall be deemed abandoned and not classified as Stored Water.

III. DECLARATION AND ADJUSTMENT OF RIGHTS

1. Overlying Rights

The Overlying Parties are currently exercising Overlying Water Rights in the Beaumont Basin. As shown on Exhibit "B", the aggregate Projected Maximum Production of water from the Beaumont Basin pursuant to Overlying Water Rights is 8610 acre feet and the Overlying Water Rights are individually decreed, in Column 4 of Exhibit "B", for each Overlying Party. The Overlying Parties

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shall continue to have the right to exercise their respective Overlying Water Right as set forth in Column 4 of Exhibit "B" except to the extent their respective properties receive water service from an Appropriator Party, as contemplated by Paragraph III.3 of this Judgment.

2. Appropriator's Share of Operating Yield

Each Appropriator Party's share of Operating Yield is shown on Exhibit "C". Notwithstanding any other provision of this Judgment, each Appropriator Party may use its Appropriator's Production Right anywhere within its service area.

3. Adjustment of Rights

A. The Overlying Parties shall have the right to exercise their respective Overlying Water Rights except as provided in this Paragraph 3.

B. To the extent any Overlying Party requests, and uses its Exhibit "B", Column 4 water to obtain water service from an Appropriator Party, an equivalent volume of potable groundwater shall be earmarked by the Appropriator Party which will serve the Overlying Party, up to the volume of the Overlying Water Right as reflected in Column 4 of Exhibit "B" attached hereto, for the purpose of serving the Overlying Party. The intent of this provision is to ensure that the Overlying Party is given credit towards satisfying the water availability assessment provisions of Government Code, Section 66473.7 et seq. and Water Code, Section 10910 et seq. or other similar provisions of law, equal to the amount of groundwater earmarked hereunder.

C. When an Overlying Party receives water service as

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provided for in subparagraph III.3.B the Overlying Party shall forebear the use of that volume of the Overlying Water Right earmarked by the Appropriator Party. The Appropriator Party providing such service shall have the right to produce the volume of water foregone by the Overlying Party, in addition to other rights otherwise allocated to the Appropriator Party.

D. Should the volume of the Overlying Water Right equal or exceed the volume of potable groundwater earmarked as provided in subparagraph 3.B, the Appropriator Party which will serve the Overlying Party shall (i) impose potable water charges and assessments upon the Overlying Party and its successors in interest at the rates charged to the then-existing regular customers of the Appropriator Party, and (ii) not collect from such Overlying Party any development charge that may be related to the importation of water into the Beaumont Basin. The Appropriator Party which will serve the Overlying Party pursuant to Subparagraph III.3.B shall also consider, and negotiate in good faith regarding, the provision of a meaningful credit for any pipelines, pump stations, wells or other facilities that may exist on the property to be served.

E. In the event an Overlying Party receives Recycled Water from an Appropriator Party to serve an overlying use served with groundwater, the Overlying Water Right of the Overlying Party shall not be diminished by the receipt and use of such Recycled Water. Recycled Water provided by an Appropriator Party to an Overlying Party shall satisfy the

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criteria set forth in the California Water Code including, without limitation, the criteria set forth in Water Code Sections 13550 and 13551. The Appropriator Party which will serve the Recycled Water shall have the right to use that portion of the Overlying Water Right of the Overlying Party offset by the provision of Recycled Water service pursuant to the terms of this subparagraph; provided, however, that such right of use by the Appropriator Party shall no longer be valid if the Recycled Water, provided by the Appropriator Party to the Overlying Party, does not satisfy the requirements of Sections 13550 and 13551 and the Overlying Party ceases taking delivery of such Recycled Water.

F. Nothing in this Judgment is intended to impair or adversely affect the ability of an Overlying Party to enter into annexation or development agreements with any Appropriator Party.

G. Oak Valley Partners LP ("Oak Valley") is developing its property pursuant to Specific Plans 216 and 216A adopted by the County of Riverside ("County") in May 1990, and Specific Plan 318 adopted by the County in August, 2001, (Specific Plans 216, 216A and 318 are collectively referred to as the "Specific Plans"). The future water supply needs at build-out of the Specific Plans will greatly exceed Oak Valley's Projected Maximum Production, as reflected in Exhibit "B" to the Judgment, and may be as much as 12,811 acre feet per year. Oak Valley has annexed the portion of its property now within the City of Beaumont into the Beaumont-Cherry Valley Water District ("BCVWD"), and is in

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the process of annexing the remainder portion of its property into the Yucaipa Valley Water District ("YVWD"), in order to obtain retail water service for the development of the Oak Valley property pursuant to the Specific Plans (for purposes of this subparagraph BCVWD and YVWD are collectively referred to as the "Water Districts", and individually as a "Water District"). YVWD covenants to use its best efforts to finalize the annexation of the Oak Valley property within the Calimesa City limits. Oak Valley, for itself and its successors and assigns, hereby agrees, by this stipulation and upon final annexation of its property by YVWD, to forbear from claiming any future, unexercised, overlying rights in excess of the Projected Maximum Production of Exhibit "B" of 1806 acre feet per year. As consideration for the forbearance, the Water Districts agree to amend their respective Urban Water Management Plans ("UWMP") in 2005 as follows: BCVWD agrees that 2,400 acre feet per year of projected water demand shall be included for the portion of Oak Valley to be served by BCVWD in its UWMP, and YVWD agrees to include 8,000 acre feet per year of projected water demand as a projected demand for the portion of Oak Valley to be served by YVWD in its UWMP by 2025. The Water Districts agree to use their best judgment to accurately revise this estimate to reflect the projected water demands for the UWMP prepared in 2010. Furthermore, the Water Districts further agree that, in providing water availability assessments prior to 2010, as required by Water Code §10910 and water supply verifications as required by Government Code §§66455.3 and

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66473.7, or any similar statute, and in maintaining their respective UWMP, each shall consider the foregoing respective projected water demand figures for Oak Valley as proposed water demands. The intent of the foregoing requirements is to ensure that Oak Valley is credited for the forbearance of its overlying water rights and is fully accounted for in each Water District's UWMP and overall water planning. The Water Districts' actions in performance of the foregoing planning obligations shall not create any right or entitlement to, or priority or allocation in, any particular water supply source, capacity or facility, or any right to receive water service other than by satisfying the applicable Water District's reasonable requirements relating to application for service. Nothing in this subparagraph G is intended to affect or impair the provision of earmarked water to Overlying Parties who request and obtain water service from Appropriator Parties, as set forth in subparagraph III.3.B, above.

H. Persons who would otherwise qualify as Overlying Producers based on an interest in land lying within the City of Banning's service area shall not have the rights described in this Paragraph III.3.

4. Exemption for Minimal Producers

Unless otherwise ordered by the Court, Minimal Producers are exempt from the provisions of this Judgment.

IV. CONTINUING JURISDICTION

Full jurisdiction, power and authority is retained and reserved to the Court for purposes of enabling the Court, upon

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application of any Party, by a motion noticed for at least a 30-day period (or consistent with the review procedures of Paragraph VII.6 herein, if applicable), to make such further or supplemental order or directions as may be necessary or appropriate for interim operation of the Beaumont Basin before the Physical Solution is fully operative, or for interpretation, or enforcement or carrying out of this Judgment, and to modify, amend or amplify any of the provisions of this Judgment or to add to the provisions hereof consistent with the rights herein decreed; except that the Court's jurisdiction does not extend to the redetermination of (a) Safe Yield during the first ten years of operation of the Physical Solution, and (b) the fraction of the share of Appropriative Water of each Appropriator.

V. THE PHYSICAL SOLUTION

1. Purpose and Objective

In accordance with the mandate of Section 2 of Article X of the California Constitution, the Court hereby adopts, and orders the parties to comply with, a Physical Solution. The purpose of the Physical Solution is to establish a legal and practical means for making the maximum reasonable beneficial use of the waters of Beaumont Basin, to facilitate conjunctive utilization of surface, ground and Supplemental Waters, and to satisfy the requirements of water users having rights in, or who are dependent upon, the Beaumont Basin. Such Physical Solution requires the definition of the individual rights of all Parties within the Beaumont Basin in a manner which will fairly allocate the native water supplies and which will provide for equitable sharing of costs of Supplemental Water.

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2. Need for Flexibility

The Physical Solution must provide maximum flexibility and adaptability in order that the Watermaster and the Court may be free to use existing and future technological, social, institutional and economic options. To that end, the Court's retained jurisdiction shall be utilized, where appropriate, to supplement the discretion granted herein to the Watermaster.

3. Production and Storage in Accordance With Judgment

This Judgment, and the Physical Solution decreed herein, address all Production and Storage within the Beaumont Basin. Because the Beaumont Basin is at or near a condition of Overdraft, any Production outside the framework of this Judgment and Physical Solution will potentially damage the Beaumont Basin, injure the rights of all Parties, result in the waste of water and interfere with the Physical Solution. The Watermaster shall bring an action or a motion to enjoin any Production that is not in accordance with the terms of this Judgment.

4. General Pattern of Operation

One fundamental premise of the adjudication is that all Producers shall be allowed to pump sufficient water from the Beaumont Basin to meet their respective requirements. Another fundamental premise of the adjudication is that Overlying Parties who pump no more than the amount of their Overlying Water Right as shown on Column 4 of Exhibit "B" hereto, shall not be charged for the replenishment of the Beaumont Basin. To the extent that pumping exceeds five (5) times the share of the Safe Yield assigned to an Overlying Party (Column 4 of Exhibit "B") in any five (5) consecutive years, or the share of Operating Yield

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Right of each Appropriator Party, each such Party shall provide funds to enable the Watermaster to replace such Overproduction.

5. Use of Available Groundwater Storage Capacity

A. There exists in the Beaumont Basin a substantial amount of available Groundwater Storage Capacity. Such Capacity can be reasonably used for Stored Water and Conjunctive Use and may be used subject to Watermaster regulation to prevent injury to existing Overlying and Appropriative water rights, to prevent the waste of water, and to protect the right to the use of Supplemental Water in storage and Safe Yield of the Beaumont Basin.

B. There shall be reserved for Conjunctive Use a minimum of 200,000 acre feet of Groundwater Storage Capacity in the Beaumont Basin provided that such amount may be reduced as necessary to prevent injury to existing water rights or existing uses of water within the Basin, and to prevent the waste of water. Any Person may make reasonable beneficial use of the Groundwater Storage Capacity for storage of Supplemental Water; provided, however, that no such use shall be made except pursuant to a written Groundwater Storage Agreement with the Watermaster. The allocation and use of Groundwater Storage Capacity shall have priority and preference for Producers within the Beaumont Basin over storage for export. The Watermaster may, from time-to-time, redetermine the available Groundwater Storage Capacity.

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VI. ADMINISTRATION

1. Administration and Enforcement by Watermaster

The Watermaster shall administer and enforce the provisions of this Judgment and any subsequent order or instructions of the Court.

2. Watermaster Control

The Watermaster is hereby granted discretionary powers to develop and implement a groundwater management plan and program for the Beaumont Basin, which plan shall be filed with and shall be subject to review and approval by, the Court, and which may include water quantity and quality considerations and shall reflect the provisions of this Judgment. Except for the exercise by Overlying Parties of their respective Rights described in Column 4 of Exhibit "B" hereto in accordance with the provisions of the Physical Solution, groundwater extractions and the replenishment thereof, and the storage of Supplemental Water, shall be subject to procedures established and administered by the Watermaster. Such procedures shall be subject to review by the Court upon motion by any Party.

3. Watermaster Standard of Performance

The Watermaster shall, in carrying out its duties and responsibilities herein, act in an impartial manner without favor or prejudice to any Party or purpose of use.

4. Watermaster Appointment

The Watermaster shall consist of a committee composed of persons nominated by the City of Banning, the City of Beaumont, the Beaumont-Cherry Valley Water District, the South Mesa Mutual Water Company and the Yucaipa Valley Water District, each of

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which shall have the right to nominate one representative to the Watermaster committee who shall be an employee of or consultant to the nominating agency. Each such nomination shall be made in writing, served upon the other parties to this Judgment and filed with the Court, which shall approve or reject such nomination. Each Watermaster representative shall serve until a replacement nominee is approved by the Court. The nominating agency shall have the right to nominate that representative's successor.

5. Powers and Duties of the Watermaster

Subject to the continuing supervision and control of the Court, the Watermaster shall have and may exercise the following express powers, and shall perform the following duties, together with any specific powers, authority, and duties granted or imposed elsewhere in this Judgment or hereafter ordered or authorized by the Court in the exercise of its continuing jurisdiction:

A. Rules and Regulations: The adoption of appropriate rules and regulations for the conduct of Watermaster affairs, copies of which shall be provided to all interested parties.

B. Wellhead Protection and Recharge: The identification and management of wellhead protection areas and recharge areas.

C. Well Abandonment: The administration of a well abandonment and well destruction program.

D. Well Construction: The development of minimum well construction specifications and the permitting of new wells.

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E. Mitigation of Overdraft: The mitigation of conditions of uncontrolled overdraft.

F. Replenishment: The acquisition and recharge of Supplemental Water.

G. Monitoring: The monitoring of groundwater levels, ground levels, storage, and water quality.

H. Conjunctive Use: The development and management of conjunctive-use programs.

I. Local Projects: The coordination of construction and operation, by local agencies, of recharge, storage, conservation, water recycling, extraction projects and any water resource management activity within or impacting the Beaumont Basin.

J. Land Use Plans: The review of land use plans and coordination with land use planning agencies to mitigate or eliminate activities that create a reasonable risk of groundwater contamination.

K. Acquisition of Facilities: The purchase, lease and acquisition of all necessary real and personal property, including facilities and equipment.

L. Employment of Experts and Agents: The employment or retention of such technical, clerical, administrative, engineering, accounting, legal or other specialized personnel and consultants as may be deemed appropriate. The Watermaster shall maintain records allocating the cost of such services as well as all other expenses of Watermaster administration.

M. Measuring Devices: Except as otherwise provided

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by agreement the Watermaster shall install and maintain in good operating condition, at the cost of the Watermaster, such necessary measuring devices or meters as Watermaster may deem appropriate. Such devices shall be inspected and tested as deemed necessary by the Watermaster and the cost thereof borne by the Watermaster. Meter repair and retesting will be a Producer expense.

N. Assessments: The Watermaster is empowered to levy and collect the following assessments:

(1) Annual Replenishment Assessments

The Watermaster shall levy and collect assessments in each year, in amounts sufficient to purchase replenishment water to replace Overproduction by any Party.

(2) Annual Administrative Assessments

a. Watermaster Expenses: The expenses of administration of the Physical Solution shall be categorized as either "General Watermaster Administration Expenses", or "Special Project Expenses".

i. General Watermaster Administration Expenses: shall include office rent, labor, supplies, office equipment, incidental expenses and general overhead. General Watermaster Administration Expenses shall be assessed by the Watermaster equally against the Appropriators who have appointed representatives to the Watermaster.

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ii. Special Project Expenses: shall include special engineering, economic or other studies, litigation expenses, meter testing or other major operating expenses. Each such project shall be assigned a task order number and shall be separately budgeted and accounted for. Special Project Expenses shall be allocated to the Appropriators, or portion thereof, on the basis of benefit.

O. Investment of Funds; Borrowing: The Watermaster may hold and invest Watermaster funds as authorized by law, and may borrow, from time-to-time, amounts not exceeding annual receipts.

P. Contracts: The Watermaster may enter into contracts for the performance of any of its powers.

Q. Cooperation With Other Agencies: The Watermaster may act jointly or cooperate with other local, state and federal agencies.

R. Studies: The Watermaster may undertake relevant studies of hydrologic conditions and operating aspects of the management program for the Beaumont Basin.

S. Groundwater Storage Agreements: The Watermaster shall adopt uniform rules and a standard form of agreement for the storage of Supplemental Water, provided that the activities undertaken pursuant to such agreements do not injure any Party.

T. Administration of Groundwater Storage Capacity: Except for the exercise by the Overlying Parties of their

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respective Overlying Water Rights described in Part III, above, in accordance with the provisions of the Physical Solution, all Groundwater Storage Capacity in the Beaumont Basin shall be subject to the Watermaster's rules and regulations, which regulations shall ensure that sufficient storage capacity shall be reserved for local projects. Any Person or entity may apply to the Watermaster to store water in the Beaumont Basin.

U. Accounting for Stored Water: The Watermaster shall calculate additions, extractions and losses and maintain an annual account of all stored water in the Beaumont Basin, and any losses of water supplies or Safe Yield resulting from such stored water.

V. Accounting for New Yield: Recharge of the Beaumont Basin with New Yield water shall be credited to the Party that creates the New Yield. The Watermaster shall make an independent scientific assessment of the estimated New Yield created by each proposed project. New Yield will be allocated on an annual basis, based upon monitoring data and review by the Watermaster.

W. Accounting for Acquisitions of Water Rights: The Watermaster shall maintain an accounting of acquisitions by Appropriators of water otherwise subject to Overlying Water Rights as the result of the provision of water service thereto by an Appropriator.

X. Annual Administrative Budget: The Watermaster shall prepare an annual administrative budget for public review, and shall hold a public hearing on each such budget

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prior to adoption. The budget shall be prepared in sufficient detail so as to make a proper allocation of the expenses and receipts. Expenditures within budgeted items may thereafter be made by the Watermaster as a matter of course.

Y. Redetermining the Safe Yield: The Safe Yield of the Beaumont Basin shall be redetermined at least every 10 years beginning 10 years after the date of entry of this Judgment.

6. Reports and Accounting

(a) Production Reports: Each Pumper shall periodically file, pursuant to Watermaster rules and regulations, a report showing the total production of such Pumper from each well during the preceding report period, and such additional information as the Watermaster may reasonably require.

(b) Watermaster Report and Accounting: The Watermaster shall prepare an annual report of the preceding year's operations, which shall include an audit of all assessments and Watermaster expenditures.

7. Replenishment

Supplemental Water may be obtained by the Watermaster from any source. The Watermaster shall seek the best available quality of Supplemental Water at the most reasonable cost for recharge in the Basin. Sources may include, but are not limited to:

(a) Recycled Water;

(b) State Water Project Water;

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(c) Other imported water.

Replenishment may be accomplished by any reasonable method including:

(a) Spreading and percolation, or injection of water in existing or new facilities; and/or

(b) In-lieu deliveries for direct surface use, in lieu of groundwater extraction.

VII. MISCELLANEOUS PROVISIONS

1. Designation of Address for Notice and Service

Each Party shall designate, in writing to the plaintiff, the name and address to be used for purposes of all subsequent notices and service herein, such designation to be delivered to the plaintiff within 30 days after the Judgment has been entered. The plaintiff shall, within 45 days after judgment has been entered, file the list of designees with the Court and serve the same on the Watermaster and all Parties. Such designation may be changed from time-to-time by filing a written notice of such change with the Watermaster. Any Party desiring to be relieved of receiving notices of Watermaster activity may file a waiver of notice on a form to be provided by the Watermaster. The Watermaster shall maintain, at all times, a current list of Parties to whom notices are to be sent and their addresses for purposes of service. The Watermaster shall also maintain a full current list of names and addresses of all Parties or their successors, as filed herein. Copies of such lists shall be available to any Person. If no designation is made, a Party's designee shall be deemed to be, in order of priority: (i) the Party's attorney of record; or (ii) if the Party does not have an

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attorney of record, the Party itself at the address on the Watermaster list.

2. Intervention After Judgment

Any Person who is neither a Party to this Judgment nor a successor or assignee of a Party to this Judgment may seek to become a party to this Judgment by filing a petition in intervention.

3. Interference with Pumping

Nothing in this judgment shall be deemed to prevent any party from seeking judicial relief against any other party whose pumping activities constitute an unreasonable interference with the complaining party's ability to extract groundwater.

4. Successors and Assigns

This Judgment and all provisions herein shall be binding on and shall inure to the benefit of the heirs, executors, administrators, successors and assigns of the parties hereto.

5. Severability

The provisions of this Judgment are severable. If any provision of this Judgment is held by the Court to be illegal, invalid or unenforceable, that provision shall be excised from the Judgment. The remainder of the terms of the Judgment shall remain in full force and effect and shall in no way be affected, impaired or invalidated by such excision. This Judgment shall be reformed to add, in lieu of the excised provision, a provision as similar in terms to the excised provision as may be possible and be legal, valid and enforceable.

6. Review Procedures

Any action, decision, rule or procedure of the Watermaster

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pursuant to this Judgment shall be subject to review by the Court on its own motion or on timely motion by any Party, as follows:

A. Effective Date of Watermaster Action: Any order, decision or action of the Watermaster pursuant to this Judgment on noticed specific agenda items shall be deemed to have occurred on the date of the order, decision or action.

B. Notice of Motion: Any Party may, by a regularly-noticed motion, petition the Court for review of the Watermaster's action or decision pursuant to this Judgment. The motion shall be deemed to be filed when a copy, conformed as filed with the Court, has been delivered to the Watermaster, together with the service fee established by the Watermaster sufficient to cover the cost to photocopy and mail the motion to each Party. The Watermaster shall prepare copies and mail a copy of the motion to each Party or its designee according to the official service list which shall be maintained by the Watermaster according to Part VII, paragraph 1, above. A Party's obligation to serve the notice of a motion upon the Parties is deemed to be satisfied by filing the motion as provided herein. Unless ordered by the Court, any petition shall not operate to stay the effect of any Watermaster action or decision which is challenged.

C. Time for Motion: A motion to review any Watermaster action or decision shall be filed within 90 days after such Watermaster action or decision, except that motions to review Watermaster assessments hereunder shall be filed within 30 days of mailing of notice of the assessment.

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D. De Novo Nature of Proceeding: Upon filing of a petition to review a Watermaster action, the Watermaster shall notify the Parties of a date when the Court will take evidence and hear argument. The Court's review shall be de novo and the Watermaster decision or action shall have no evidentiary weight in such proceeding.

E. Decision: The decision of the Court in such proceedings shall be an appealable Supplemental Order in this case. When the same is final, it shall be binding upon the Watermaster and the Parties.

Dated: FEB - 4 2004

GARY TRANBARGER

JUDGE OF THE SUPERIOR COURT

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RULES AND REGULATIONS

OF THE

BEAUMONT BASIN WATERMASTER

Adopted: June 8, 2004
Amended: February 7, 2006

BEAUMONT BASIN WATERMASTER
Rules and Regulations

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SECTION 1
GENERAL PROVISIONS

1.0 In General. In general, Watermaster will strive to accomplish as many of its specific duties as is feasible and practical by entering into agreements with the Parties for the performance of those duties (e.g. meter installation, testing and maintenance, meter reading, water level measurement, etc). Nothing herein shall conflict with the terms of the Judgment.

1.1 Definitions. The terms used in these Rules and Regulations shall have the same meanings as set forth in Section 1, Paragraph 3 of the Judgment, unless the context shall clearly indicate a different meaning. The following additional terms are defined for the purposes of these Rules and Regulations:

(a) "**Annual or Year**" means a fiscal year, July 1 through June 30 following, unless the context shall clearly indicate a different meaning.

(b) "**Judgment**" means the Judgment Pursuant to Stipulation Adjudicating Groundwater Rights in the Beaumont Basin dated February 4, 2004 in the Riverside Superior Court, Case No. 389197.

(c) "**Salt Credits**" means an assignable credit that may be granted by the Regional Water Quality Control Board and computed by the Watermaster from activities that result from the removal of salt from the Basin, or that result in a decrease in the amount of salt entering the Basin. Salt Credits may be used by Appropriators to facilitate implementation of the Beaumont Basin Water Resources Management Plan and as an offset against potential impacts associated with discrete projects. This does not preclude development of Salt credits by Appropriators implementing projects through agreements with their users.

(d) "**Watermaster**" and "Watermaster Committee" means the 5-member committee composed of persons nominated by the City of Banning, the City of Beaumont, the Beaumont-Cherry Valley Water District, the South Mesa Mutual Water Company and the Yucaipa Valley Water District, each of whom shall have the right to nominate one representative who shall be an employee of or consultant to the nominating agency.

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SECTION 2
ADMINISTRATION

2.0 **Principal Office**. The principal office of the Watermaster shall be:

Office of the Watermaster Secretary
C/O Beaumont-Cherry Valley Water District
560 Magnolia Avenue,
Beaumont, CA 92223

or at such other location as may be designed from time-to-time by the Watermaster by resolution.

2.1 **Records**. All records of the Watermaster shall be available for public inspection pursuant to the California Public Records Act, except as otherwise provided by law. Copies of such records may be obtained upon payment of the cost of duplication.

2.2 **Meetings of the Watermaster**. All meetings of the Watermaster shall be open in public and conducted in accordance with the provisions of the California Open Meeting Law (Brown Act).

2.3 **Quorum**. A majority of the 5-member committee acting as the Watermaster shall constitute a quorum for the transaction of business.

2.4 **Voting Procedures**. Only action by affirmative vote of a majority of the members of the Watermaster Committee shall be effective.

2.5 **Employment of Experts and Agents**. The Watermaster may employ or retain such administrative, engineering, geologic, accounting, legal or other specialized personnel and consultants as it may deem appropriate.

2.6 **Acquisition of Facilities**. The Watermaster may purchase, lease and acquire all necessary real and personal property, including facilities and equipment.

2.7 **Investment of Funds**. The Watermaster may hold and invest all Watermaster funds in investments authorized from time-to-time for public agencies of the State of California, pursuant to a Statement of Investment Policy adopted by the Watermaster Committee.

2.8 **Borrowing**. The Watermaster may borrow, from time-to-time, amounts not exceeding annual receipts (payments on funds borrowed to implement Watermaster projects and programs must be included in Watermaster assessments such that they are part of Watermaster's annual receipts).

2.9 **Contracts**. The Watermaster may enter into contracts and agreements for the performance of any of its powers, and may act jointly or cooperate with agencies of the United States, the State of California, or any political subdivisions, municipalities, special districts or any person.

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2.10 **Budgets**. The Watermaster shall prepare a proposed annual administrative budget for the upcoming fiscal year for Watermaster review. The Watermaster shall hold a public hearing on each such budget prior to adoption. Budgets shall be prepared in sufficient detail so as to make a proper allocation of the expenses and receipts. The adopted budget shall be funded in the upcoming year through assessments made pursuant to the Judgment. Expenditures within budgeted items may thereafter be made by the Watermaster as a matter of course (Judgment p.22, lines 3-5).

2.11 **Assessments**. Pursuant to the Judgment, Watermaster is empowered to levy and collect the following assessments: Annual Replenishment Assessments and Annual Administrative Assessments.

(a) **Annual Replenishment Assessments**. The Watermaster shall levy and collect assessments in each year, in amounts sufficient to purchase replenishment water to replace Overproduction by any Party from the prior fiscal year. Replenishment assessments shall be collected not later than October 1 of each year. Under no circumstances shall Overlying Parties be required to pay assessments for pumping in an amount up to that set forth in column 4 of Exhibit B pf the Judgment, subject to Section III of the Judgment.

(b) **Annual Administrative Assessments**. Annually, not later than the June meeting of the Watermaster, a General Administrative Budget shall be adopted for the ensuing fiscal year for the purpose of funding General Administration Watermaster Expenses. The General Watermaster Administration Expenses shall include office rent, labor, supplies, office equipment, incidental expenses and general overhead. General Watermaster Administration Expenses will be assessed equally among the Appropriators who have appointed representatives to the Watermaster (Judgment, p. 19, lines 21-27).

(c) **Special Project Assessments**. Special Project Assessments will be levied to cover special project expenses including: special engineering, economic or other studies, litigation expenses, meter testing or other major operating expenses. Each such project shall be assigned a task order number and shall be separately budgeted and accounted for. Special Project Expenses shall be allocated to the Appropriators, or portion thereof, on the basis of benefit. This may be accomplished through the identification and implementation of Special Project Committees. A Specific Project Committee may involve a specific Party or any group of Parties, provided that no Party shall be involved without its approval (Judgment, p. 20, lines 1-9). Special Project Assessments shall be invoiced upon approval of a budget and a scope of work for a Special Project by Project Committee.

(d) **Supplemental Assessments**. Supplemental Assessments may be levied based on incurring unbudgeted or unforeseen expenses as approved by Watermaster. Examples include Special Project expenses for litigation in which Watermaster has taken action to participate. All Supplemental Assessments shall reference the Watermaster action authorizing same and be invoiced within one week of the Watermaster action.

(e) **Assessment Procedure**. Assessments shall be levied and collected as follows:

(f) **Notice of Assessment**. The Watermaster shall give written notice of all applicable assessments to each producer in the form of an invoice.

(i) **Payment**. Each assessment shall be payable on or before thirty (30) days after the date of invoice, and shall be the primary obligation of the party or successor owning the water production facility at the time written notice of assessment is given, even though prior arrangement for payment by others has been made in writing and filed with the Watermaster.

(ii) **Delinquency**. Any delinquent assessment shall incur a late charge of 10% per annum (or such greater rate as shall equal the average current cost of borrowed funds to the Watermaster) from the due date thereof.

(iii) **Assessment Adjustments**. The Watermaster shall make assessment adjustments as necessary for the reporting period as either a credit or a debit in the next occurring assessment period unless otherwise reasonably decided by the Watermaster.

(iv) **Collection of Delinquent Assessments**. The Watermaster may bring suit in a Court having jurisdiction against any Producer for the collection of any delinquent assessments and interest thereon. The Court, in addition to any delinquent assessments, may award interest and reasonable costs including attorneys' fees.

(g) **Salt Credits**. Watermaster may establish a method of calculating salt credits in the future as part of a conjunctive use program or as part of the maximum benefit objectives demonstration program for discrete projects.

2.12 Annual Report. A draft annual report shall be prepared by the August Watermaster meeting and a final report shall be prepared by the September meeting of each year. At a minimum, the annual report will describe Watermaster's operations, assessments and expenditures, and a review of Watermaster activities. The annual report shall also include a summary report by the Watermaster engineer, at a minimum, describing and updating any basin condition information collected or analyzed and a current active party list.

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2.13 Basin Condition Report. The Watermaster shall prepare, at least once every two years, a "state of the groundwater basin" report including an update on the status of monitoring, storage and water quality.

2.14 Interventions. Any Person who is neither a Party to the Judgment nor a successor or assignee of a Party to the Judgment may seek to become a party to the Judgment by filing a petition in intervention. Watermaster will provide a standard form for interventions should the need arise, and will report on any such interventions in its annual report. Interveners shall have no water rights under the Judgment (unless acquired from an Appropriator Party).

2.15 Notice and Waiver of Notice. Pursuant to the Judgment, each Party shall designate, in writing, the name and address to be used for purposes of all subsequent notices and services under the Judgment. Such designation may be changed by filing a written notice with the Watermaster. Any Party desiring to be relieved of receiving notices of Watermaster activity may file a waiver of notice on a form to be provided by the Watermaster. Watermaster staff shall maintain, at all times, a current list of Parties to whom notices are to be sent and their addresses for the purposes of service as well as a current list of the names and addresses of all parties or their successors and assigns. Copies of such lists shall be available to any Person.

2.16 Watermaster Alternates. To ensure consistency in the administration of the affairs of the Watermaster, the members of the Watermaster Committee will endeavor to attend all meetings of the Watermaster. However, from time-to-time the press of business may prevent such regular attendance. Therefore, the members of the Watermaster agencies may appoint an alternate member to the Watermaster Committee who, in the absence of the regular member, shall, if present, participate in a meeting of the Watermaster the same as if the alternate member were a regular member of the Watermaster Committee. Each alternate member must hold a senior management position within the organization of the appointing Watermaster member agency.

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SECTION 3
MONITORING

3.0 **Scope**. The Watermaster will carry out the monitoring activities described in the Beaumont Basin Management Plan and such policies and procedures as may be deemed necessary by the Watermaster. Any such policies and procedures shall be adopted at regular or special meetings of the Watermaster and reported in the Watermaster's annual report.

3.1 **Measuring Devices**. Groundwater production shall be monitored by measuring devices and/or meters (hereinafter collectively, "meter" or "meters"), as follows:

(a) **Meter Installation**. Except as otherwise provided by agreement, such necessary meters as Watermaster may deem appropriate shall be installed as follows:

(i) **New Wells**:

(1) **Appropriator Wells**. A meter shall be installed on each new Appropriator well by the Appropriator and at the Appropriator's expense concurrently with the installation of the pump.

(2) **Overlyer Wells**. A meter shall be installed on each new Overlyer well by the Watermaster and at the Watermaster's expense concurrently with the installation of the pump.

(ii) **Existing Wells**. Meters shall be installed on existing wells as soon as practicable by the Watermaster at the Watermaster's expense.

(b) **Meter Maintenance**. The Watermaster shall, at its expense, perform routine maintenance on all well meters in the Beaumont Basin.

(c) **Inspection, Testing, Repair and Retesting**. Meters shall be inspected and tested as deemed necessary by the Watermaster and the cost thereof borne by the Watermaster. The Watermaster may contract for a meter testing service or with an Appropriator for meter inspection and/or testing. Any Producer may request an evaluation of any or all of its water meters at any time; provided, however, the Watermaster shall only pay for tests initiated by the Watermaster. Meter repair and retesting will be a Producer expense (Judgment, pp. 18-19, lines 28 – 7).

3.2 **Reporting By Producers**. Each Producer producing in excess of 10 acre-feet per year shall file with the Watermaster on forms provided therefore, a monthly report of its total water production during the preceding calendar month, together with such additional information as the Watermaster may reasonably require (including power use records, if unmetered). The report shall be due on the fifteenth (15th) day of the month next succeeding the end of each respective month. Appropriators shall report groundwater levels and Overlying Owner

production along with such additional information as may be necessary to complete the Watermaster monitoring program through Agreements with the Watermaster. Producers producing 10 acre-feet or less per year shall file an annual report of their total water production during the preceding fiscal year by the 15th of July of each year on forms provided therefore.

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SECTION 4
OPERATING YIELD, SAFE YIELD AND NEW YIELD

4.0 Redetermination of Operating Yield. The Operating Yield of the Beaumont Basin shall be redetermined annually by the Watermaster.

4.1 Redetermination of Safe Yield. The Safe Yield of the Beaumont Basin shall be redetermined at least every ten (10) years beginning 10 years after the date of entry of the Judgment (Judgment p. 22, lines 6-9).

4.2 New Yield. In order to encourage maximization of Basin water under the Physical Solution, New Yield shall be accounted for by the Watermaster in interim periods between re-determinations of Safe Yield.

(a) New Yield includes proven increases in yield in quantities greater than the historical level of contribution from certain recharge sources may result from changed conditions including, but not limited to, the increased capture of rising water, increased capture of available stormflow, and other management activities that occur after February 20, 2003, as determined by Watermaster (Judgment, p. 4, lines 1-5). These increases are considered New Yield.

(b) Recharge with new locally-generated water shall be credited as New Yield to the Party that creates the new recharge. The Watermaster shall make an independent scientific assessment of the estimated New Yield to be created by each proposed project based upon monitoring data. The cost of the Watermaster scientific assessment of the New Yield shall be borne by the Party applying to create it.

(c) New Yield shall be allocated on an annual basis, based upon monitoring data and review by the Watermaster. (Judgment, p. 21, lines 14-20).

4.3 **Losses or Spills from the Basin**. Water in Storage may be subject to losses. The Watermaster shall determine if losses are occurring and report its findings in the first Basin Condition Report. If losses are occurring, Watermaster shall determine how much water is being lost. Supplemental Water stored pursuant to Groundwater Storage Agreements shall be lost prior to Basin water (i.e., unused operating safe yield) held in Storage by a Party to the Judgment.

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SECTION 5
RECHARGE

5.0 In General. All Groundwater Recharge activities in the Beaumont Basin shall be subject to the Watermaster Rules and Regulations

(a) The Watermaster shall calculate additions, extractions and losses, and maintain an annual account of all recharged water in the Beaumont Basin, and any losses of water supplies or Safe Yield resulting from such recharged water (p. 21, lines 9-13).

(b) The owners of existing publicly-owned recharge facilities shall cooperate with the Watermaster to expand, improve and/or preserve recharge facilities. The Watermaster shall cooperate with appropriate entities to construct and operate new recharge facilities.

(c) The Watermaster shall account for all sources of recharge and shall provide an annual accounting of the amount of recharge and the location of the specific types of recharge.

(d) The Watermaster may determine to prepare a Recharge Master Plan, which Plan shall be periodically updated to account for changed conditions.

(e) The Watermaster may arrange, facilitate and provide for recharge by entering into contracts with appropriate persons, who may provide facilities and operations for the physical recharge of water.

5.1 Application to Recharge Supplemental or New Yield Water. All recharge of Supplemental or New Yield Water shall be subject to Watermaster approval obtained by an application made to the Watermaster to protect the integrity of the Beaumont Basin.

5.2 Notice of Pending Applications. Upon receipt of an application, the Watermaster staff shall prepare a written summary and analysis of each such application. The application, along with the written summary and analysis shall be distributed to the Producers and any other interested parties not less than 21 days prior to the date the Watermaster is scheduled to consider and take action on the pending application. The cost of the summary and analysis of each application shall be borne by the applicant.

5.3 Watermaster Investigations of Applications. The Watermaster may, in its discretion, cause an investigation of the subject of a pending application. Any party to the proceeding may be requested to confer and cooperate with the Watermaster's staff and consultants, and to provide such additional information and data as may be reasonably required to complete the investigation.

5.4 Sources of Supplemental Water. Supplemental Water may be obtained by the Watermaster from any available source. The Watermaster shall, however, seek to obtain the

best available quality of Supplemental Water at the most reasonable cost for recharge. Available sources may include, but are not limited to:

(a) Maximum beneficial use of Recycled Water, which shall be given a high priority by the Watermaster;

(b) State Project Water;

(c) Local Imported Water through facilities and methods for importation of surface and groundwater supplies from adjacent basins and watersheds;

(d) Available supplies of Metropolitan Water District;

(e) Stormwater recharge projects.

(f) Other Imported Water.

5.5 Method of Replenishment. The Watermaster may accomplish replenishment by any reasonable method, including spreading and percolation, injection of water in existing or new facilities, in-lieu delivery arrangements and acquisition of unproduced water.

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SECTION 6
STORAGE

6.0 In General. A substantial amount of available groundwater storage capacity exists that is not used for storage or regulation of basin waters. It is essential that the use of storage capacity be undertaken only under Watermaster control and regulation so as to protect the integrity of the Beaumont Basin. The Watermaster shall exercise regulation and control of storage primarily through the execution of Groundwater Storage Agreements.

6.1 Relationship Between Recapture and Storage. Recapture of water held in a storage account will generally be approved by the Watermaster as a component of and coincident with a Groundwater Storage Agreement. However, the Watermaster may approve a Groundwater Storage Agreement where the plan for recovery is not yet known. In such cases, the applicant for a Groundwater Storage Agreement may request Watermaster approval of the Agreement and subsequently submit and process an independent Application for Recapture to the Watermaster.

6.2 Storage of Water. Storing Supplemental Water for withdrawal, or causing withdrawal of water unused and stored in prior years, shall be subject to the terms of a Groundwater Storage Agreement with the Watermaster. Any Water recharged by any person is deemed abandoned and shall not be considered water stored except pursuant to these Rules and Regulations and a Groundwater Storage Agreement.

6.3 Application for Storage of Water. The Watermaster will ensure that any Person, including, but not limited to, the State of California and the Department of Water Resources, shall make an application to the Watermaster to store and recover water as provided herein. The Watermaster shall also ensure that sufficient storage capacity shall be reserved for local projects implemented by the Appropriators.

6.4 Contents of Groundwater Storage Agreements. Each Groundwater Storage Agreement shall include, but not be limited to, the following components:

(a) The quantities and term of the storage right, which shall specifically exclude credit for any return flows;

(b) A statement of the priorities of the storage right as against overlying, Safe Yield uses, and other storage rights;

(c) The projected delivery rates, together with projected schedules and procedures for spreading, injection or in-lieu deliveries of Supplemental Water for direct use;

(d) The calculation of storage water losses and annual accounting for water in storage; and

(e) The establishment and administration of withdrawal schedules, locations and methods.

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6.5 Notice of Pending Applications. Upon receipt of an application, the Watermaster staff shall prepare a written summary and analysis of each such application. The application along with the written summary and analysis shall be distributed to the Producers and any other interested parties not less that 21 days prior to the date the Watermaster is scheduled to consider and take action on the pending application. The cost of the written summary and analysis of each such application shall be borne by the applicant.

6.6 Watermaster Investigations of Applications. The Watermaster may, in its discretion, cause an investigation of the subject of a pending application. Any party to the proceeding may be requested to confer and cooperate with the Watermaster's staff and consultants, and to provide such additional information and data as may be reasonably required to complete the investigation.

6.7 Accounting for Water Stored. The Watermaster shall calculate additions, extractions and losses of all water stored and any losses of water supplies or Safe Yield resulting from such water stored, and keep and maintain for public record an annual accounting thereof.

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SECTION 7
ADJUSTMENTS OF RIGHTS

7.0 In General. Overlying Parties shall have the right to exercise their respective Overlying Water Rights except to the extent provided in Section III, Paragraph 3, entitled Adjustment of Rights, of the Judgment. (Judgment, p. 8, lines 12-14).

(a) To the extent any Overlying Party requests, and uses its adjudicated water rights to obtain water service from an Appropriator Party, an equivalent volume of potable groundwater shall be earmarked by the Appropriator Party which will serve the Overlying Party, up to the volume of the Overlying Water Rights as reflected in Column 4 of Exhibit "B" of the Judgment, for the purpose of serving the Overlying Party. (Judgment, p. 8, lines 15-27).

(b) When an Overlying Party receives water service as provided for in paragraph 7(a), the Overlying Party shall forebear the use of that volume of the Overlying Water Right earmarked by the Appropriator Party. The Appropriator Party providing such service shall have the right to produce the volume of water foregone by the Overlying Party, in addition to other rights otherwise allocated to the Appropriator Party. (Judgment, p. 8, line 28 – p. 9, line 7).

7.1 Notice of Adjustment of Rights. The Overlying Pumper and Appropriator shall complete a Notice of Adjustment of Rights (Form 5) and file it with the Watermaster within 30 days of entering into a Service Agreement.

7.2 Accounting for Adjustment of Rights. Watermaster staff will maintain an accounting of all adjustments of rights based on actual meter readings or other measuring devices. The accounting will be presented in the Annual Report and other relevant Watermaster reports as appropriate.

7.3 Transfer of Water. Any Appropriator may transfer all or any portion of its Appropriator's Production Right or Operating Yield that is surplus to its needs to another Apppropriator in accordance with these Rules and Regulations.

7.4 Watermaster Supervision and Approval. Any proposed transfer shall first be approved by the Watermaster and implemented under Watermaster supervision.

7.5 Marketing Procedures. An Appropriator wishing to transfer all or any portion of its Appropriator's Production Right may do so in any one of the following three ways:

(a) The Appropriator may undertake its own marketing efforts and negotiate an agreement with one or more Appropriators; or

(b) The Appropriator may request assistance from the Watermaster to conduct a sealed bidding process among the Appropriators and award a contract to the highest bidder; or

(c) The Appropriator may request the Watermaster to allocate the total amount of water to be transferred to the accounts of the other Appropriators in proportion to their respective shares of the Operating Safe Yield and assess each of the Appropriators for the water at a cost not to exceed a Watermaster-approved Groundwater Replenishment Rate.

7.6 Disposition of Revenue. Any revenue generated from the transfer of surplus water shall be used first to reduce or pay off delinquent Annual Administrative Assessments and Annual Replenishment Assessments, if any, and the balance shall be paid over to the transferring party. At the transferring party's option, the balance may be credited to future Assessments.

7.7 Accounting for Transfers. The Watermaster shall maintain an accounting of all transfers, and such accounting shall be included in the Annual Report and other relevant Watermaster reports as appropriate.

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SECTION 8
COORDINATION WITH THE SAN GORGONIO PASS WATER AGENCY AND OTHER AGENCIES

8.0 **In General**. The San Gorgonio Pass Water Agency ("Agency") was established by the California Water Uncodified Act No. 9099. The Agency has contracted with the California Department of Water Resources to import as much as 17,300 acre feet of water from the California State Water Project. As of 2004, the Agency is importing, at its sole cost and expense, up to 2,000 acre feet of State Water Project water per year for recharge in the Beaumont Basin.

8.1 **Potential Conflict**. The Agency has expressed concern that the exercise of its powers may conflict with the powers of the Watermaster, a concern that the Watermaster has acknowledged.

8.2 **Coordination of Water Resources Management Activities**. The Judgment provides that any Person may make reasonable beneficial use of the Groundwater Storage Capacity for the storage of Supplemental Water; provided however that no such use shall be made except pursuant to a written Groundwater Storage Agreement with the Watermaster. (Judgment, p. 15, lines 17-21). Therefore, in order to minimize the potential for conflict, the Watermaster is authorized to coordinate with the Agency, or other agencies, such reasonable Groundwater Storage Agreements. Each such Agreement shall address (for example) whether the management activity that is the subject matter of the Agreement will increase or deplete water supplies, enhance or impair water quality, is engineeringly feasible, and whether it will provide the greatest public good with the least private injury.

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SECTION 9
REVIEW PROCEDURES

9.0 In General. Nothing in the Judgment or these rules and regulations shall be deemed to prevent any party from seeking judicial relief against any other party whose pumping activities constitute an unreasonable interference with the complaining party's ability to extract groundwater. Any and all disputes between and among the Producers and/or the Watermaster shall be addressed expeditiously and resolved, if possible, amicably, in accordance with the following procedures.

9.1 Complaints or Contesting an Application. Any Producer or interested person may file a written complaint with the Watermaster concerning matters other than applications to recharge (Section 5), or store (Section 6), or contest an application to recharge or store water. The written complaint or objection shall describe the basis for the complaint or objection and the underlying facts and circumstances. Such complaint or objection shall be filed with the Watermaster at least fourteen (14) days before the item is to be agendized for the Watermaster Committee. The Watermaster staff shall provide notice of the complaint or objection to all interested parties.

(a) **Answering the Complaint or Objection.** At the discretion of the affected Party , a written answer to a complaint or objection may be filed at the time it is presented to the Watermaster Committee for consideration. In lieu of immediately answering the complaint or objection, the Party may request a reference to a two-member subcommittee of the Watermaster for review, discussion, and potential resolution prior to the item being agendized for Watermaster consideration

(b) **Continuance for Good Cause.** An affected Party may also request a continuance to a subsequent Watermaster meeting (without reference to a subcommittee) and the request may be granted by the Watermaster's staff where good cause exists.

(c) **Investigation by Watermaster.** The Watermaster may, in its discretion, cause an investigation of the subject matter of the complaint. Any party to the proceeding may be requested to confer and cooperate with the Watermaster, its staff or consultants to carry out such investigations, and to provide such information and data as may be reasonably required.

(d) **Uncontested Applications.** The Watermaster shall consider and may approve or deny any uncontested application to recharge or store water at a regularly-scheduled meeting of the Watermaster. Where good cause appears, the Watermaster may also, conditionally approve, or continue an uncontested application to a future meeting. If the Watermaster staff recommendation to the Watermaster is to deny an application, it shall first be referred to a two-member subcommittee of the Watermaster for review, discussion and potential resolution with the applicant.

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(e) **Judicial Review**. Any action, decision, rule or procedure of the Watermaster shall be subject to review by the Court on its own motion or on timely motion by any Party as follows:

(i) **Effective Date of Watermaster Action**: Any order, decision or action of the Watermaster pursuant to the Judgment or these Rules and Regulations on noticed specific agenda items shall be deemed to have occurred on the date of the order, decision or action.

(ii) **Notice of Motion for Judicial Review**: Any Party May, by a regularly noticed motion, petition the Court for review within 90 days of the action or decision by Watermaster, except motions for review of assessments under the Judgment shall be filed within 30 days of mailing of the notice of the assessment. The motion shall be deemed to be filed and served when a copy, conformed as filed with the Court, has been delivered to the Watermaster staff, together with a service fee sufficient to cover the cost of photocopying and mailing the motion to each Party. The Watermaster staff shall prepare the copies and mail a copy of the motion to each Party or its designee according to the official service list that shall be maintained by the Watermaster staff pursuant to the Judgment. Unless ordered by the Court, any petition shall not operate to stay the effect of any Watermaster action or decision which is challenged.

(iii) **De Novo Nature of Proceeding**: Upon filing of a petition to review a Watermaster action, the Watermaster shall notify the Parties of a date when the Court will take evidence and hear argument. The Court's review shall be de novo and the Watermaster decision or action shall have no evidentiary weight in such proceeding.

(iv) **Decision**: The decision of the Court in such proceedings shall be an appealable Supplemental Order in this case. When it is final, it shall be binding upon the Watermaster and the Parties.

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SECTION 10
WATERMASTER FORMS

10.1 In General. In order to facilitate and expedite the performance of its duties, the Watermaster may, from time-to-time, develop standardized forms for the transaction of business. Such forms shall be adopted by minute action of the Watermaster Board.

10.2 Approved Forms. The following standardized forms shall be used, except when good cause exists for the use of a customized format:

(1) Application for Groundwater Storage Agreement.

(2) Groundwater Storage Agreement.

(3) Application for Recharge.

(4) Application (or Amendment to Application) to Recapture Water in Storage.

(5) Notice to Adjust Rights of an Overlying Party due to Proposed Provision of Water Service by an Appropriator.

(6) Request for Notice or Waiver of Notice and Designation of Address for Notice and Service.

(7) Transfer of Water Between Appropriators.

(8) Transfer of Right to Recapture Water in Storage Between Appropriators.

- END OF RULES AND REGULATIONS -