CALL OF SPECIAL MEETING
OF THE BEAUMONT-CHERRY VALLEY DISTRICT
BOARD OF DIRECTORS

The undersigned, Ryan Woll, President of the Beaumont-Cherry Valley Water District, hereby calls a Special Meeting of the Board of Directors to be held Wednesday, April 10, 2013 immediately after the Regular Board Meeting. The meeting will be held at the District's Administrative Offices located at 560 Magnolia Avenue, Beaumont, California 92223.

The agenda for said meeting is attached.

Dated: Thursday, April 4, 2013

Melissa Bengell FOR
Ryan Woll, President of the
Board of Directors of the
Beaumont-Cherry Valley Water District

BEAUMONT-CHERRY VALLEY WATER DISTRICT
AGENDA
BOARD OF DIRECTORS WORKSHOP MEETING
560 Magnolia Avenue, Beaumont, CA 92223
Wednesday, April 10th, 2013
Immediately After Regular Board Meeting

Call to Order, President Woll

Roll Call

Public Input

PUBLIC COMMENT: At this time, any person may address the Board of Directors on matters within its jurisdiction which is not on the agenda. However, any non-agenda matters that require action will be referred to Staff for a report and possible action at a subsequent meeting. To provide comments on specific agenda items, please complete a speaker's request form and provide the completed form to the Board Secretary prior to the board meeting. Please limit your comments to three minutes. Sharing or passing time to another speaker is not permitted.

ACTION ITEMS

1. **Workshop to Discuss Preliminary Draft 2013 Urban Water Management Plan Update**

ADJOURNMENT

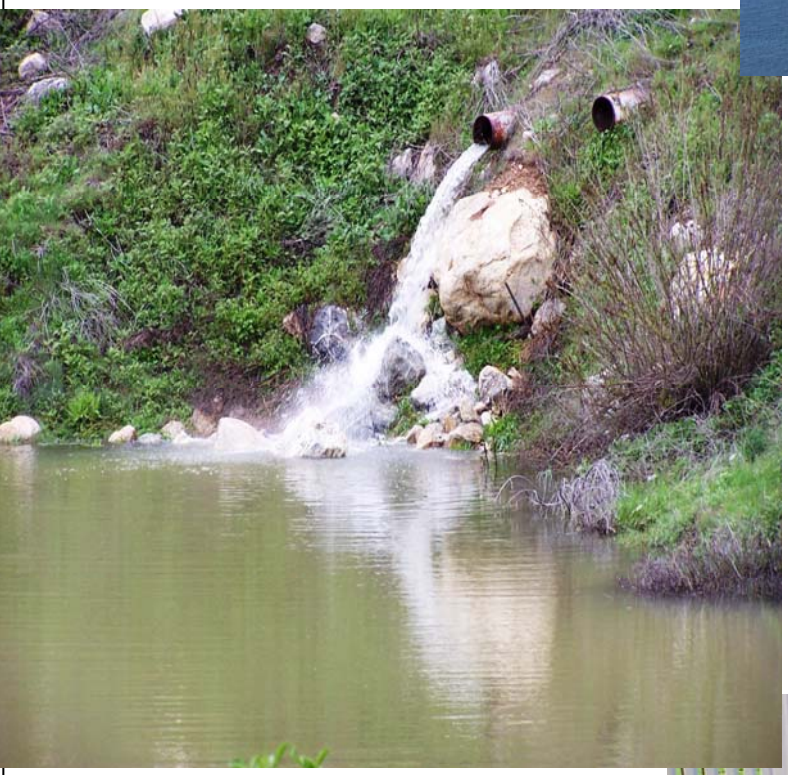
AVAILABILITY OF AGENDA MATERIALS - Agenda exhibits and other writings that are disclosable public records distributed to all or a majority of the members of the Beaumont-Cherry Valley Water District Board of Directors in connection with a matter subject to discussion or consideration at an open meeting of the Board of Directors are available for public inspection in the District's office, at 560 Magnolia Avenue, Beaumont, California ("District Office") If such writings are distributed to members of the Board less than 72 hours prior to the meeting, they will be available from the District's Board Secretary of the District Office at the same time as they are distributed to Board Members, except that if such writings are distributed one hour prior to, or during the meeting, they can be made available from the District's Board Secretary in the Board Room of the District's Office.

REVISIONS TO THE AGENDA -In accordance with §54954.2(a) of the Government Code (Brown Act), revisions to this Agenda may be made up to 72 hours before the Board Meeting, if necessary, after mailings are completed. Interested persons wishing to receive a copy of the set Agenda may pick one up at the District's Main Office, located at 560 Magnolia Avenue, Beaumont, California, up to 72 hours prior to the Board Meeting.

REQUIREMENTS RE: DISABLED ACCESS - In accordance with §54954.2(a), requests for a disability related modification or accommodation, including auxiliary aids or services, in order to attend or participate in a meeting, should be made to the Board Secretary, Dawn Jorge, at least 48 hours in advance of the meeting to ensure availability of the requested service or accommodation. Ms. Jorge may be contacted by telephone at (951) 845-9581, Ext. 21, email at dawn.jorge@bcvwd.org or in writing at the Beaumont-Cherry Valley Water District, 560 Magnolia Avenue, Beaumont, California 92223.

DRAFT

2013 URBAN WATER MANAGEMENT PLAN UPDATE



BEAUMONT CHERRY VALLEY WATER DISTRICT

Beaumont, California

April 2013

DRAFT
2013 URBAN WATER MANAGEMENT PLAN UPDATE

BEAUMONT CHERRY VALLEY WATER DISTRICT
560 N. MAGNOLIA AVENUE
BEAUMONT, CALIFORNIA 92220

April, 2013

ABBREVIATIONS AND ACRONYMS

Acre-ft	acre-feet
Acre-ft/yr	acre-feet per year
AD	Assessment District
AFY	acre-feet per year
BCVWD	Beaumont Cherry Valley Water District
BIA	Building Industry Association
BMP	Best Management Practices
BSU	Beaumont Storage Unit, Beaumont Basin
CaSIL	California Spatial Information Library
ccf	hundred cubic feet (748 gallons)
CEC	Chemicals of Emerging Concern
CEQA	California Environmental Quality Act
CFD	Community Facilities District
cfs	Cubic feet per second
CII	Commercial, Industrial and Institutional
CIMIS	California Irrigation Management Information System
Company	Beaumont Land and Water Company
CUWCC	California Urban Water Conservation Council
CVAN	Cherry Valley Acres and Neighbors
DFW	Department of Fish and Wildlife (formerly Fish and Game (DFG)
District	Beaumont Cherry Valley Water District
DMM	Demand Management Measure (water conservation)
DPH	California Department of Public Health
DWR	Department of Water Resources
EBX	East Branch Extension of the State Water Project
EBX II	East Branch Extension of the State Water Project Phase II
EIR	Environmental Impact Report
EMWD	Eastern Municipal Water District
ERP	Emergency Response Plan
ft	feet
ft bgs	feet below ground surface
GIS	Geographic Information System
gpcd	Gallons per capita per day

gpd	Gallons per day
gpm	gallons per minute
GWMP	Groundwater Management Plan
HP	Horsepower
ICWMC	Interagency California Watershed Mapping Committee
IRWMP	Integrated Regional Water Management Program
JPA	Joint Powers Agency
LAFCO	Local Agency Formation Commission
LSG	Little San Gorgonio
MAX	Maximum
MCL	Maximum Contaminant Level
MF	Microfiltration
MG	Million gallons
mgd	millions of gallons per day
mi^2	square miles
MIH	miner's inch hours
MIN	Minutes or Minimum
MOU	Memorandum of Understanding
MSL	Mean Sea Level
N/A	Not Available/Not Applicable
NDMA	Nitrosodimethylamine
NRCS	Natural Resources Conservation Service
Pass	San Gorgonio Pass
Pass Agency	San Gorgonio Pass Water Agency
PPCP	Pharmaceuticals and Personal Care Products
RCFCD	Riverside County Flood Control and Water Conservation District
Recharge Program	Stormwater Runoff and Groundwater Recharge Program
RF/CP	Recharge Facilities/Community Park
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SAR	Sodium Adsorption Ratio
SAWPA	Santa Ana Watershed Project Authority
SARI	Santa Ana Regional Interceptor (Brine line)
SBVMWD	San Bernardino Valley Municipal Water District (Valley District)
SCAG	Southern California Association of Governments
SCPGA	Southern California Professional Golf Association

SGPWA	San Gorgonio Pass Water Agency
SOI	Sphere of Influence
Spreading Grounds	Little San Gorgonio Creek Spreading Grounds
sq mi	square mile
STWMA	San Timoteo Watershed Management Authority
SWP	State Water Project
TDS	Total Dissolved Solids
THM	Trihalomethane (A disinfection by-product)
TOC	Total Organic Carbon
UF	Ultra-filtration
ULFT	Ultra-Low-Flush Toilet
USGS	U.S. Geological Survey
USWS	U.S. Weather Service
UWMP	Urban Water Management Plan
Valley District	San Bernardino Valley Municipal Water District
WUCOLS	Water Use Classification of Landscape Species
WWTF	Wastewater Treatment Facility
YVWD	Yucaipa Valley Water District

TABLE OF CONTENTS

LIST OF TABLES

Number	Title	Page

To be provided

LIST OF FIGURES

Number	Title	Page

To be provided

Section 1

Plan Preparation

Urban Water Management Planning

The California Water Code requires all urban water suppliers within the state to prepare urban water management plans and update them every five years. These plans satisfy the requirements of the Urban Water Management Planning Act of 1983 including amendments that have been made to the Act. Sections 10610 through 10657 of the Water Code detail the information that must be included in these plans, as well as who must file them. Appendix A contains the text of the Act. This report constitutes the 2013 update to the Beaumont-Cherry Valley Water District's (BCVWD's or District's) 2005 Urban Water Management Plan (UWMP).

According to the Act,

- The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.
- A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate
- As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years
- The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.
- The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.
- Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

The Act requires that each urban water supplier, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, shall prepare, update and adopt its urban water management plan at least once every five years or before December 31, in years ending in five and zero. The Plan may be updated at any time when the Urban Water Supplier believes significant changes have occurred in population, land use, and/or water sources that may affect the contents in the Plan. The deadline for the 2010 Update was extended to July 1, 2011.

BCVWD was late in its submittal principally due to the desire to have the 2010 census data available due to the rapid growth that had occurred since the last census in 2000. Accurate census data is important in forecasting future water supply and infrastructure needs. This data is also necessary to accurately determine the per capita water rates required by SBX7-7 as discussed below.

In addition, the area was in a severe economic recession which slowed development to a standstill; many development projects that were approved for water service stopped unfinished. Several changed the type of development from residential to large warehouse commercial

distribution centers. As a result, progress on the UWMP Update was delayed to further evaluate these changes in land use and growth projections.

Changes in the Act Since 2005

There have been some changes to the Act since 2005. Some of the significant changes that affect the UWMP Update are listed below:

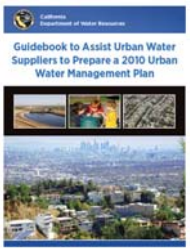
- Provide at least 60 days notice to any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. (§10621(b))
- The water use projections required by §10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in § 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier. It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirement under §65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households. (§10631.1)
- Beginning January 1, 2009, eligibility for a state funded grant or loan shall be conditioned on the implementation of the water demand management measures (DMM) described in Section 10631. If a DMM is not currently being implemented, then the urban water supplier submits to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement. If a DMM is not locally cost-effective (the present value of the local benefits is less than the present value of local costs to implement the DMM), then the water supplier will submit supporting documentation and the DWR will provide a determination within 120 days of UWMP submittal. (§10631.5(a))
- Indirect potable reuse is to be considered as an option for a potential use of recycled water. (§10633 (d))
- A copy of the UWMP will also be submitted to the California State Library no later than 30 days after its adoption(§10644 (a))

California Water Conservation Bill of 2009 (SBX7-7)

California Water Conservation Bill of 2009, enacted in November 2009, is also known as the "20% by 2020" bill. §10608.16 requires that California shall achieve a 20-percent reduction in urban per capita water use on or before December 31, 2020. The state shall make incremental progress towards the state target by reducing urban per capita water use by at least 10 percent on or before December 31, 2015.

The UWMP 2010 Update shall include the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data. When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections. An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan. The state has developed various methodologies to calculate the per capita. One of the methods must be selected. This is discussed in a subsequent section of this UWMP.

UWMP Report Organization and Format



The organization of the sections of this report follows as closely as possible the "Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan, March 2011" developed by the California Department of Water Resources (DWR) to facilitate review by DWR. Although there is some flexibility in the organization and content, the "Guidelines" have specific required elements and table formats.

Throughout the various sections, the California Water Code (law) is cited and included to help the reader better understand why certain material is presented the way it is. Whenever the Water Code is cited it is presented in a boxed format as shown below:

> §10620 xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx.

Coordination

Agency and Organization Involvement

> §10620(d)(2)) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

Table 1-1 presents a list of adjacent water agencies and communities that would have an interest in the BCVWD UWMP Update.

The City of Beaumont has a direct interest since the city is served by BCVWD. The City of Banning has agreements with BCVWD to recharge imported water on their behalf, has an existing emergency potable water connection with BCVWD and stub outs across Highland Springs Avenue for potable and recycled water and has financially participated with BCVWD in the construction of a production well. BCVWD has pipeline facilities within the City of Calimesa; however the District does not serve the city. The city is served by YVWD.

BCVWD has an agreement with South Mesa WC to purchase South Mesa's unused "surplus storage" account water from the Beaumont Basin Adjudication until 2014.

The County of Riverside is involved with the land use planning and building permit approval in the unincorporated community of Cherry Valley – a community directly served by BCVWD. The Riverside and San Bernardino County LAFCOs have an interest since they have requirements for water supply assessments whenever there is an annexation.

The Beaumont Basin Watermaster manages the groundwater basin which provides over 80% of the District's groundwater production.

The SGPWA is the State Water Contractor that imports water on behalf of the District and its other retail agencies through the East Branch Extension of the State Water Project. BCVWD has been purchasing water from SGPWA and percolating it in BCVWD's groundwater recharge facility since 2006. The SGPWA also has an agreement with BCVWD to use recharge facilities at the mouth of Little San Gorgonio Canyon on BCVWD-owned land for the recharge of State Project Water.

The Cherry Valley Acres and Neighbors (CVAN) is a local organization which is very active on land use and water issues.

The Riverside Building Industry Association is included since they are also very active in the area.

Table 1-1
Coordination with Appropriate Agencies, Groups and Organizations

Agency, Group or Organization	Participated in developing UWMP Update	Sent Public Hearing Notice	Sent copy of draft UWMP Update	Attended public meetings	Commented on the draft UWMP Update	Sent notice of intention to adopt UWMP	Sent Final UWMP Update
City of Beaumont							
City of Banning							
City of Yucaipa							
City of Calimesa							
YVWD							
South Mesa WC							
County of Riverside							
County of San Bernardino							
Eastern MWD							
SGPWA							
Beaumont Basin Watermaster							
Riverside County LAFCO							
San Bernardino County LAFCO							
CVAN							
Riverside BIA							
General public							

Notification

> §10621(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

As indicated in Table 1-1, the 60-day notification was given to the City of Beaumont and the counties of Riverside and San Bernardino on _____. The public hearing was held on _____. It should be pointed out that BCVWD does not serve any customers in San Bernardino County except its own residences.

> §10635(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

As indicated in Table 1-1, BCVWD will submit a copy of the UWMP Update within 60 days of submittal to the Department of Water Resources.

> §10642 Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.

BCVWD has encouraged residents and other members of the public to attend the public meetings. The meeting announcements are posted on the District's web site and published in the newspapers as required. The Riverside BIA and CVAN have been listed in Table 1-1 as organizations the District is working with in the preparation of the UWMP update.

> §10642 Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area.

Prior to adopting the UWMP Update, the update was made available for public review and hearing. Notification of the hearing is made pursuant to § 6066 of the Government Code. §6066 of the Government Code requires publication of the notice "once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. The period of notice commences upon the first day of publication and terminates at the end of the fourteenth day, including herein the first day."

BCVWD issued a draft of the UWMP Update and notified the organizations and agencies in Table 1-1 on _____. The public hearing on the draft UWMP Update was held on _____. Describe the meeting/comments etc.

Plan Adoption, Submittal and Implementation

> §10621(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

The BCVWD's 2005 UWMP Update has undergone significant revisions as part of the 2010 Update. Most significantly the results of the 2010 census have been incorporated and the impacts of the economic turndown and slow housing market have lowered the future population projections. This is discussed in detail in Section 2 of the 2010 UWMP Update. Also the impacts of SBX7-7 (20% reduction in per capita demand by 2020) has impacted the water supply requirements.

A public workshop was held in the evening on _____at a District Board Meeting. The District Engineer made a presentation of the Draft UWMP 2010 Update and took comments from the Board of Directors and the Public. Written comments were submitted to the District on the date of the meeting. These comments were responded to at the meeting. The comments

and responses are presented in Appendix O. Also included is a copy of the District's presentation. Comments were also taken from the public verbally at the Board Meeting and were responded to. This is documented in the minutes of the Board Meeting.

> §10642 After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

A public hearing, noticed in accordance with the Government Code, was held at the District offices at_____. A summary of the public hearing and comments received is provided in Appendix O and this UWMP has been amended as appropriate.

The 2013 UWMP Update was adopted on _____. The meeting was noticed as required by law. A copy of the notice is in the Appendix. The updated plan will be adopted and filed as required by law.

> §10643 An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

BCVWD used the 2005 UWMP Update in developing its water supply program. For example the 2005 UWMP Update specified a specific amount of imported State Project Water would recharged. The District purchased and 80 acre parcel and completed hydrogeologic studies, a test recharge project and designed and constructed the Phase I Groundwater Recharge Facility. The District also constructed a 24-in pipeline to a turnout and metering station on the East Branch Extension of the State Water Project to convey imported water to the recharge site. The recharge facility began operation in September 2006 and as of the end of 2012 has recharged approximately 34,600 acre-ft of imported water. BCVWD is recharging as much water as is made available by the SGPWA.

The 2005 UWMP Update envisioned a recycled water system and recycled water use. BCVWD completed the recycled water transmission main loop essentially encircling the City of Beaumont and installed a 2 MG recycled water storage tank. The District has also been awarded a facilities planning grant from the SWRCB to prepare the facilities plan for a recycled water connection to YVWD. The District continues to work with the City of Beaumont for recycled water. At the time of this writing, the District is working towards acquiring a recycled water use permit from the RWQCB.

The 2005 UWMP Update was used as a reference in all of the water supply assessments prepared by the District.

Many more examples could be cited to demonstrate how the District implements the recommendations and guidance in the 2005 UWMP Update. Based on its past history, BCVWD will use the 2013 UWMP Update as a guide for new development and implement the water supply projects and strategies therein.

> §10644(a) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

BCVWD agrees to submit a copy of the 2013 UWMP Update as required by §10644(a).

> §10645 Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

BCVWD will, within 30 days of filing with DWR, make the plan available to the public at the District's office at 560 Magnolia St., Beaumont, CA 92223. It will also be posted on the District's website in pdf form for reading/downloading by the public.

Project Team and Acknowledgements

The 2013 Urban Water Management Plan Update was prepared by Joseph. C. Reichenberger P.E., BCEE, Staff Engineer, with assistance and review from Eric Fraser P.E, General Manager and Dan Jaggers, Director of Engineering,

We acknowledge the help from the District's Board of Directors, other District Staff including Tony Lara, Director of Operations, Knute Dahlstrom, as well as Steve Gratwick with the District's engineering consultant, Parsons.

Section 2

Service Area Description and Population Projections

Service Area

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631. (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

The District's present service area covers approximately 28 square miles, virtually all of which is in Riverside County, and includes the City of Beaumont and the community of Cherry Valley. The District owns 539 acres of watershed land in Edgar Canyon in San Bernardino County located just north of the Riverside-San Bernardino County line where the District operates a number of wells and several reservoirs.

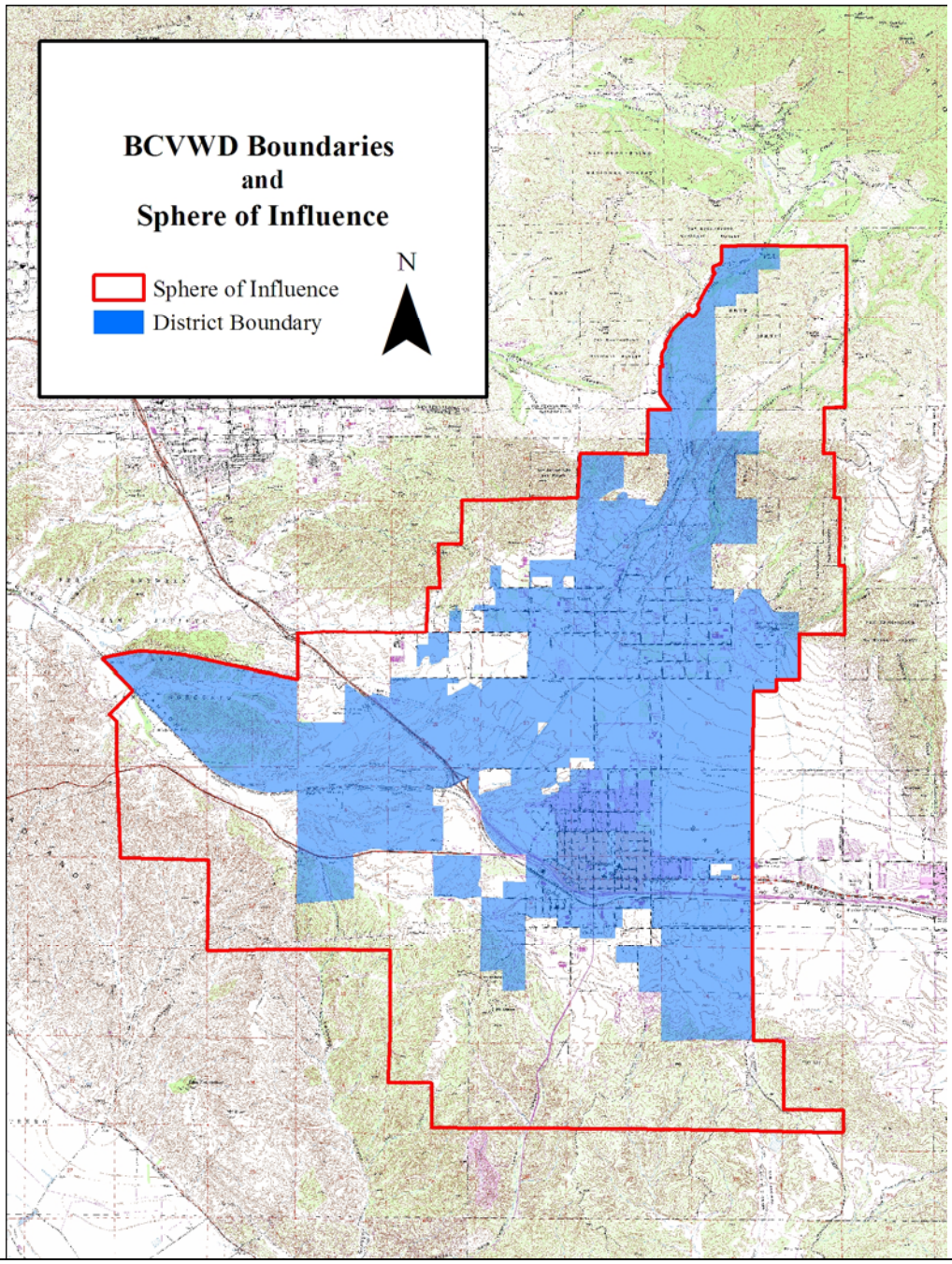
The District's Sphere of Influence (SOI), or ultimate service planning area, encompasses an area of approximately 37.5 square miles (14.3 sq mi are in the City of Beaumont). This SOI was established by the Riverside and San Bernardino County Local Agency Formation Commissions (LAFCOs). SOIs are established as a planning tool and help establish agency boundaries and avoid problems in service, unnecessary duplication of costs, and inefficiencies associated with overlapping service.

Figure 2-1 shows the District's present service boundary and SOI.

The District's SOI is bounded on the west and north by the Yucaipa Valley Water District (YVWD) and on the east by the City of Banning. The northerly boundary of Eastern Municipal Water District (EMWD) is one-mile south of the District's southerly SOI boundary. The area between EMWD and the District's SOI is not within any SOI and could be annexed to either the District or EMWD. The District's SOI in Little San Gorgonio Canyon follows Oak Glen Road. The area west of Oak Glen Road is within YVWD's SOI; east of Oak Glen Road is within the District's SOI.

The District's service area ranges in elevation from 2300 feet above mean sea level in Fairway Canyon area of Beaumont on the southwestern boundary, to 2900 feet in Cherry Valley, and over 4,000 feet in the upper reaches of the SOI.

The area serves primarily as a "bedroom" community for the Riverside/San Bernardino Area and the communities east of Los Angeles County along the I-10 corridor.



Source: modified from USGS 1:24 000 topographic maps of Beaumont, Forest Falls, Yucaipa, and El Casco, CA

Figure 2-1
District Boundary and Sphere of Influence

Beaumont Cherry Valley Water District
Beaumont, California

0 8000

NORTH

Approximate Scale in Feet

History and Boundaries

The District owns approximately 2,800 acres of watershed land north of Cherry Valley along the Little San Gorgonio Creek (also known as Edgar Canyon) and Noble Creek. There are two stream diversion locations within Little San Gorgonio Creek that are in the Department of Water Resources, Division of Water Rights database. The diversions have pre-1914 recorded water rights amounting to 3,000 miners inch hours (MIH) or approximately 45,000 acre-feet per year (AFY) of right for diversion of water for domestic and irrigation uses. However, the District has never had a demand that requires such large quantities of water supply; and the watersheds may not be capable of supplying such quantities during an average year. The creeks/canyons have been used for water supply via diversions for irrigation and domestic service since the latter part of the 1800s.

At the turn of the Twentieth Century the District's service area was provided water by the Beaumont Land and Water Company (Company) via the above-mentioned diversions along the Little San Gorgonio Creek. The Company owned the land that eventually would become the Beaumont Irrigation District in 1919 and ultimately the Beaumont-Cherry Valley Water District in 1973. Even though the name has changed, the District's authority comes from the Irrigation District Law of the State of California, California Water Code §20500 et seq.

As the Company's land began to develop, the need for water grew. To answer the new demands the Company began the construction of wells on the watershed lands in 1907. With the construction of the new wells the Company began to divert water for recharge in the canyon areas rather than provide diverted water directly to the customers. The diversions, which actually began as early as 1902, allowed the Company to recharge the underground aquifers during storm events and pump the water when needed. With the diversions, the Company also purchased the riparian water rights from downstream landowners. The water rights purchases often required the Company to deliver a specified amount of water to the seller on a regular basis. Even today, the District continues deliveries of water as required by agreements, some of which date back to the early 1900s.

At the present time the District currently diverts, recharges and operates wells in Little San Gorgonio Creek (Edgar Canyon). The District does not operate any wells located in Noble Canyon.

BCVWD Authority Under the Irrigation District Law

BCVWD was formed originally as an Irrigation District under California Water Code §20500 et seq. This section defines the "powers" and authority of irrigation districts which is summarized below:

- Furnish water in the district for any beneficial use, including fire protection (§20500, 22077)

- Control, distribute, store, spread, treat, recapture and salvage any water (including but not limited to sewage waters for the beneficial use of the district or its residents (§22078)
- Provide for any and all drainage made necessary by the irrigation provided for by the District. (§22095)
- Acquire lease and operate plants for the generation, transmission, distribution and sale of electric power (§22115)
- Acquire, construct, maintain, and operate facilities for the collection and disposal of sewage subject to approval by a majority of the voters of the district (§22170, 22176)
- Fix and collect charges for any service provided by the district including the sale of water (with standby charges), connections to new pipelines or extensions of existing pipelines, use of water for groundwater recharge, use of water for power purposes and sale of electric power (§22280)
- Impose a special tax pursuant to Article3.5 (commencing with Section 50075) of Chapter 1 of Part 1 of Division 1 of Title 5 of the Government Code. The special taxes shall be applied uniformly to all taxpayers or all real property within the district, except that unimproved property may be taxed at a lower rate than improved property (§22078.5)

Although these powers are permitted under statute, approval from LAFCO may be required before certain activities are undertaken.

Overview of BCVWD's Water System and Operation

BCVWD has both a potable and a non-potable water distribution system. BCVWD provides potable water, scheduled irrigation water to agricultural users through the potable water system; water for landscape irrigation of parks, playgrounds, school yards, street medians and common areas is through its non-potable (recycled) water system.

At the end of 2012, the District had 15,697 connections (about 300 are landscape irrigation connections to the non-potable water system and about 45 are for agricultural irrigation which are connected to the potable water system). The number of connections increased from 5600 in the year 2000 before the housing boom that encompassed Western Riverside County and particularly Beaumont. In 2011 the District provided 11,730 acre-ft of water (10.47 mgd average). The maximum day pumping was 19.8 mgd. All of this was groundwater. Pumping declined steadily since the high of nearly 13,600 acre-ft in 2008 to 10,875 acre-ft in 2010. The 2011 pumping shows a slight increase. The reduction from 2008 to 2010 is attributable to the decrease in construction water sales, foreclosures and water conservation.

Potable Water System

BCVWD's potable water system is supplied by wells in Little San Gorgonio Creek (Edgar Canyon) and the Beaumont Basin (sometimes called the Beaumont Storage Unit or the Beaumont Management Zone). The District has a total of 24 wells (1 well is a standby). The Beaumont Basin is adjudicated and managed by the Beaumont Basin Watermaster. BCVWD augments its groundwater supply with imported State Project Water from the San Gorgonio Pass Water Agency (SGPWA) which is recharged at BCVWD's recharge facility at the intersection of Brookside Avenue and Beaumont Avenue. Overall, the

water quality from BCVWD's wells is excellent. Total Dissolved Solids (TDS) is usually below 250 mg/L. Nitrates are only a sporadic problem in a few wells at present. The District continues to monitor these wells per California Department of Public Health (DPH) requirements. No wells have had to be taken out of service because of water quality concerns.

Wells in Edgar Canyon have limited yield, particularly in dry years, and take water from shallow alluvial and bedrock aquifers; wells in the Beaumont Basin are large capacity and pump from deep aquifers – some as deep as 1500 ft below the ground surface. The Edgar Canyon wells are very inexpensive to operate and are the preferred source; however, those wells are not able to meet the current average day demand. The Edgar Canyon wells pump to a gravity transmission main that extends the full length of the District-owned properties in Edgar Canyon. The transmission main connects to the distribution system in Cherry Valley. Water from the Edgar Canyon Wells which is not used in the developed areas adjacent to Edgar Canyon or Cherry Valley is transferred to lower pressure zones serving the City of Beaumont.

During 2011 the Edgar Canyon Wells provided a little over 18 percent of the total annual supply; the rest is pumped from wells in the Beaumont Basin. BCVWD's total well capacity (Edgar Canyon and Beaumont Basin) is about 27.5 million gallons per day (mgd). The District is easily able to meet the maximum day demand (currently about 20 mgd) with the largest well out of service.

Because of the range of topographic elevations in the District's service area, 11 pressure zones are needed to provide reasonable operating pressures for customers.

BCVWD has 14 reservoirs ranging in size from 0.5 million gallons (MG) to 5 MG. Total storage is approximately 22 MG – slightly more than 2 average days. The reservoirs provide gravity supply to their respective pressure zones. The BCVWD's system is constructed such that any higher zone reservoir can supply water on an emergency basis to any lower zone reservoir. There are booster pumps in the system to pump water up from a lower pressure zone to a higher pressure zone also. This provides great flexibility in system operations.

The transmission system in the main pressure zones is 24-in diameter. (There is some 30-in diameter pipelines at some reservoirs.) The bulk of this pipe (ductile iron with cement mortar lining) was installed in the last 10 to 15 years. There are a number of small distribution lines in the system which are gradually being replaced over time with minimum 8-in diameter pipe. Thedistribution system is capable of providing over 4000 gallons per minute (gpm) fire flow in the industrial/commercial areas of the service area.

Imported Water and Recharge Facilities

About the year 2000, BCVWD began investigating an 80-acre site on the east side of Beaumont Avenue between Brookside Ave. and Cherry Valley Blvd. as a location for a facility to recharge captured storm flow. After extensive hydrogeologic investigations

including pilot testing, the District eventually purchased the site and developed Phase 1 of the recharge facility on the westerly half of the site. The Phase 1 facilities were completed and went on line in late summer 2006. Phase 2 of the recharge facility is under construction with anticipated construction completion in 2013. This site has excellent recharge capabilities. Long-term percolation rates are around 10 acre-ft/acre/day with proper maintenance.

The District completed construction of a 24-in pipeline from the groundwater recharge site to a turnout on East Branch Extension (EBX) of the State Water Project. A metering station was installed at the turnout at Noble Creek and Vineland Avenue and BCVWD began taking imported water deliveries from SGPWA for recharge in September 2006. In conjunction with the recharge facility, the District developed a drought-tolerant landscape garden with walking trails and picnic areas for visitors to the site. Since its operation in 2006 through the end of 2012, over 34,600acre-ft (over 11 billion gallons) of imported water have been recharged.

Non-potable (Recycled) Water System

Currently BCVWD has about 30 miles of non-potable water transmission pipelines in place which is supplemented by an extensive network of smaller distribution lines installed by developers as part of the tract development that has occurred since about 2002. The transmission system forms a loop around the City of Beaumont and comprises of primarily 24-in diameter ductile iron pipe. The system includes a 2 million gallon recycled (non-potable) water reservoir which provides gravity storage for the system. There are about 275 existing landscape connections to the recycled water system receiving about 1,500 acre-ft of water based on 2012 meter records. The existing recycled water system is currently supplied with potable water through 5 interconnections between the potable and non-potable water system. The District is working with the City of Beaumont, YVWD and the City of Banning on a regional recycled water system. BCVWD has been awarded a facilities planning grant from the SWRCB to develop a facilities plan for a recycled water connection with YVWD.

The 2 MG non-potable water reservoir is configured to receive potable water or untreated State Project Water (SPW) through air gap connections. The non-potable water system can have a blend of recycled water, imported water and potable water. The 2 MG reservoir is located at the District's groundwater recharge facility at Beaumont Avenue between Brookside Ave. and Cherry Valley Blvd.

Climate

Temperature

Table 2-1 presents temperature data for the City of Beaumont obtained from the Western Regional Climate Center. The climate in Cherry Valley is similar, but temperatures are cooler in the upper elevations of the District's SOI.

Temperatures below freezing are common in winter in the upper elevations of the service area. Temperatures over 100^{o}F are also common in the summer.

Table 2-1
District Climate[1]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	60.5	63.6	66.2	72.5	78.8	88.0	95.6	95.5	90.6	80.7	69.4	62.0	77.0
Average Min. Temperature (F)	38.6	39.1	40.0	42.8	47.7	52.5	58.4	58.6	55.8	49.3	43.1	39.2	47.1
Average Total Precipitation (in.)	3.76	3.44	3.12	1.36	0.63	0.16	0.23	0.22	0.51	0.60	1.65	2.09	17.76
Average Total Snowfall (in.)	1.1	0.4	0.2	0	0	0	0	0	0	0	0.1	0.3	2.0
Standard Monthly Average ETo[2]	2.81	2.76	3.78	5.31	6.10	6.97	7.08	6.83	5.67	4.15	3.31	2.56	57.33

[1] Western Regional Climate Center, Beaumont 1E 7/1/1948 – 12/30/2004
[2] CIMIS website – Winchester, CA

Precipitation

As shown in Table 2-1, virtually all the precipitation occurs during the months of November through April; most of the precipitation is in the form of rain, but snow is common in higher elevations of the service area during the winter. Some rainfall occurs in summer from thunderstorms that are associated with monsoonal moisture. Annual precipitation in Beaumont averages approximately 17.8 inches, with increasing amounts of precipitation with increasing elevation.

Evapotranspiration

Table 2-1 presents the monthly reference average ETo based on the California Irrigation Management Information System (CIMIS), Winchester, CA station. This station is located about 15 miles south of the BCVWD and is representative of the evapotranspiration in the District's service area. The reference ETo represents the amount of water used and evaporated by a 4 to 7-in tall stand of grass in an open field. Water use by other crops and landscape materials can be determined using the appropriate crop coefficient in conjunction with the ETo.

The service area is in Reference ETo Zone 9 – South Coast Marine to Desert Transition.[1]

[1] California Department of Water Resources and University of California Cooperative Extension, A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California, The Landscape Coefficient Method and WUCOLS III, August 2000.

Service Area Population and Demographics

Historical Population

Historic and current populations for the District's service area are presented in Table 2-2 and were obtained from several sources:

- 1980, 1990 and 2000 populations – U.S. Census Bureau, 2000 Census of Population and Housing, Population and Housing Unit Counts, PHC-3-6, California, Washington D.C., 2003. This data was used for the City of Beaumont. Data for Cherry Valley for this period was estimated.
- 2010 population – U.S. Census Bureau for City of Beaumont and Cherry Valley based on census tract data allocated to the District service area using GIS

Table 2-2
Historical Population

	1980	1990	2000	2010
City of Beaumont				
Population	6,818	9,685	11,407	36,837
Households	2,852	3,718	3,887	12,950
People/Household	2.39	2.60	2.93	2.84
Cherry Valley				
Population	5,012	5,945	5,891	6,279
Households	2,023	2,530	2,310	2,45 0
People/Household	2.48	2.35	2.55	2.56
TOTAL				
Population	11,130	15,630	17,298	43,116
Households	4,875	6,248	6,197	15,400
People/Household	2.43	2.50	2.79	2.80

The data for the 2010 census was obtained for each census tract. The census tract maps were integrated into the District's GIS system which also showed the District's Boundary. The census tract population was then adjusted to include only the population within the District boundary. Household data for 2010 for Beaumont was taken from census data. Household data for Cherry Valley was estimated based on the historical population per dwelling unit.

It should be pointed out that the data in Table 2-2 indicate the people living in the District's service area. Except for a relatively few number that are on private wells or local water systems, all are served by the District.

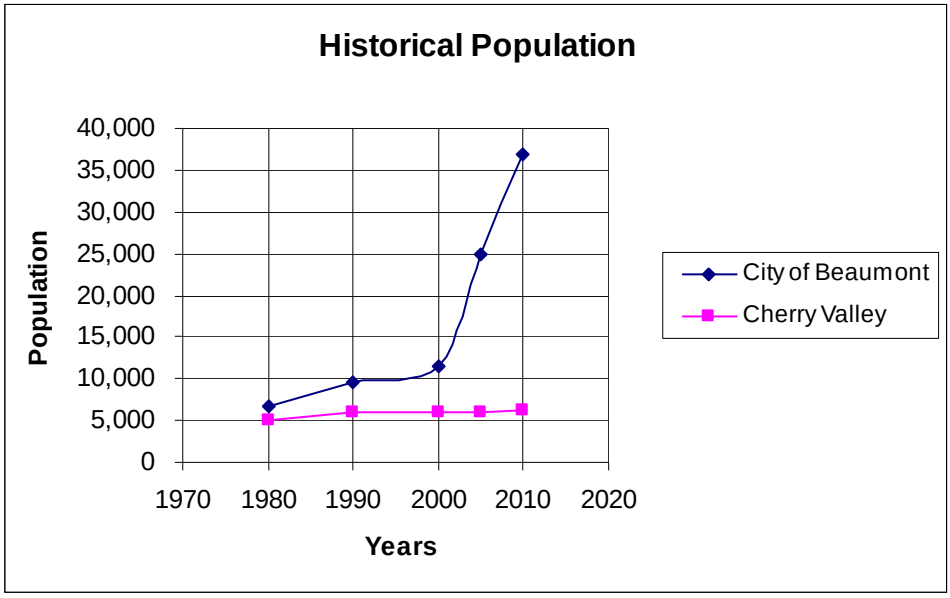
The data in Table 2-2 indicates a very rapid growth for the City of Beaumont from the year 2000 to 2010. About 2/3 of this growth occurred between 2000 and 2005 based on building permits issued by the City of Beaumont. The high rate of growth continued until mid-2008 when development slowed markedly following the economic turndown in the US and California.

Single family building permits in the City of Beaumont started picking up in 1999-2000 and reached their peak in 2005 with 2,300 new home permits issued. The number of permits for new homes declined to 169 in 2011. New home permits picked up in 2012 to

223 for the year.[1] Figure 2-2 illustrates the historical growth in population. From 1996-2012 single family permits averaged 568 per year; from 2000-2012, the average was 740 per year.

The population in Cherry Valley remained relatively constant since 1990. A few homes were constructed but not many. During the period from 2000 to 2008, the community of Cherry Valley did not experience nearly the growth that Beaumont or other areas in Western Riverside County experienced.

Figure 2-2
Historical Population Growth in District



Other Demographic Information

Income and Home Values

Table 2-3 presents data on the household income and median home values in the service area.

Population Age and Diversity

The median age in Beaumont is 38.6 years; Cherry Valley is 47.3 years. The median age in California is 33.4 years, compared to the U.S. as a whole of 35.6 years.[2] It can be seen that Beaumont and Cherry Valley are older communities.

The service area is ethnically diverse. Caucasian, Hispanic and Asian percentage in the City of Beaumont are 46%, 40% and 7% respectively; for Cherry Valley the percentages are 76%, 18% and 2% respectively.

[1] City of Beaumont, Department of Building and Safety, Yearly Reporting of Permit Information, year 2000-2012.

[2] http://www.clrsearch.com/Beaumont_Demographics/CA/Population-Growth-and-Population-Statistics?compare=Cherry+Valley%2C+CA Accessed 7/19/2011.

Table 2-3
Income and Housing Values for 2009

Parameter	City of Beaumont[1]	Cherry Valley[2]	California[3]
Median Household Income	$58,695	$50,317	$58,931
Per Capita Income	$21,067	$26,240	$42,395[4]
Median Home or Condo Value	$210,169	$212,932	$384,200

Employment

The latest data on employment in the service area is the year 2010 census. This is summarized in Table 2-4.

Table 2-4
Employment from 2010 Census[5,6]

Parameter	City of Beaumont	Cherry Valley	Total
Total Population 16 yrs and older	12,131	7,474	19,605
Total Population 16 yrs and older in labor force	5,757	3,524	9,281

Principal industries for males in the City of Beaumont are construction, retail trade and manufacturing; for females, principal industries are retail sales, cashiers and office administration. In Cherry Valley the principal industries for males are construction and retail trade; for females, education and healthcare/social services.

Build-out Population

The BCVWD service area build-out or "saturation" population was determined using the City of Beaumont's Zoning Map from the City's General Plan[7] and the District's GIS to

[1] www.city-data.com/city/Beaumont-California.html, 2011 Onboard Informatics, for City of Beaumont, CA. Accessed 7/18/2011

[2] www.city-data.com/city/Cherry-Valley-California.html, 2011 Onboard Informatics, for City of Beaumont, CA. Accessed 7/19/2011

[3] www.city-data.com/city/Beaumont-California.html, 2011 Onboard Informatics, for City of Beaumont, CA. Accessed 7/18/2011

[4] www.infophase.com/ipa/A0104652.html, Accessed 7/19/2011

[5] http://www.clrsearch.com/Beaumont-Demographics/CA/, Accessed 2/6/2013

[6] http://www.clrsearch.com/Cherry-Valley-Demographics/CA/, Accessed 2/6/2013

[7] City of Beaumont General Plan, Adopted March 2007.

determine the total areas of the various zoning categories in the District's sphere. Actual GIS data was obtained from the City and integrated into the District's GIS system to determine the land use within the District's Sphere of Influence. The zoning designation included a range of dwelling units/acre. An average value was used in the build-out analysis. The District's estimate of the City of Beaumont's build-out population is 90,600. (The City's General Plan, page 25, states the build-out population is 87,200; so the District's estimate is reasonable.)

The same approach was used for Cherry Valley, only this time data from Riverside County General Plan, Pass Area Land Use Plan was used[1]. Again the GIS data set was obtained from the County and integrated into the District's GIS system to determine the land use category areas within the District's Sphere of Influence. Build-out population for Cherry Valley, within the BCVWD's Sphere of Influence is 21,700 people.

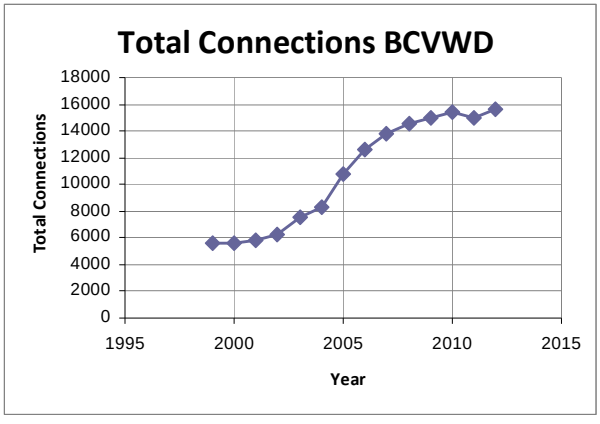
Total estimated build-out population within the BCVWD's Sphere of Influence is 112,300 or about 2.6 times the current population. BCVWD believes this population would not be reached until well beyond 2050 or 2060, if ever.

The build-out population is a function of the local zoning; this could change at any time resulting in an increase or reduction in the build-out population.

BCVWD Historic Connection Growth

Figure 2-3 shows the growth in total connections (services) within the service area. Virtually all of these occurred in the City of Beaumont. Prior to the year 2000, the District had about 5,600 total connections. The number of connections increased steadily until about 2008 when the annual increase began to slow down and level off. The peak year was 2005 when 2,433 connections were added. For 2009 and 2012 the increase was just over 280 connections per year. The average for the period 2001 through 2012 was 844 new connections per year. The number of connections dropped in 2011. This is more a function of the data collection which is taken from the total active accounts. The drop is likely due to the high number of foreclosures in the service area. Many of these accounts were "closed."

Figure 2-3
Connection Growth in BCVWD Since 1999



[1] The Pass Area Land Use Plan, October 7, 2003. (Part of Riverside County General Plan)

Based on an analysis of the total number of connections and the population in the service area, there are about 2.75 people per connection. Table 2-5 summarizes the population growth within the BCVWD service area using connections as a base.

Table 2-5
BCVWD Historic Population Growth Based on Connections

Period	Connections/yr	People/year	People/5 yrs
2001 - 2012	843	2,320	11,598
2009 - 2012	202	775	3,874

Current Development Projects Approved and In the Approval Process

In August 2012, BCVWD contacted the City of Beaumont[1] to determine the status of construction projects and developments. BCVWD was particularly interested in the number of units that were approved that still needed to be completed. Seven major developments were identified that are under construction. These are identified in Table 2-6 along with the number of dwelling units yet to be constructed as of August 2012.

The Heartland Development in Table 2-6 could be changed to large distribution warehousing which would reduce the equivalent dwelling unit (EDU) count from 922 EDUs to about 180 EDUs – a significant reduction in water demand. The project has been rough graded, but nothing has been constructed as of the end of 2012.

Table 2-7 presents a list of projects that have be approved by the City of Beaumont but have not yet started construction.

Table 2-6
Projects within BCVWD Service Area Under Construction (2012)

Development Name	Total Housing Units Approved	Housing Units to be Constructed	Estimated Build-out Year
Seneca Springs	955	9	2012
Tournament Hills	1,094	387	2020
Sundance	4,716	2,788	2025
Fairway Canyon SCPGA	3,566	2,351	2025
Aspen Creek	106	77	2014
Heartland (see text)	922	922	2035
Four Seasons	2,041	1,097	2025
Family Dollar Store	Commercial	Negl	2013
Totals	13,400	7,631	

Source: City of Beaumont Project Status 9/1/2012 and Personal Communication, D. Jaggers, BCVWD with City of Beaumont Aug, 2012)

[1] Personal Communication, Dan Jaggers (BCVWD) with K. Warinski (City of Beaumont), 8/1/2012

Table 2-7
Projects Approved for Construction by City of Beaumont (2012)
but Have Not Started Construction

Development Name	Total Housing Units Approved	Estimated Build-out Year
Kirkwood Ranch	403	2030
Potrero Creek Estates	700	2040
Tract 32850	95	2025
Nobel Creek Meadows	648	2030
Hidden Canyon (see text)	411	2020
Sunny Cal Specific Plan	560	2025
Totals	2,817	

Source: City of Beaumont Project Status 9/1/2012 and Personal Communication, D. Jaggers, BCVWD with City of Beaumont Aug, 2012)

In Table 2-7, Hidden Canyon development may be changed to large distribution warehousing which would reduce the size from 411 EDUs to about 200 EDUs – a significant reduction in water demand. The Sunny-Cal Specific Plan project site will still need to be annexed to BCVWD as it is currently not in the District's service area; it is within the District's sphere of influence, however.

With the housing units yet to be constructed plus the units which have been approved but not yet into construction (total of 10,448 units [7,631 + 2,817]), there will be an increase in population of about 29,300 people based on 2.8 people/EDU. This will bring the total population served by the District to about 72,500.

There are several projects that are still under City of Beaumont review; these are presented in Table 2-8. These projects have a total of 6,725 units with would add another 18,800 people bringing the total population served to about 91,300 assuming 2.8 people/EDU.

Not included in Tables 2-7 and 2-8 are a number of industrial/commercial developments. These include Dowling Orchard Business Park (26.3 ac), Farmer Boys (0.62 ac), Ramona Tire (0.44 ac) and Mountain Bridge (38 ac). The water demand for these facilities is estimated to be the equivalent of 225 EDUs on the basis of 2,000 gallons/day/acre. These projects would bring the total EDUs to 17,398, i.e. (10,448+6,725+225) and bring the population served to about 91,800. Previously in this section it was stated the estimated build out population in BCVWD's Sphere of Influence is 112,300, with 90,600 in the City of Beaumont.

Table 2-8
Projects Under Review by City of Beaumont (2012)

Development Name	Total Housing Units Approved	Estimated Build-out Year
Taurek (Potrero/Viele, TR-31162)	244	Unknown
Jack Rabbit Trail	2,000	Unknown
The Preserve/Legacy Highlands Specific Plan	3,412	Unknown
American Villas (693 American Ave)	36	Unknown
Eighth St. Condos (1343 Eighth St.)	16	Unknown
Pennsylvania Ave Apts (850 Penn Ave)	8	Unknown
Beaumont Commons Affordable Housing (Xenia, 6th -8th St)	120	Unknown
Tuscany Townhomes (8th Xenia)	188	Unknown
Tournament Hills 3 (TM 36307)	233	Unknown
Oak Valley Senior Center (Oak Valley Pkwy/Oak View)	372	Unknown
Hidden Canyon II	82	Unknown
Beaumont Distribution Center	14 (EDUs)	Unknown
Totals	6,725	

Population Projections for 2013 UWMP Update

SCAG/WRCOG Data

Projections of population and households to year 2035 in 5-year increments were available through the Southern California Association of Governments (SCAG)[1]. The data from SCAG was originally developed in concert with the Western Riverside Council of Governments (WRCOG) and was available by City and Unincorporated County area

[1] Projections of population and households to year 2035 in 5-year increments – Southern California Association of Governments (SCAG), Regional Transportation Plan, Adopted 2008 Growth Forecast, Los Angeles, CA www.scag.ca.gov/forecast/index.htm (accessed 2/13/2013)

as well a by census tracts. The latest version in 5-year increments was prepared in 2008 and so did not incorporate the results of the 2010 census.

The population in one of the census tracts in Cherry Valley had to be adjusted for areas which are outside of the District's Sphere of Influence (Hidden Meadows) and other areas which could not easily be served by the District. The population within these areas was estimated based on the approximate number of houses and subtracted from the census tract totals and not included in the District's projections.

Table 2-9 presents a summary of the SCAG/WRCOG projections within the BCVWD Sphere of Influence based on the 2008 WRCOG population forecast study. **The data in Table 2-9 do not take into account the 2010 census.** Figure 2-4 shows the historic population growth and includes the 2010 census. The populations in Table 2-6 and Figure 2-4 beyond 2010 are the actual SCAG/WRCOG 2008 population study forecast. The growth rate beyond 2010 for the City of Beaumont and the District as a whole closely matches the growth actually experienced between 2000 and 2010 and is probably not a realistic long term growth rate.

WRCOG updated the forecast in 2012 and included the results of the 2010 census.[1] A comparison between the 2008 and 2012 forecasts for the City of Beaumont are presented in Table 2-10.

Table 2-10
Comparison of SCAG City of Beaumont 2008 and 2012 RTP Forecasts

Year	2008 RTP Forecast	2012 RTP Forecast
2010	33,251	36,877
2020	52,591	56,500
2035	77,438	79,400

[1] Adopted Regional Transportation Plan (RTP), 2012 Growth Forecast, Los Angeles, CA www.scag.ca.gov/forecast/index.htm (accessed 2/13/2013.

Table 2-9
SCAG/WRCOG Population and Household Projections[1]

	1980	1990	2000	2005	2010	2015	2020	2025	2030	2035
City of Beaumont										
Population	6,818	9,685	11,407	21,242	33,950	45,029	52,591	63,660	74,686	77,439
Population Change per Period					12708	11079	7562	11069	11026	2753
Population Change per Period %					60%	33%	17%	21%	17%	4%
Households	2,852	3,718	3,887	7,071	11,032	15,428	18,888	22,747	26,728	27,745
People/Household	2.39	2.60	2.93	3.00	3.08	2.92	2.78	2.80	2.79	2.79
Cherry Valley										
Population	5,012	5,945	5,891	6,657	8,403	9,818	12,014	13,957	15,640	17,528
Population Change per Period					1746	1415	2196	1943	1683	1888
Population Change per Period %					26%	17%	22%	16%	12%	12%
Households	2,023	2,530	2,310	2,583	3,215	3,716	4,552	5,168	5,748	6,388
People/Household	2.48	2.35	2.55	2.58	2.61	2.64	2.64	2.70	2.72	2.74
TOTAL										
Population	11,130	15,630	17,298	27,899	42,353	54,847	64,605	77,617	90,326	94,967
Population Change per Period					14454	12494	9758	13012	12709	4641
Population Change per Period %					52%	29%	18%	20%	16%	5%
Households	4,875	6,248	6,197	9,654	14,247	19,144	23,440	27,915	32,476	34,133
People/Household	2.43	2.50	2.79	2.89	2.97	2.86	2.76	2.78	2.78	2.78

[1] U.S. Census Bureau, 2000 Census of Population and Housing, Population and Housing Unit Counts, PHC-3-6, California, Washington D.C., 2003 for the years 1980, 1990, and 2000. All other data from SCAG/WRCOG. **Note that 2010 data does not conform to 2010 census data**

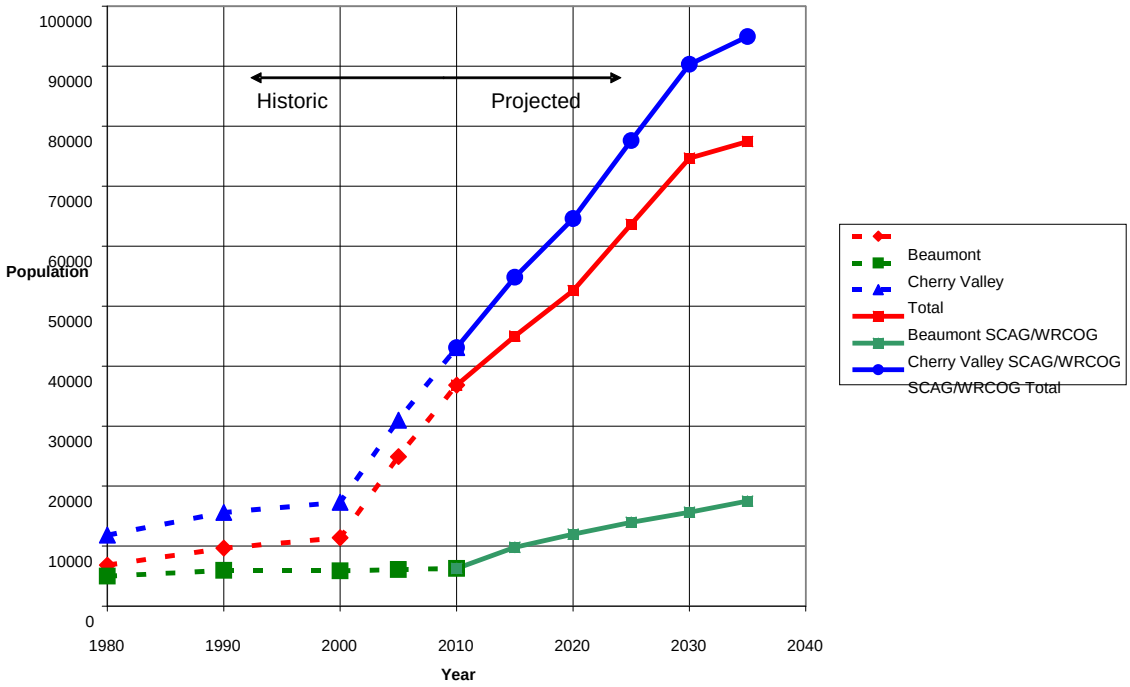


Figure 2-4
Historic and SCAG/WRCOG Population Forecasts for BCVWD Service Area

The changes in the 2020 and 2025 populations are not significant in terms of growth rate and the "shape of the growth curve."

Looking at Figure 2-4, the population growth forecast for the District as whole, and Beaumont in particular, closely approximates the growth experienced during the housing boom in the early to mid-2000s. This amount of growth may be overstated. Consequently, it is the District's opinion that the SCAG/WRCOG projections are not representative of what is to be expected over then next 20 to 25 years particularly in light of the impact of the recent economic downturn and the very slow recovery.

Recommended Adjusted Population Growth

As stated above, BCVWD believes the SCAG/WRCOG growth rates may be overstated. The housing boom in the early 2000s was unmatched in the history of the area and the growth rate during that period of time approaches the growth estimated by SCAG/WRCOG. This is unrealistic and some adjustment is appropriate.

Table 2-10 presents the District's estimate of population and households over the planning period associated with this UMWP Update. This growth rate is based on District review of local area property and growth rate projections set forth herein. Historical data is presented to provide a perspective on the growth rates. The population growth rates are assumed to increase gradually from the current "flat" growth rate to about 12% per 5-year period (about 2.4% per year). A gradual transition is growth rate is assumed. .

Table 2-10
Recommended 2013 UWMP Population and Household Projections

	1980	1990	2000	2005	2010	2015	2020	2025	2030	2035
City of Beaumont										
Population	6,818	9,685	11,407	24,909	36,837	39,784	43,762	49,014	54,895	61,483
Population Change per Period		2,867	1,722	13,502	11,928	2,947	3,978	5,251	5,882	6,587
Population Change per Period %		42%	18%	118%	48%	8%	10%	12%	12%	12%
Households	2,852	3,718	3,887	8,675	12,950	14,058	15,629	17,505	19,606	21,958
People/Household	2.39	2.60	2.93	2.87	2.84	2.83	2.80	2.80	2.80	2.80
Cherry Valley										
Population	5,012	5,945	5,891	6,085	6,279	6,530	7,053	7,758	8,689	9,992
Population Change per Period		933	-54	194	194	251	522	705	931	1,303
Population Change per Period %		19%	-1%	3%	3%	4%	8%	10%	12%	15%
Households	2,023	2,530	2,310	2,385	2,450	2,512	2,661	2,873	3,194	3,647
People/Household	2.48	2.35	2.55	2.55	2.56	2.60	2.65	2.70	2.72	2.74
TOTAL										
Population	11,130	15,630	17,298	30,994	43,116	46,314	50,815	56,772	63,584	71,475
Population Change per Period		3,800	1,668	13,696	12,122	3,198	4,501	5,957	6,813	7,891
Population Change per Period %		32%	11%	79%	39%	7%	10%	12%	12%	12%
Households	4,875	6,248	6,197	11,060	15,400	16,570	18,291	20,378	22,800	25,605
People/Household	2.43	2.50	2.79	2.80	2.80	2.80	2.78	2.79	2.79	2.79

Figure 2-5 is a plot of the recommended UWMP population projections over time, including the historical data. Also plotted for comparison is the SCAG/WRCOG forecast which essentially retains the "boom period" growth over the next 25 year period. The growth rate expected by the District over the next 20 to 25 years is about mid-way between the historical (low growth rate) and the "boom period" growth rate.

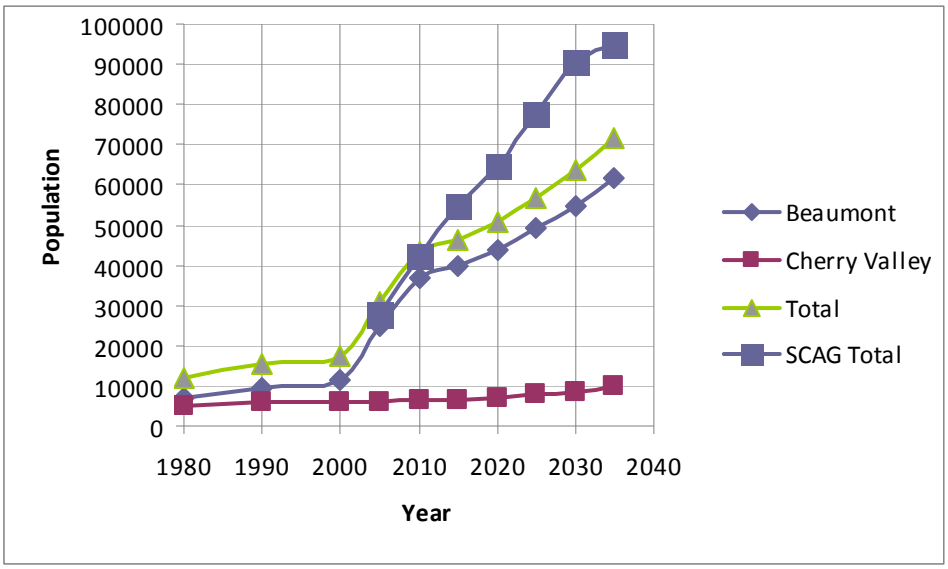


Figure 2-5
Recommended Population Projections for 2010 UWMP Update vs SCAG

The persons per household in Table 2-10 is assumed to reduce gradually from current levels to 2.80 people/unit in the City of Beaumont. For Cherry Valley, the demographics will change over time resulting in gradually greater population per dwelling unit.

Comparison to Previous UWMPs

The 2005 UWMP Update for the District presented population data based on the Southern California Association of Government's (SCAG's) projections and a District-developed projection based on District-estimated tract/developer build-out rates. This data is summarized in Table 2-11 for reference. The development populations were based on an estimate of the growth of equivalent dwelling units (EDU) and the population per EDU.

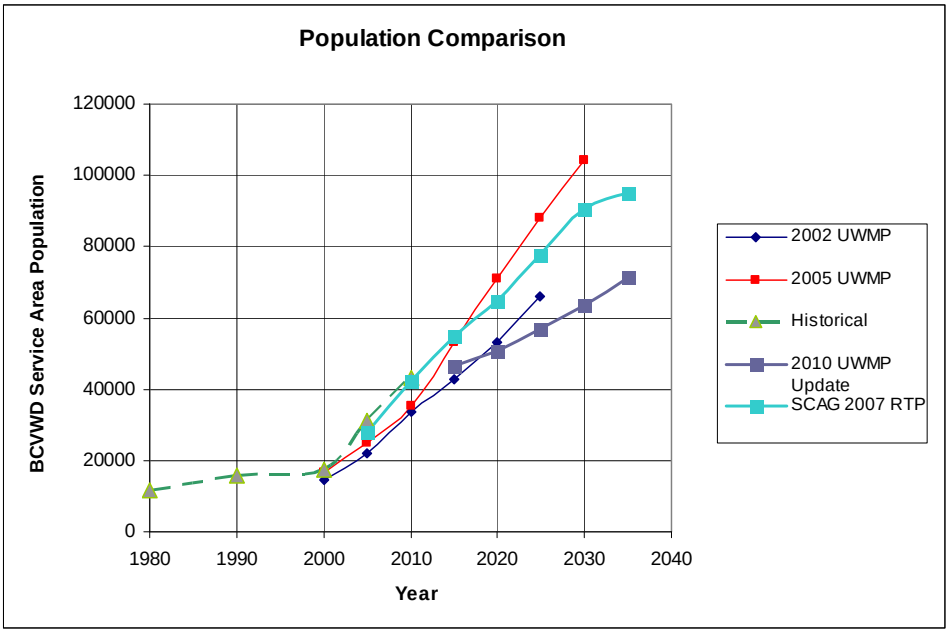
The data in Table 2-8 is presented only for historical purposes and provide a basis for comparison between the 2010 UWMP Update and the most recent past UWMP. The populations at year 2030 by either method are approximately the same; however, the growth rates are quite different. The development-estimated growth rate was much higher than the SCAG rate in the 2010-2025 period indicating a desire on the developers to "build out" quickly. Of course, that did not occur because of the economic turndown which occurred in 2008 and housing development virtually stopped.

Table 2-11
Population Projections from 2005 UWMP Update

	2000	2005	2010	2015	2020	2025	2030
SCAG Estimated Growth							
City of Beaumont	10,533	17,844	27,225	43,709	59,898	75,411	90,290
Cherry Valley	5,891	6,981	7,936	9,610	11,159	12,559	13,870
Total	16,744	24,975	35,241	53,319	71,057	87,970	104,160
Development Estimated Growth (Used as the basis for the 2005 UWMP Update)							
Total	18,214	24,152	69,342	95,845	101,875	104,354	105,681

Figure 2-6 shows the historic population through the 2010 census (2005 population estimated) along with the population projections in the 2002 and 2005 UWMP Updates. It can be seen that the population increase between 2000 and 2010 exceeded that projected in the UWMP Updates. This is not surprising since Beaumont was one of the fastest growing communities in the U.S. at the time. The SCAG/WRCOG forecast is also shown for reference. The population forecasts in the previous UWMPs were overly aggressive and if continued into the future would result in overstated projections.

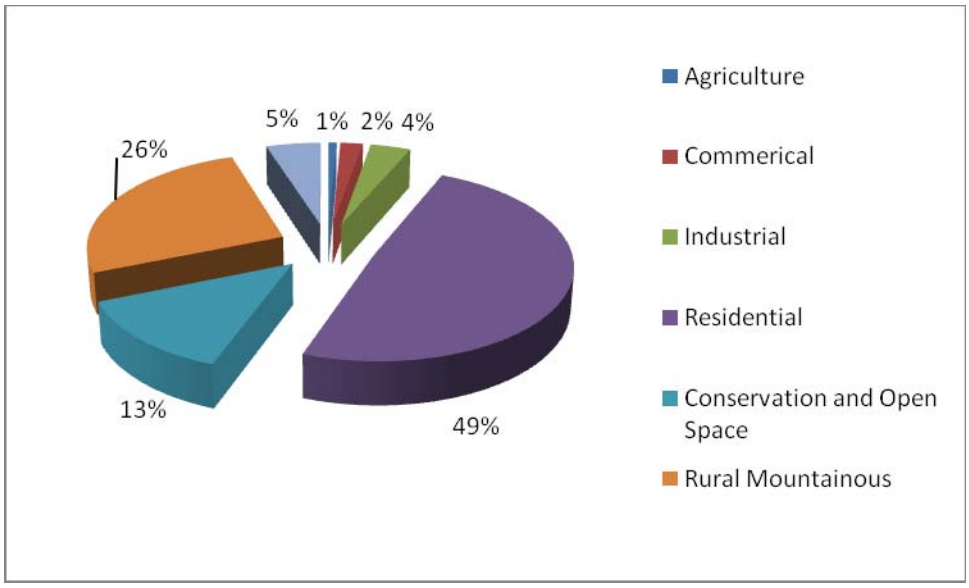
Figure 2-6
Historical Population vs Previous UWMP Population Projections



Land Use

Figure 2-7 shows the distribution of land use within the District's SOI based on the City of Beaumont and Riverside County Zoning as presented in the latest General Plans. Almost 50% of the land use is residential; 39% is open space, conservation or rural mountainous.

Figure 2-7
Land Use Distribution Within BCVWD SOI based on Current Zoning



It should be pointed out during the last few years, the City of Beaumont has been promoting rezoning of residential zoning areas to commercial and industrial zoning in areas currently being considered for development. Those areas include projects listed in Tables 2-6, 2-7 and 2-8, such as the Heartland Development, the Hidden Canyon Development and possibly the Jack Rabbit Trail Development. This would result in a significant reduction in the water demand.

Section 3

System Demands

This section discusses the methodology for the baseline per capita demand and establishes the baseline and interim compliance daily per capita water use. In addition this section will present the historic, current and projected water demands for the potable and non-potable (landscape irrigation) system along with a plan for implementing the Water Conservation Bill of 2009 (SB7X7-7, 20% reduction by 2020 or 20x2020).

Baselines and Targets

> §10608.20(e) An urban retail water supplier shall include in its urban water management plan. . . due in 2010 the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.

In February 2008, the Governor introduced a seven-part comprehensive plan for improving the Sacramento-San Joaquin Delta. A key component of his plan was a goal to achieve a 20 percent reduction in per capita water use statewide by the year 2020 (called 20x2020).

In November 2009, SBX7-7, The Water Conservation Act of 2009, was signed into law as part of a comprehensive water legislation package. The Water Conservation Act addresses both urban and agricultural water conservation. The urban provisions reflect the approach taken in the 20x2020 Water Conservation Plan. The legislation sets a goal of achieving a 20 percent statewide reduction in urban per capita water use and directs urban retail water suppliers to set 2020 urban water use targets. The law also required an interim target to be set to be met in 2015. DWR developed methodologies for urban water retailers to use in quantifying their "baseline" per capita and setting the 2020 target and the 2015 interim target.[1] The consequence of not meeting the targets is the inability of the water retailer to secure grants or loans from any state program on or after July 1, 2016.

Service Area and Supply

BCVWD's service area is well defined. All supply to the distribution system in 2010 and currently (2013) is from groundwater pumped into the system from 24 wells (1 well is standby). All of the wells are equipped with flow meters which are read daily and readings recorded. This procedure has been followed for at least 3 decades if not longer. BCVWD's water production is reported to the State of California as required by law and to the Beaumont Basin Watermaster as required by the basin adjudication. BCVWD's non-potable water system is currently supplied with potable water produced from these same wells. The non-potable system serves landscaping almost exclusively.

Although the District has been taking imported State Project Water since 2006, all of this water is percolated (recharged) and becomes part of the water pumped into the system by the wells.

[1] California Department of Water Resources, Division of Statewide Integrated Water Management, Water Use and Efficiency Branch. "Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use," February 2011

In 2004 BCVWD began serving water through a metered connection to the adjacent city of Banning on an emergency basis. Subsequently, the City of Banning and BCVWD entered into an agreement to share in the cost of constructing several high production wells. BCVWD operates the wells and Banning reimburses BCVWD for a proportionate share of the operating costs. Banning and BCVWD found this arrangement to be mutually beneficial and allows Banning to recharge imported State Project Water in BCVWD's groundwater recharge area and have a means of extracting the water and conveying it to their system. The pumped water is conveyed through BCVWD's system to a metered connection at the BCVWD/Banning boundary. BCVWD keeps daily records of the water exported to Banning.

The volume of water entering the BCVWD distribution system is easily determined by totalizing the well production; the water that leaves the BCVWD's system to Banning is totalized also. BCVWD meters all water served to customers both inside and outside the District boundaries as well as all construction water, water used for street sweeping, and water used in fire services.

Baseline Daily Per Capita Water Use Determination

Base Daily Per Capita Water Use is defined as average gross water use, expressed in gallons per capita per day (GPCD), for a continuous, multiyear base period. The Water Code specifies two different base periods for calculating Base Daily Per Capita Water Use under Section 10608.20 and Section 10608.22:

1. The first base period is a 10- to 15-year continuous period, and is used to calculate baseline per capita water use per §0608.20.
2. The second base period is a continuous five-year period, and is used to determine whether the 2020 per capita water use target meets the legislation's minimum water use reduction requirement per §10608.22.

Unless the urban retail water supplier's five year Base Daily Per Capita Water Use per Section 10608.12 (b) (3) is 100 GPCD or less, Base Daily Per Capita Water Use must be calculated for both baseline periods. **BCVWD's Base Daily Per Capita Water Use exceeds 100 GPCD, so both baseline periods must be evaluated.**

Methodology for Compliance with *§10608.20*

> §10608.20 (a) (1) Each urban retail water supplier shall develop urban water use targets and an interim urban water use target by July 1, 2011. Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28, and may determine the targets on a fiscal year or calendar year basis.
>
> (2) It is the intent of the Legislature that the urban water use targets described in subdivision (a) cumulatively result in a 20-percent reduction from the baseline daily per capita water use by December 31, 2020.
>
> (b) An urban retail water supplier shall adopt **one of the following methods** for determining its urban water use target pursuant to subdivision (a):
>
> (1) Eighty percent of the urban retail water supplier's baseline per capita daily water use…
>
> (2) The per capita daily water use that is estimated using the sum of the following performance standards…

(3) Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30,2009)…

(4) A method that shall be identified and developed by the department, through a public process, and reported to the Legislature no later than December 31, 2010

In establishing the baseline, BCVWD used "Method 1: eighty percent of the water supplier's baseline per capita use". In selecting this method, the "baseline period" is to be determined as follows:

a) If recycled water made up less than 10 percent of 2008 retail water delivery, use a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

b) If recycled water made up 10 percent or more of 2008 retail water delivery, use a continuous 10- to 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

In establishing the "baseline," method a) applies to BCVWD since whatever water was in the non-potable water system was actually potable water. No recycled water was available or distributed in 2008. **So BCVWD used 10-year periods ending December 31, 2004 through December 31, 2010.**

A separate spreadsheet table for the gross water use was developed for each ten-year period following DWR's suggested format. The gross water use is essentially all of the water that enters the water system over the year, less the amount sold to other agencies and any change in distribution storage determined at the beginning and end of the year. In the case of BCVWD, this would be the water sold to the City of Banning. BCVWD did not make any adjustments for meter accuracy on the well meters since the District regularly maintains these meters. The change in distribution storage was not quantified as it is determined to be negligible compared to the amount of water used during the year. These Gross Water Use Tables are included in Appendix B to this UWMP Update.

The Gross Water Use and estimated population served by the District for each year from 1995 through 2010 were used to develop the per capita water use. A summary of the per capita values for each ten-year period is shown in Table 3-1.

Table 3-1
Summary of Average per Capita for 10-year Periods §10608.12 (b) (1)

Period	Average per Capita, gpcd
1995-2004	298
1996-2005	297
1997-2006	298
1998-2007	299
1999-2008	303
2000-2009	299
2001-2010	289

The baseline period 1999 through 2008 had the highest per capita water use – 303 gallons per capita per day. Table 3-2 presents the Gross Water Use Table for the period 1999 – 2008 for information. Tables for the other periods are in the Appendix.

Table 3-2
Calculation of per Capita Gross Water Demand 1999 – 2008

TABLE 1. GROSS WATER USE CALCULATION	Utility Name:	Beaumont Cherry Valley Water District, Beaumont, CA									
	12-month period from:	1-Jan			to:		31-Dec				
	Volume Units:	acre-ft									
		1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
1	Volume from Own Sources (raw data)	5,887	6,308	5,063	8,896	7,109	8,662	9,672	12,139	13,694	14,307
	Meter error adjustment (+/-)										
	Subtotal: Corrected Volume from Own Sources	5,887	6,308	5,063	8,896	7,109	8,662	9,672	12,139	13,694	14,307
2	Volume from Imported Sources (raw data)	0	0	0	0	0	0	0	0	0	0
	Meter error adjustment (+/-)										
	Subtotal: Corrected Volume from Imported Sources	0	0	0	0	0	0	0	0	0	0
3	***Total Volume Into Dist. System = Line 1 + Line 2***	***5,887***	***6,308***	***5,063***	***8,896***	***7,109***	***8,662***	***9,672***	***12,139***	***13,694***	***14,307***
4	Volume Exported to Other Utilities (raw data)	0	0	0	0	0	354	366	636	530	753
	Meter error adjustment (+/-)										
	Subtotal: Corrected Volume Exported to Other Utilities	0	0	0	0	0	354	366	636	530	753
5	Change in Dist. System Storage (+/-)	0	0	0	0	0	0	0	0	0	0

Table 3-2 (Cont'd)
Calculation of per Capita Gross Water Demand 1999 – 2008

6	***Gross Water Use Before Indirect Recycled Water Use Deductions = Line 3 - Line 4 - Line 5***	***5,887***	***6,308***	***5,063***	***8,896***	***7,109***	***8,308***	***9,306***	***11,503***	***13,164***	***13,554***
7	Indirect Recycled Water Use Deduction	0	0	0	0	0	0	0	0	0	0
8	***Gross Water Use After Indirect Recycled Water Use Deductions = Line 6 - Line 7***	***5,887***	***6,308***	***5,063***	***8,896***	***7,109***	***8,308***	***9,306***	***11,503***	***13,164***	***13,554***
9	*Water Delivered for Ag. Use (optional deduction)*										
10	*Process Water Use (optional deduction)*										
11	**Gross Water Use After Optional Deductions = Line 8 - Line 9 - Line 10**	**5,887**	**6,308**	**5,063**	**8,896**	**7,109**	**8,308**	**9,306**	**11,503**	**13,164**	**13,554**
12	Average Daily Gross Water Use, mgd line 11/365*0.3258	**5.254**	**5.631**	**4.519**	**7.941**	**6.346**	**7.415**	**8.306**	**10.268**	**11.751**	**12.099**

Table 3-3, corresponding to DWR "Table 4", presents the population and per capita water uses for the period 1999 to 2008. The population was developed using census tract block data for the years 1990, 2000, and 2010 in combination with the District's GIS system. The population is very accurate for the decade years. For the intervening years between 1990 and 2000, a linear growth in population was assumed. This is reasonable in light of the fact that the population growth in that decade was minimal (15,630 to 17,298). For the decade from 2000 -2010, the population was assumed to follow the growth in connections to the BCVWD system. This was a period of very high growth in the District.

Table 3-3
Per Capita Water Use 1999 -2008
§10608.12 (b) (1)

DWR Table 4			
Utility Name:	BCVWD		
12-month Period:	January to December		
Number of Years in Range:	10		
(1)	(2)	(3)	(4)
Base Years*	**Service Area Population**	**Gross Water Use (mgd)**	**Daily Per Capita Water Use (3) *1000000 ÷ (2)**
1999	17,131	5.25	307
2000	17,298	5.63	326
2001	18,014	4.52	251
2002	19,223	7.94	413
2003	22,390	6.35	283
2004	24,612	7.42	301
2005	30,994	8.31	268
2006	35,745	10.27	287
2007	39,013	11.75	301
2008	40,894	12.10	296
		Total of Column (4):	3033.2
		Divide Total by Number of Base Years:	303
* Enter the actual year of the data in this column. The most recent year in base period must end no earlier than December 31, 2004, and no later than December 31, 2010.			

Methodology for Compliance with §10608.22 Water Conservation Act 2009

> §10608.22 Notwithstanding the method adopted by an urban water retail water supplier pursuant to §10608.20, an urban retail water supplier's per capita daily water use reduction shall be no less than 5 percent of the base daily per capita water use as defined in paragraph (3) of subdivision (b) of §10608.12. This section does not apply to an urban retail water supplier with a base daily per capita at or below 100 gallons per capita per day.
>
> §10608.12 (b) "Base daily per capita water use" means any of the following:
>
> (1) The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10- year period ending no earlier than December 31, 2004, and no later than December 31, 2010. Calculated in Tables 3-2 and 3-3 above.
>
> (2) For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier, the urban retail water supplier may extend the calculation described in paragraph (1) up to an additional five years to a maximum of a continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010. Does not apply to BCVWD.
>
> (3) For purposes of §10608.22, the urban retail water supplier's estimate of its average gross water use, reported in gallons per day and calculated over a continuous five year period ending no earlier than December 31, 2007, and no later than December 31, 2010.

In addition to complying with §10608.20, described in the previous subsection, BCVWD must comply with §10608.22 which stipulates BCVWD's per capita daily water use reduction shall be no less than 5 percent of the base daily per capita water use as defined in paragraph (3) of subdivision (b) of §10608.12.

Paragraph (3) of subdivision (b) of §10608.12 requires determination of the gross water use (and per capita use) over continuous five-year periods ending no earlier than December 31, 2007 and no later than December 31, 2010.

Table 3-4 presents a summary of the results of analyzing per capita water use for the 5-year periods from 2003 – 2007 through 2006 – 2010. The 5-year period from 2004 – 2008 had the highest per capita water use at 291 gallons per capita per day.

Table 3-4
Summary of Average per Capita for 5-year Periods
§10608.12 (b) (3)

5-year Period	Average per Capita, gpcd
2003-2007	288
2004-2008	291
2005-2009	283
2006-2010	274

Table 3-5, corresponding to DWR "Table 3," presents the calculation for the period 2004 -2008. Calculations for the other periods are in Appendix B

Table 3-5
Calculation of the Per Capita Water Use (2004 – 2008)

Utility Name:	**Beaumont Cherry Valley Water District**		
12-month Period:	1-Jan to 31-Dec		
(1)	(2)	(3)	(4)
Base Years*	**Service Area Population**	**Gross Water Use mgd)**	**Daily Per Capita Water Use (3) ÷ (2)**
2004	24,612	7.42	301
2005	30,994	8.31	268
2006	35,745	10.27	287
2007	39,013	11.75	301
2008	40,894	12.10	296
		Total of Column (4):	1454
		Divide Total by 5:	291
*Most recent year in base period must end no earlier than December 31, 2007, and no later than December 31, 2010.			

Calculation of Baseline and Targets

1. Eighty percent of the 10-year period average per capita gross water use.

   The period for calculation is 1999-2008 with a per capita water use of 303 gallons/capita/day (from Table 3-3).

   0.80 * 303 gallons/capita/day = **242 gallons/capita/day**

2. 95% of the 5-year period average per capita gross water use (i.e., 5% use reduction).

   The period for calculation is 2004 2008 with a per capita water use of 291 gallons/capita/day (from Table 3-5)..

   0.95 * 291 gallons/capita/day = **276 gallons/capita/day**

Since the 2020 target based on 80% of the 10-year average per capita gross water use is less than 95% of the 5-year average per capita gross water use, **the 2020 target is 242 gallons/capita/day.** The **interim (2015) target** is the mid-point between 303 gallons/capita/day and 242 gallons/capita/day or **273 gallons/capita/day**. Table 3-6 summarizes the targets.

BCVWD could also choose to comply with method (3) which is 95% of the applicable state hydrologic region target as stated in the State's April 30, 2009, draft 20x2020 Water Conservation Plan. The 2020 per capita target using that approach is 149 gallons/capita/day. This is far less than the 242 gallons per capita per day calculated above. Consequently method (3) will not be used.

Table 3-6
Baseline and Targets for Compliance
with SB7X-7

Target Year	Per Capita Water Use, gal/cap/day
Baseline	303
2015	273
2020	242

Water Demands

§10631(e)(1) and (2) Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses: (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; (I) Agricultural.

Methodology

The total water requirement for each of the 5-year time periods was based on the population in Table 2-10 – the recommended populations, and the estimated per capita water use.

Review of the per capita water demand for 2010, 2011 and 2012 indicated a significant reduction from previous years. Per capita water use in 2010, for example, was about 231 gpcd, down significantly from the 326 gpcd and 268 gpcd in the years 2000 and 2005 respectively. This was due to the significant turn-down in construction activities with the corresponding reduction in construction water, a large number of new homes constructed with small yards and high efficiency plumbing fixtures and appliances, a water conservation ethic among the residents and a two-tiered water rate structure which promotes wise use of water. Future water use is expected to be similar to that recently experienced.

Because of uncertainties, per capita water use for 2015 is estimated to be 240 gpcd, slightly higher than current per capita. The 240 gpcd is expected to gradually reduce to about 230 gpcd by the year 2035. Figure 3-8 shows the historic and projected per capita water demands within the BCVWD service area used for this UWMP Update. The “per capita” includes both the potable and non-potable demands since that is what the historic data is based on.

The per capita demands are below the 2015 and 2020 targets presented in Table 3-6 indicating compliance. It is important to remember that this is the total per capita demand. From year 2015 on recycled water will be introduced into the non-potable water system. This will have the effect of reducing the potable water demand significantly and bring down the potable water per capita appreciably.

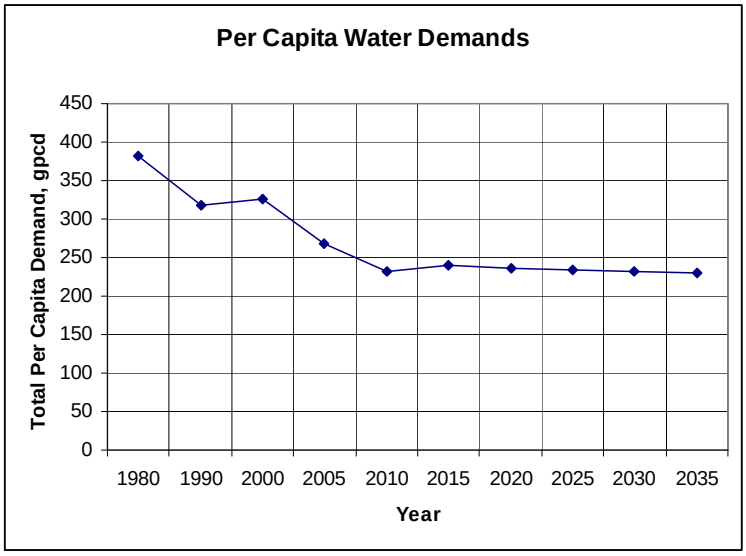


Figure 3-1
Historic and Projected Per Capita Water Demands

Using the per capita water demands and the populations presented in Table 2-10, the total, potable and non-potable water demands are presented in Table 3-7.

Table 3-7
Historic and Projected Water Demands

	Water Demands, AFY		
Year	Total	Potable	Non-potable
1980	5,074	5,074	
1990	5,572	5,572	
2000	6,308	6,308	
2005	9,306	8,268	1,038
2010	11,023	9,201	1,822
2015	12,453	10,953	1,500
2020	13,492	11,912	1,580
2025	14,947	13,287	1,660
2030	16,526	14,786	1,740
2035	18,417	16,587	1,830

Figure 3-2 shows the historical and projected potable and non-potable water demands graphically. The total water demand is increasing at rate of approximately 290 acre-ft/year

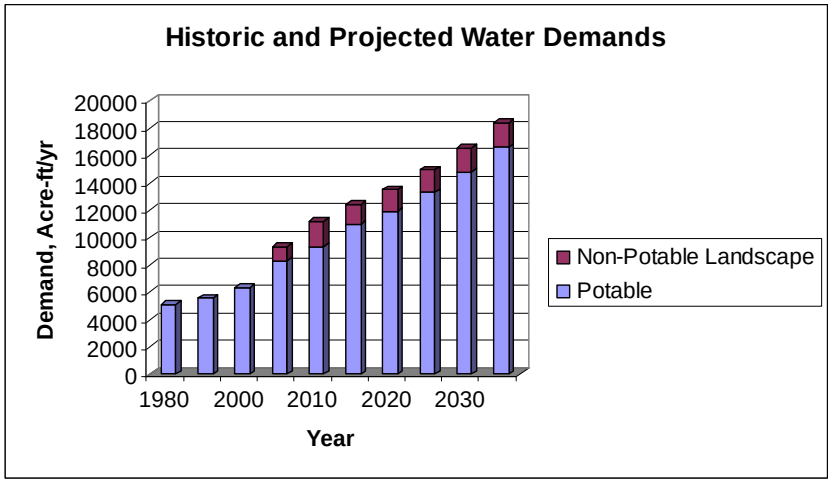


Figure 3-2
Historic and Projected BCVWD Water Demands

DWR requires the water demand to be allocated to various sub-sectors such as multi-family, commercial, industrial etc. The basis for the allocation is the "Public Water System Statistics Report" the District files with DWR each year. This report has the breakdown by water use sector and can be used as the starting point for the projections.

The District's service area will continue to develop as primarily single family residences during the 25-year planning period to year 2035 though the District is seeing a number of developers interested in changing from single family developments to industrial/commercial warehousing. This would result in a reduction in water demand should this actually occur. At this point in time it is too early to forecast.

To forecast the single family demand, the approach used in this UWMP Update is to forecast the other water demand sectors first. Then the total water demand of the other sectors is subtracted from the total water demand to arrive at the single family water demand.

As land prices begin to rise in the area, there may be more multi-family residences being constructed in the service area than has historically been constructed. For multi-family residential connections and water use, the growth rate was assumed to be half of the growth of single family residences. This same approach, i.e., half of the single family rate, was used for industrial, and institutional/governmental connections and water use; commercial connections and water use growth rate was expected at 2/3 of the population growth as shops and merchants try to meet the needs of the population.

Landscape water demands in the non-potable water system are metered and currently the demand is about 1,500 acre-ft/yr through about 275 connections. Future annual growth in landscape connections (on the non-potable water system) will be slower than that experienced during the construction boom of the early 2000s. A large portion of the basic infrastructure was completed with the initial phases of many of the development projects, i.e. major boulevards with medians and common areas, pocket parks, and schools, and future developments will not need to construct these. Also some of the landscaping will be replaced over time with low water using landscaping even though irrigated with recycled water.

The agricultural irrigation connections are declining as the land use is changing from orchards to residential land. Most of the irrigation customers are in Cherry Valley and would not likely be served by the recycled water system within the foreseeable future. They will continue to be served potable water. The agricultural irrigation accounts will decline throughout the planning period at a gradual rate particularly as the cost of water continues to increase.

The “Other” category accounts are anticipated to increase at an estimated rate of 1/3 of the population growth rate. These are primarily fire services which have essentially zero demand plus street sweeping and construction water. The water deliveries to these accounts will increase over time but the category total water use by these accounts is not significant compared to the total water deliveries in the District. Non-revenue water is also included in this category.

The water deliveries in acre-ft/yr to the multi-family, commercial, industrial, institutional/governmental, agricultural and “other” categories were projected from the actual 2010 values through 2035 on the basis that the changes in demand would be proportional to the changes in accounts and connections – a reasonable assumption.

Tables 3-8 a presents the past (2005) and current (2010) water deliveries by water use sector to the extent the District has the data. All of the water served by the District is metered.

Table 3-8a
Water deliveries — actual, 2005 and 2010 (Acre-ft/yr)

	2005		2010	
Water use sectors	# of accounts	Volume (acre-ft/yr)	# of accounts	Volume (acre-ft/yr)
Single family	9,141	5,800	14,296	7,638
Multi-family	NA	NA	105	362
Commercial	267	797	323	84
Industrial	8	242	13	90
Institutional/governmental		NA	45	434
Landscape	97	1,038	305	1,822
Agriculture	78	225	91	95
Other	125	1,204	221	498
Total	9,716	9,306	15,399	11,023

“Other” includes Construction and Fire Services
“Landscape” is demand currently on non-potable system and potable water systems.
Source: BCVWD Public Water System Statistics submitted to DWR

In Table 3-8a, the District meters all construction water and fire services and bills for the water used. This water is included in the “Other” category. Even though the number of accounts nearly doubled from 2005 to 2010, the total amount of water served in the “Other” category decreased. This was due to the reduction in construction activity during the period. Fire service water use is minimal.

Tables 3-8b through 3-8c present the projected water deliveries for each 5-year period through 2035.

Table 3-8b
Water Deliveries – projected for 2015 and 2020

	2015		2020	
Water use sectors	# of accounts	Volume (acre-ft/yr)	# of accounts	Volume (acre-ft/yr)
Single family	15,911	9,345	17,488	10,243
Multi-family	109	375	114	394
Commercial	339	88	361	94
Industrial	13	93	14	98
Institutional/governmental	47	450	49	472
Landscape	340	1,500	358	1,580
Agriculture	85	90	80	85
Other	226	510	234	527
Total	17,070	12,453	18,698	13,492

Table 3-8c
Water Deliveries – projected for 2025 through 2035

	2025		2030		2035	
Water use sectors	# of accounts	Volume (acre-ft/yr)	# of accounts	Volume (acre-ft/yr)	# of accounts	Volume (acre-ft/yr)
Single family	19,576	11,538	21,967	12,952	24,739	14,658
Multi-family	121	417	128	442	136	469
Commercial	389	101	421	109	456	119
Industrial	15	104	16	110	17	117
Institutional/ governmental	52	500	55	530	58	562
Landscape	376	1,660	394	1,740	415	1,830
Agriculture	75	80	70	75	65	70
Other	243	547	253	569	263	593
Total	20,848	14,947	23,304	16,526	26,149	18,417

As can be seen in Tables 3-8a through 3-8c, the water deliveries will increase from a little over 11,000 acre-ft/year in 2010 to over 18,400 acre-ft/year by 2035 based on the population projections in Section 2. This represents an increase of 67% over the 25 year period.

In Tables 3-8a through 3-8c, the “Landscape” category includes only the service connections which are connected to the District’s non-potable water distribution system. These connections serve parks, playgrounds, schoolyards, street medians and common areas only.

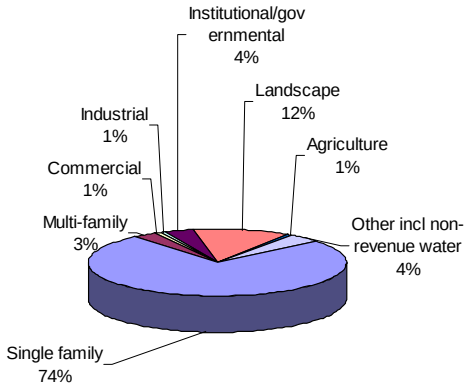
It is important to recognize that existing golf course demands are not included in the landscape demands in Tables 3-8a – 3-8c. There are three golf courses currently in the BCVWD service area:

Highland Springs Golf Course (Exec)	162 AFY from BCVWD meter records
California Oak Valley Golf Club (18)	750 AFY from Watermaster Reports
Morongo Tukwet Canyon Golf Club (36)	1,250 AFY from Watermaster Reports

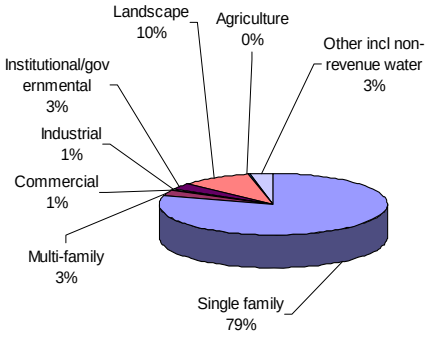
The Highland Springs Golf Course is located in Cherry Valley and in order to be served from the existing non-potable water system would require a booster pumping station and about 7,000 ft of pipeline. It is not likely to be served for many years yet. Outlets from the BCVWD non-potable water system currently exist for the California Oak Valley and Morongo Tukwet Canyon Golf Clubs. These courses have overlying pumping rights according to the Beaumont Basin Judgment and use groundwater to irrigate the courses. If BCVWD supplies them with recycled water, the Judgment requires the golf courses to forego pumping the equivalent amount of water from the Basin and allow the water supplier, in this case BCVWD, to pump the water. This is discussed later in the Section on Water Supply.

As of 2010 the non-potable system is supplied with potable water. From 2015 on, however, it will be a blend of recycled water and untreated imported State Project Water or other non-potable water sources. Blending may be required in order to meet the Regional Board’s Maximum Benefit requirement of a 10-year moving average TDS equal to 330 mg/L.

Figure 3-8 presents the water demands by use sector graphically for the year 2015 and year 2035. The demand in the single family sector is projected to increase from 74% to 79% of BCVWD’s total water demand over the planning period.



Water Demands Year 2015



Water Demands Year 2035

Figure 3-3
Water Demands by Use Sector 2015 and 2035

Lower Income Household Water Use

> §10631.1(a).The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier

Table 3-9 presents the long term low-income housing needs, per capita water demand and annual water demand per low-income housing unit for the City of Beaumont and Cherry Valley.

The number of low-income housing units for the City Beaumont was based on information in the City of Beaumont's General Plan, Housing Element dated October, 2010. The data in the Beaumont Housing Element originated in the Regional Housing Needs Assessment (RHNA) prepared by SCAG. The RHNA new housing construction need was 2732 dwelling units. For the purposes of this UWMP update, this was assumed to be the ultimate build-out need. The current (2010) number of units came from the City's Housing Element, Inventory of Government Assisted Housing Developments (rounded up). All of the low-income housing units are in multi-family units and that was assumed to continue through to the year 2035.

For the community of Cherry Valley, WRCOG developed a Low-income housing need for the entire WRCOG area (10,311 units). A separate projection for Cherry Valley was not provided, The low-income housing allocation for Cherry Valley was estimated based on the current population of Cherry Valley to the WRCOG population. The result was an estimated need of 175 low-income housing units. For Cherry Valley the low-income housing needs were assumed to be single family units with multi-family units only be developed in the year 2035.

The single family, low-income unit water demand was estimated to be 75% of a typical Beaumont single family home. Multi-residential unit water demand was estimated to be 2/3 of a low-income single family unit.

Table 3-10 presents a projection of the water demands for low-income housing based on the data in Table 3-8. The demands presented in Tables 3-8a through 3-8c, presented previously, include the demands in Table 3-10. Note that in Tables 3-8a through 3-8c, the number of accounts are presented, not the number of units. Most of the multi-family residential are not individually metered.

Table 3-9
Current and Projected Low-income Housing Needs

	2010	2015	2020	2025	2030	2035
City of Beaumont						
Single Family	0	0	0	0	0	0
Multi-family	350	651	952	1,253	1,554	1,855
Subtotal EDU	350	651	952	1,253	1,554	1,855
Cherry Valley						
Single Family	70	72	74	76	78	80
Multi-family	0	0	0	0	0	25
Subtotal EDU	70	72	74	76	78	105
Total Single Family	70	72	74	76	78	80
Total Multi Family	350	651	952	1,253	1,554	1,880
Total Low Income	420	723	1,026	1,329	1,632	1,960
Unit Water Use AFY						
Single Family Residential, gpcd	231	240	237	235	232	230
Single Family Residential, AFY*	0.78	0.81	0.80	0.79	0.78	0.78
Low Income Single Family Residential, AFY	0.58	0.61	0.60	0.59	0.58	0.58
Low Income Multi-Family Residential, AFY	0.39	0.40	0.40	0.39	0.39	0.39

* Based on 3 people per residence

Table 3-10
Projected Low-income Housing Water Demands, acre-ft/yr

Low Income Water Demands	2015	2020	2025	2030	2035
Single-family residential	50	45	46	48	49
Multi-family residential	300	389	512	635	768
Total	350	434	558	683	817

The 2035 low-income water demand of 817 acre-ft/yr represents about 5% of BCVWD's water demand, i.e., not significant.

SGPWA Water Demand Projections

> §10631(k) Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c)

The San Gorgonio Pass Water Agency (Pass Water Agency) completed their UWMP update early in 2011. Table 3-11 provides a summary of water demands provided by BCVWD to the Pass Water Agency. Table 3-11 also shows the current water demand projections extracted from Table 3-8a through 3-8c for comparison.

Table 3-11
Summary Potable Water Demands in BCVWD and Pass Water Agency, AFY

Total Water Demand Projection	2010	2015	2020	2025	2030	2035
Current BCVWD Projections from Tables 3-8a through 3-8c	11,023	12,453	13,492	14,947	16,526	18,417
Provided to Pass Water Agency by BCVWD in mid 2010 and included in their UWMP (Tables 2-1, 2-2 UWMP)	15,658	19,239	19,494	23,043	26,817	28,194
Pass Water Agency Total Water Demand in their UWMP	29,767	40,062	48,164	59,690	71,651	77,805

Since the Pass Agency finalized their 2010 UWMP, BCVWD's water demand projections have been significantly reduced. This was due largely to the turndown in the economy and the rather slow return. It is also BCVWD's opinion that the growth in future years will not be nearly what was experienced in the 2000 – 2006 period.

BCVWD's water demand projections which were included in the Pass Water Agency's 2010 UWMP ranges from 37.5 % to 23.4% of the Pass Water Agency's total projected water demands within their entire service area.

Table 3-12 presents information on BCVWD's projected imported water requirements from the Pass Water Agency's 2010 UWMP. Included are BCVWD's initial estimates given to the Pass Agency in 2010 for their UWMP preparation. For comparison the current projected amount of SPW is also shown in Table 3-12 based on the data from Table 4-18. It is clear the initial amounts provided to the Pass Agency were understated.

Table 3-12
Imported State Water Project Requirement Provided to SGPWA, AFY

	2010	2015	2020	2025	2030	2035
BCVWD's Projected Imported State Project Water Requirement provided to SGPWA for use the Agency's 2010 UWMP (See Table 4-18)	2,855	7,406	7,726	9,166	10,890	12,820
SGPWA's Total Projected Imported State Project Water Requirement in the Agency's 2010 UWMP (Table 2-3 of UWMP)		6,970	7,760	15,015	22,468	26,920
BCVWD's requirement as a percent of the SGPWA's Total Imported Water Requirement		107%	99.6%	61%	48.5%	47.6%

The SGPWA has a Table A State Water Project amount of 17,300 acre-ft/yr. So if the Agency's projections are correct, additional Table A water (or the equivalent) will need to be purchased sometime between 2020 and 2025. BCVWD's portion of the imported water needs in the Pass Water Agency's service area ranges from over 107% down to just under 48%. The amount of Table A which is purchased will **need to be adjusted for the reduced reliability** of the State Water Project. This is discussed in a subsequent section of this UWMP Update.

Water Use Reduction Plan

> Urban retail water suppliers are to prepare a plan for implementing the Water Conservation Bill of 2009 requirements and conduct a public hearing which considers the economic impacts §10608.26.

Key elements of BCVWD's water use reduction plan are:

- Conversion of landscaped common areas, parks and street medians to recycled water. This will occur by 2014- 2015. BCVWD already has constructed a 28 to 30 mile long backbone recycled water distribution system forming a loop around the City of Beaumont. A 2 MG recycled water reservoir was constructed n 2010 to provide storage. This system is currently supplied with potable water. About 1500 acre-ft/yr are currently used in this recycled water distribution system. In addition developers installed many miles of smaller distribution pipelines within their subdivisions to convey the water internally. BCVWD has been approved for a Facilities Planning Grant from the SWRCB for a connection to YVWD's recycled water system. This will augment the recycled water BCVWD fully intends to use from the City of Beaumont's treatment facility. BCVWD has been working with the RWQCB to secure a master recycled water use permit. Implementation of this project will reduce the potable water demand by about 14%.
- Use of a tiered water rate. Early in 2011, the BCVWD's Board of Directors implemented a declining tiered water rate structure to promote water conservation. It is expected that this would result in a reduction of about 7.5 to 10% in demand.

- Implementation of new landscape ordinances in the City of Beaumont and Riverside County aimed at reducing outdoor water use. The impact of the new ordinances will be felt gradually, but it would not be unreasonable to estimate a 15 to 20% reduction in outdoor water use District-wide over time (7.5 to 10% of the total water use).
- Construction of "smart", low water using landscaping at new homes. Developers are moving away from traditional full turf lawns to more drought tolerant, low water using landscape materials in response to demands from new home buyers to reduce costs and create a more sustainable environment. The results indicate that outdoor water use is easily cut in half with these new "smart" designs. Some of the high water using "common areas" and street medians will be converted to low water using landscaping. Use of artificial turf for athletic fields is growing; the Beaumont Unified School District is installing artificial turf at its new stadium complex currently under construction. It is very likely that athletic fields at their other schools may be converted to artificial turf also. It is hard to quantify the impacts of the smart landscaping because it is closely related to the new landscape ordinances the City and County have adopted.
- New houses will have the latest high efficiency plumbing fixtures and high efficiency appliances such as dishwashers and washing machines.

There will be an economic impact on BCVWD due to the reduced water sales and revenue. However, some of this reduction will be offset by a reduction in electric power costs for pumping and the cost for imported water. Most of BCVWD's water supply is produced from wells in the Beaumont Basin where water levels are 500 ft below ground. To introduce this water into the distribution system requires another 200 ft of head for a total of 700 -800 ft pumping lift. Considering a wire to water efficiency of 65%, nearly 1100 kWh of electricity are required for each acre-ft pumped from the Beaumont Basin. Each acre-ft conserved, will save approximately $100 in pumping cost. BCVWD's current Tier 2 commodity rate is $0.93/100 cu ft. This is equivalent to $405/acre-ft. But since BCVWD's groundwater pumping rights are limited due to the adjudication, there will be a savings in the purchase of imported water. The current rate paid to the SGPWA for imported water is $317/acre-ft. So, if 1 acre-ft is saved, $405 in revenue will be "lost", but the savings in expenses would amount to $417. So it can be concluded that the impact on BCVWD's customers should be minimal.

Section 4

System Supplies

Background and Approach

BCVWD is taking a conservative approach in the statement of available water supplies for this UWMP Update. The firm sources are:

- Edgar Canyon Groundwater
- Water Stored in the Beaumont Basin
- Recycled Water from the City of Beaumont and YVWD
- Imported Water from SGPWA

This UWMP Update recognizes that the above "firm" sources will vary from year to year due to hydrologic conditions and other factors. Reliability factors are considered in quantifying the above sources. These sources may be supplemented by the following sources assuming they are technically and economically feasible, and can be developed and quantified with a reasonable degree of certainty.

- Urban Runoff captured and percolated in existing water quality basins to the point it can be effectively quantified
- Shallow groundwater with excessive nitrates from the mouth of Edgar Canyon to supplement the non-potable water system
- Stormwater captured and percolated in or from Edgar Canyon, Noble and Marshall Creek and other local water courses
- Well(s) in the Singleton Groundwater Basin to supplement the potable water supply providing these can be developed with reasonable yield and not impact existing private wells. The Singleton Basin is currently not adjudicated.
- Wells San Timoteo Groundwater Basin to supplement the non-potable water system providing the quality is suitable.

It is anticipated that these sources may be developed over the planning period covered by this UWMP Update and when proven technically feasible and quantified, can be included in future UWMP Updates.

Firm Sources

The groundwater available in Edgar Canyon is well documented as pumping records are available dating back to 1957; the Beaumont Basin was adjudicated in 2004 and the water pumped and in storage for each of the producers is maintained by the Beaumont Basin Watermaster, an arm of the court.

Recycled water which is used in the non-potable water system is subject to the Regional Board's Maximum Benefit objectives which require a 10-year annual average Total Dissolved Solids (TDS) of

330 mg/L in the non-potable water blend. BCVWD has prepared a blending study[1] to determine how much recycled water can actually be used on an annual basis and still meet this TDS blending requirement. The results of that study are incorporated in this UWMP Update to make sure the amount of recycled water which can be used is not over-estimated.

Surplus recycled water which is not used in non-potable water system could be percolated provided it complies with CDPH's regulation for replenishing groundwater basins used for potable water supply with recycled municipal wastewater. (The latest draft of these regulations is dated November 21, 2011. On January 9, 2013, the SWRCB issued a draft amendment to the SWRCB's Recycled Water Policy which was adopted in May, 2009.) The use of recycled water for groundwater recharge is subject to treatment and monitoring requirements for pharmaceuticals and personal care products and chemicals of emerging concern that are quite costly. These costs will be identified later in this UWMP Update along with the implications.

BCVWD prepared a number of studies[2, 3]to identify the tertiary effluent water quality requirements, diluent water requirements, and reporting and cost implications. The results of these blending studies are incorporated into this UWMP Update.

Imported water from the State Water Project through the SGPWA considered the results of the 2011 DWR Reliability Study[4]. The capacity limitations on the East Branch Extension, Phases I and II (EBX I and EBX II) were considered in determining the limits on available imported state project water. To take into account competing demands for imported water from the Pass Agency's members, the draft allocation agreement[5] allocation percentages were considered. Even though this has not been officially adopted by the Pass Agency, it represents a reasonable basis for allocation.

Supplemental Sources

There are a number of water sources which were identified in previous UWMPs such as stormwater and urban runoff capture, nitrate contaminated groundwater from the mouth of Edgar Canyon, Singleton Basin groundwater etc. These sources will not be included in this UWMP Update as firm supplies since there has not been sufficient engineering design work or operational experience with these sources. These, and perhaps others, will be explored in the upcoming decades and their yields firmed up. But, until these are firmed up, they will be considered "supplemental" sources which will help reduce the amount of imported water needed.

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[1] BCVWD (2012). Blending of Various Source Waters in BCVWD's Non-potable Water System – TDS Implications, August.

[2] J. Reichenberger PE to E. Fraser (2012). Memorandum, Impact of Draft Recharge Regulations on Ability to Percolate Surplus City of Beaumont Recycled Water, October 31.

[3] J. Reichenberger (2013). Reclaimed Water Blending Study with Reduced Irrigation Demands, Spreadsheet analysis with and without Tukwit Canyon GC, February

[4] State of California, Natural Resources Agency, Department of Water Resources (2012). Final Delivery Reliability Report, June.

[5] Regional Water Allocation Agreement for Water Imported by the San Gorgonio Pass Water Agency, March 12, 2012.

Water Sources

10361(b). Identify and quantify to the extent practicable, the existing and planned sources of water available to the supplier over the same 5-year increments described in subdivision (a)

In the early years of the District, diverted surface water from Edgar Canyon (Little San Gorgonio Creek) was used for domestic and agricultural supply. Remnants of some of the diversion boxes are still visible in Edgar Canyon. Since the early 1900's, wells supplemented the surface diversions. Eventually the surface diversions were no longer used and the District relied solely on groundwater from both Edgar Canyon and the Beaumont Storage Unit (BSU or the Beaumont Basin).

In September 2006, BCVWD completed the first phase of its storm water capture and groundwater recharge project located along Beaumont Ave. between Brookside Ave. and Cherry Valley Blvd. and began recharging imported State Project Water (SPW) purchased from the Pass Water Agency. The facility sits astride Noble Creek. The imported water percolates into the ground and comingles with the native groundwater in the Beaumont Basin. Groundwater and percolated imported water are BCVWD's only current water source.

Future water sources will include recycled water and could include captured and recharged stormwater from Edgar, Noble, Marshall and other canyons, urban runoff captured and recharged in detention and water quality basins, captured, nitrate-contaminated underflow from the Edgar Canyon, groundwater from the Singleton and perhaps the San Timoteo groundwater basins.

BCVWD is considering introducing SPW directly into the non-potable water distribution system. This will reduce the cost of water pumped into the non-potable system by about $100 per acre-ft and will reduce energy and the District's carbon footprint. (The $100 per acre-ft is the cost of energy to pump the water from the groundwater table into the non-potable water distribution system.) When recycled water having a TDS concentration greater than 330 mg/L is introduced into the non-potable water system, imported SPW will need to be blended in to meet the 330 mg/L, 10-year average Maximum Benefit TDS in the blended water.

Table 4-1 identifies the water sources which are currently used or planned to be used by the District to meet future demands. Each of these sources will be described in more detail in subsequent subsections.

Table 4-1
Current and Future Water Sources Available to BCVWD

Water Source	2010	2015	2020	2025	2030	2035
Groundwater, Edgar Canyon	●	●	●	●	●	●
Groundwater stored in the Beaumont Basin	●	●	●	●	●	●
Imported Water purchased through SGPWA	●	●	●	●	●	●
Recycled water for landscape irrigation		■	■	■	■	■
Recycled water for groundwater recharge				◆	◆	◆
Storm Water Capture and Recharge from Edgar Canyon, Noble Creek and other local watershed			◆	◆	◆	◆
Urban Storm Runoff captured in detention and water quality basins		◆	◆	◆	◆	◆
Captured, nitrate-contaminated shallow groundwater from Edgar Canyon to supplement non-potable water system			◆	◆	◆	◆
Singleton Basin groundwater			◆	◆	◆	◆
San Timoteo Basin groundwater to supplement non-potable water system			◆	◆	◆	◆

● Firm, existing source ■ Firm, future source ◆ Supplemental source, not considered as part of firm supply at this point

Groundwater

10361(b). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) Copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being taken by the urban water supplier to eliminate the long term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past 5 years.

(4) A detailed description of the analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier.

The District currently owns and operates a total of 24 groundwater wells of which only 20 are used to any great degree. Three of the wells have their capacity shared with the City of Banning. (BCVWD constructed these wells under a cooperative agreement with Banning for shared capacity rights.) The 20 wells have a total production capability of approximately 27.5 million gallons per day (mgd) not including the capacity shared with Banning. Table 4-2 presents a summary of the District's wells and their current capacity.

The maximum day and average day demand in 2010 were 19.7 and 9.85 mgd respectively. The maximum day/average day ratio is 2.0. For 2011, the maximum day was 19.8 mgd. The maximum day of record occurred in 2007 when 23.3 mgd was pumped into the system. BCVWD can meet the maximum day demand with the largest well out of service based on a 24-hour operation assuming short-term use of the shared Banning capacity (Total capacity is 25.6 mgd).

The District's wells are located in four areas:

- Upper Edgar Canyon (San Bernardino County)
- Middle Edgar Canyon (San Bernardino County)
- Lower Edgar Canyon (Riverside County)
- Beaumont Storage Unit (Beaumont Basin) (Riverside County)

Note that “Edgar Canyon” is synonymous with “Little San Gorgonio Creek”.

Little San Gorgonio Creek (Edgar Canyon)

Groundwater in Edgar Canyon primarily occurs in the younger and older alluvial valleys and within the rock fractures beneath the alluvium associated with the extensive faulting in the area. Numerous faults cross the canyon generally in a southeast-northwest direction. These act as barriers to groundwater movement and subdivide the canyon into several sub basins. The groundwater aquifer is limited and storage is small. Groundwater levels vary from just few feet below ground surface to about 200 feet below ground surface. The groundwater levels and groundwater production respond quickly to stream flow. During wet years considerably more water can be pumped than during dry years.

BCVWD prefers to use the wells in Edgar Canyon since they are the least expensive to operate and the water can be conveyed to the District customers by gravity with no additional pumping.

BCVWD has two active surface water diversions in Edgar Canyon. These are on file with the State of California Division of Water Rights.

- Diversion Number S014351 located in the SE1/4 of NE1/4 of Section 2, T2S, R1W, SB&M and first used in 1907. This location is about 1200 ft downstream of the USGS gauging station in Little San Gorgonio Creek, near the upper end of the District’s property.
- Diversion Number S014352 located in the NW1/4 of SE1/4 or Section 22, T2S, R1W, SB&M and first used in 1894. This location is just upstream of the existing percolation ponds at the mouth of Edgar Canyon.

Table 4-2
Summary of BCVWD Well Pumping Capacity

Edgar Canyon Wells			Beaumont Basin Wells		
Well No.	Capacity, gpm	Comment	Well No.	Capacity, gpm	Comment
4A	300	(L)	1	1300	
5	160	(L)	2		Inoperable
6	250	(M)	3	1500	
9A		Limited use	16	800	
10	50		21	2100	
11	100		22	1700	
12	130		23	2700	
13		Stand-by	24	1250	Total 2500, 1250 to Banning
14	200		25	1450	Total 2900, 1450 to Banning
18	50		26	750	Total 1500, 750 to Banning
19	220		29	4000	
20	50				
RR-1		Not used (L)			
Total	1510	gpm	Total	17,550	gpm
	2.17	mgd		25.3	mgd
	2430	Acre-ft/yr		28,340	Acre-ft/yr
Total System			19,060 gpm		
			27.5 mgd		
			30,770 Acre-ft/yr		

(M) = Middle Canyon, (L) = Lower Canyon; All the rest are Upper Canyon Wells

BCVWD has operated numerous percolation ponds in the canyon. Surface flows in Little San Gorgonio Creek are captured and diverted into the percolation ponds which then recharge the shallow aquifers to help supply the existing wells in Upper and Middle Edgar Canyon. BCVWD has been doing this since the late 1800s as noted above and has a pre-1914 water right to divert up to 3,000 miners inch hours (MIH) or approximately 43,440 acre-feet per year (acre-ft/yr) for diversion of water for domestic and irrigation uses[6]. However, BCVWD has never had a demand that requires such

[6] A miner's inch in Southern California is reported to be 0.02 cubic ft/second (cfs)

large quantities of water supply; and the watersheds may not be capable of supplying such quantities during an average year.

Table 4-3 presents the 5-year production from the wells in Edgar Canyon for the years 2006 - 2010. From 1957 to 2010, a period of 53 years, the average production from the Edgar Canyon Wells was 1,944 ac-ft/yr. However, prior to 1983, the ability to utilize the water pumped from Edgar Canyon was limited due to a lack of sufficient conveyance capacity to deliver water from Edgar Canyon to Cherry Valley and Beaumont. In 1983, the District installed the 14-in Edgar Canyon Transmission Main which enabled larger quantities of water to be conveyed from the Edgar Canyon to Cherry Valley and Beaumont. Since 1983 to 2010, a period of 27 years, the average amount pumped was 2,263 ac-ft/yr. This is far more indicative of Edgar Canyon's ability to produce water.

Table 4-3
Groundwater Extractions from Edgar Canyon Wells (2006 – 2010)

Year	Total Production Acre-ft
2006	2,549
2007	2,365
2008	2,108
2009	1,783
2010	1,867
5-year average	2,134

During 2011, 2,158 acre-ft were produced from Edgar Canyon—approximately the previous 5-year average.

Statistical information on the Edgar Canyon production for the period 1983 to 2011 is presented in Table 4-4:

Table 4-4
Groundwater Extraction Statistics from Edgar Canyon Wells (1983 -2011)

Parameter	Annual Production Acre-ft
Average	2,259
Maximum	3,738
Minimum	1,117
Minimum 3-yr Moving Average	1,230
90^{th} Percentile	3,288
10^{th} percentile	1,277

In Table 4-4, the term "10^{th} Percentile" means that 90 percent of the time the production was greater than the value shown. In other words, there would be only one year in ten that the production would be less than 1,272 ac-ft/yr. The minimum 3-year moving average, to be used for the 3-year drought period, is 1,230 acre-ft.

The San Timoteo Watershed Management Authority (STWMA) estimated the safe yield from Edgar Canyon to be 2,600 ac-ft/yr.[7] This amount appears consistent with the average amount of extractions shown in Table 4-4 from Edgar Canyon for the period 1983 – present.

A water budget analysis in a report prepared for the SGPWA indicated the yield from Edgar Canyon was between 2,000 and 2,800 ac-ft/yr. Based on the 20-year period 1988-2008 when water levels were reported rising in Edgar Canyon, pumping averaged 2,900 ac-ft/yr and suggests that the yield of Edgar Canyon may be in the range of 2,300 to 2,800 ac-ft/yr. This also is consistent with both the District's data and that of STWMA.[8]

For purposes of this UWMP Update, 2,260ac-ft/yr will be used as the average annual yield from the Edgar Canyon Wells.

The quality of the groundwater in Edgar Canyon is excellent. The TDS concentration is in the lower 200 mg/L range; nitrate levels are low, except at the mouth of Edgar Canyon. At the mouth of Edgar Canyon, USGS has reported[9] that a monitoring well 2S/1W-22G4 had a nitrate-N concentration of 11.3 mg/L. This exceeds the drinking water MCL of 10 mg/L. Well 2S/1W-22G4 is a shallow monitoring well that is perforated from 138 to 158 below ground surface. USGS states that this well is likely affected by "an anthropogenic source of nitrogen that may include agricultural activity or septic tank seepage." BCVWD believes some of this nitrate contaminated water can be captured through an extraction barrier and introduced into the non-potable water system for landscape irrigation. This would put this water to beneficial use and reduce the contamination flowing into the Beaumont Basin. The nitrates in the water would be used by the landscaping materials. This is discussed in more detail later in this section as a potential future water source.

Beaumont Basin (Beaumont Storage Unit)

The Beaumont Basin, or Beaumont Storage Unit (BSU) as it is also known, is one of the largest storage units in the San Gorgonio Pass area covering an area of about 27 sq. mi. with at least 1.1 million acre-feet of water in storage and about 200,000 to 400,000 acre-feet of unused groundwater storage capacity. STMWA estimates the amount of water in the Beaumont Basin could be as much as 2.4 million acre-ft based on usable groundwater extending down to 1500 ft below ground surface.[10] This is 500 ft deeper than previously assumed and is based on several recent wells drilled by BCVWD.

The boundaries of the BSU are defined on all sides by postulated faults including the Banning and Cherry Valley Faults to the north and unnamed faults to the south, east, and west. The Cherry Valley Fault is the dividing line between the BSU and the Singleton storage unit. See Figure 4-1.

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[7] Wildermuth Environmental, Inc. (2005). Integrated Regional Water Management Program for the San Timoteo Watershed, Final Draft, prepared for the San Timoteo Watershed Management Authority, , June 2005.

[8] SGPWA (2010). *Report on the Sustainability of the Beaumont Basin and Beaumont Management Zone*, prepared for the SGPWA by Hahn Water Resources, LLC, Evergreen, CO, November.

[9] USGS (2006). *Geology, Ground-Water Hydrology, Geochemistry, and Ground-Water Simulation of the Beaumont and Banning Storage Units, San Gorgonio Pass Area, Riverside, California*, U.S. Department of the Interior, U.S. Geologic Report, in cooperation with the San Gorgonio Pass Water Agency, Scientific Investigations Report 2006-5026.

[10] "*Integrated Regional Water Management Program for the San Timoteo Watershed*," Final Draft, prepared for the San Timoteo Watershed Management Authority, Wildermuth Environmental, Inc., p 2-15, June 2005.

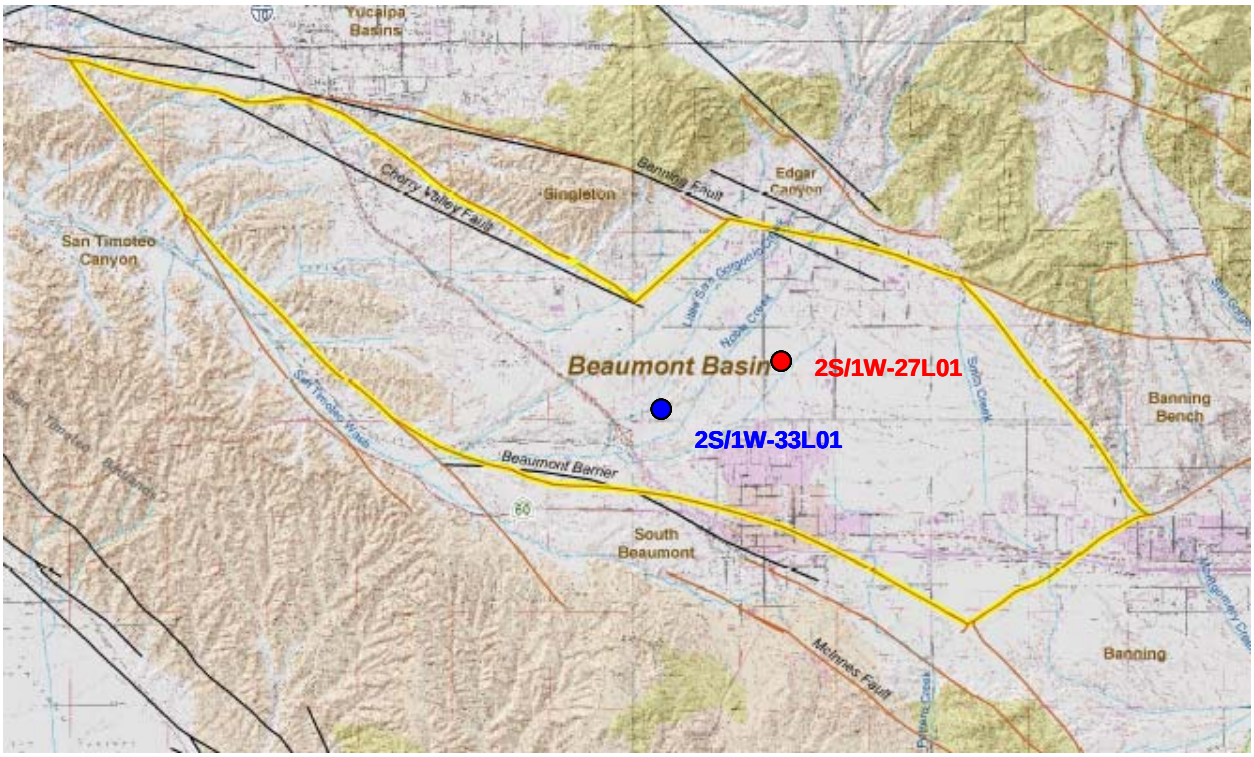


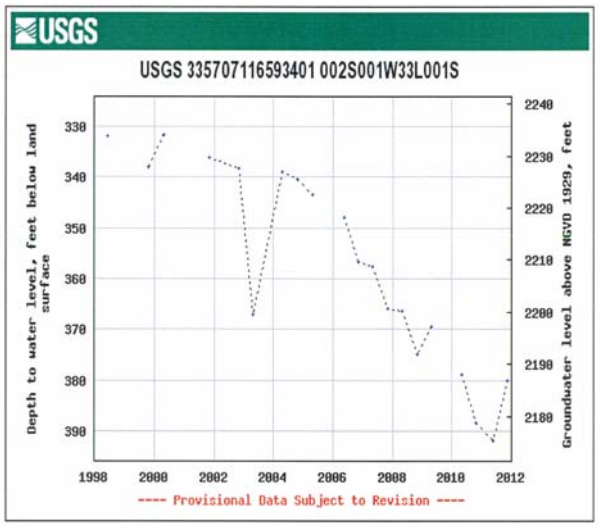
Figure 4-1
Beaumont Groundwater Basin and Major Fault Boundaries
Source: Beaumont Basin Watermaster

Groundwater within the BSU primarily occurs in the older alluvium and the San Timoteo Formation. Groundwater elevations in the BSU range from approximately 160 ft below ground surface (bgs) to 600 ft bgs. Underlying the BSU are nearly impermeable granitic/metamorphic basement rocks.

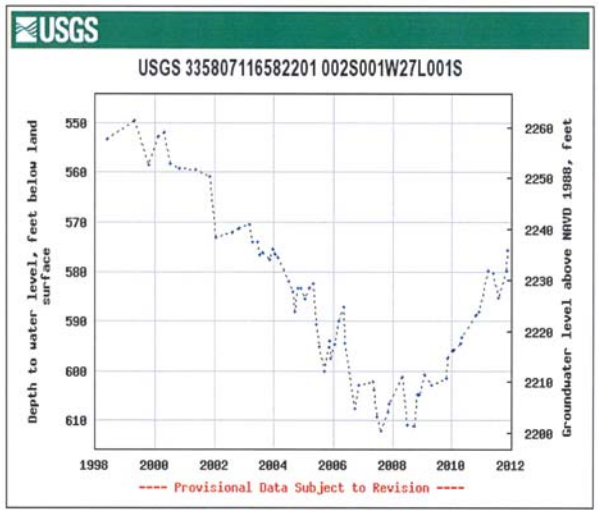
It should be noted that the BSU has been drawn down from the steady state groundwater elevations computed in the Bloyd (1971) report[11]. The Bloyd report shows that the groundwater elevation is approximately 100 feet below steady-state (pre-development) conditions. According to STWMA, progressive drawdown of water levels in the Beaumont Basin occurred from the 1920s to about 1980. Since then groundwater levels have stabilized. Current levels in the basin are about 75 to 120 ft below the 1920 levels and about 10 to 40 ft below the 1980 level.[12]

[11] Bloyd, R.M., 1971, Underground storage of imported water in the San Gorgonio Pass area, southern California: U.S. Geological Survey Water-Supply Paper 1999-D.

[12] "*Integrated Regional Water Management Program for the San Timoteo Watershed*," Final Draft, prepared for the San Timoteo Watershed Management Authority, Wildermuth Environmental, Inc., p 2-13, June 2005



Well 2S/1W-33L01 Near Little San Gorgonio Creek between Oak Valley Parkway and Brookside Ave.



Well 2S/1W –27L01 Near BCVWD Recharge Site

Figure 4-2
Typical Beaumont Basin Well Levels[13]
(See Figure 4-1 for location)

Figure 4-2 shows two wells, one just west of Little San Gorgonio Creek, the other near the BCVWD recharge site show a steady decline of water levels. Well 27L01, at the BCVWD recharge site, shows a recovery starting in late 2006 when the District began recharging state project water. Water levels rose 30 to 40 ft. Well 33L01, farther west, shows an increase from 2011. That could be due to stream percolation in the nearby creeks or a time lag for the recharge water to reach the well – approximately 1 mile southwesterly of the recharge area. It is very likely a combination of the two. Figure 4-2 clearly demonstrates the recharged water reaches the main groundwater table.

Groundwater flow in the BSU generally follows the ground surface topography. However, there is a north-south groundwater divide that roughly follows Cherry Avenue, a major north-south arterial on the east side of Beaumont. To the west of Cherry Avenue, groundwater flows southwest and west toward San Timoteo Canyon; to the east of Cherry Avenue, groundwater flows southeast and east toward Banning.

In the western portion of the Beaumont Basin, the groundwater elevations intersect the surface elevations. The groundwater becomes surface water in springs and seeps along the tributary drainages to San Timoteo Wash.

During the field investigation work related to the District's Stormwater Capture and Recharge project, (described subsequently), multiple aquifers systems were identified by Geoscience Support Services Inc (Geoscience)[14]. They designated the aquifer systems beneath the recharge site as:

- Perched -- 300 to 400 ft bgs
- Shallow -- 478 to 485 ft bgs

[13] SGPWA (2012). Annual Report on Water Conditions, Reporting Period 2011. November

[14] Geoscience Support Services, Inc, (2002). *Geohydrologic Investigation Noble Creek Recharge Study*, July 1, 2002

- Intermediate – 600 to 1000 ft bgs
- Deep –below 1000 ft bgs

Prior to drilling the production well at the recharge site, the base of useable groundwater water in the Beaumont Basin was thought to be 1000 ft bgs. This the primary production zone of most of the older municipal wells in the BSU. As part of the pilot recharge project, a well was drilled to 1500 ft bgs and test pumped at 3,000 gpm. The water quality from this well is excellent, with total dissolved solids concentrations in the low 200 mg/L range. During the aquifer testing, water from the deep aquifer was analyzed and found to be chemically quite different from that of the intermediate aquifer. That well became BCVWD Well No. 23 and was put into service in late summer 2004. In 2005, BCVWD drilled Well No. 24 into the deep aquifer and it too was test pumped at 3,000 gpm. Since that time BCVWD also drilled Well No. 25 to 1,500-ft depth. The District also purchased a deep well from the Sunny Cal Egg Ranch which became Well No. 29 which produces 4,000 gpm. The finding of this deep aquifer greatly extends the amount of usable groundwater in the BSU.

Table 4-5 presents the BCVWD's groundwater extractions in the BSU. The table shows the amount extracted and sold to Banning. Sale of water to Banning started in 2004.

Table 4-5
BCVWD's Groundwater Extractions from Beaumont Basin Wells (2006 – 2010)

Year	Total Production Acre-ft	Sold to Banning Acre-ft	Net BCVWD Extractions Acre-ft
2006	9,590	636	8,954
2007	11,329	530	10,799
2008	12,199	751	11,448
2009	10,981	495	10,486
2010	9,156	148	9,008
5-year average	10,651		10,139

Production in 2011 was 9,571 acre-ft – a little less than the average for 2006-2010. No water was sold to Banning in 2011.

Water Quality in the Beaumont Basin

During the period 2002 – 2006 TDS concentrations in the Beaumont Basin Groundwater ranged from 160 to 360 mg/L. Historical ambient TDS based on the period 1954 – 1973 was 230 mg/L; for the period 1984- 2003 the ambient TDS was 260 mg/L. Although there is a slight upward trend, the TDS is still very low.[15]

Average nitrate-N concentrations for the period 2002 – 2006 ranged from 0.26 to 7.9 mg/L with maximum concentrations ranging from 0.26 to 9.03 mg/L. During that same period about 70% of the wells sampled for nitrate-N had an average concentration less than 2.5 mg/L. None of the wells

[15] Wildermuth Environmental Inc. (2007). First Biennial Engineer's Report, July 2003 through June 2006, Beaumont Basin Watermaster for San Timoteo Watershed Management Authority vs. City of Banning et.al, June.

sampled had nitrate-N exceeding the MCL of 10 mg/L[16]. BCVWD's Well No. 16 in Cherry Valley experienced a "spike" in nitrate-N in 2005 reaching 9.0 mg/L; at the same time, Well No. 21 showed a concentration of 6.1 mg/L.[17] These concentrations have since decreased. This was investigated but no conclusions could be drawn as to the exact cause. Other wells west of the mouth of Edgar Canyon at the Bonita Vista and Cherry Valley Water Companies have shown elevated nitrate-N levels.

Beaumont Basin Adjudication

The Beaumont Basin was adjudicated in February 2004, in Superior Court, Riverside County Case RIC 389197, *San Timoteo Watershed Management Authority vs. City of Banning et al*. The Judgment established the Beaumont Basin Watermaster (Watermaster) to administer the judgment. It established the rights of the Overlying Parties and the Appropriator Parties, e.g., BCVWD and others. Some of the essential elements of the Judgment are as follows:

- The Safe Yield of the Basin was established at 8,650 acre-ft/yr. This was to be re-evaluated every 10 years. §I 3.X and §VI 5.Y. It will next be evaluated in 2014.
- A controlled overdraft of the basin is allowed for the first 10 years to create more usable storage capacity in the Basin for Conjunctive Use. In the Judgment this is termed "Temporary Surplus." This has been established at 160,000 acre-ft. After 10years the controlled overdraft ceases. This provided a 10-year time frame for the appropriators to develop facilities to use imported SPW and develop other water sources. § I3.BB and Exhibit C, Column (5).
- The Overlying Parties can extract, in total, a maximum of 8,650 acre-ft/yr. The Overlying Producers and their rights are shown in column (4) of Exhibit B. If an Overlying Party pumps more than five times its share of the operating safe yield (as shown in column (4) of Exhibit B) in any five consecutive year period, the overlying producer shall provide Watermaster with sufficient funds to replace the overproduction. Exhibit B, Column (4) and §II 1.A
- During the first ten years after adoption of the Judgment (until 2014), the Appropriator Parties can extract, in total, a maximum of 16,000 acre-ft/yr, i.e., the temporary surplus amount divided by 10 years. Thereafter the Appropriating Parties can extract, as a maximum, only the amount each has in storage or otherwise credited to the Appropriator Party. If, after the first 10 years, an Appropriator Party pumps more than each has in storage or otherwise credited, the Appropriator producer shall provide Watermaster with sufficient funds to replace the overproduction. Watermaster uses a similar 5-consecutive year period for accounting as described above for the Overlying Parties. BCVWD is an Appropriator Party. BCVWD has a 42.51% share of the temporary surplus for the first 10 years (until 2014) and can extract up to 6,802 acre-ft/yr without the need to replenish. Thereafter BCVWD can only extract what it has in storage or otherwise credited to BCVWD by Watermaster**.** §V 4 and Exhibit C, Column (5)

[16] Ibid

[17] Wildermuth Environmental, Inc. (2007). Water Quality Impacts from On-site Waste Disposal Systems in the Cherry Valley Community of Interest, Final Report, prepared for San Timoteo Watershed Management Authority, Project Committee No. 1, March.

- An Overlying Party can request water service from an Appropriator Party. For example, an Overlying Party can subdivide its property and then request an Appropriator, such as BCVWD, to supply the new subdivision with water. When this happens, the Overlying Party is precluded from extracting that volume of water provided by the Appropriating Party and the Appropriating Party shall have the right to produce the water foregone by the Overlying Party. §III 3
- If an Appropriating Party serves recycled water to an Overlying Party, the Overlying Party's water right is not diminished, but the Appropriator Party shall have the right to use that portion of the Overlying Water Right offset by the recycled water. In other words, serving recycled water to an Overlying Party allows the Appropriator to pump the equivalent amount of groundwater. §III 3 E.
- There is a provision which requires the BCVWD to set aside 2,400 AFY of projected water demand in the 2005 Urban Water Management Plan update specifically for Oak Valley Partners, LP. For the 2010 UWMP update, the Judgment states this figure should be revised to reflect the projected water demands. Oak Valley Partners, LP has an overlying pumping right per column (4) of Exhibit B equal to 1,806 AFY. However it is unclear how this 1,806 AFY is to split between YVWD and BCVWD. BCVWD started to provide potable water service to Oak Valley Partners, LP land in 2005; in 2010, BCVWD provided at total of 1,307 acre-ft to them. Based on providing about 1,300 AFY of potable water currently, BCVWD tentatively will allocate 900 acre-ft future demand (2,400 acre-ft/yr – 1,300 acre-ft/yr) to Oak Valley Partners, LP for this 2013 UWMP Update per the Judgment. §III.3.G
- If any Overlying Party produces less than 5 times the share of the safe yield assigned to the Overlying Party during any 5 year period (per Column (4) of Exhibit B), the unused portion shall be apportioned to the Appropriator Parties per Column (2) of Exhibit C: BCVWD 42.51%, Yucaipa Valley Water District 13.58%, South Mesa Water Company 12.48%, and the City of Banning 31.43%. The availability and allocation of any such groundwater not produced by the overlying parties in accordance with their rights under the Judgment shall be first determined in fiscal year 2008/09 and every year thereafter according to a schedule. (Watermaster Rules and Regulations §7.8.)
- 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 Appropriator. (Watermaster Rules and Regulations §7.3.)
- Watermaster has the authority to enter into Groundwater Storage Agreements with producers for the storage of supplemental water, wellhead protection and recharge, well abandonment, well construction, monitoring, replenishment, mitigation of overdraft, and collection of assessments. §VI.5.
- Supplemental replenishment water can be recycled water, State Project Water, or other imported water. Replenishment can be accomplished by spreading and percolation, injection, or in-lieu use of surface water or imported water. §VI 7.

- A minimum 200,000 acre-ft of groundwater storage capacity shall be reserved for conjunctive use. Any person, party or not a party to the Judgment, can make reasonable beneficial use of the groundwater storage capacity for storage of supplemental water provided that it is in accordance with a storage agreement with Watermaster. §I.3.S and §V.5.B
- Minimal producers (10 or less acre-ft/yr) are exempt from the Adjudication. §III.4.and §I.3.K
- An Appropriator's pumping right consists of the Appropriator's share of the Operating Yield, plus (1) any water acquired by the Appropriator from an Overlying Producer or other Appropriator, (2) any water withdrawn from the Appropriator's storage account, (3) any new yield created by the Appropriator. The operating yield is defined as the maximum quantity of water which can be produced annually by the Appropriators which consists of Appropriative Water plus Temporary Surplus. Appropriative Water is the amount of Safe Yield remaining after satisfaction of the Overlying Water Rights. §I.3.B, C. and M

The entire Judgment is contained in Appendix C.

Singleton Basin

The Singleton Groundwater Basin adjoins the Beaumont Basin and is separated from the Beaumont Basin by the Cherry Valley Fault as shown in Figure 4-3.

Wells in the Singleton Basin are primarily for private use. BCVWD had a study performed in the 1980s on the potential yield of wells in the Singleton Basin[18]. Bloyd (1971) suggested that well yields in the Singleton Basin would be less than the other storage units[19]. Well yields are probably in the 200 gpm (300 AFY) range – perhaps slightly larger. BCVWD currently does not have any wells in the Singleton Basin. Land has been set aside at the District's Hannon Tank Site (2650 Zone Reservoir) for construction of a well which would be in the Singleton Basin should the District ever want to proceed with a well.

Due to the uncertainty of the production, well supply from the Singleton Basin will not be considered as a firm supply for this UWMP Update, but should be considered for evaluation, and if cost effective, implemented as part of future UWMP Updates.

Total BCVWD Historic Groundwater Extractions

The District's annual groundwater production from 1957 through 2010 is depicted in Figure 4-4. Groundwater pumping remained steady or showed only a slight increase from 1957 to about 2000. After 2000 the pumping increased dramatically to accommodate the rapid growth in the service area. Figure 4-5 illustrates the groundwater sources in 2010. Eighty-three percent of the groundwater came from the Beaumont Basin; 17 percent from Edgar Canyon.

[18] Recollection of District Engineer J. C. Reichenberger PE of a report prepared for BCVWD by Robert Fox, circa 1985.

[19] Bloyd, R.M., 1971, Underground storage of imported water in the San Gorgonio Pass area, southern California: U.S. Geological Survey Water-Supply Paper 1999-D.

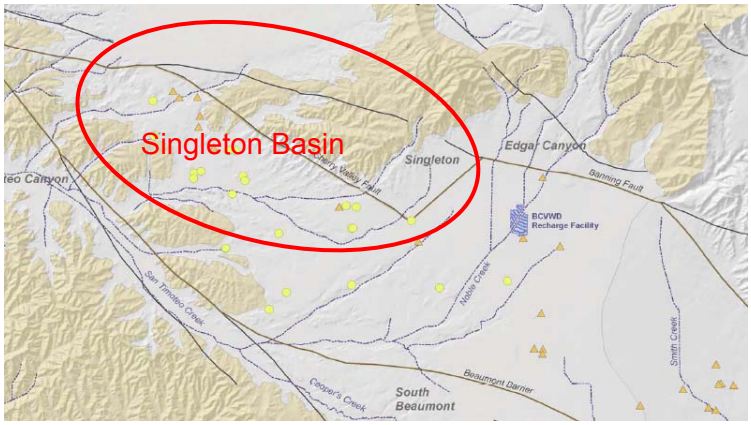


Figure 4-3
General Location of the Singleton Basin

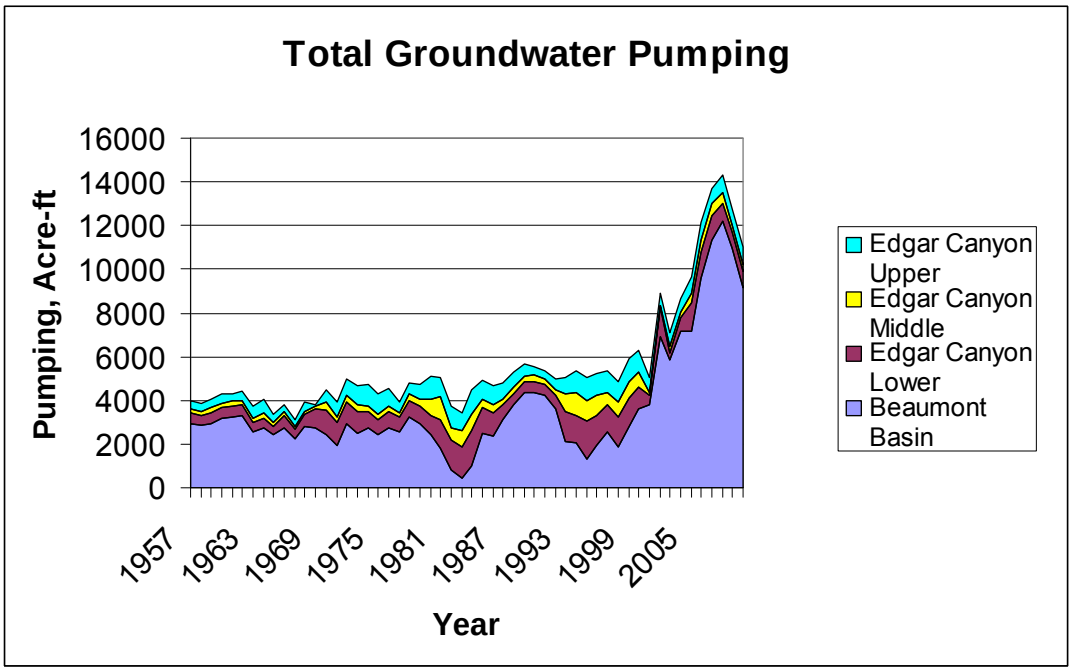


Figure 4-4
Groundwater Production from 1957 through 2010

Implementation of the Adjudication

The Adjudication requires Watermaster to allocate unused Overlying Party pumping rights and oversee the reassignment of overlying party pumping allocation to Appropriator Parties when the Appropriator Party provides potable or non-potable (recycled) water service to developments on the Overlying Party's lands. This is in addition to accounting for water in storage etc. per the Adjudication and the Watermaster Rules and Regulations.

The discussion which follows and the reassignments are based on the initially established safe yield of 8,650 acre-ft/yr. It is possible this could change, i.e., be reduced with the re-evaluation of the safe

yield set for 2014. Should this be the case there would be less water returned to the appropriators. However, at this point, there is no way to forecast what will happen. As a result, BCVWD will take a conservative (low amount of reassignment) position for the future. This can be adjusted in future UWMP Updates.

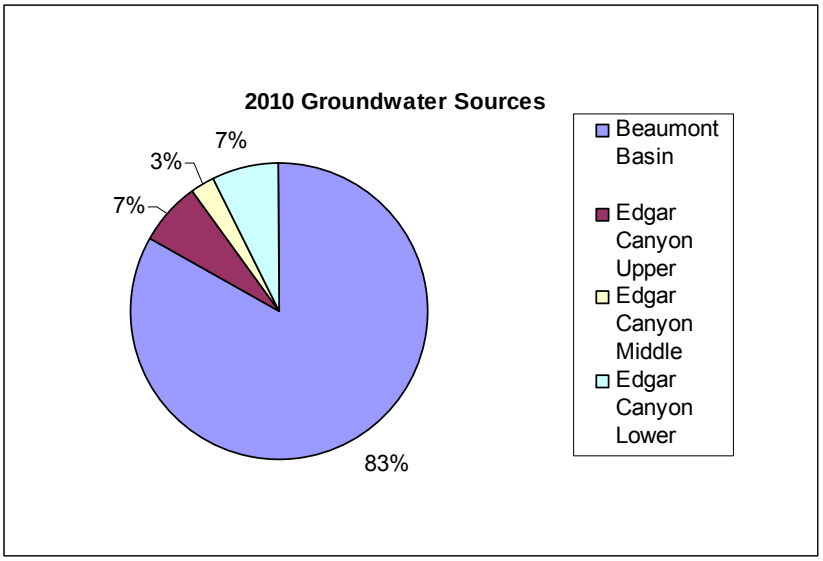


Figure 4-5
Groundwater Sources 2010

Allocation of Unused Overlying Party Rights and Reassignment of Pumping Allocations

The Beaumont Basin Watermaster Rules and Regulations §7.8, requires Watermaster to allocate 42.51% of the unused Overlying Party pumping rights to BCVWD. This is done every year beginning in Fiscal Year 2008-09 based on the previous 5 years of Overlying Party pumping amount. Also when an overlying party develops his/her property and receives potable or non-potable (recycled) water from an Appropriator, the overlying party shall forbear pumping the equivalent amount of groundwater. Watermaster will reassign this forbearance pumping to the Appropriator supplying water to the overlier's developed property. This is done every year.

The Overlying Parties and their rights along with their FY 2008-09 groundwater production from the Beaumont Basin is presented in Table 4-6. Table 4-6 separates the Overlying Parties into four categories:

1. Overlying Parties Likely to Develop and Receive Potable or Non-Potable Water from BCVWD
2. Overlying Parties Likely to Receive Non-potable Water from BCVWD
3. Overlying Parties Likely to Develop and Receive Potable or Non-Potable Water from Others, e.g., YVWD
4. Overlying Parties Likely to Remain Unchanged in the foreseeable future

Table 4-7 presents a summary of the unused overlier pumping rights allocated to BCVWD by Watermaster. BCVWD's share of the 5,742 acre-ft of unused overlier pumping rights in 2008-09 shown in Table 4-6 is 2,441 acre-ft as shown in Table 4-7. That amount, 2,441 acre-ft, will be allocated in 2013-14 in accordance with the Watermaster Rules and Regulations.

The amount in Table 4-7 which is transferred will not remain constant in the future. As some of the properties in Table 4-6 develop or take potable or non-potable water from BCVWD or other Appropriator Parties, the amount of unused rights will diminish and the Appropriator Party that supplies potable or non-potable water will be able to pump the equivalent amount of potable water.

Beyond FY 2013-14, the distribution of unused overlier pumping rights to BCVWD will gradually begin to decrease as some these parties begin to develop their property. A detailed analysis of each of the Overlying parties was performed considering the overlying party's land area and category. Some of the assumptions are:

- The Oak Valley Partners' site area within the BCVWD boundary has been receiving potable water since 2005 and in 2010 received a total of 1,307 acre-ft of potable water and landscape water through the non-potable water system from BCVWD. Oak Valley Partners has an overlier right of 1,806 AFY. It is unclear how this is to be split between the two service areas: BCVWD and YVWD. For purposes of this 2013 UWMP Update, an interim value of 451 AFY will be assumed to the Oak Valley Partners' Forebearance amount.
- Sunny Cal Egg Ranch and Poultry Company and associated landowners have prepared a Specific Plan #41 for the City of Beaumont which envisions 571 dwelling units on 324 total acres. This project will require about 371 AFY of potable water and 120 AFY of non-potable water based on BCVWD's estimated water demand of 0.65 AFY/EDU. The total overlying right is 1784 AFY which means, even after development, there will be unused pumping rights to be reallocated to Appropriator Parties such as BCVWD. This project is expected to start development sometime after 2015.
- Walt Beckman has 38 acres of land which if developed at a density of 2 EDU/acre will require about 50 AFY of potable water. Development is not anticipated to start before 2020. The Beckman pumping right is 75 AFY, so even after development there will be some right allocated back to the Appropriator Parties including BCVWD.
- Merlin Properties, the Roman Catholic Bishop of San Bernardino, and Leonard Stearns sites total about 174 acres – all within the boundaries or sphere of YVWD and as such would not be served by BCVWD. However, a portion of the unused pumping rights less any pumping allocation transferred to YVWD for serving these projects, would be transferred to the "pool" and reallocated to the Appropriators. BCVWD's share will be 42.5% of the unused pumping rights. At 2 EDU/acre, about 450 EDU could be constructed on these properties which would have a water demand of 300 AFY. These properties have an aggregate pumping right of 904 AFY, so there will be unused pumping rights reallocated to the Appropriator Parties, such as BCVWD even after they develop.
- The Plantation on the Lake, Rancho Calimesa Mobile Home Park and Sharondale Mesa Owner's Association sites will likely not change significantly in the foreseeable future. For purposes of this UWMP Update, these overliers will essentially maintain the status quo. They have an aggregate 931 AFY of pumping right and are using about 618 AFY; so just over 300 AFY is allocated to the Appropriator Parties with BCVWD getting 42.5% of the "pooled" amount.
- California Oak Valley Golf Course and East Valley Golf Club have an aggregate 3,150 AFY of pumping right; their annual water use (pumping) is 1,967 AFY, so a significant amount of water will be allocated back to the Appropriator Parties.

Table 4-6
Overlying Parties, Pumping Rights and FY 2008-09 Production[20]

Overlying Party	FY 2008 - 09			
	Total Production, acre-ftr	Overlying Water Right, acre-ft	Unused Overlying Allocation, acre-ft	Category
Beckman	13.2	75	61.8	1
Oak Valley Golf and Resort, LLC	792.5	950	157.5	2
Merlin Properties	1.6	550	548.4	3
Oak Valley Partners, LP	310.5	1,806	1,495.5	1
Plantation on the Lake, LLC	358.4	581	222.6	4
Rancho Calimesa Mobile Home Park	69.3	150	80.7	4
Roman Catholic Bishop of San Bernardino	0.7	154	153.3	3
Sharondale Mesa Owners Association	189.9	200	10.1	4
Morongo Tukwet Canyon Golf Club	1161.9	2,200	1,038.1	2
Stearns	1.1	200	198.9	3
Sunny-Cal Egg and Poultry Company	2.6	1,439.5	1,436.9	1
Albor Properties III, LP	2.3	300	297.7	1
Nikodinov	0.7	20	19.3	1
McAmis	0.5	5	4.5	1
Aldama	0.8	7	6.3	1
Gutierrez and Monroy	1.4	10	8.6	1
Darmont	0.4	2.5	2.2	1
Total	2,907.8	8,650	5,742.4	

Category:

1. Overlying Parties Likely to Develop and Receive Potable or Non Potable Water from BCVWD
2. Overlying Parties Likely to Receive Non-potable Water from BCVWD
3. Overlying Parties Likely to Develop and Receive Potable or Non Potable Water from Others, e.g., YVWD
4. Overlying Parties Likely to Remain Unchanged within the foreseeable future

[20] Wildermuth Environmental, Inc. (2010). Sixth Annual Report of the Beaumont Basin Watermaster, Draft Report, February.

Table 4-7
Transfer of Unused Overlying Party Rights to BCVWD[21]

Fiscal Year Transferred	Amount Transferred to BCVWD Acre-ft/yr
2008 - 09	1,901
2009 - 10	2,225
2010 - 11	2,244
2011 - 12	2,189
2012 - 13	2,475
2013 - 14	2,441
Average	2,246

Table 4-8 presents a summary of the reallocated overlier pumping rights and pumping forbearance to BCVWD based on the assumptions presented above.

It must be noted that the amount of the reallocation of unused pumping rights which could be transferred to BCVWD would be affected by changes in the Beaumont Basin safe yield. The safe yield is subject to re-evaluation every 10 years. .

Direct Delivery of Non-potable or Recycled Water

BCVWD has pipeline facilities to deliver non-potable or recycled water to Oak Valley Golf Club and the Morongo Tukwet Canyon Golf Club which is reflected in Table 4-8. Neither has requested BCVWD to provide recycled water. Both golf courses are supplied with private wells.

At the current time there is not enough recycled water from the City of Beaumont to supply these golf courses particularly considering the amount of recycled water that must be reserved for environmental mitigation. For planning purposes it will be assumed the Oak Valley Golf Club will be assumed to be irrigated in 2020 and Tukwet Morongo Canyon after 2035.

The demand for the Oak Valley Golf and Resort and the East Valley Golf Club totaled 1,954 acre-ft in FY 2008-09, round to 2,000 AFY. (See Table 4-8.) Their total Overlying Party pumping right is 3,150 acre-ft/yr as presented previously in Table 4-6. Assuming their annual water use for the golf courses will remain relatively constant for the foreseeable future, 1,150 acre-ft/yr[22] will remain in the pool of unused Overlying Party rights which will be reallocated back to the Appropriators. BCVWD can expect to secure 42.51% of the unused pumping rights, e.g., 489 acre-ft (Table 4-8).

The total of reallocated unused pumping rights decreases over time as these rights are used to support development of the respective properties. On the other hand the amount of potable and recycled water delivered to those properties increases over time as development progresses.

[21] Wildermuth Environmental, Inc. (2010). Sixth Annual Report of the Beaumont Basin Watermaster, Draft Report, February.

[22] 3,150 acre-ft/yr –2,000acre-ft/yr = 1,150 acre-ft/yr

Table 4-8
Estimates of Reallocation of Pumping Rights and Pumping Forbearance to BCVWD

	Year							
	2005	2010	2015	2020	2025	2030	2035	Build out
Overlier Forebearance of Pumping to BCVWD for receiving potable water service AFY								
Beckman	0	0	0	25	50	50	50	50
Sunny Cal Egg Ranch	0	0	0	100	200	300	371	371
Oak Valley Partners	36	451	451	451	451	451	451	451
Total	36	451	451	576	701	801	872	872
Overlier Forebearance of Pumping to BCVWD for receiving recycled water service, AFY								
Sunny Cal Egg Ranch	0	0	0	30	60	90	120	120
California Oak Valley Golf and Resort, LLC	0	0	0	750	750	750	750	750
Morongo Tukwet Canyon Golf Club	0	0	0	0	0	1250	1250	1250
Total	0	0	0	780	810	2090	2120	2120
Total Without Morongo Tukwet GC				780	810	840	870	870
BCVWD's share of reallocation of Unsused Overlier pumping Rights (0.4251), based on 8650 AF Safe Yield, AFY								
Beckman	23	26	26	19	11	11	11	11
Sunny Cal Egg Ranch	752	755	755	703	648	593	550	550
Oak Valley Partners	550	444	444	359	270	181	0	0
Oak Valley and Morongo Tukwet Canyon Golf Courses	394	508	503	714	760	489	489	489
Outside BCVWD Overliers	359	383	383	357	329	301	274	257
Overliers not expected to change	149	133	133	133	133	133	133	133
Total	2,226	2,249	2,244	2,285	2,151	1,707	1,456	1,439

Summary of Available Groundwater

In addition to the imported water and transferred groundwater in storage which will be discussed subsequently, Table 4-9 presents a summary of the groundwater which BCVWD can count on in this UWMP Update.

Table 4-8 presented an estimate of BCVWD's share of the reallocated pumping rights. The data in Table 4-8 was based on the Adjudication safe yield of 8,650 acre-ft/yr. A number of previous studies have indicated the safe yield may be less, perhaps in the 6,000 acre-ft/yr range. It is possible after the mandatory safe yield study is completed, the safe yield of the Beaumont Basin could be reduced. Therefore, to be conservative in the amount of groundwater available to BCVWD for water supply planning, it will be assumed the reallocated overlier pumping rights will be reduced to 70% of the estimated amount shown in Table 4-8. This is based on the 6,000 acre-ft/yr possible safe yield/8,650 acre-ft/yr, the current Judgment safe yield.

Table 4-9
Average Annual Groundwater Available to BCVWD, AFY

	Year						
Source	2005	2010	2015	2020	2025	2030	2035
Edgar Canyon Groundwater	2,526	1,867	2,260	2,260	2,260	2,260	2,260
Beaumont Basin Groundwater[a]	6802	6802	0	0	0	0	0
Subtotal	9,328	8,669	2,260	2,260	2,260	2,260	2,260
BCVWD's share of reallocation of Unused Overlier pumping Rights (0.4251), AFY based on 2004 Safe Yield (8650 AFY)	2,226	2,249	2,244	2,285	2,151	1,707	1,456
Adjusted BCVWD share of reallocated pumping rights assuming a reduction in safe yield to 6000 AFY	2,226	2,249	1,560	1,590	1,500	1,190	1,010
Overlier Forebearance of Pumping to BCVWD for receiving potable water service AFY	36	451	451	576	701	801	872
Overlier Forebearance of Pumping to BCVWD for receiving recycled water service, without Morongo Tukwet Canyon, AFY	0	0	0	780	810	840	870
Subtotal Forebearance Pumping w/o Morongo Tukwet Canyon, AFY	36	451	451	1,356	1,511	1,641	1,742
Total Estimated Groundwater Pumping w/o Need to Replace w/o Morongo Tukwet Canyon, AFY	11,590	11,369	4,271	5,206	5,271	5,091	5,012

a) BCVWD pumped more than this in 2005 and 2010 as a result of stored imported water, groundwater purchases from appropriators, and reallocation of pumping rights.

Imported Water

Imported Water is provided to BCVWD through the San Gorgonio Pass Water Agency one of the 29 state water contractors that import water from Northern California through the State Water Project. The Agency was formed under a special act of the legislature – the San Gorgonio Pass Water Agency Act in 1961. The Agency has a service are of 225 sq. mi., exclusively in Riverside County. The service area includes the incorporated cities of Calimesa, Beaumont, and Banning, and the communities of Cherry Valley, Cabazon, and the Banning Bench. In addition to the BCVWD, the major water retailers in the Pass Service area include the City of Banning, YVWD, Banning Heights Mutual Water Company, High Valley Water District, South Mesa Mutual Water Company, and Cabazon Water District.

SGPWA Table A Imported Water Supply

The Pass Agency has a Table A amount of **17,300 acre-ft/year** based on their contract with the Department of Water Resources (DWR). Table A amounts are used in allocating the total State Water Project (SWP) water supply that is determined by DWR to be available for delivery each year among the State Water Contractors. The Table A amount is the maximum a contractor may request in any year from DWR. It is also the maximum amount that DWR agrees to deliver to a contractor,

like the Pass Agency, during a year. The sum total of all of the Table A amounts of all of the 29 State Water Contractors under the Monterey Agreement (1994) shall not exceed 4.185 million acre-ft. (The DWR 2011 State Water Project Delivery Reliability Report[23] states 4.172 million acre-ft as the total combined maximum Table A amount – not significantly different.) The Pass Agency's Table A are shared with other agencies in the Pass' service area.

Under certain hydrologic and water supply conditions, DWR is not always able to deliver all of the water requested by the contractors. In these cases a smaller amount ("allocation") is set by DWR and allocated and delivered by prorating the amount available in proportion to the contractor's Table A amount. Thus the Pass Agency's Table A amount of 17,300 acre-ft/year is subject to the reliability of State Water Project.

The State Water Project has been and continues to be subject to delivery reduction caused by the operational restrictions of several biological opinions issued in December 2008 and June 2009 by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). These recent federal court decisions have been remanded (returned back) to the agencies for further study. The Department of Water Resources (DWR) expects these opinions will be replaced with new opinions, but DWR does not expect the new opinions will provide significant relief. The 2008/2009 rules are still legally binding. The DWR 2011 delivery reliability report[24] uses the assumptions in the 2008/2009 biological opinions.

The delivery reliability was calculated by DWR using the Cal-Sim-II computer model which simulates current and future operations of the SWP. The analyses are based on 82 years (1922-2003) of rainfall and runoff adjusted to reflect current and future levels of development. The impact of climate change is factored into the calculations. Figure 4-6 presents a cumulative probability curve of deliveries as a percent of a Contractor's Table A amount.

The results are summarized in Table 4-10. In reading Table 4-10, 90 percent of the time the SWP will be able to deliver 28 percent of a Contractor's Table A; 50 percent of the time, the SWP will be able to deliver 64 percent of Table A.

Relating this to the Pass Agency, this means **on the average** (50% of the time), the SWP should be able to **deliver 11,100 acre-ft/yr to the Pass Agency**.

Figure 4-7 presents recent historical delivery percentages from 1992 – 2012. The average for the period is 72.6% or slightly above the 64% stated in the 2011 Delivery Reliability Report. This is not surprising since the Reliability Report percentages were based on future conditions. But the figure does lend credibility to the Reliability Report projections. This 64% reliability factor has been considered in the amount of water available on a consistent basis from the SWP.

[23] State Water Project Final Delivery Reliability Report 2011 (2012). Department of Water Resources, (June)

[24] Ibid

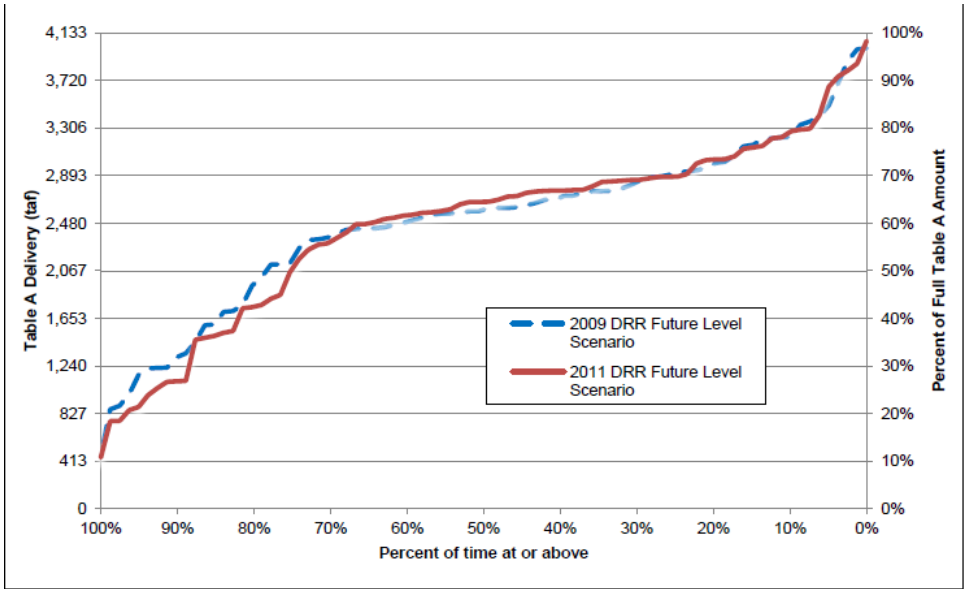


Figure 4-6
SWP Delivery Reliability (Future Conditions)
Source: 2011 Final Delivery Reliability Report, Technical Addendum

Table 4-10
Percent Probability of Receiving Full Table A Amount

Probability Expressed as a % of Time	Percent of Table A
90	28
80	42
70	56
60	61
50	64
40	66
30	69
20	73
10	78

Source: Extracted from 2011 Final Delivery Reliability Report Technical Addendum

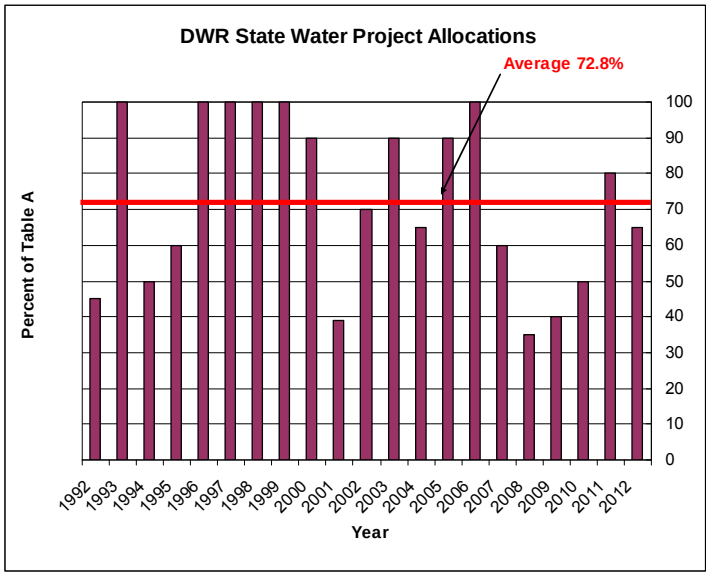


Figure 4-7
Historical SWP Delivery Percentages

In addition to the maximum annual Table A amount, there is a limit of **32 cfs** on the instantaneous rate of delivery. (If operated continuously for the entire year, this would be 23,360 acre-ft. Since this exceeds the annual Table A amount, the maximum amount which could be delivered on an annual basis is still 17,300 acre-ft.) So California aqueduct conveyance is not a current limitation.

BCVWD Imported Water Supply

The 7 major water producers within the Pass Agency developed a draft regional water allocation agreement[25] for water imported by the Agency based on the proportion of the water producer's sphere of influence area within the Agency. When the Agency purchases additional Table A water, it will be added to the baseline 17,300 acre-ft, current Table A. The draft agreement describes the methodology to distribute any unused allocation. This draft agreement has not been adopted by the Pass Agency, however, it does provide a basis for water supply planning for this UWMP Update.

According to the "allocation agreement" described above, BCVWD would be able to receive **27.4% of the 11,100 acre-ft/yr reliability-adjusted Table A, or 3040 acre-ft/yr on a long term average annual basis**.

[25] Draft Regional Water Allocation Agreement for Water Imported by the San Gorgonio Pass Water Agency, March 14, 2012.

Importation Facilities and Capacity

Pass Agency imports SPW through the East Branch Extension (EBX). EBX Phase I was completed in 2003; the Environmental Impact Report for EBX Phase II (EBX II) was certified in 2008 and Phase II is currently under construction and scheduled for completion in 2015.

The EBX begins downstream of DWR's Devil Canyon Power Plant at the Devil Canyon Afterbay, north of the City of San Bernardino (Water Surface Elevation =1,931 ft MSL). From the Afterbay, the SPW flows through the Foothill Pipeline to the Greenspot Pump Station. From the Greenspot Pump Station, the water is pumped through the Greenspot Pipeline to the Crafton Hills Pump Station. The Crafton Hills Pump Station then pumps the SPW through the Crafton Hills Pipeline to Crafton Hills Reservoir. From the Crafton Hills Reservoir the water flows by gravity to the inlet of the Cherry Valley Pump Station. The Cherry Valley Pump Station then pumps the SPW through the Noble Creek Pipeline to the EBX terminus at Noble Creek in Cherry Valley (HGL Elevation ≈ 3,000 ft MSL). The EBX has a total length of about 33 miles; the water is lifted over 1,000 ft to get it to the Pass Agency. The EBX facilities up to the Garden Air Creek Metering Facilities are shared with San Bernardino Valley MWD (Valley District).

EBX II provides Valley District and the Pass Agency additional capacity to deliver water and at the same time provides some system redundancy. EBX II begins at Greenspot Rd and Cove Camp Rd and goes south in the Mentone Pipeline crossing under the Santa Ana River to the Citrus Reservoir and Pump Station at the intersection of Opal St and San Bernardino Ave. From the Citrus Pump Station the SPW is pumped through the Mentone Pipeline East to the Crafton Hills Pump Station, constructed as part of the first phase of the EBX.

The EBX II includes modification of the Crafton Hills and Cherry Valley Pump Stations, enlargement of Crafton Hills Reservoir, and a connector to the Yucaipa Pipeline.

Table 4-11 presents a summary of the EBX I Facilities and capacities; Table 4-12, the EBX II Facilities and their capacities.

From Tables 4-11 and 4-12, the Pass Agency has **64 cfs capacity in the East Branch Extension** except for:

- ***Foothill Pipeline*** – Pass Agency has 32 cfs in this pipeline but can use additional capacity if SBVMWD is not using the capacity. The 32 cfs is the maximum capacity Pass Agency currently has in the rest of the California Aqueduct.
- ***Cherry Valley Pump Station*** – Pass Agency has 52 cfs of total pumping capacity and 32 cfs of firm capacity (largest pump out of service). There is no space to add additional pumps in the building without major modifications.

Table 4-11
EBX I Facilities, incl. EBX II Improvements

Facility	Description	Size	Capacity	SGPWA Capacity	Comment reference to SGPWA
Foothill Pipeline	From Devil Canyon to Santa Ana River Crossing	78”	220 cfs	32 cfs	Can use additional capacity with SBVMWD Board Approval
Santa Ana River Crossing (SARC)	Under Santa Ana River to Greenspot Pump Station	42”	108 cfs	16 cfs	Has 48 cfs capacity in parallel route (EBX II)
Greenspot Pump Station	Greenspot Pump Station		70 cfs total	16 cfs	Has 48 cfs capacity in parallel route (EBX II)
Greenspot Pipeline	Greenspot Pump Station to Crafton Hills Pump Station	48”	70 cfs	16 cfs	Has 48 cfs capacity in parallel route(EBX II)
Crafton Hills Pump Station			135 cfs total 110 cfs firm	64cfs	3 @25 cfs, 2 @ 20cfs, 2 @ 10 cfs
Crafton Hills Pipeline	Crafton Hills Pump Station to Crafton Hills Reservoir	54”		64 cfs	
Crafton Hills Reservoir			220 AF		Enlarged in EBX II from 85 AF
Bryant Street PIpeline	Crafton Hills Reservoir to Riverside San Bernardino County Line	54”	104 cfs	64 cfs	
Singleton Pipeline	Riverside San Bernardino County Line to Cherry Valley Pump Station	54”	64 cfs	64 cfs	
Cherry Valley Pump Station			52 cfs total 32 cfs firm	52 cfs	Includes 20 cfs pump added in EBX II plus 1@16 cfs, 2@ 8 cfs
Noble Creek Pipeline	Cherry Valley Pump Station to Noble Creek Terminus	36”	32 cfs	32 cfs	Capacity could be as high as 52 cfs if velocity allowed to 7.4 ft/sec

Table 4-12
EBX II Improvements

Facility	Description	Size	Capacity	SGPWA Capacity	Comment reference to SGPWA
Mentone Pipeline South	Foothill Pipeline to Citrus Reservoir	66"	175 cfs	48 cfs	Has 16 cfs capacity in parallel route (EBX I)
Citrus Reservoir			400 AF		
Citrus Pump Station			160 cfs 150 cfs firm	48 cfs	Has 16 cfs capacity in parallel route (EBX I) 4@ 25 cfs, 4 @ 20 cfs, 2@ 10 cfs
Mentone Pipeline East	Citrus Pump Station to Crafton Hills Pump Station	60"	160 cfs	48 cfs	Has 16 cfs capacity in parallel route (EBX I)

- ***Noble Creek Pipeline*** – The velocity in this pipeline based on the total capacity of the Cherry Valley Pump Station of 52 cfs is 7.4 ft/sec. This is marginally acceptable with the headloss of 35 ft in the 10,000 ft length pipeline.

Current BCVWD Firm Capacity

With completion of EBX II construction in 2015, the Pass Agency is limited to 32 cfs or 17,300 acre-ft/yr in the EBX assuming a 75% operating time. This is based on the current SGPWA purchased capacity of 32 cfs in the Foothill Pipeline.

If the Draft Regional Imported Water Allocation Agreement discussed previously was used to allocate capacity, **BCVWD's share of the EBX capacity would be 4,740 acre-ft/yr, i.e., 27.4% of 17,300 acre-ft.** To be able to realize this capacity every year, the Pass Agency (on behalf of BCVWD) would need to purchase more Table A to make up for the 64% reliability of the SWP.

To bring the BCVWD capacity up to 4,740 acre-ft/year, purchase of 2,660 acre-ft of additional Table A on behalf of BCVWD would be required, i.e., (4740 – 3040)/0.64. At $5,000/acre-ft for Table A, this would require the expenditure of $13.3 million, round to $15 million on behalf of BCVWD.

Facilities and Expenditures for Additional EBX Capacity

It is recognized that Pass Agency could get additional capacity up to 64 cfs in the Foothill Pipeline as described above, but would need to purchase an additional 32 cfs capacity in the Foothill Pipeline to be guaranteed that capacity. This would double the current Pass Agency delivery capacity to 35,000 acre-ft/year assuming a 75% utilization factor.

There would also need to be modifications made to the Cherry Valley Pump Station or alternatively construct a new turnout upstream of the Cherry Valley Pump Station and a pipeline extension to the BCVWD recharge facilities.

A very rough estimate of the cost to purchase 32 cfs in the Foothill Pipeline and increase the capacity of the pump station by adding two 16 cfs pumps (500 HP each) is estimated as follows:

Foothill Pipeline, L = 70,000 ft, 78 in dia, capacity = 252 cfs per Valley District, unit cost today @ $8/inch diameter/ft length = $625/ft. Purchase of 32 cfs capacity = $6 million.

Cherry Valley Pump Station, 2 pumps @ 16 cfs, 500 HP each in a new building @ $4,000/HP = $4 million.

Total Facilities estimated at $10 million.

BCVWD's share of the 35,000 acre-ft/yr based on the draft regional allocation agreement would be 9,500 acre-ft/yr. To achieve this capacity, Pass Agency would have to purchase (9,500 – 4,740)/ 0.64 =7,440 acre-ft of new Table A on behalf of BCVWD. (Note the 0.64 accounts for the reliability of the SPW.) At a unit cost of $5,000/acre-ft, the purchase of the Table A to bring BCVWD's imported water capacity to 9,500 acre-ft/yr would be over $37 million. This is over and above the costs for added capacity in EBX facilities described above. Total expenditures are estimated to be about $62 million.

Table 4-13 presents a summary of BCVWD's costs to bring its firm, reliable Imported Water supply capacity to 9,500 AFY.

Table 4-13
Summary of BCVWD Costs for Added Imported Water Supply

Condition	EBX Capacity		
	Current	32 cfs	64 cfs
Reliable BCVWD Share considering capacity sharing agreement, AFY	3040	4740	9500
Additional Table A to be purchased by BCVWD including 64% reliability factor, AFY	--	2660	7440
Pipeline & Pump Station Costs, $ millions	--	--	$10
Additional Table A purchase, $ millions	--	$15	$37
Subtotal Cost, $ millions	--	$15	$47
Total Cost, $ millions		$62	

BCVWD Facilities for Imported Water

BCVWD takes water from a turnout and metering station at the current end of the EBX I at Orchard Ave. and Noble Creek in Cherry Valley. BCVWD began to take imported water deliveries from the SGPWA in September 2006 and is recharging the imported water at BCVWD's Phase I groundwater recharge facilities. Recharge of imported water has occurred almost continuously since September 2006. As of December 31, 2012, 34,631 acre-ft (11.3 billion gallons) of water have been recharged to BCVWD's account. A summary of the imported water recharged to the Beaumont Basin for BCVWD is presented in Table 4-14. The data is from the Pass Water Agency invoices. The 34,631 acre-ft is over 3-year's worth of extractions from the Beaumont Basin.

Table 4-14
Imported Water Recharged for BCVWD's Account

FY	Imported SPW, acre-ft
2006	3501
2007	4501
2008	2399
2009	2741
2010	5727
2011	7979
2012	7783
Total	34631
Average	4947

Recharge Facility Capacity

Water from BCVWD's EBX turnout is metered by DWR and then enters a 3500-ft long, 24-in diameter pipeline which conveys the water to the recharge site. The pipeline was constructed by BCVWD in 2006. The 24-in pipeline was designed for 30 cubic feet per second (cfs). If operated continuously, the pipeline could convey 21,700 acre-ft per year. This is a little more than the entire Pass Agency Table A amount (17,600 acre-ft/year) and over 2.5 times what BCVWD purchased from the Pass Agency in 2011. If a 75% utilization factor were used, the pipeline could convey 16,300 acre-ft/year or just under the Pass Agency's Table A amount.

In summary, the **pipeline capacity is more than ample** considering the amount of imported water available from the Pass Agency shown in Table 4-13.

Geoscience Inc. has prepared a number of reports on the operation of the recharge project since recharge began in September 2006. The last report is dated February, 2010. Based on their initial studies, the weighted average recharge rate is 10.3 acre-ft/wetted acre/day. This is a very high rate. There are a total of 10.2 wetted acres in the BCVWD Phase 1 (Westerly portion) Recharge facility. This would mean that the existing recharge facility would be able to percolate over 100 acre-ft/day. Theoretically this is would be over 36,000 acre-ft per year (about twice the Pass Agency's Table A amount.) The 36,000 acre-ft per year however has to be reduced because of the need to "rest" and "restore" the basins and perform routine maintenance. BCVWD has 3 trains (2.7 acres, 4.2 acres, and 3.32 acres (wetted) respectively for trains 1, 2, and 3). Assuming only 2 trains are operating at any one time, the capacity is 25,200 acre-ft/yr – again much more than the Pass Agency's Table A amount. There never has been enough imported water available to "stress test" the Phase 1 facility to determine its capacity. It is safe to estimate the capacity of Phase I as somewhere between 20,000 and 25,000 acre-ft/yr.

The construction of Phase II is currently being constructed and should be complete in 2013. Phase II has an estimated bottom wetted area of about 15 acres and increase the recharge capacity by another 30,000 to 35,000 ac-ft/yr. This would bring the total capacity to 50,000 to 60,000 ac-ft/yr.

Aquifer Response

BCVWD installed monitoring wells with the initial construction of the recharge facility to track and "trace" the recharged water. According to Geosciences, Inc, Feb 2010 report, BCVWD recharged over 15,000 acre-ft of water from September 2006 to December 20, 2009 and water levels in the 3 shallow aquifer monitoring wells (perforated from 480 to 550 ft below ground surface) increased 94.4 ft, 86.1 ft, and 89.5 ft respectively. In the deeper aquifer (perforated 600 to 700 ft below ground surface), water levels increased in the fall and winter when BCVWD Well 23 was used less and decreased in summer when the well was used more. The water level in the two very deep monitoring wells (perforated 600 to 1000 ft below ground surface) increased 11.5 and 13.2 ft respectively since start of recharge in September 2006. In summary, it is clear the water is reaching the intended aquifers. Figure 4-2, presented previously, also demonstrates this.

This data contradicts statements made in a USGS Report for the Pass Agency[26]. Specifically the report states that artificial recharge, including that from imported SPW in recharge ponds takes between 23 and 71 years to reach the water table depending on location. Spreading data from monitoring wells supports a much faster vertical travel time.

Use of the Aquifer as a Water Treatment Facility

As the imported water percolates downward approximately 500 ft to the groundwater table, the aquifer material is providing complete treatment of the water eliminating the need for a surface water treatment plant. In essence the groundwater recharge facility is BCVWD's surface water treatment plant.

Use of the aquifer for treatment is much more efficient and reliable than taking water directly from State Aqueduct and treating it. The Aqueduct is shut down periodically for maintenance; State Water availability is tenuous during droughts. If BCVWD had a treatment facility, it would have to be shut down during these periods. This is not very efficient use of capital facilities. BCVWD recognizes the cost to repump the percolated water costs about $90 to $100 per AF, but the costs to treat the water in a surface water treatment plant would be more costly, particularly if the project capital costs are considered.

Imported Water Summary

There is adequate capacity in the recharge facilities and the 24-in connection to the SWP to bring in the foreseeable amount of imported water BCVWD might need. The limitations are in the supply from the SWP itself which was addressed above along with the estimated costs.

Recycled Water

Existing System and Sources

BCVWD has an extensive network of about 30 miles of backbone, non-potable (recycled water) pipelines already constructed. See Figure 4-8. The system includes a 2 million gallon non-potable water reservoir. There are about 275 existing landscape connections to the recycled water system receiving 1,500 acre-ft of water (2011 total) It is believed that the current usage is slightly less. The existing recycled water system is currently pressurized with potable water through 5 interconnections

[26] USGS (2006). Geology, Ground-Water Hydrology, Geochemistry, and Ground-Water Simulation of the Beaumont and Banning Storage Units, San Gorgonio Pass Area, Riverside County, California, D. L. Rewis, A. H. Christensen, J. C. Matti, J. A. Hevesi, T. Nishikawa, and P. Martin, Scientific Investigations Report 2006-3026.

between the potable and non-potable water system. The non-potable water system was constructed from 2002 to the present.

The system is designed so that any surplus recycled/non-potable water could overflow into the percolation basins at BCVWD's groundwater recharge facility and recharge the BSU. However, as previously stated additional treatment and monitoring would be required and recharge with recycled water is not currently planned. The existing pipeline from the EBX brings State Project Water to the site to blend with and supplement the recycled water to meet the Regional Board's Maximum Benefit, 10-year average TDS requirement of 330 mg/L in the non-potable water system.

There are three existing wastewater reclamation plants in the San Gorgonio Pass Area:

- City of Beaumont Treatment Plant No. 1
- YVWD Henry Wochholz Water Reclamation Plant
- City of Banning Wastewater Treatment Facility.

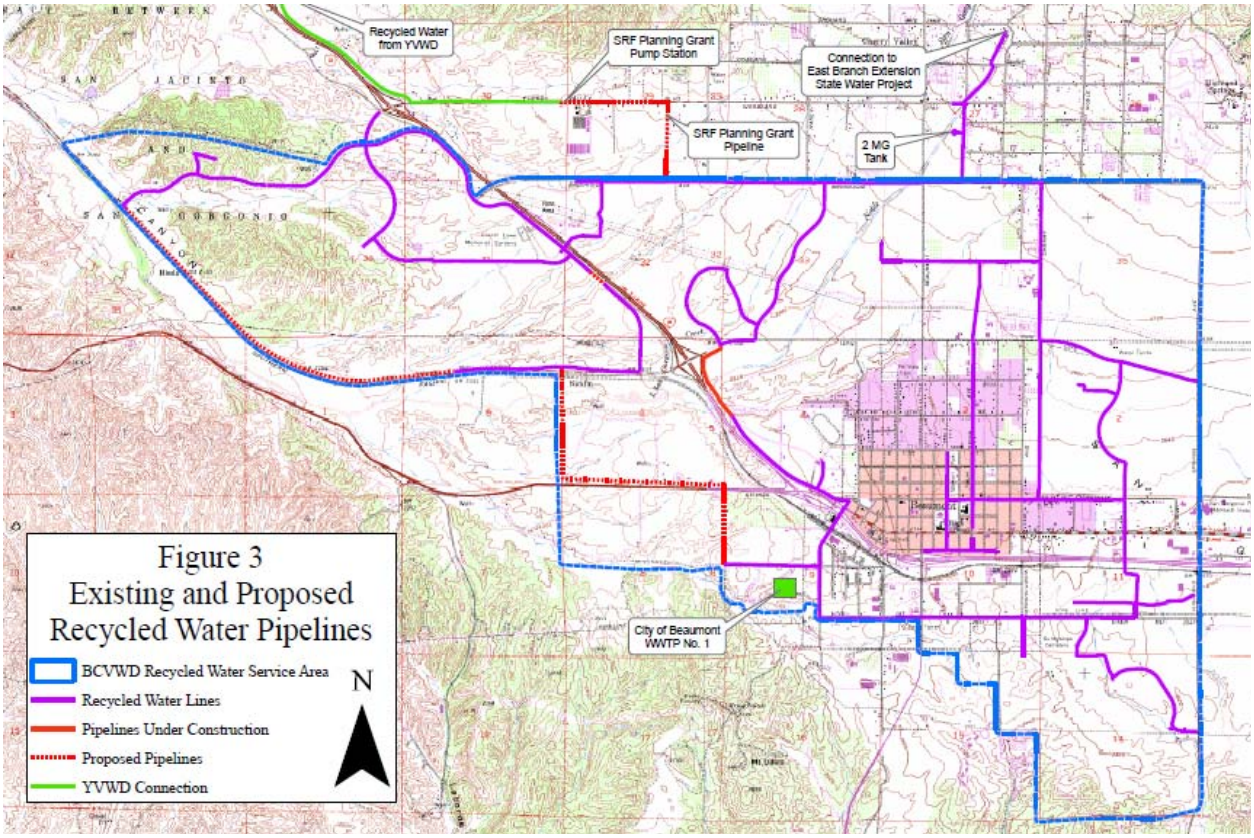


Figure 4-8
BCVWD Non-potable Water Transmission System

Source: Plan of Study, Pump Station and Recycled Water Pipeline to Use Recycled Water from YVWD within the BCVWD Service Area, May, 2010

The City of Beaumont's Treatment Plant No. 1 (to the right) has a current capacity of 4 million gallons/day (mgd) and is in the process of being expanded. The treatment facility provides tertiary filtration and ultraviolet disinfection. Per a 2007 letter from CDPH, the facility, as it currently stands, needs some upgrades and validation testing to provide effluent meeting CDPH Title 22 requirements for unrestricted use. Current wastewater flow is about 2.5 mgd. A portion of the effluent is currently discharged to Cooper's Creek, a tributary of San Timoteo Creek which is a tributary of the Santa Ana River; a portion is discharged into an unnamed creek at DP-007 located approximately 1,300 ft northwesterly along the railroad tracks from Veile Ave.. As part of the environmental permitting[27] for the recycled water system, the US Fish and Wildlife Service required that 1.8 mgd of effluent continue to be discharged to Cooper's Creek for maintenance of habitat[28]. BCVWD is in negotiations with the City of Beaumont at the present time for recycled water.

The YVWD Wochholz Facility (to the right) is a tertiary facility with a current flow of 4.5 mgd and a capacity of 6.7 mgd. It was recently expanded and upgraded and provides tertiary treatment using microfiltration membranes and ultraviolet disinfection. BCVWD is planning on a second source of recycled water from YVWD. BCVWD has had several meetings with YVWD and YVWD will be able to provide BCVWD with recycled water. YVWD would have to construct about 5 miles of pipeline from their system to near the intersection of I-10 and Cherry Valley Blvd. From there the pipeline would extend to the BCVWD's Well 29 site, or another site nearby, where BCVWD would construct a small recycled water balancing (surge) tank and pump station. A pipeline would be constructed in Cherry Valley Blvd from the pump station site to tie into the BCVWD's existing recycled water system in Brookside Ave – approximately 6,500 ft in length. The SWRCB has approved a grant of up to $75,000 (matching funds) to complete a facilities plan which could ultimately lead to a low-interest loan from the State Revolving Fund (SRF Loan).

The City of Banning has a secondary treatment facility that percolates effluent into the alluvium along Smith Creek under a permit from the Colorado River Regional Water Quality Control Board. The City has plans to upgrade this plant to a modern membrane bioreactor facility to provide recycled water. The City also is considering a satellite water reclamation plant near the Sun Lakes Community to provide recycled water to the Sun Lakes Golf Course and a potential future course to be built by developers. It is possible that some surplus recycled water from the City of Banning could be introduced into the BCVWD recycled water system at some point in the distant future; however, for purposes of this UWMP Update, this will not be considered at this time.

In the analysis of the availability of recycled water for this UWMP Update, it is assumed that the community of Cherry Valley will continue to use on-site systems.

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[27] Initial Study/Mitigated Negative Declaration Beaumont Cherry Valley Water District Recycled Water System Project, SCH 2007081127, June 2007.

[28] Letter dated February 29, 2008, Karen Goebel USFWS to Michelle Jones SWRCB, Informal Consultation for Beaumont Cherry Valley Water District Recycled Water System, SRF Loan C-06-5157-110.

Constraints on the Use of Recycled Water

1. Annual demand for non-potable water are presented as "Landscape Demands" in Tables 3-8a through 3-8c and vary from 1,500 AFY in 2015 to 1830 AFY in 2035.
2. Monthly variation in the demand was determined considering both the evapotranspiration measured at California Irrigation Management Information System (CIMIS) Winchester, CA station and the variation in BCVWD's actual non-potable water bimonthly billing.
3. TDS concentration in the City of Beaumont's recycled water is about 400 mg/L.[29] Imported State Project Water average TDS is 250 mg/L based on data from SGPWA and supported by data from the Metropolitan Water District of Southern California for the East Branch of the SWP.[30] TDS of YVWD recycled water is assumed to be 330 mg/L. The TDS concentrations were not projected to change for this UWMP Update.
4. Annual average TDS in the non-potable water system does not exceed 330 mg/L. This is a conservative approach and makes allowance for variations in the imported and recycled water quality.
5. Recycled water available from YVWD = 2,000 AFY; from 2030 and beyond, up to 3000 AFY are available based on initial discussions between BCVWD and YVWD.
6. To estimate the amount of wastewater treated at the City of Beaumont's WWTP, a per capita flow of 75 gpcd after 2008 to reflect higher efficiency plumbing fixtures in new homes which now predominate the City.
7. Environmental mitigation flow to Cooper's Creek from the City's WWTP is 1.8 mgd based on the City's agreement with U. S. Fish and Wildlife. (Note this could be decreased in the future if studies show and the regulators agree that the habitat can be maintained with less flow.)
8. The total wastewater flow tributary to the City of Beaumont's wastewater treatment plant is reduced by 10 percent to estimate the amount of recycled water which is available. The 10% reduction factor accounts for some operational uncertainties complying with the 1.8 mgd environmental mitigation flow as well as the influent wastewater contained in the partially dewatered solids which are hauled offsite and the amount used on-site for irrigation and washdown.
9. Non-potable water will be provided to California Oak Valley Golf Course (750 AFY) in 2020. No plans to provide recycled water to Morongo Tukwet Canyon Golf Club until after 2035.
10. Surplus recycled water is not percolated at this time due to the cost of complying with the CDPH draft regulations for a Planned Groundwater Recharge Project.

Table 4-15 presents shows the amount of recycled water available from the City of Beaumont's WWTP for this UWMP Update; Table 4-16 presents a summary of the month by month, blending study of the non-potable water system.

[29] Wildermuth Environmental, Inc. (2011). Total Dissolved Solids and Nitrate-nitrogen Projections for the Beaumont Management Zone, Table 2, April 21.

[30] Metropolitan Water District of Southern California (2012). Salinity in Metropolitan Supplies, Historical Perspective, Handout #2. Presented at Salinity Management Update Study Workshop, Southern California Salinity Coalition, June 1.

Table 4-15
Recycled Water Available from City of Beaumont's WWTP

Year	2010	2015	2020	2025	2030	2035
City of Beaumont Population	36,837	39,784	43,762	49,014	54,895	61,483
Wastewater Generation Flow Rate, gpcd	75	75	75	75	75	75
Wastewater Flow, mgd	2.76	2.98	3.28	3.68	4.12	4.61
Environmental Mitigation Flow, mgd	1.8	1.8	1.8	1.8	1.8	1.8
Wastewater Available for Recycling, mgd	0.96	1.18	1.48	1.88	2.32	2.81
Estimated amount which can be recycled, mgd	0.87	1.07	1.33	1.69	2.09	2.53
Estimated amount which can be recycled, AFY	971	1194	1494	1892	2336	2835

In Table 4-16, it can be clearly seen that not all of the City of Beaumont's recycled water which is available, can actually be used. This is due to two reasons: 1) the monthly variation in the landscape water demands which greatly limit the need during the winter, non-growing season and 2) the need to blend down the recycled water with imported water to meet the Maximum Benefit TDS requirement. The amount begins to gradually decrease over time because the irrigation demand does not grow as fast as the recycled water production from the City's treatment plant.

Table 4-16 shows that there will always be some imported available for direct recharge.

Increasing the Use of City of Beaumont's Recycled Water

The spreadsheet model set up for the recycled water blending indicates that even with seasonal storage of the recycled water will not increase the utilization very much. The demand for recycled water is far less than the supply, even in summer.

If the Morongo Tukwet Canyon Golf Club was irrigated with recycled water, an additional 450 to 600 AFY of the City of Beaumont recycled water could be used. However, this would require an equal amount (approximately) of imported SPW.

For maximum utilization of all of the surplus recycled water, advanced membrane/advanced oxidation/disinfection treatment will have to be installed. This will comply with the draft guidelines for Planned Groundwater Recharge Projects but will add significantly to the cost. Membrane plants similar to the Orange County project cost $6/gallon/day capacity and $1,370/million gallons to operate.

Table 4-16 shows 1,100 to 1,500 AFY of City of Beaumont recycled water is unused. It could be used for groundwater recharge however, if the level of treatment was increased to advanced treatment per the draft regulations. To provide advanced treatment would cost about $6 to $8 million to construct and about $500,000 to $700,000 per year to operate. This does not include the cost to extend the SARI brine line from YVWD and buy capacity.

Table 4-16
Results of Non-potable Water System Blending Study

Year	2015	2020	2025	2030	2035
Non Potable Water Sources Available					
Recycled Water from City of Beaumont, AFY	1,194	1,494	1,892	2,336	2,835
Recycled Water from YVWD, AFY	2,000	2,000	2,000	3,000	3,000
Imported State Project Water, AFY	3,040	3,040	3,040	3,040	3,040
Demands					
Non-potable Water System Demand, AFY	1,500	1,580	1,660	1,740	1,830
California Oak Valley GC, AFY	0	750	750	750	750
Morongo Tukwet Canyon GC AFY	0	0	0	0	0
Total Non-potable Water Demand, AFY	1,500	2,330	2,410	2,490	2,580
Non-potable Water Supplied					
YVWD Recycled Water, AF	0	210	30	0	0
Beaumont Recycled Water, AF	775	1,100	1,230	1,295	1,335
Imported State Project Water, AF	724	1,020	1,150	1,195	1,245
Total Water Into Non-potable Water System, AF	1,499	2,330	2,410	2,490	2,580
Blended TDS in Non-potable Water System, mg/L	328	328	328	328	328
Available SPW to Percolate, AF	2,316	2,020	1,890	1,845	1,795
Percent of Available City of Beaumont Recycled Water Used	65%	73%	65%	55%	47%
Amount of Unused City of Beaumont Recycled Water, AFY	419	394	662	1,041	1,500

Current and Projected Demand vs. Supply

Table 4-17 presents a summary of the current and project supply and demand situation for BCVWD.

Table 4-17
BCVWD Potable Water Supply Summary

Year	2005	2010	2015	2020	2025	2030	2035
Demands							
Total Water Demand not incl. GCs, AFY	9,306	11,023	12,453	13,492	14,947	16,526	18,417
Non-potable Landscape Demand, AFY	1,038	1,822	1,500	1,580	1,660	1,740	1,830
Oak Valley GC, AFY	0	0	0	750	750	750	750
Morongo Tukwet Canyon GC, AFY	0	0	0	0	0	0	0
Total Non-potable Demand, AFY	1,038	1,822	1,500	2,330	2,410	2,490	2,580
Potable Water Demand, AFY	8,268	9,201	10,953	11,912	13,287	14,786	16,587
Sources of Potable Water Supply							
Edgar Canyon Groundwater, AFY	2,526	1,897	2,260	2,260	2,260	2,260	2,260
Beaumont Basin Groundwater, AFY	6,802	6,802	0	0	0	0	0
BCVWD Share of Unused Overlier Rights, AFY, based on 6000 AF Safe Yield	2,226	2,249	1,500	1,590	1,500	1,190	1,010
Overlier Forebearance of Pumping for Potable Water Supply, AFY	36	451	451	576	701	801	872
Overlier Forebearance of Pumping for Recycled Water Supply, AFY	0	0	0	780	810	840	870
Subtotal Groundwater Extractable without Replacement, AFY	11,590	11,399	4,271	5,206	5,271	5,091	5,012
Groundwater Used in Non-potable Water System, AFY	1038	1822	0	0	0	0	0
Groundwater Available to Meet Potable Water Demand, AFY	10,552	9,577	4,271	5,206	5,271	5,091	5,012
Groundwater Shortfall, AFY	-2,284	-376	6,682	6,706	8,016	9,695	11,575
Supplemental Supplies, AFY							
Imported Water Not Used in Non-Potable System which can be Recharged, AFY	0	5,727	2,316	2,020	1,890	1,845	1,795
Total Water Available for Potable Supply, AFY	10,552	15,304	6,597	7,226	7,161	6,936	6,807
Potable Water Demand - Supply Shortfall, AFY	-2,284	-6,103	4,366	4,686	6,126	7,850	9,780

Table 4-17 clearly shows a shortfall in the water supply by 2015. The root cause of this is the reduction in the allowable pumping from the Beaumont Basin as a result of the adjudication (a loss of

6,802 AFY) and the reduction in the amount of imported SPW which can be counted on by BCVWD (reduction from an average of 5,475 AFY to 3,040 AFY).

A shortfall is shown by the year 2015; the problem will actually occur in 2014 when the temporary surplus ends. Fortunately BCVWD has been able to accumulate a significant amount of water in storage as a result of the recharge of essentially all of the imported water available, purchase of water from South Mesa Water Company and the transfer of that water to BCVWD's storage account and the reallocation of unused overlier pumping rights. It is estimated that BCVWD has about 35,000 AF in storage at the present time. On this basis and with shortfall of about 4,400 AFY, there is about 8 years of water in storage to make up the difference. This is not a lot time. **Something will need to be done within the next 4 to 5 years**. In the meantime BCVWD will continue to purchase SPW to the extent that it is available.

The result is BCVWD must rely on other sources. One of those is additional imported SPW through additional Table A purchase.

Table 4-18
Additional Table A Imported Water Needs for BCVWD

Year	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Imported Water Available for Recharge, AFY	0	5,727	2,316	2,020	1,890	1,845	1,795
Imported Water Used in Non-potable Water System, AFY	0	0	724	1,020	1,150	1,195	1,245
Total Imported Water Used, AFY	0	5,727	3,040	3,040	3,040	3,040	3,040
Shortfall from Table 4-17, i.e, Total Additional Imported Water			4,366	4,686	6,126	7,850	9,780
Total Imported Water Needed, AFY			7,406	7,726	9,166	10,890	12,820

The quantity of imported water needed beyond year 2028 or so will exceed BCVWD's share of the EBX II capacity (9500 AFY) shown in Table 4-13. This will mean either EBX III or utilization of unused capacity from other retailers in the SGPWA service area.

There are a number of ways that the amount of imported water can be reduced:

- Conservation –If the potable water demand can be reduced by just 10% the shortfall and total imported water needs could be reduced by 1000 to 1600 AFY from 2015 through 2035. This alone would defer the need to expand EBX until well after 2030.
- Short or medium term lease of unused SPW Table A to provide time to implement some of the local water resource projects described below and in the remainder of this chapter.
- Use Recycled Water at Morongo Tukwet Canyon GC – the analysis in Tables 4-16 through 4-18 did not include irrigating Tukwet Canyon GC. Facilities exist to serve the golf course in BCVWD's current backbone non-potable water system. This will provide an additional 1250 AFY of groundwater supply resulting from the forebearance of their pumping.
- Capture of Urban Runoff

- Use of High Nitrate Groundwater from the mouth of Edgar Canyon in the non-potable water system. This would free up some of the imported water used to blend down the TDS to meet Maximum Benefit.
- Purchase of additional imported SPW Table A
- Provide Advanced Treatment of the City of Beaumont's and YVWD's recycled water to use for groundwater recharge.

Future Supplies

Storm Water Capture and Groundwater Recharge

The following subsections describe a number of potential storm capture and recharge projects. The analyses of the potential amount of storm water that can be captured can only be considered very preliminary. Much more detailed engineering and hydrologic work will be needed to confirm the estimates presented for these alternatives.

Little San Gorgonio Creek (Edgar Canyon)

The District has been diverting surface flows in Edgar Canyon for groundwater recharge since 1902. The District has two Diversion Points recorded with the State of California Division of Water Rights: S014351located in Upper Edgar Canyon and S014352 located just above the recharge basins at the mouth of Little San Gorgonio Creek. These claim pre-1914 rights to the waters of Little San Gorgonio Creek. BCVWD used the upper diversion to and capture stream flow (see picture to right) allow it to flow through a series of percolation basins adjacent to the stream in the vicinity of a number of wells in Little San Gorgonio Creek. Percolating the diverted flows did improve the yield of the wells in Edgar Canyon, which are shallow alluvial and bedrock wells. Water which did not percolate was returned to the stream and allowed to flow downstream. Most of the water eventually percolated. It takes significant rainfall for runoff to reach the lower percolation ponds at the mouth of Little San Gorgonio Creek. Only on rare occasions does water actually exit the canyon.

Figure 4-9 shows the watershed boundary for Little San Gorgonio Creek and the location of the precipitation, stream gages and diversions. The USGS operated a stream gauging station in Little San Gorgonio Creek (11056500) at the Oak Glen Road bridge for the period 1948 through 1985 – a 37-year period. The station measured flows from only a 1.74 sq mi (1114 acres) drainage area. (The entire Little San Gorgonio Creek watershed at the mouth of Edgar Canyon is about 4610 acres.)

Average daily flows at the gauge are highly variable ranging from 0 to 1180 cfs (2/25/1969). Eighty-eight percent of the daily flows are less than 1 cfs (2 acre-ft/day). The average flow at the gauging station during the gauged period is 0.7 cfs (about 500 acre-ft/yr). On January 25, 1969 an instantaneous peak flow of 1,990 cfs was recorded at the gauge. (The average flow for that day was 359 cfs.)

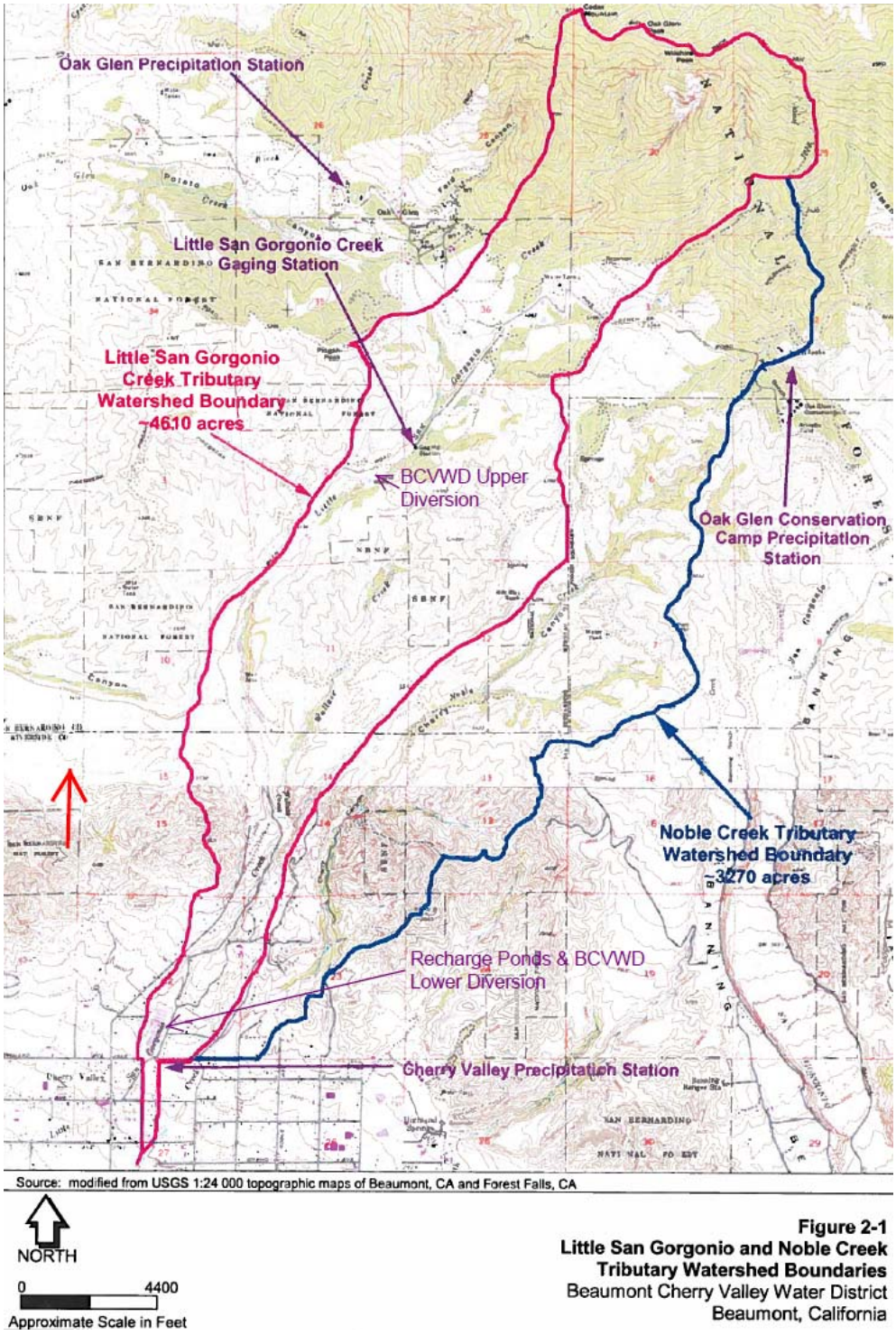

Figure 4-9
Little San Gorgonio Creek and Noble Creek Watershed Areas[31]

[31] BCVWD (2003). Hydrology Study, Resource Development Program on Little San Gorgonio & Noble Creeks, January.

The year 1969 was a particularly unusual year for runoff in Little San Gorgonio Creek. There were two large storms: January 21-26 and February 24-25 which resulted in the 6 highest average daily flows recorded during the 37-year record. Other than those two storms, the maximum average daily flows recorded at the gauge were less than 50 cfs (100 acre-ft/day).

Table 4-19 presents a summary of the average daily flow recorded at the Little San Gorgonio Creek Gauge during the record period 1948-1985. It is a relatively rare event that the flow is above 10 cfs (20 acre-ft/day).

Table 4-19
Average Daily Flows at Little San Gorgonio Creek

Average Daily Flow as measured at gauge 1948-1985	Number of Days	Estimated Average Daily Flow at Mouth of Little San Gorgonio Canyon
Greater than 2 cfs	801	Greater than 6 cfs
Greater than 3 cfs	530	Greater than 9 cfs
Greater than 5 cfs	297	Greater than 15 cfs
Greater than 10 cfs	60	Greater than 30 cfs
Greater than 20 cfs	25	Greater than 40 cfs
Greater than 100 cfs	3	Greater than 300 cfs
Total Days in Record	13514	

Since there is no stream gauge at the mouth of Little San Gorgonio Creek, the amount of stream flow that could be captured and percolated must be estimated from the data available. Prorating the runoff on the basis of watershed area, the projected stream flow at the mouth of Little San Gorgonio Creek would be 4.2 times the gauged area stream flow (4610 acres/1114 acres = 4.2). The watershed below the gauging station is at lower elevation and receives less precipitation however, so the runoff/acre would be less.

A factor of 3 will be used which will account for the reduced unit runoff and the losses which occur due to percolation within the streambed of Little San Gorgonio Creek. This should provide a rough estimate of the stream flow at the mouth of the canyon, but this should be verified by more extensive watershed hydrologic studies before this amount of water can be considered as part of a firm yield in this or future UWMP updates. The estimated flow at the mouth of Little San Gorgonio Canyon, based on the factor of 3, is also shown in Table 4-19.

Under historic conditions, some of the flow which leaves Little San Gorgonio Creek will percolate in the unlined portion of Noble Creek prior to leaving the Beaumont Basin. The portion that percolates would be part of the natural safe yield of the Beaumont Basin. Only water which would not percolate, i.e., flows out as surface flow beyond the boundary of the Basin, can be considered "new water." There are about 21,000 ft of unlined stream channel to the Basin boundary. Estimating the streambed percolation rate at 2 ft/day (approximately1/3 to 1/4 of that experienced in the District's percolation ponds[32]), the amount that percolates would be about 15 acre-ft/day assuming a flow width

[32] The 1/3 factor was estimated assuming the storm flow will have some sediments which will reduce the percolation rate from that observed using SPW in BCVWD's recharge ponds.

of 15 ft average width of the active stream channel. (Note the actual width of the channel is about 100 ft but the normal flows do not cover the entire width of the channel.) Based on this about 7.5 cfs or more of flow from the mouth of Little San Gorgonio are required to see measurable flow leaving the basin.

To be able to actually capture and percolate these flows in the Beaumont Basin will require some capture/storage/desilting ponds. BCVWD has constructed additional basins to supplement the existing percolation ponds at the mouth of Little San Gorgonio Canyon. All of these basins have a total storage volume of about 80 acre-ft. With this volume available, average daily stream flows below 25 cfs should be able to be captured assuming the water can be stored and percolated in the basins and/or conveyed down to the District's main recharge site and percolated after desilting. Based on the frequency data in Table 4-19, a total of 21,500 acre-ft of water could have been captured over the 37-year period under this scenario under the best of conditions assuming anything over 30 cfs cannot be captured. This averages 580 AFY of captured water from Little San Gorgonio Creek. The 37-year period modeled experienced 2 dry periods (below normal precipitation) and 2 wet periods (above normal precipitation). Figure 4-10 presents a "cumulative departure from the mean (CDM)" for Beaumont precipitation. The CDM value at the start of the study period is approximately the same as the CDM value at the end of the study period indicating a relatively "average" period in total. For estimating the yield for this project, it might be more appropriate to consider 500 AFY as a reasonable estimate considering operational constraints etc.

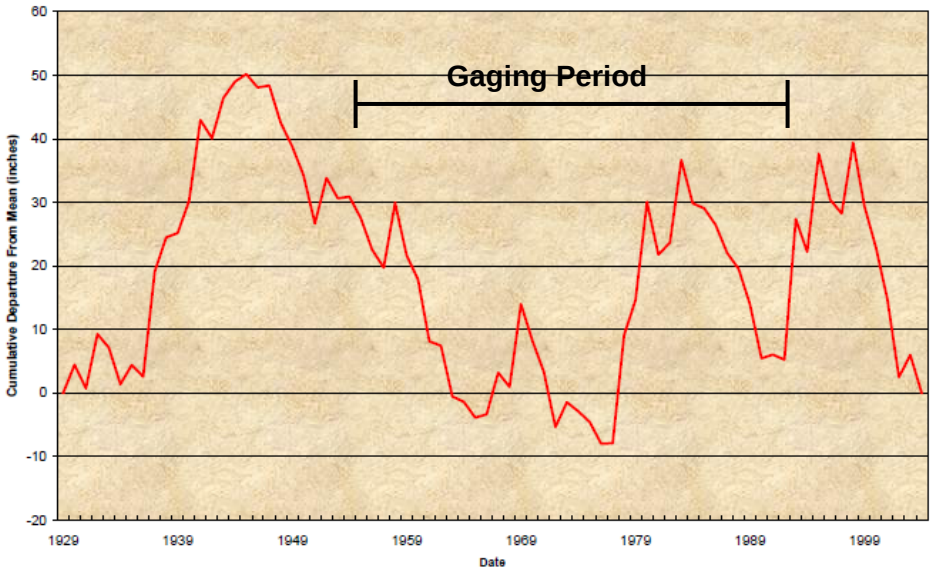

Figure 4-10
Cumulative Departure from the Mean Precipitation – Beaumont

Source: Wildermuth Environmental, IRWMP, San Timoteo Watershed, 2006

The 500 AFY from Little San Gorgonio Creek is considerable less than estimated by the District in previous studies. These previous studies were very conceptual and did not consider the limitations due to the limited storage in the existing storage/desilting basins.

Noble Creek

The Noble Creek watershed is 5.7 sq mi (3650 acres) above the intersection with Orchard Avenue as shown in Figure 4-9. It is a long narrow watershed, approximately 6 miles long by about 0.75 mile wide that is adjacent to Little San Gorgonio Creek and extends up to 7800 ft elevation. It is very similar in exposure, elevation and orientation as Little San Gorgonio Creek; the watershed area is

79% of Little San Gorgonio Creek. Noble Creek does not have the extent of alluvial aquifer that Little San Gorgonio Creek has. This would result in more runoff from the mouth of the canyon.

At this time the Noble Creek watershed is ungauged. For estimating purposes, short of more extensive studies, it would be reasonable to expect the runoff per unit area would be similar to Little San Gorgonio Creek. Using the analysis presented above for Little San Gorgonio Creek and prorating the drainage areas, about 400 AFY or more could be expected from the Noble Creek Watershed.

The District owns 15.1 acres of land adjacent to Noble Creek north of Orchard St.produced and west of Cherry Ave. which can be used for desilting basins and storm water retention/percolation basins in the Noble Creek watershed if necessary. This would provide BCVWD with an opportunity to capture any flows in Noble Creek downstream of Bogart Park.

As an alternative to constructing desilting/percolation basins on the BCVWD 15-acre parcel, a "soft plug," sandbag diversion dike could be installed in the concrete lined section of Noble Creek adjacent to BCVWD's recharge facility. This "soft plug" would also capture any overflows out of Little San Gorgonio Creek. The diverted flows would enter a desilting basin(s) and then flow into one of the Phase 2 percolation ponds to recharge the Beaumont Basin.

In addition to the recharge benefit, the Noble Creek improvements would provide key flood control benefits downstream by retarding the flow and shaving off the runoff peaks.

Grand Avenue Storm Water Interceptor (Marshall Creek)

Riverside County Flood Control and Water Conservation District (RCFCD) developed a master drainage plan for Beaumont Area in 1983 and identified a series of storm drains in the Marshall Creek Watershed in Cherry Valley as shown in Figure 4-11. There is considerable runoff from this area even in relatively light rainfall which can be observed along Brookside Avenue in the vicinity of Cherry Ave.

The RCFWCD master plan includes a major storm drain for Marshall Creek. According to the master plan, the main Marshall Creek Channel starts at the upper end of Bellflower Ave. and follows Bellflower Ave. to Brookside Ave. If follows Brookside Ave. to Cherry Ave. where it joins the existing channel. There is a lateral proposed (Line 16) that extends up Cherry Ave. to Cherry Valley Blvd and then follows Cherry Valley Blvd. to Winesap Ave.

BCVWD staff has observed significant runoff flowing in Brookside Ave. from this drainage area. The minor rainstorm runoff is relatively clean, with little sediment – primarily since it is runoff from impervious surfaces on developed land. An alternative to the RCFCD master plan described above would be to construct a storm drain conduit from the BCVWD Phase 2 Recharge Site along Grand Ave to Bellflower Ave. as shown in Figure 4-12. This would allow BCVWD to capture runoff flowing down Bellflower Ave and the runoff in Noble St. Cherry Ave, Jonathon Ave. and Winesap Ave. The tributary watershed area is approximately 1160 acres.

This project would reduce the flooding along Brookside Ave so there would be flood control and water conservation benefits. The details of the project should be coordinated with RCFCD.

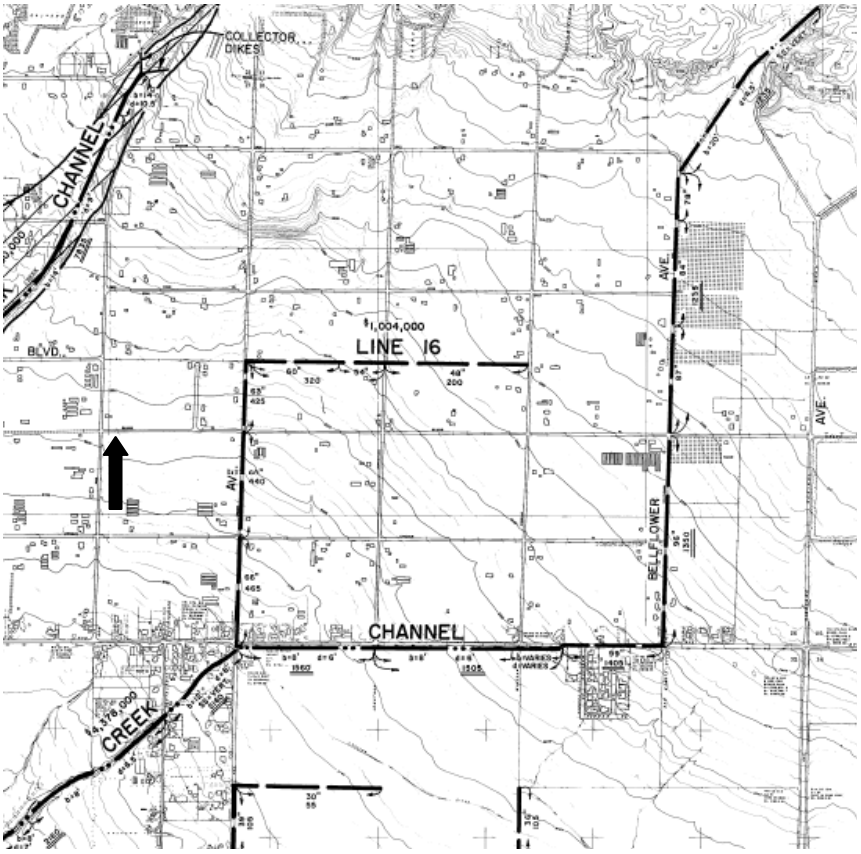

Figure 4-11
Portion of RCFCD Master Drainage Plan

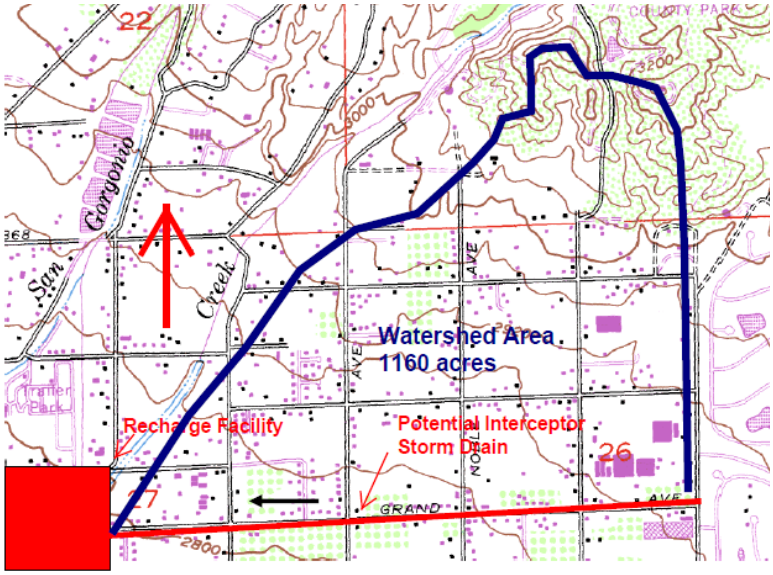

Figure 4-12
Grand Avenue Interceptor Storm Drain

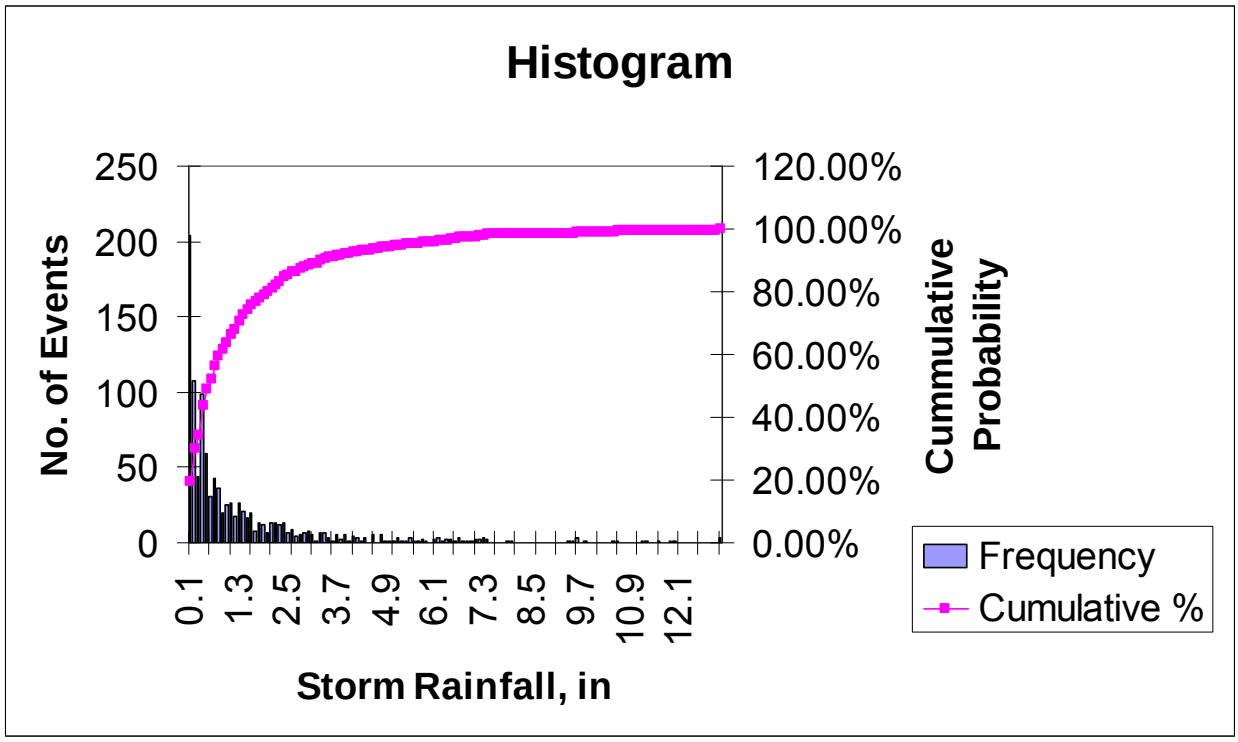

Figure 4-13
Storm Rainfall at Beaumont Rain Gage (1928 – 2006)

Beaumont Rain Gage daily rainfall from January 1928 through December 2006, a 79-year period, was used to estimate the runoff volumes. The Natural Resources Conservation Service (NRCS) Curve Number Method was used. The runoff was determined for each "storm" rather than each day. A storm is a continuous period of daily rainfall not interrupted by more than 3 days of non-rain. A frequency distribution of storm rainfall is shown in Figure 4-14.

In the determination of how much storm runoff can actually be captured, the storage capacity in the recharge/retention ponds and the percolation rate must be considered. The data for the 79-year rainfall record indicated there were 1,125 "storms" or distinct rainfall events during the period with an average duration of 4.9 days – say 5 days. The Phase 2 Recharge facility has about 50 acre-ft of storage capacity. Based on an average infiltration rate of 3 acre-ft/acre/day, about 45 acre-ft/day can be percolated over the 15 wetted acres of the Phase 2 charge facility. So for an average storm duration of 5 days, up to 225 acre-ft can be captured and percolated.

A storm rainfall of 5.1 inches of rainfall is projected to generate a little over 225 acre-ft of runoff from the 1160 acre drainage area. Frequency analysis of the rainfall events indicates that about 95% of all storm runoff events can be captured. See Figure 4-13

Using the frequency diagram and limiting the capture to storm rainfall amounts of 5.1 inches or less, an estimated 16,000 acre-ft would have been captured and percolated over the 79- year period. This is an average of about 200 acre-ft/yr. This is about 40% of all of the runoff that occurred during the period. More could be captured if there were storage and percolation capacity available.

Other Urban Runoff Captured in Water Quality Basins

As the area overlying the Beaumont Groundwater Basin develops additional impervious areas will be created in the form of rooftops, driveways, streets and sidewalks. These impervious areas will

increase the amount of runoff from that which has historically occurred over the undeveloped land. STWMA prepared a report entitled "Urban Water Management Strategy"[33] which delineated several projects to capture and recharge stormwater. Estimates were made of new stormwater recharge in excess of that which is already accounted for in the Adjudication.

The study was based on 50 years of precipitation record (1949-50 through 1998-99). A model was developed using daily data for precipitation and runoff and is described in detail in the "Urban Water Management Strategy Report. Stormwater capture and recharge projects are shown in Figure 4-14. Figure 4-15 shows existing basins in operation.

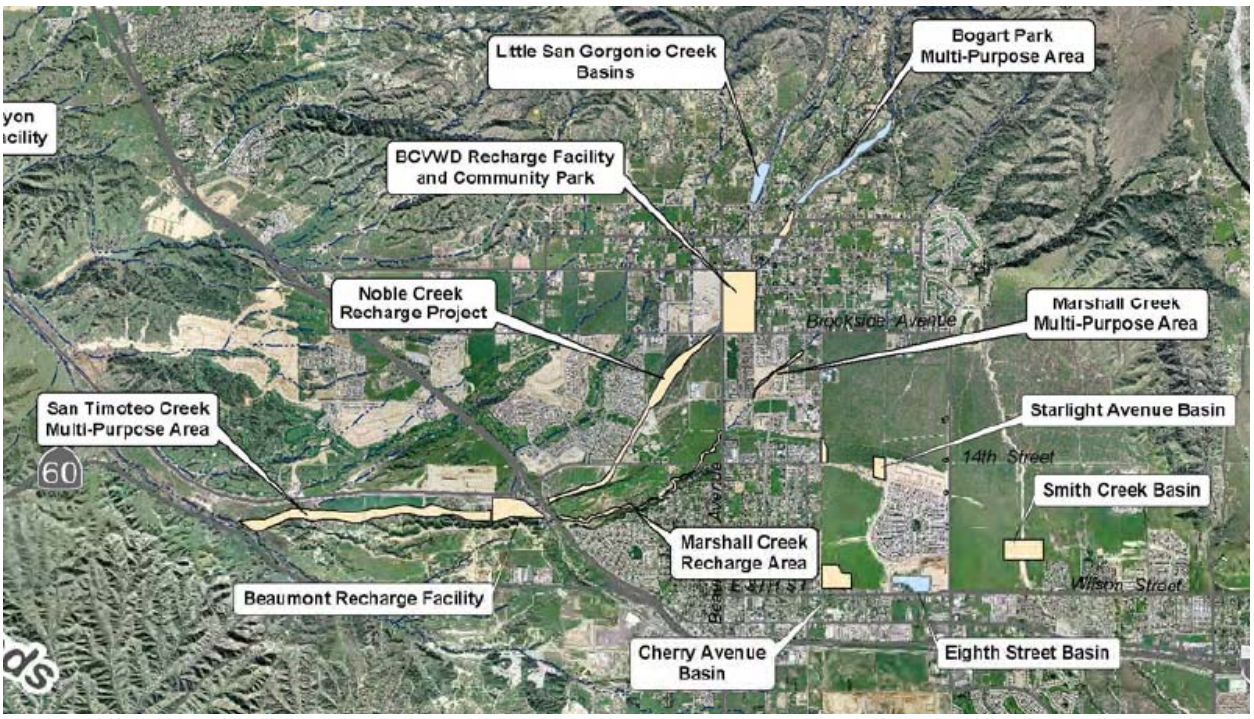

Figure 4- 14
Existing and Potential Stormwater Capture and
Recharge Facilities Overlying the Beaumont Basin
Source: STWMA[34]

In Figure 4-14 there are 3 facilities that currently exist: Starlight Basin, Cherry Avenue Basin and the Eight St Basin. Several other larger facilities potentially could be developed to capture additional runoff.

Table 4-20 presents a summary of the urban runoff projects and the estimated annual storm water as "new water" taken from the STWMA report.

BCVWD understands that the Eighth Street and possibly other water quality basin were constructed with augured and filled percolation "wells" to assist in percolating water captured in the basins. Additional testing and monitoring and measuring are needed to determine how well these percolation wells are working. Data is needed on the amount of water captured and the amount that is actually released or overflows.

[33] Ibid

[34]

Figure 4-15
Stormwater in Eighth St. Basin (left) and discharging into Cherry Avenue Basin

Summary of Potential Stormwater Capture

A summary of the potential Stormwater Capture is presented in Table 4-21.

Table 4-21
Summary of Potential Stormwater Capture

Potential Stormwater Capture Project	Potential Amount of Water Captured, AFY
Little San Gorgonio Creek	500
Noble Creek	400
Marshall Creek/Grand Avenue	200
Eighth St., Cherry Ave. & Starlight Water Quality Basins*	540
Other Potential Stormwater Capture Projects identified in STWMA Report not including the Beaumont Recharge Facilities in San Timoteo Creek*	1,220

* Source STWMA[35] The capture amounts in the STWMA reports may be optimistic.

Data should be collected on the flows tributary to the potential stormwater capture projects to determine their effectiveness and long term water supply capability. Every effort should be made to try to capture and percolate as much stormwater as possible to offset the need for more imported water.

[35] Extracted from Ibid

Table 4-20
Existing and Potential Stormwater Capture and Recharge Facilities[36]

Facility	Location/Description	Recharge Area, acres	Fully Developed Stormwater Capture, acre-ft/yr
Existing Facilities			
Eighth St. Basin	N/o 8th St., W/o Highland Springs Ave., S/o Pardee Sundance Tract	16	200
Cherry Ave. Basin	E/o Cherry Ave, S/o Carnation Lane adjacent to southeast corner of Pardee Sundance Tract	21	200
Starlight Ave. Basin	N/o Oak Valley Pkwy, E/o Starlight Ave, adjacent to Pardee Sundance Tract	4	140
Total Existing Facilities		41	540
Potential Facilities			
Noble Creek Recharge Project	Along Noble Cr. Brookside to I-10; 7000' long, 150' wide; may include soft levees, grade stabilizers etc	35	530
Marshall Creek Recharge Area	Along Marshall Cr. Beaumont Ave. to I-10, length approx. 5000 ft, 60' – 100' width	8	480
Marshall Creek Multipurpose Area	Along Marshall Creek upstream of Cougar Way,for a length of about 5000 ft. Creek width = 60 ft; install soft check/barrier dikes etc to promote recharge	12	210
Subtotal Potential Facilities		55	1,220
Total Potential and Existing Facilities		96	1,760
Beaumont Recharge Facility	S/o San Timoteo Canyon Rd and SPRR tracks	28	1,200
Total All Facilities		124	2,960

[36] Extracted from Ibid

Use of Nitrate-Contaminated Groundwater from Edgar Canyon (Pollution Control Project)

The USGS, in a report prepared in cooperation with the Pass Agency, stated that nitrate concentrations in wells in this area ranged from 1.0 to 11.3 mg/L as Nitrogen (MCL = 10 mg/L). The highest concentration (11.3 mg/L) was in well 2S/1W-22G4, located in Edgar Canyon just upstream of the existing canyon spreading grounds.[37]

In addition to the "floor" of Edgar Canyon at the mouth, the Bonita Vista Water Company recently had to abandon their well supply and annex to BCVWD. The principal reason was nitrate contamination. There were 3 wells originally but 1 well has been abandoned and 1 well was reportedly deeded back to the property owner. A significant amount groundwater probably exists in the floor of Edgar Canyon at the mouth and the adjacent areas which could be recovered.

In terms of water quality, based on data from 1998 and 1999, the TDS in BCVWD's RR-1 well in the floor of Edgar Canyon near the mouth was 370 mg/L. Nitrate as nitrate was 24-27 mg/L. For the Bonita Vista Water Company wells, the TDS is estimated to be 310 mg/L with 22 mg/L as nitrate. This was based on sampling performed in 2010 at nearby Cherry Valley Water Company wells. The water quality in terms of TDS is actually better than the TDS of the City of Beaumont Recycled Water. If the nitrate-rich water were extracted and introduced into the recycled water system, it would reduce the amount of imported water needed for blending to meet the 330 mg/L blended water maximum benefit water quality objective. This would make more of the imported water available for potable uses. The nitrates would be beneficially used by the landscaping.

This project would intercept that flow and pump it into the District's recycled water system. This project is conceptual and will require significant hydrogeological work to confirm the feasibility, design and yield. Figure 4-16 shows the location of the project and the principal elements.

The project is attractive, since it will extract a poor quality groundwater and put it to beneficial use which in turn reduces the amount of imported water needed for blending in the recycled system.

Wells in the Singleton Basin

The Singleton Groundwater Basin is not adjudicated and so wells constructed in this basin would result in "new" water which would offset the need for imported water. However, there is not much information about the hydrogeology of the Singleton Basin and what the impact a large municipal production well, e.g., 300-500 gpm (400 – 700 AFY) will have on the existing wells. There is a site for a well at BCVWD's Hannon Tank Site (2650 Zone Reservoir), so a well could be installed here if hydrogeologic studies appear favorable. Again this would reduce the need for imported water.

[37] USGS (2006). Geology, Ground-Water Hydrology, Geochemistry and Ground-Water Simulation of the Beaumont and Banning Storage Units, San Gorgonio Pass Area, Riverside County, California, Scientific Investigations Report 2006-5026, in cooperation with the San Gorgonio Pass Water Agency, pg. 66.

Figure 4-16
Groundwater Extraction Project (Pollution Control Project)

Article 21 Water

In addition to Table A water, State Water Contractors, like the Pass Agency, can receive "Article 21 Water". Article 21 Water refers to the section in each of the "contracts" that makes available surplus water on short notice. This water is available because it is water not needed to meet contractual or water quality requirements in the Delta. State Water Contractors must take this water immediately and the water is over and above the Contractor's Table A commitment. The 2011 Draft Reliability Report indicated that up to 20,000 acre-ft/yr of Article 21 water will be available 74% of the time. There is a 7% chance of receiving 100,000 to 200,000 acre-ft/yr and a 5% chance of receiving 200,000 to 300,000 acre-ft/yr of Article 21 Water. How much of this Article 21 water would actually be available to the Pass Water Agency is unknown since the amount available to each contractor is a function of their Table A amount and the number of contractors interested in Article 21 water. If the two largest contractors (Metropolitan Water District of Southern California and Kern County Water Agency) "sign on," the amount proportioned to the other contractors will be small. It is possible, however, during wet years the Pass Agency may be able to obtain 3,000 to 8,000 acre-ft of Article 21 Water.

The Pass Agency should take every opportunity to secure Article 21 water when it is available. There is sufficient capacity to accommodate the flow once EBX II is completed. BCVWD believes that there will be ample quantities of Article 21 water available in the future particularly when the effects of climate change are considered and there seems to be a resistance to construct additional storage facilities on the State Water Project. With climate change more of the runoff will be early, will be as a result of rain rather than snow and will be flashy and high in flow rate. This will quickly fill existing reservoirs possibly requiring early releases.

Turnback Pool Water

When State Water Contractors determine they do not need all of their allocation, they have the opportunity to turn back the water to the Department of Water Resources. The water is put into to "pools", Pool A and Pool B, depending on when the turn back decision is made. The contractor is paid a small amount for the turn back water depending on whether it is in Pool A or B. The Department of Water Resources then offers the other contractors the opportunity to purchase the turn back pool water. If there are more than one contractor offering to buy turn back pool water, as there typically are, then the amount each contractor can purchase is proportional to the Contractor's Table A.

The Pass Agency should take every opportunity to purchase Turn Back Pool water when it is available. There is sufficient capacity to accommodate the flow once EBX II is completed.

Additional Table A

Previously in this Section, BCVWD identified a shortfall in its water supply and estimated the amount of additional imported water would be needed. Pass Agency will need to purchase additional Table A to meet the demands of BCVWD and Pass Agency's other members. This must be initiated as soon as possible. After February 2014, there will be no temporary surplus, and BCVWD and other appropriators in the Beaumont Basin Judgment will have to look for sources to make up the loss of the temporary surplus. In the case of BCVWD, this means the loss of 6,802 AFY.

Other Opportunities for Supply

Transfer or Exchange Opportunities

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

Transfers from South Mesa Water Company

BCVWD has an agreement with South Mesa Water Company (SMWC) to transfer unused rights from SMWC to BCVWD's groundwater storage account in the Beaumont Basin. The transfers first began in FY 2006-07 and can continue through 2014 at BCVWD's option at which point the "temporary surplus" in Beaumont Basin terminates. Water transfers from SMWC are summarized in Table 4-22.

Table 4-22
Water Transfers from SMWC to BCVWD

FY	Transferred from SMWC, acre-ft
2006-07	1500
2007-08	2500
2008-09	2000
2009-10	0
2010-11	3500
Total	9500

Since South Mesa is an appropriator, future water transfers will not be possible because appropriators will not have pumping rights beyond 2014 and most likely will not have excess water to sell.

Participation in Other Agency Water Supply Projects

BCVWD could participate in a joint project with another Southern California agency. These projects could include groundwater treatment and desalination.

Many of the groundwater basins in Southern California are impacted by excessive nitrates, high total dissolved solids, and, in some cases volatile organic chemicals (VOCs) and perchlorate. There are a number of agencies constructing or planning to construct desalters, VOC, nitrate and perchlorate removal facilities in the area including the Santa Ana Watershed Project Authority, the Chino Basin Desalting Authority, Eastern Municipal Water District and others. BCVWD could participate in one or more of these projects in exchange for State Project Water. BCVWD understands that they will need to work with the Pass Agency and others to work out the arrangements to bring this exchange about. BCVWD understands there will be transportation (wheeling) charges imposed.

BCVWD sees transfers and exchanges as very viable solution to providing long term water supplies.

Desalinated Water Opportunities

As stated above there are opportunities to participate in desalting projects particularly for groundwater in other regions and exchange the water for State Project Water. However, installing desalting facilities within the Beaumont Basin would not be very practical since the existing groundwater water quality is excellent. The TDS is only about 250-275 mg/L. Generally to make desalting practical, the TDS should be in the 1500 mg/L or greater range. It is possible that desalting may be required on the recycled water in conformance with the maximum benefit commitments. But this would only be partial demineralization to reduce the TDS to the maximum benefit objective of 330 mg/L.

Summary

Table 4-22, (presented previously as Table 4-17), is a summary of BCVWD's potable water supply for the period 2005 to 2035 by 5-year period. The table shows a short fall from 2015 through 2035 primarily as a result of the "loss" of the temporary surplus pumping, i.e., approximately 6,800 AFY. The shortfall for the next 5-year period is about 4,600 AFY. Fortunately BCVWD has about 25,000 acre-ft of banked water in storage. This can be used to offset the shortfall for about 5 years or so.

It is important to understand that Table 4-23 represents a very conservative approach to water supply. Principal assumptions are:

- No Article 21 Water or Turn Back Pool Water is assumed to be purchased.
- The voluntary inter-agency allocation agreement wherein BCVWD is allocated 27.4% of Pass Agency's Imported Water is in effect. BCVWD will very likely be able to obtain as much Pass Agency water as they have in the past – at least for the next 5 years or so since the other agencies in the Pass Area are not expect to take their full "allocation."
- BCVWD's share of the unused overlier pumping rights is based on a reduced safe yield of 6000 AFY
- No recycled water is delivered to Morongo Tukwet Canyon Golf Course. If recycled water were delivered, it would reduce the amount of imported water needed.

BCVWD has water in storage in the Beaumont Basin now which will allow the District to meet demands for the next 5 years or so. BCVWD should continue to try to capture as much storm runoff as possible in the recharge basins in Edgar Canyon and elsewhere.

Table 2-6 presented a list of projects within the BCVWD service area that were under construction before the housing slump hit. These projects (7,631 EDUs) have their entitlement paperwork essentially complete and are "ready to go." We can expect these to start up again within the next two years.

Actions to Be Taken

It is imperative that BCVWD:

1. Request the Pass Agency to immediately begin negotiations to secure additional Table A water. The amount BCVWD requires is presented in Tables 3-12 and 4-18. The required amount is just what is needed to balance supply with demand. There is no "cushion" to bank water for future dry periods. There are over 7600 EDUs ready to go. In the purchase of Additional Table A, the 64% reliability factor must be considered.
2. Request the Pass Agency to purchase Article 21 and Turn Back Pool Water whenever it is available
3. Request that BCVWD work with San Bernardino Valley MWD (Valley District) or other State Water Contractors to secure imported water on at least a short term basis (lease or other arrangement) to build up BCVWD's storage account while Pass Agency negotiations are on-going to secure added Table A.
4. Introduce recycled water from either YVWD and/or the City of Beaumont into the non-potable system for delivery by 2015.
5. Evaluate stormwater capture and recharge and begin to implement those that are technically, economically and environmentally feasible.
6. Work with the City of Beaumont, Beaumont Unified School District, the Parks and Recreation Department, Home Owners Associations and other high water users to convert high water using landscapes in parks and medians to drought tolerant, low water using landscaping

Table 4-23 (previously as 4-17)
BCVWD Potable Water Supply Summary

Year	2005	2010	2015	2020	2025	2030	2035
Demands							
Total Water Demand not incl. GCs, AFY	9,306	11,023	12,453	13,492	14,947	16,526	18,417
Non-potable Landscape Demand, AFY	1038	1,822	1,500	1,580	1,660	1,740	1,830
Oak Valley GC, AFY	0	0	0	750	750	750	750
Morongo Tukwet Canyon GC, AFY	0	0	0	0	0	0	0
Total Non-potable Demand, AFY	1,038	1,822	1,500	2,330	2,410	2,490	2,580
Potable Water Demand, AFY	8,268	9,201	10,953	11,912	13,287	14,786	16,587
Sources of Potable Water Supply							
Edgar Canyon Groundwater, AFY	2,526	1,897	2,260	2,260	2,260	2,260	2,260
Beaumont Basin Groundwater, AFY	6,802	6,802	0	0	0	0	0
BCVWD Share of Unused Overlier Rights, AFY, based on 6000 AF Safe Yield	2,226	2,249	1,500	1,590	1,500	1,190	1,010
Overlier Forebearance of Pumping for Potable Water Supply, AFY	36	451	451	576	701	801	872
Overlier Forebearance of Pumping for Recycled Water Supply, AFY	0	0	0	780	810	840	870
Subtotal Groundwater Extractable without Replacement, AFY	11,590	11,399	4,271	5,206	5,271	5,091	5,012
Groundwater Used in Non-potable Water System, AFY	1038	1822	0	0	0	0	0
Groundwater Available to Meet Potable Water Demand, AFY	10,552	9,577	4,271	5,206	5,271	5,091	5,012
Groundwater Shortfall, AFY	-2,284	-376	6,682	6,706	8,016	9,695	11,575
Supplemental Supplies, AFY							
Imported Water Not Used in Non-Potable System which can be Recharged, AFY	0	5,727	2,316	2,020	1,890	1,845	1,795
Total Water Available for Potable Supply, AFY	10,552	15,304	6,597	7,226	7,161	6,936	6,807
Potable Water Demand - Supply Shortfall, AFY	-2,284	-6,103	43,66	4,686	6,126	7,850	9,780

Section 5

Water Supply Reliability and Water Shortage Contingency Planning

Water Supply Reliability

> 10620(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions

BCVWD has a very diverse water portfolio that allows it to maintain a reliable water supply to its current and future customers. The portfolio consists of:

- Unadjudicated groundwater from Little San Gorgonio Creek (Edgar Canyon)
- Unadudicated groundwater from the Singleton Basin (future)
- Adjudicated groundwater from the Beaumont Basin
- Imported State Project Water from SGPWA
- Recycled water from the City of Beaumont and YVWD (both future)
- Non-potable groundwater from the mouth of Edgar Canyon (potential future)
- Stormwater capture from Noble and Little San Gorgonio Creek and others (potential future)
- Percolated urban runoff from developing areas (potential future)

In addition BCVWD has a storage account in the Beaumont Basin to store imported water when available in ample supply during wet years under a conjunctive use program. The Beaumont Basin has enormous amounts of groundwater in storage as well as storage capacity to store more groundwater. The water in storage and the ability to store imported and other water permits BCVWD to easily "get through" dry years with little direct impact on consumers. BCVWD is fortunate to have this resource.

BCVWD's water management strategy since its formation has always been to maximize local water resources including local groundwater and capture and percolate surface flows in Little San Gorgonio Creek for subsequent extraction in the District's Edgar Canyon wells. With increasing demand for water, BCVWD began installation of a non-potable water system with the intent of using recycled water from the City of Beaumont and YVWD. Currently (2013) the water demand in the non-potable system is about 20% of the total water demand. The non-potable water system is supplied exclusively with potable water at present. Recycled water is anticipated to be introduced into the non-potable water system in 2015.

BCVWD has been fortunate to have a very reliable water supply, a large amount of groundwater in storage and a large amount of groundwater water storage capacity. This underground reservoir allows BCVWD to accommodate loss of imported water supply or reductions in their Edgar Canyon supply due to droughts.

In Section 4, BCVWD's water well pumping capacity was discussed and BCVWD has ample capacity to meet the maximum day demand with the largest well out of service. Standby generators are provided on critical water supply wells.

Plans to Ensure a Reliable Water Supply

Expansion of the Debris and Stormwater Capture Basins in Edgar Canyon

In 2012 BCWD completed the construction of a series of debris and stormwater capture basins at the mouth of Little San Gorgonio Creek (Edgar Canyon), immediately upstream of the existing recharge ponds used by the Pass Water Agency. These basins will allow BCVWD to capture and recharge a portion of the larger storm flows that make it to the outlet of Edgar Canyon.

Phase 2 Groundwater Recharge Facility

The immediate focus of the District is on implementing Phase 2 of the Groundwater Recharge Facility. This work was designed several years ago and is now being constructed. The project will more than double the capacity of the Phase 1 facility and allow the District to percolate more imported water including Article 21 and turnback pool water. It will also allow BCVWD to percolate storm flows and runoff in Noble Creek which flows between the Phase 1 and 2 facility.

Recycled Water Supply

BCVWD has already installed over 30 miles of recycled water transmission main and distribution piping and a 2 MG non-potable water reservoir. This is a looped system that essentially encircles the City of Beaumont. There are over 275 connections to the non-potable water system receiving potable water through this system. Current demands are about 1,500 AFY. As soon as recycled water is available it will be introduced and the potable supply disconnected. BCVWD has been awarded a facilities planning grant from the SWRCB to study the technical and economical feasibility of a connection to the YVWD recycled water system that will deliver 2000 AFY of recycled water to BCVWD (3000 AFY after 2030). This project was described in Section 4 of this UWMP Update. Discussions are underway with the City of Beaumont to take recycled water from the City's plant. To do this will require a balancing tank and booster pumping station at the treatment plant site. The City will need to complete the validation of its treatment plant to meet full Title 22 as required in a letter from CDPH in 2007.. BCVWD expects recycled water may be available as soon as late 2014/early 2015.

Imported Water Supply

BCVWD will need to increase its reliable imported water supply from 3040 AFY currently to over 12,800 AFY by 2035 unless more local water is used. See Table 4-18 in Section 4. For Pass Agency's 2010 UWMP, BCVWD provided the Pass Agency with some preliminary estimates of imported water demand. Table 5-1 presents a summary of the imported demands considered by Pass Agency in the preparation of their UWMP and the current BCVWD estimate of imported water requirement. Table 5-1 shows that there is an increase in BCVWD's imported water requirements over that preliminarily projected. One of the factors which caused this is the maximum benefit water quality TDS requirement of 330 mg/L in the recycled water system. This required equal volumes of imported water with each volume of City of Beaumont recycled water. So there was not an "acre-ft for acre-ft" savings.

The imported water supply requirements represent a conservative estimate. As more storm water and runoff water is captured and percolated the requirement will decrease. Similarly if more recycled water can be used, for example on the Morongo Tukwet Canyon Golf Course the imported water demand will decrease.

Table 5-1
BCVWD Imported Water Requirements vs Pass Agency UWMP

Year	2005	2010	2015	2020	2025	2030	2035
Preliminary BCVWD Imported Water Requirement provided to SBPWA Aug 2010,AFY[1]		2,855	6,776	5,103	7,451	9,758	10,904
Imported Water Requirement, Table 4-18 herein, AFY		--	7,406	7,726	9,166	10,890	12,820
Difference, AFY		--	630	2,623	1,715	2,132	1,916
SGPWA Imported Water Demand in 2010 UWMP, AFY			6,970	7,760	15,015	22,468	26,920
BCVWD % of SGPWA Imported Water Demand, AFY			>100%	100%	61%	48%	48%

It is important to point out that the amounts of imported water in Table 5-1 do not include any reliability factor. To find the true Table A requirement, the imported water demands should be multiplied by 1.56 i.e., 1/0.64, to arrive at the Table A amount that is actually needed.

Pass Agency will need to purchase additional Table A immediately in order to be able to meet these projected requirements. If all of the member agencies of SGPWA demand imported water there may not be enough to meet demands and likely could exceed the Pass Agency Table A amount very soon. Certainly by 2025 it will be exceeded.

With the completion of EBX II, the Pass Agency will have 64 cfs delivery capacity except for:

- Foothill Pipeline portion of EBX II for which Pass Agency has only 32 cfs capacity but can get additional capacity by requesting it and if SBVMWD is not using the capacity. Pass Agency is considering the purchase the additional 32 cfs capacity.
- Cherry Valley Pump Station has only 32 cfs of firm pumping capacity, 52 cfs total pumping capacity. Expanding this pump station will be costly, but may have to be done at some point. An alternative may be a turnout and pipeline extension upstream of the Cherry Valley Pump Station.
- Noble Creek Pipeline is probably limited by velocity to about 52 cfs – the total capacity of the Cherry Valley Pump Station.

The 64 cfs capacity corresponds to about 35,000 AFY – i.e., double the current Table A. Table 2-3 in Pass Agency's 2010 UWMP projects a 26,920 AFY imported water demand for its service area in 2035. So based on this, the 64 cfs pipeline capacity should be adequate to beyond 2035.

Stormwater and Urban Runoff Capture

BCVWD will be evaluating a number of stormwater and urban runoff capture projects to decrease the need and cost for imported water. These were described in Section 4 and are summarized herel

[1] Provided to CDM by J. C. Reichenberger, District Engineer, 8/17/2010

- Noble Creek “Soft Plug” -- Plans are in process and discussions underway with the Riverside County Flood and Water Conservation District to install a soft plug diversion, system in the concrete-lined portion of Noble Creek separating Phases I and II of the recharge facility to capture and percolate storm runoff. This will be relatively easy to develop and implement now that Phase 2 of the Recharge Facility is nearing completion.
- Discussions have also been held to install temporary berms in lower Noble Creek, upstream of the I-10 bridge to slow down and percolate storm runoff from the urban areas of Beaumont. This lower reach of Noble Creek receives a substantial amount or urban runoff from the new developments in the watershed. Even small amounts of rainfall produce measurable runoff
- Construction of an interceptor storm drain on Grand Avenue north of Brookside Avenue to capture urban storm runoff from about 1,160 acres of developed area in Cherry Valley. This area generates significant relatively clear runoff from even minor rain events. This runoff will be conveyed to the Groundwater Recharge Facility for percolation.
- The City of Beaumont has required developers to construct “water quality basins” to store and percolate runoff from the streets, roofs and other impervious areas in the development. Several of these basins exist. See Section 4. More should be installed to maximize the capture of runoff.

High Nitrate Groundwater from Mouth of Edgar Canyon

The use of nitrate-contaminated groundwater from the mouth of Edgar Canyon in the non-potable water system is a potential future project. This contaminated groundwater cannot be used for potable water supply without expensive treatment. Using it in the non-potable water system for landscape irrigation has a number of benefits. First, the landscaping materials use the nitrates as fertilizer; secondly, the contaminated groundwater is intercepted and precluded from flowing toward and contaminating the high quality Beaumont Basin groundwater; and thirdly, a water source is generated which offsets the need for imported water.

Financing

BCVWD has the financing in place and is collecting fees from each new residential unit or “equivalent dwelling unit” for commericial/indusrial/institutional facility for the purchase of additional Table A water, local water resource development, water treatment and recycled water facilities, including pipelines, tanks pumps, wells etc. When they are purchasing the Table A amount, the District recognizes that additional rights need to be purchased to account for the reliability issues with delivery of State Project Water.

In 2009 a Capital Improvement Program, which included the projects above, was developed by BCVWD and provided to the rate study consultant to factor into any proposed rate changes. The rate study and adopted rates have taken many of these projects into consideration.

Inconsistent Water Sources

> 10631(c)(2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

Groundwater

After February 2014, when the "Temporary Surplus" pumping stops, BCVWD will only be able to pump groundwater the District has banked in its storage account in the Beaumont Basin. The banked water includes percolated imported water, percolated stormwater and urban runoff, transferred water from South Mesa Water Company and reallocation of unused overlier rights and pumping forebearance water. The Beaumont Basin Adjudication allows appropriators, like BCVWD, to have their own water storage account in the basin. As of July 1, 2011, BCVWD has an 80,000 AF authorized storage account. (If full, this is about 4.8 years supply at the year 2035 potable water demand assuming no other supply.) The storage account can be used to store captured runoff and imported water for use during dry years. As of December 31, 2011, BCVWD's storage account had a balance of almost 32,000 AF. This is almost 3 years potable water supply at the current demand and just less than 2 years at the year 2035 demand. BCVWD is actively recharging any water that is available from the Pass Agency. In summary as long as the District has water in its storage account, the impacts of an inconsistent supply are easily mitigated.

In addition, there are over 2.4 million AF of groundwater available in storage according to STWMA. This water could be "tapped" in a true emergency but would require Watermaster approval.

Groundwater from Edgar Canyon is affected to some degree by climate as can be seen from the statistics in Table 5-2. The average annual extraction from Edgar Canyon is 2259 AFY based on records from 1983-2010. During that period of time the minimum extracted was 1117 AFY; 90 percent of the time at least 1270 AFY are available (the 10th percentile). This was discussed in detail in Section 4. Any reductions in pumping from Edgar Canyon is easily replaced by groundwater from BCVWD's storage account in the Beaumont Basin.

Table 5-2 (Presented Previously as Table 4-4)
Groundwater Extraction Statistics from Edgar Canyon Wells (1983 -2011)

Parameter	Annual Production Acre-ft
Average	2,259
Maximum	3,738
Minimum	1,117
Minimum 3-yr Moving Average	1,230
90th Percentile	3,288
10th percentile	1,277

This variability will be accounted for in the drought analysis in this section.

Recycled water is consistently available. Although during droughts, consumers are more aware of water conservation and reduce their indoor water consumption somewhat. They are more aware of the need to do only full loads of laundry, full loads for the dishwasher etc. BCVWD is counting on two separate sources: YVWD and the City of Beaumont. For the YVWD supply the amount that BCVWD is proposing to use is far less than the amount of recycled water produced at YVWD's water recycling plant.

The only sources which may not be consistently available due to climate are stormwater, urban runoff, Edgar Canyon groundwater and imported water.

Imported Water

In addition to the inconsistencies due to the biological/endangered species restrictions and other factors identified in Section 4 which affect the overall reliability of imported State Project Water, there is variability in the supply due to climate, i.e., wet years vs. dry years. DWR reduces the allocation to each Contractor during dry periods but makes excess water available during wet years (Article 21 Water).

Uncertainties with earthquake impacts on the Delta levees or conduits and pump stations could also occur which would cut off the supply of imported water for a while – perhaps 6 months to a year or more, depending on the severity of the problem. Should these catastrophic events occur, BCVWD will be relying on water in its Watermaster-monitored, groundwater storage account. By keeping a sufficient amount of water in storage will allow BCVWD to "weather" these supply interruptions. As stated above, as of the end of 2011, BCVWD has 32,000 AF in its storage account; so outages of even a year would not have a significant impact on BCVWD's ability to provide water to its customers. In the future as demands increase, BCVWD will need to ensure there is adequate water in the storage account to weather long term outages. Because of BCVWD's ability to store water in the Beaumont Basin (up to 80,000 AF), it is only in extreme cases that water use restrictions would need to be imposed. BCVWD is very fortunate to have a large groundwater basin available for extreme emergencies.

Stormwater and Urban Runoff Reliability (Potential Projects)

Construction is complete on desilting and percolation basins at the mouth of Edgar Canyon upstream of the recharge ponds used by the Pass Agency. This will allow BCVWD to trap and desilt excess storm flows and release slowly to the Recharge Facilities overlying the Beaumont Basin or to percolate the flows in Lower Edgar Canyon Spreading Grounds which appear to overly a portion of the Beaumont Basin per a recent USGS report.

The combination of a large, essentially uncontaminated, groundwater basin with ample storage capacity in conjunction with the BCVWD Groundwater Recharge Project Phase I and Phase II facilities provide a unique opportunity to capture and percolate stormflows and runoff. The Phase 1 recharge facilities have about 10 wetted acres of percolation area. The storage capacity within Phase 1 is about 30 acre-ft and the percolation capacity is 20,000 to 25,000 AFY. Phase 2, which is about to come on line, has about 15 wetted acres and about 50 acre-ft of storage. This is expected to add another 20,000 to 25,000 AFY or more of percolation capacity.

The storage and percolation capacity provides ample opportunity to take advantage of the "flashy" storm flows from Little San Gorgonio Creek (Edgar Canyon) and Noble Creek upper watersheds. Installation of diversion works (soft plugs) in the concrete-lined portion of Noble Creek channel would allow BCVWD to capture, desilt, and percolate additional storm runoff from the Little San Gorgonio/Noble Creek watershed.

Another potential project, Grand Avenue Stormwater Interceptor, was identified in Section 4 to intercept runoff in the Marshall Canyon watershed and convey it to the District's groundwater recharge facility. This project would be subject to reduction during dry periods.

As development occurs, the City is requiring developers to install urban runoff capture and percolation facilities; so in the future, as the population grows, more runoff will be generated. There are 3 existing urban runoff capture basins that have been constructed; more are likely. Urban runoff captured and percolated in these basins will need to be monitored, measured and reported to Watermaster to receive credit for this water. The urban runoff which is percolated and stored in the groundwater basin available for use as a water supply. Having a large groundwater storage account available will allow capture of runoff during wet years to use

during dry years and effectively increasing the consistency of the supply. This described in Section 4 of this UWMP Update.

Summary

Table 5-3 (DWR Table 29) presents a summary of the factors resulting in inconsistency in the source of supply. Because BCVWD overlies the Beaumont Groundwater Basin, these inconsistencies in supplies will not result in interruption of water supplies to current or future customers. The reason for this is the fact that the Beaumont Groundwater Basin has an extensive amount of water in storage (upward of 2.4 million AF) with 200,000 to 400,000 AF additional available for storage. BCVWD has an 80,000 AF storage account in the basin managed by the Beaumont Basin Watermaster. This allows BCVWD to store water during wet years for use during dry years.

Table 5-3
Factors Resulting in Inconsistency of Supply (DWR Table 29)

Water Supply Source	Limitation Quantification	Legal	Environmental	Water Quality	Climate	Additional Information
Edgar Canyon Groundwater	1270				X	Note 1
Beaumont Basin Groundwater Appropriator Rights	0	X				Note 2
Beaumont Basin Groundwater Transfer of Pumping Rights South Mesa WC	0	X				Note 2
Beaumont Basin Groundwater Unused Overlier Rights	Variable	X			X	Note 3
State Project Water	470	X	X		X	Note 4
Recycled Water	None					Note 5
Stormwater Capture from Edgar Noble, and Marshall Canyons					X	
Urban Runoff Capture and Percolation					X	
Nitrate-contaminated Groundwater					X	
Singleton Basin Well					X	

1 10 percentile historic production from Edgar Canyon Wells (see Section 4)
2 After 2014 the Appropriator production rights are zero per Adjudication
3 Reallocation of Overlier pumping rights are variable. Estimated to drop to 1000 AFY by 2035
4 SWP reliability discussed in text. 10% of Table A is available 100% of the time; adjusted per draft allocation agreement.
5 Recycled water is not subject to any significant variations. Domestic water restrictions typically have greatest impact on outdoor water use.

Water Shortage Contingency Planning

> 10632(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

Water supplies may be interrupted or reduced significantly in a number of ways –regional and local power outage, an earthquake that damages water delivery or storage facilities, or a contaminated well or water source. This section describes how BCVWD will meet the maximum day demands of their customers and their plans to respond to such emergencies so that emergency needs are met promptly and equitably. Table 5-4 presents the average day and maximum day demands for the period 2005 through 2035 based on BCVWD's maximum day/average day ratio of 2.0. This provides the backdrop for the sub-sections to follow.

Table 5-4
Historic and Projected Average and Maximum Day Potable Water Demands

Year	Average Day Demand, AFY	Average Day Demand, mgd	Maximum Day Demand, mgd
2005	9,306*	7.4	17.0 actual
2010	11,023*	8.3	19.7 actual
2015	10,953	9.8	19.6
2020	11,912	10.6	21.3
2025	13,287	11.9	23.7
2030	14,036	12.5	25.0
2035	15,837	14.1	28.2

* Total water demand since potable water used in non-potable system

Regional and Local Power Outage

To meet emergency water needs BCVWD has both gravity storage and wells. Storage can provide for short term power outages; wells, equipped with standby generators or emergency power connections can meet longer term power outages.

Storage

The storage can provide short term water supply for regional or local power outage, i.e., a few hours to one day depending on the time of year and water demand. Approximately 24 MG (72.5 acre-feet) of gravity storage is available as listed in Table 5-5.

Table 5-5
Gravity Storage Reservoirs in BCVWD System

Available Reservoirs	Total Aboveground Storage (MG)	Total Aboveground Storage (acre-feet))
Upper Edgar	0.75	1.5
Lower Edgar	1.0	3.1
Noble & Highland Springs	3.0	9.2
Vineland I, II & III	6.0	18.5
Cherry I,II, and III	4.0	12.3
Taylor	3.9	12.0
Hannon (2650 Zone)	5.0	15.3
3900 Zone (not yet operational)	0.2	0.6
TOTAL	23.85	72.5

The reservoir storage capacity in Table 5-5 does not include the Twelfth and Palm Reservoir (0.4 MG). This serves as an equalization tank for the Twelfth and Palm Boosters. The almost 24 MG of gravity storage is more than one maximum day based on 2010 conditions. Considering the vast amount of water in storage in the Beaumont Basin aquifer, the need for large amounts of above-ground gravity storage is not warranted– provided, of course, there is adequate well capacity to meet the maximum day demands. BCVWD has such well capacity on standby power or capable of being connected to portable standby generators.

Wells

Wells equipped with emergency power or emergency power connections can supply up to a maximum of 14,880 gpm, or 65.7 acre-feet per day (AF/day) or 21.4 mgd and assumes all wells in service. See Table 5-6. This capacity only includes BCVWD's share of the joint wells with the City of Banning. (If there was a regional power outage, the City of Banning would likely need water too, and would rely on their share of the well capacity.)

The District has three portable generators. The portable units have the capability of running up to 50, 350 and 550 horsepower (hp) motors respectively.

BCVWD's wells with standby power or standby power connections can provide water to meet the maximum day demand to the year 2020 assuming all wells with standby power or standby power connections are in service. So a local or regional power outage should have little or no impact. If, however, Well 29, BCVWD's largest well, is out of service for any reason due to mechanical failure, BCVWD will only be able to supply 15.7 mgd and will not be able to meet the maximum day demand during a regional power outage of extended duration. During such an event, water use, e.g., irrigation, will have to be restricted. It should be noted that 15.7 mgd **will** be able to supply an average day to well beyond the year 2035; so the impacts of a regional power outage will depend on the time of year.

BCVWD has plans for the rehabilitation/replacement of Well 2 which should boost capacity by 1500 gpm (2.2 mgd) or more. This well should be equipped with a generator or standby power

connection. As other wells are constructed, they should have standby power to provide back-up and reliability.

Table 5-6
BCVWD Wells with Standby Power or Connections for Standby Power

Well No.	Location	Total Capacity		Remarks
		GPM	AF/Day	
12	Upper Edgar Canyon	130	0..6	Auxiliary engine drive
14	Upper Edgar Canyon	200	0.9	Portable generator connection
6	Middle Edgar Canyon	250	1.1	Auxiliary engine drive
4A	Lower Edgar Canyon	300	1.3	Portable generator connection
16	BSU	800	3.5	Portable generator connection
21	BSU	2,100	9.3	Portable generator connection
22	BSU	1,700	7.5	Portable generator connection
23	BSU	2,700	11.9	Standby Generator
24	BSU	1,250	5.5	Standby Generator (only BCVWD's Share of Capacity Shown – total = 2500 gpm)
25	BSU	1,450	6.4	Standby Generator (only BCVWD's Share of Capacity Shown – total = 2900 gpm)
29	BSU	4,000	17.7	Standby Generator
Total Wells with Standby Power or Standby Power Connections		14,880	65.7	21.4 mgd capacity
Total Wells with Standby Power or Standby Power Connections with Well 29 out of service		10,880	48.0	15.7 mgd capacity
Total All Wells		17,550	77.6	25.3 mgd capacity

Pressure Zone Transfers and Boosting

BCVWD is able to move water between pressure zones through pressure regulators and booster pumping stations. Except for the Cherry Yard Boosters (21A, 21B and 21C), which are used regularly, the other boosters are usually used only for emergency transfers when gravity transfer from higher pressure zones cannot be made.

Boosters 21A and 21B which pump from the Cherry Reservoir (2750 Zone) to Noble Reservoir (3040 Zone) have transfer switches so a portable generator can be connected. Booster 21C has a natural gas driven pump that has a capability of pumping 1,500 gpm from the Cherry reservoir (2750 Zone) to the Noble reservoir (3040 Zone).

There is an emergency booster at the Well 4A site with a 100 hp motor; which is rated at 500 gpm and can boost water from the 3040 Zone to the Upper Edgar Tank (3620 Zone), BCVWD's highest active pressure zone. In addition, the 50 hp Noble Tank Booster, which has a rated capacity of 500 gpm, can boost water from the 3040 Zone to the 3330 Mesa Pressure Zone.

Stationary backup generators with automatic transfer switches were installed at the headquarters building and at Highland Springs Hydropneumatic system.

Summary

BCVWD is well positioned with a combination of ground storage, wells with standby power or standby power connections and pressure zone boosters to weather even extended local or regional power outages. If BCVWD's largest well is out of service for mechanical reasons and demands are high due to climatic conditions, there will be a need to initiate water restrictions to reduce the demands. The reduction could be as much as 45% on the maximum day (year 2035).

As population occurs as projected, additional well capacity will be needed to keep pace with the maximum day demand. New wells will be equipped with standby power generators.

Earthquake or Other Natural Disasters

BCVWD Facilities

The San Andreas Fault passes through the San Gorgonio Pass area about 8 to 10 miles north of the center of BCVWD's service area. If a major earthquake were to occur along the San Andreas Fault in the Pass area many of the BCVWD's facilities could be affected.

The Cherry Tanks, Upper Edgar Tank, Taylor Tank, the Vineland Tanks and the Hannon Tank are all equipped with flexible connectors (EBBA Iron Flex-tends) for movement during an earthquake. Upper Edgar, Cherry Tank III, Vineland II and III, and Taylor Tank are all anchored to their ringwall foundation and have been designed to resist seismic shaking. These are all relatively new tanks constructed since year 2000 or so and designed and constructed to recent AWWA standards. These tanks should be capable of resisting significant earthquake shaking. BCVWD's other tanks were designed according to AWWA standards in effect at the time they were constructed; but over time the design standards have improved and become more stringent. The greatest vulnerability will be with these older steel tanks.

Experience with other earthquakes, e.g., Landers, magnitude 7.3 (1992), has shown steel water tanks survive but do suffer some minor structural damage. Observations of the some of the water tanks showed the inlet/outlet piping sheared off and some "elephant footing" of the side wall occurred but the tanks remained intact. This is what would be expected with BCVWD's older tanks. The newer tanks should survive with little or no damage. The older tanks should be able to be put back into service within a week, if not sooner.

Wells and well pumps could be damaged during a very severe earthquake but they should be able to be put back into service within a month depending on the availability of equipment to "pull" the pumps and the availability of replacement pumps and other parts.

Piping breaks could be expected to occur, but these can be repaired fairly quickly. BCVWD has an inventory of repair clamps, fittings and pipe as well as staff and equipment to make these repairs.

BCVWD has also constructed emergency interties at various locations along Highland Springs Road so that water can be supplied in either direction between the City of Banning and BCVWD.

Another threat is fire in the watershed which could cause damage to wells in Little San Gorgonio Canyon (Edgar Canyon). A severe fire could damage and make inoperable some or all of the 11 active wells in the canyon. Damage could occur to power and telemetry poles, electrical panels, pump house roofs etc. If all of the wells in Edgar Canyon were put out of service, BCVWD would lose about 2.2 mgd (or about 8 percent) of its well capacity. This can be made up by the Beaumont Basin wells; so the impact from a water supply standpoint would be minimal. There would be a financial impact since the replacement water from the Beaumont Basin would be more costly to pump.

Each well is in a concrete masonry block building, but the roof and electrical power lines/poles are vulnerable to fires. A severely burned watershed could present a problem when heavy rains come and cause mud and debris flows that could make access into the canyon to maintain the wells difficult. There were several severe fires in the watershed in the 1990's, but no damage was done to BCVWD facilities and no water supply outages occurred. In fact the fire fighters relied on BCVWD water supply facilities to fight the fires.

The bulk of the watershed where the wells are located is owned by BCVWD and BCVWD rigorously controls entry which minimizes the fire danger; but the threat is always there. BCVWD has established procedures for fires in the watershed with a number of the staff actually experiencing them in the past.

Imported Water Interruptions

The SWP California Aqueduct could be interrupted for a number of reasons including:

- Earthquake or extremely high floods destroying levees in the Sacramento-San Joaquin Delta
- Earthquake damage to the aqueduct or any of its major pumping stations
- Subsidence/slippage/flooding of the aqueduct

Levee Destruction:

The U.S. Geological Survey indicated a 63 percent chance of a magnitude 6.7 quake in the next 30 years in the Bay/Delta Area. A 6.7 quake could create a collapse of the 100-year-old levees that channel Delta water, causing saltwater to flood in (dam break in reverse) and contaminate the supply [2] A seismic event creating levee breeches could create an outage of 1 to 2 years[3] A report by the U.S. Department of the Interior, indicated a large earthquake with significant levee

[2] SCWC (Southern California Water Committee) Blog (2012). April is Earthquake Preparedness Month in California--Time to Protect California's Water Supply from a Quake, Richard Atwater, April 12.

[3] Jack R. Benjamin and Assoc. in assoc. with Resource Management Associates and Economics Insight (2005). Preliminary Seismic Risk Analysis Associated with Levee Failures in the Sacramento – San Joaquin Delta. Prepared for California Bay-Delta Authority and California Department of Water Resources (June)

breaches could cause disruption in the water supply for 28 months.[4] Based on this, it is not unreasonable to assume the SWP would not be delivering water for at least 2.3 years or say 2.5 years minimum.

Land subsidence in the Delta has been on going since the 1800s as the peat soil dries and oxidizes. The land subsidence creates increased water level differences and increased water pressures on the levees which increases the risk of breach from causes other than seismic events.

Since 1900 there have been 163 levee breaches which flooded 114 islands. Fifty-one of the breaches have occurred since 1970 about the time the SWP began operation and Oroville Dam was constructed. The most recent was in 2004 at the Jones Tract. The cause of the failure was unknown. It happened in June and took about 1 month to "seal" the breach and almost 6 months to pump out the flooded island.[5] These breaches have not caused significant disruption in the SWP delivery up until now.

Climate change will bring its own stresses on the Delta levees. Sea level rise will exacerbate the water level differential over time, increasing hydrostatic pressures on the levees. Climate changes will affect the hydrologic response of the Sacramento-San Joaquin River watersheds resulting in higher peak flows and less snowmelt. This will mean higher peak flows earlier in the season than the levees have historically experienced. This in combination with sea level rise will cause increased water pressure on the levees.[6]

In summary, climate change, subsidence, and aging levees will increase the risk of levee breach and the "Jones Tract" experiences can be expected to become more frequent and more severe. However, these should be less catastrophic than a significant seismic event causing an outage of supply due to numerous levee breaches and salt water intrusion shutting down deliveries for as much as 2.5 years or perhaps longer.

Aqueduct or Pump Station Damage

The California Aqueduct could be ruptured by displacement on the San Andreas Fault, and supply may not be restored for a three to six week period or perhaps even longer. The situation would be further complicated by physical damage to the pumping equipment, the electrical switchgear. These repairs could take a number of months depending on the severity.

One of the SWP's important design engineering features is the ability to isolate parts of the system. The Aqueduct is divided into "pools." Thus, if one reservoir or portion of the California Aqueduct is damaged in some way, other portions of the system can still remain in operation and supply water. For example, if the Banks Pumping Plant in Tracy were to be out of service or the aqueduct out of service between Banks Pumping Plant and San Luis Reservoir, water could be delivered into the East Branch from water stored in San Luis Reservoir or Silverwood Reservoir. Similarly if the Edmunston Pumping Plant or the aqueduct either upstream or downstream of Edmunston Pumping Plant were out of service, water to the East Branch could be delivered from water stored in Silverwood Reservoir.

[4] US Dept of Interior (undated). Anticipating California Levee Failure: Government response strategies for protecting natural resources from freshwater oil spills, Office of Environmental Policy and Compliance, Region IX, prepared by: Melissa Blach, Karen Jurist, and Sara Morton

[5] DWR (undated). Levee Failures in the Sacramento-San Joaquin Delta, Water Conference Poster, prepared by URS Consultants.

[6] Lund, J. et. al. (2007). Envisioning Futures for the Sacramento-San Joaquin Delta, Public Policy Institute of California.

If however, there was damage to the Devil Canyon Power Generating Station or the penstocks leading to it, the East Branch Extension bringing water to the Pass Water Agency would be out of service. The length of service outage could be 6 months or more depending on the severity.

Aqueduct Subsidence, Slippage and Flooding

The Aqueduct is subject to damage from a wide variety of causes. Past examples include slippage of aqueduct side panels into the California Aqueduct near Patterson in the mid-1990s, the Arroyo Pasajero flood event in 1995 (which also destroyed part of Interstate 5 near Los Banos), and various subsidence repairs needed along the East Branch of the Aqueduct since the 1980s. All these outages were short-term in nature (on the order of weeks), and DWR's Operations and Maintenance Division worked diligently to devise methods to keep the Aqueduct in operation while repairs were made. Thus, the SWP contractors experienced no significant interruption in deliveries.[7] These events would not have a significant impact on water deliveries to the Pass Agency assuming there is adequate storage in Silverwood Reservoir.

Summary

In the event of a major catastrophe which caused an outage of the State Water Project for an extended period of time, e.g., a year or more, BCVWD would be relying on its own Beaumont Basin storage account to make up the difference. In the event the outage is long enough to deplete the District's storage account, BCVWD could request Watermaster to temporarily waive the need for immediate replenishment and give permission to draw on the Basin. There is over 2 million acre-ft of water in storage in the basin, and short term "mining" will have little impact on the overall water levels in the basin. Also, BCVWD can begin to implement some water use restrictions. BCVWD is in a unique position that interruptions in supply can easily be accommodated.

Water Supply Contamination

Contamination of BCVWD's water supply could occur as a result of past or current industrial/commercial operations, old dumps and landfills, on-site wastewater disposal systems, cross-connections, vandalism or terrorism. A cross-connection or bacteriological contamination would be the most serious and require immediate action once detected. The actions that are to be taken and the notifications are in the BCVWD's Emergency Response Plan (ERP). The ERP was developed in 2004 and most recently updated in 2011. It is reviewed at least every two years and adjustments are made as needed.

Past Industrial/Commercial Operations etc.

Lockheed Martin[8]

Lockheed Martin Corporation used two remote sites near Beaumont, Calif., to test solid rocket propellant and motors, weapons, and ballistics. Contamination related to these operations has been found at both sites—Potrero Canyon and Laborde Canyon. Although the sites are owned or managed by entities other than Lockheed Martin today, Lockheed Martin has assumed responsibility for environmental cleanup at both locations.

[7] Kern County Water Agency (2010). Urban Water Management Plan Update.

[8] http://www.lockheedmartin.com/us/who-we-are/sustainability/remediation/beaumont.html Accessed 09052012

The Potrero Canyon site is south of Beaumont and not overlying any of the Beaumont Basin. BCVWD is not extracting any groundwater from this area. Laborde Canyon is located southwest of the City of Beaumont in the San Timoteo Badlands and does not overly the Beaumont Groundwater Basin.

Other Contaminated Sites

The Regional Board's Geographic Environmental Information Management System (GEIMS/GeoTracker) was reviewed for contaminated sites in the BCVWD service area. There are 3 "open" sites in Beaumont; two are in the remediation phase; one is in the site assessment phase. There are 8 "closed" sites which means the Regional Board has approved the remediation or the site was not considered to need remediation. There were 4 sites identified in Cherry Valley; all have been closed.

On-site Wastewater Disposal Systems

BCVWD has been monitoring the nitrate concentration in its wells over the years and has noticed a gradual increase in some wells. At this point in time, no wells are shut down because of nitrate contamination.

The University of California Riverside (UCR), under contract with the SWRCB, conducted a water quality assessment of Beaumont Management Zone with the specific objective of looking at nitrate contamination from on-site wastewater disposal systems.[9]

Forty wells and 11 surface water sites were sampled and analyzed in the UCR study. In the central part of the BMZ, i.e., generally in Cherry Valley, several wells "showed clear signs of contamination by septic systems. The groundwater within the central part of Cherry Valley appeared to be more strongly affected by septic systems than groundwater on the periphery of Cherry Valley. Several wells had relatively high concentration of pharmaceuticals and personal care products (PPCPs) and major anions and cations suggesting septic waste was entering the groundwater system.[10]" Note the MCL is 10 mg/L.

Figure 5-1 shows historical trends in the nitrate concentrations in the BCVWD's wells, Wells 1, 16 and 21 are in the Beaumont Basin; wells 4 and 5 are in lower Edgar Canyon.

BCVWD has been able to deal with the nitrate concentrations by blending with other lower nitrate source waters when it has become an issue. The last time was in 2006-07 when the District was required by CDPH to monitor nitrate concentration in Well 16 and the 2850 zone reservoir on a regular basis. It is believed that the nitrate incidents may occur again. At some point in time it may be necessary to either install well-head treatment for nitrate removal (ion exchange or reverse osmosis) if blending alone cannot mitigate the problem. If the problem gets worse, sewers may need to be installed in the more densely developed portions of Cherry Valley.

Other than nitrates, there are no other known sources of contamination.

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[9] Univ. of California Riverside (2012). Final Report: Water Quality Assessment of the Beaumont Management Zone: Identifying Sources of Groundwater Contamination Using Chemical and Isotope Tracers. SWRCB Agreement No. R*-2010-0022, Department of Environmental Sciences, Riverside, CA 92521, Feb 3.

[10] Ibid, pg 27

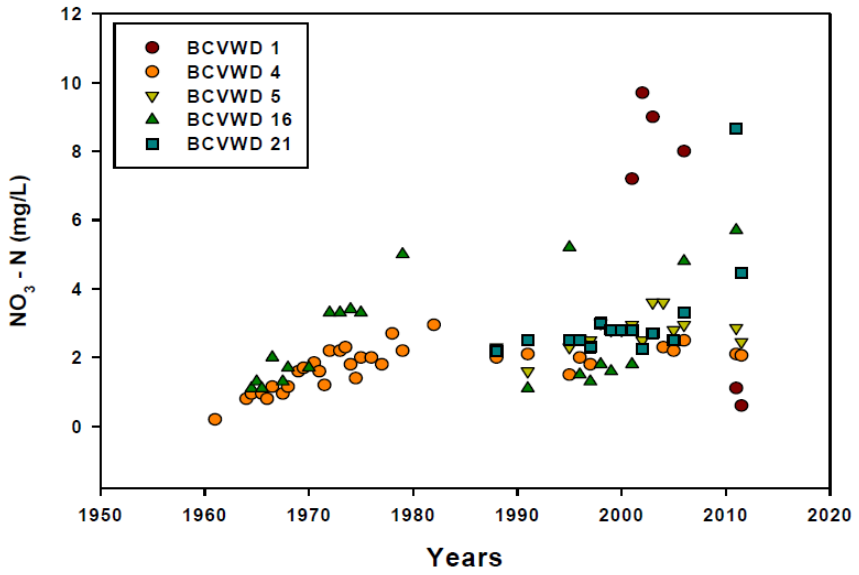

Figure 5-1
Historical Trends in Nitrate-N Concentration in Selected BCVWD Wells[11]

Vandalism and Terrorism

Vandalism and terrorism-related contamination are very remote possibilities; nevertheless they can occur. BCVWD has installed intrusion alarms on its new well pump buildings and reservoirs and other critical facilities. Cameras have been installed at the District headquarters and elsewhere. Vandalism has not been a cause for concern in the past; terrorism can be cause for concern; however, BCVWD did have a Vulnerability Assessment and Emergency Response Plan prepared as required by the US EPA after 9/11/2001 attacks. The Vulnerability Assessment is a sensitive document and is kept confidential on file with BCVWD's Director of Operations. The document outlines steps and procedures to be implemented to prevent or minimize terror incidents.

BCVWD Actions Needed During Water Supply Interruption

BCVWD has a water system Emergency Response Plan which is reviewed annually. It was last updated in May 2011. This ERP indentifies the actions to be taken, emergency reporting stations, notification and alert process, and procedures for various emergencies. These actions will not be repeated here.

Impact of Local Interruptions of Supply, Vandalism and Terrorism

BCVWD has its own field crews, equipment and materials to respond promptly and make emergency repairs to the water system should vandalism occur. Several of BCVWD's operations staff live on District property in Little San Gorgonio Canyon and so are able to respond to emergencies quickly. There is always an on-call staff person. Operations staff can "poll" the telemetry system remotely with a laptop computer to make adjustments and identify problems. When an interruption occurs, such as a pipeline main break, BCVWD staff immediately respond and isolate the main and stop the leak. That is their first duty. They then assess the situation and determine what needs to be done next. Time permitting they will notify the affected customers of the outage and its expected duration.

[11] Ibid

BCVWD's Emergency Response Plan has the procedures to be followed and notifications and wording necessary when cross-connections, bacteriological contamination, or other emergency action is required by the DPH.

The ERP provides specific details on dealing with terror attacks on the water system. This is confidential.

Impact of Longer Term Aqueduct Interruptions

BCVWD is fortunate to have the Beaumont Groundwater Basin available to meet demands even during extended periods of imported water supply outages. There are over 2.4 million AF of groundwater available in storage according to STWMA. The Beaumont Basin Adjudication allows appropriators, like BCVWD, to have their own water storage account in the basin. As of July 1, 2011, BCVWD has an 80,000 AF authorized storage account. (If full, this is about 5 years of potable water supply at the year 2035 potable water demand assuming no other supply.) BCVWD has a storage account in the basin and maintains substantial amounts of banked water. And as of December 31, 2011, BCVWD's storage account had a balance of almost 32,000 AF. This is almost 3 years water supply at the current demand and just over 2 years at the year 2035 potable water demand.

The key to managing these longer term interruptions is maintenance of a significant amount of water in storage in the Beaumont Basin. At least one year's potable water demand in storage is recommended.

Outage Due to Contamination

Well outage due to contamination, not terrorism-related and not bacteriological, would occur gradually resulting in enough time to take a well out of service and assess the next steps.

The most serious incident in the past occurred at Wells 1, 16 and 21 where nitrate spiking occurred. Well 1 pumps into a small reservoir at 12th and Palm Avenue which receives water from another well (Well 3 and ultimately Well 2 when it is put back into service). Both Wells 2 and 3 are low in nitrate, so the nitrate spike can easily be blended down to meet the MCL before it is introduced into the distribution system by the 12th and Palm Boosters. Well 16 and 21 pump into a reservoir (Vineland and Cherry respectively). These reservoirs receive water indirectly from a number of other low nitrate wells. Blending must be carefully monitored to ensure there is ample low-nitrate water in the reservoir to meet the MCL. So far this has not been an issue and the system blending has complied with DPH requirements. If these wells increase in nitrates, blending may not be a solution and treatment will be required.

Actions taken during outages due to cross-connection or bacteriological contamination are in the Emergency Response Plan and were discussed above.

Advisory Reductions for Short-term Interruptions

A short-term interruption could result in district-wide water shortage, e.g., several major production wells out of service for maintenance, bacteriological contamination etc., or a localized water shortage, e.g., transmission main break, reservoir out of service, etc. In the latter case a reduction in demand would only be required in a small (localized) portion of the service area.

Localized Interruption

If the interruption is localized, BCVWD staff would generally go "door to door" in the affected area notifying the affected customers of the interruption and the estimated time to get the water

supply “back to normal.” The purpose is to request the customers to voluntarily reduce their water use until the situation can be remedied. Staff will suggest that they do the following:

1. Avoid watering lawns, washing cars (except at commercial car washes), hosing down driveways and sidewalks, and filling or adding make-up water to swimming pools
2. Minimize use of water using appliances, e.g., automatic washing machines and dishwashers, i.e., full loads only.
3. Use water wisely within the house, shorten showers, minimize faucet running time, etc.
4. Stop using water from hydrants for construction and dust control
5. Reduce park, school and street median landscape watering to the minimum needed to sustain plant life.

Once the short term emergency is over, BCVWD staff will again notify the customers that the water supply is “back to normal” but they should continue to use water wisely.

District-wide Interruption

If the interruption is District-wide, individual customer notification is not practical. A more extensive outreach program is needed.

BCVWD management will notify the District’s Board of Directors, City of Beaumont elected officials and management, and the Riverside County Supervisor whose district covers the service area of District wide interruption as appropriate. In addition BCVWD will notify the newspapers, e.g, Riverside Press-Enterprise, Banning Record Gazette, etc, cable TV provider (Time Warner), and local radio stations in Riverside, San Bernardino, and the Coachella Valley, including the Spanish language stations In addition a notice will be posted on the BCVWD website.

Consumers will be urged to conserve water by taking the steps listed above for a localized interruption. Once the short term emergency is over, BCVWD staff will again notify all of the local elected officials, newspapers and cable TV and radio stations that the water supply is “back to normal” but customers should continue to use water wisely.

Mandatory Reduction in Water Use During Water Shortages

In the event that the advisory measures for short-term interruptions do not result in the water reduction needed to meet demands, mandatory prohibitions will be necessary. Depending on the required reduction and the time of year, these could include specific mandatory prohibitions of specific water use activities. To provide guidance, 5 water consumption reduction stages are identified.

Consumption Reduction Stages

Five consumption reduction stages are summarized in Table 5-7 and are presented in detail subsequently under "Drought Planning."

Table 5-7 (DWR Table 35)
Water Shortage Contingency-Rationing Stages to Address Water Supply Shortages

Stage No.	Water Supply Conditions	% Shortage
1	Mechanical or electrical supply failure at one large production well, 12th and Palm Booster booster pump, or transmission main damage during the peak demand period resulting in an outage of more than a week, Voluntary water conservation by customers recognizing there is a reduction in supply. Typically customers are very cooperative and recognize the seriousness of the situation.	10
2	Water supply conditions for Stage 1, but voluntary water conservation measures are not achieving the reduction needed and a mandatory reduction of water demand is required.	10
3	Mechanical/electrical failure at two large production wells or mechanical/electrical failure at one large production well and a reservoir (tank) is out of service during the peak demand period. Mandatory reduction is required	20
4	Mechanical/electrical failure at two large production wells and one reservoir (tank) is out of service for an extended period of time (more than 1 week). Mandatory reduction is required	30
4 Plus	Mechanical/electrical failure at multiple large production wells and more than 2 reservoirs (tanks) out of service for an extended period of time (more than 1 week). This could be the result of a large earthquake or other local catastrophe. Mandatory reduction is required	50

The General Manager along with the Board of Directors would assess the emergency situation and determine which stage is appropriate. It is possible that after initial assessment, the General Manager and the Board could require a greater reduction in water demand and would declare a higher stage. Ideally, if there were sufficient time, a public hearing would be held before implementing any of the stages; but this may not always be possible.

Mandatory Prohibitions During Water Shortages

10632(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

10632(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

Table 5-8 presents a list of these prohibitions, some suggested consumption reduction methods and prohibitions that can be considered by the Board of Directors during water shortages, the "stage" when they are to be implemented, and the estimated District-wide percent of water reduction the measure could have.

Table 5-8 (DWR Tables 36 and 37)
Water Shortage Contingency – Mandatory Provisions and Projected Reductions

Examples of Prohibitions	Stage When Prohibition Becomes Mandatory	Projected Reduction (%) District-wide
Precluding the use of potable water from hydrants for street sweeping and construction and dust control. (Non-potable or recycled water could be used for construction water and street sweeping.)	2	3-5
Restricting lawn watering and park, school and street median landscape watering to odd/even days or restricting watering to specific number of days per week	2	15 -25
Prohibiting the operation of any non-recycling ornamental fountain or water display.	2	1-3
Prohibiting washing cars (except at commercial car washes), hosing down driveways and sidewalks (except as necessary for public health and safety), and filling or adding make-up water to swimming pools.	3	5
Temporary rate surcharges as part of a temporary tiered rate structure	3	25-30
Prohibiting the use of any hoses without automatic shut-off nozzles for any purposes inside or outside of structures, including businesses that use rinse water	3	5
Prohibiting restaurants from serving drinking water unless specifically requested by the customer.	3	2-5
Restricting irrigation to once per week including all parks, schools, street medians etc.	4	35-40
Prohibiting operation of any ornamental fountain or water display	4	1
Initiate customer water use allotments and surcharges for water use above the allotment.	4	25-35
Prohibiting all irrigation of landscaping including all parks, schools, street medians etc.	4 plus	50
Initiate penalties and flow restrictions for flagrantly exceeding allotments	4 plus	10% more than just with allotment and surcharges

Except in extreme sudden emergencies, the Board of Directors would normally hold a pubic hearing to discuss the conditions requiring more than voluntary reductions in water use and the need to implement mandatory water use restrictions. Comments from the public will be taken and considered before making a decision. Some of the restrictions could include one or more of the above depending on the water shortage and its duration. A resolution would be adopted identifying the course of action and mandatory restrictions.

It is possible that the initial recommended prohibitions may not result in the desired reduction and more restrictive measures need to be taken. The Board would then call for another public hearing, present the facts and the results to-date of the implementation of the water restrictions and the need for further reductions. Further reductions could then be implemented through a resolution.

The list presented in Table 5-8 above is not intended to include all possible restrictions; other measures may be identified during the public hearing and implemented.

Customers would be notified in writing of any prohibitions set by the Board and notices would be posted on the District's website, and the local newspapers and cable TV (English and Spanish).

Charges for Excessive Water Use

10632(f) Penalties or charges for excessive use, where applicable.

BCVWD has provisions within its Rules and Regulations to establish charges for excessive water use. Currently there is 2-tiered rate structure in effect which increases the unit cost (per one hundred cubic feet [ccf]) for water use in a billing period over 44 ccf. BCVWD could increase these charges, initiate consumption surcharges for excessive use and/or provide for additional tiers upon proper notification and following the procedures established by Proposition 218. This is not something that can be done on short notice however.

BCVWD has "water waster" provisions in Part 15 of its Rules and Regulations.

> "15-1 PROHIBITION OF WATER WASTER – No person, firm, or corporation shall use, deliver, or apply waters received from this District in any manner that causes the loss, waste, or the applications of water for unbeneficial purposes. Within the meaning of this Regulation, any waters that are allowed to escape, flow, and run into areas which do not make reasonable beneficial use of such water, including but not limited to streets, gutters, drains, channels, and uncultivated lands, shall be presumed to be wasted contrary to the prohibitions of these Rules and Regulations.
>
> 1) Upon the first failure of any person, firm, or corporation to comply, this District shall serve or mail a warning notice upon any person determined to be in violation of these Rules and Regulations.
>
> 2) Upon the second failure of any person, firm or corporation to so comply, the water charges of any such consumer shall be doubled until full compliance with these Rules or Regulations has been established to the satisfaction of the Board of Directors of the District.
>
> 3) Upon the third failure of any person, firm, or corporation to so comply, the District shall terminate water service to any connection through which waters delivered by the District are wasted in violation of these Rules and Regulations."

Termination of service can be initiated by the BCVWD violation of its Rules and Regulations including unauthorized use of water or of the water system. This could include any violation of a duly established water conservation/water use rule or regulation.

Table 5-9 presents a summary of the penalties/charges and the stage when they could be in effect.

Table 5-9 (DWR Table 38)
Water Shortage Contingency – Penalties and Charges

Penalties or Charges	Stage When Charge or Penalty Takes Effect
Temporary surcharge & additional usage tiers	3
Penalties and flow restrictions for exceeding allotments	4 plus
Termination of service for failure to comply with provisions of water shortage resolution	At any time

Impacts of Water Shortage Contingency Actions on Revenues and Expenditures

> 10632(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

Rather than identify the financial impacts of each prohibition on BCVWD's financial position, the impacts will be assessed on a "percent reduction in water demand" basis.

The District water rate structure includes a service (meter) charge (bimonthly, regardless of how much water is used), and a 2-tiered commodity charge per 100 cu ft of water used. In addition there is a power surcharge and an imported water surcharge per 100 cu ft of water used.

During times of drought, the revenue from the commodity charge and the power and imported water surcharges would be reduced by an amount equal to the water conservation effort. The meter charge would not be affected. But the reduction in water consumption will also reduce the power consumption needed to pump and produce water and reduce the need for imported water, essentially balancing out the reduction in surcharge revenue.

For 2012, the budget estimated $2.286 million in fixed meter (service) charges and $4.627 million in water sales revenue (commodity charge). The expenses budgeted for chemicals and treatment and electricity was $1.525 million. The fixed meter (service) charges would not be affected by a reduction in water sales.

Assuming a water reduction of 25% is required for a 2-month long-term interruption, the annual reduction would be (2/12) * 25% or 4.2%. The resultant loss in water sales revenue would be $195,000, i. e, 0.042 *$4.627 million; the reduction in chemicals and electricity would be $64,000. The net would be an annual loss of revenue of $131,000.

A 50% reduction in water demand for a period of 1 month would result in a similar net annual revenue loss of $131,000.

The costs above do not include additional staff overtime that may be required providing notifications, production, publication, and mailing of notices; updates, water conservation messages, inspection and enforcement. An estimate of $25,000 for each "event" is reasonable to cover these costs. So the total annual impact could be in the $150,000 to $175,000 range.

In the BCVWD audited Financial Report for 2010, the last official audit, showed BCVWD with over $100 million in net assets of which $3.946 million was designated for operating reserve. The impact of a net $175,000 loss due to a water reduction of 25% over a 2 month period (or

50% for a 1 month period) will not affect BCVWD's operation. It is less than 5% of the designated operating reserve. As a result, no special action is needed.

Water Shortage Contingency Resolution

> 10632(h) A draft water shortage contingency resolution or ordinance.

A draft water shortage contingency resolution is included at the end of this Section.

Water Quality

> 10634 The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

Groundwater

The Beaumont Basin and Edgar Canyon groundwater quality is excellent and is expected to remain high quality throughout the period 2010 through 2035.

Review of recent general mineral and inorganic analysis for wells in the upper, middle, and lower Edgar Canyon indicated the inorganic chemicals of concern (heavy metals) were all below the detection level for reporting purposes except for iron in one well (4A) and total chromium. Both of these were well under the MCL however. The testing for perchlorate indicated concentrations less than the detection level for reporting purposes.

Historic data for BCVWD Well 6 in Middle Edgar Canyon from the period 1955 to 1995 was reviewed for water quality changes in nitrate. From the period 1955 to about 1970 nitrate (as nitrate) increased about 0.17 mg/L/year. Thereafter the rate of increase appears to have slowed down. It is currently at 11 mg/L (MCL = 45 mg/L). It would be expected to remain under 20 mg/L for the next 20 years. See Figure 5-2.

Well 4A, in lower Edgar Canyon had a nitrate concentration of 7.5 mg/L in 2009 and 8.7 in late 2012; Well 12 in upper Edgar Canyon had a nitrate concentration of 5.1 mg/L in 2009; Well 11, close to Well 12, had a nitrate concentration of 5.9 mg/L in late 2012.

In summary the groundwater quality in BCVWD's wells in Edgar Canyon will continue to remain well under the MCL values for regulated constituents for the next 20 years or more and will not impact future water supply

The water quality in the Beaumont Basin is excellent thought some of the wells have experienced nitrate spiking at times during the past. TDS concentration in the Basin is less than 250 mg/L in most areas.

Recycled Water and Impact on Groundwater Quality

The Regional Water Quality Control Board, San Ana Region, has established a maximum benefit water quality objective of 330 mg/L TDS to allow the use of recycled water in the area. Current groundwater TDS is about 230 to 250 mg/L. The use of recycled water, with a current City of Beaumont recycled water TDS of about 400 mg/L, is expected to have an impact on the groundwater quality over time. It is further recognized that the TDS of the recycled water will increase over time as the well water supply increases in TDS. This is discussed below.

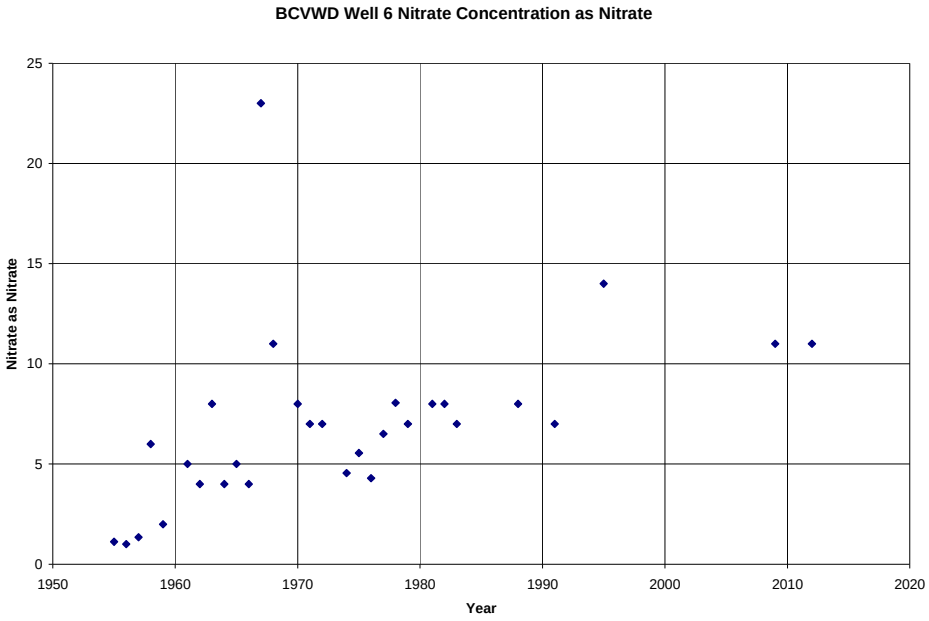

Figure 5-2

Nitrate (as Nitrate) Concentrations in BCVWD Well No. 6 Edgar Canyon

The Regional Board required the City of Beaumont, as well as BCVWD and other agencies overlying the Basin, to agree to certain actions to ensure the TDS of the groundwater basin does not exceed 330 mg/L maximum benefit objective. This includes funding and constructing desalters and/or zero discharge facilities as needed. The commitments are a condition of the permit to allow recycled water to be used. One of the conditions imposed by the Regional Board is that the 10-year annual average of TDS concentration in the recycled (non-potable water system cannot exceed 330 mg/L. As such this will require blending recycled water with other lower TDS water, e.g., imported State Project Water. Based on the commitments and the regulatory power of the Regional Board, groundwater quality and beneficial uses will be protected.

As part of the recycled water permit process, the City of Beaumont, through a consultant, developed a simplified groundwater model of the Beaumont Basin[12]. The model results indicated the average quality of the groundwater could reach the maximum benefit objective of 330 mg/L sometime after 2025. The exact year depends on the water demands, amount of SPW imported into the Basin, the amount of recycled water used, etc. It is important to recognize that the model was based on complete mix theory and did not account for the travel time or losses from the ground surface to the groundwater table which is up to 500 ft or more below the ground surface. It is BCVWD's opinion that the TDS will not reach the maximum benefit objective until well beyond 2050. The Maximum Benefit Permit conditions require systematic monitoring of the groundwater quality in the basin over time.

Another water quality consideration with maximizing the use of recycled water by recharging surplus amounts not needed for landscape irrigation to supplement the potable water supply is the potential presence of chemicals of emerging concern (CECs) which include pharmaceuticals and personal care products (PPCPs) as well as compounds which have CDPH notification

[12] Wildermuth Environmental, Inc (2009). Total Dissolved Solids (TDS) and Nitrate Projections for the Beaumont Management Zone, July 9.

levels, e.g, NDMA, 1,4-dioxane etc. This will require blending with imported or other non-recycled source water, monitoring and careful control of Total Organic Carbon (TOC) in any recycled water recharged. The current draft groundwater recharge regulations[13] limit the amount of recycled water that can be recharged unless the TOC can be "diluted down."

Table 4-19, presented previously in Section 4 indicated about 420 AFY of City of Beaumont recycled water will not be able to be used for landscape irrigation; this will increase to 1500 AFY by the year 2035. The Draft Recharge Regulations for Surface Spreading of Recycled water stipulate the Total Organic Carbon Concentration (TOC) in the recycled water cannot exceed (0.5 mg/l)**/**recycled municipal wastewater contribution (RWC). The TOC concentration in the City of Beaumont's recycled water is estimated to be about 8 mg/L. Based on this the RWC cannot exceed 0.0625.

The RWC is defined as the amount of recycled water/(amount of recycled water and diluent water). To achieve an RWC = 0.0625 requires a 15:1 dilution of recycled water and non-wastewater, i.e., imported water. If 420 AFY of City of Beaumont recycled water cannot be used for irrigation if will need to be diluted with 6300 AFY of imported SPW. That amount of imported water is not available. So, percolating surplus recycled water does not appear viable with the current regulations.

Another consideration is the monitoring for chemicals of emerging concern (CECs) and pharmaceuticals and personal care products (PCCP). This is very costly and the District is very concerned about long term consequences of these in recycled water. The District strongly believes that if any surplus recycled water is to be percolated it have full advanced treatment (FAT) as stated in the Draft Regulations. FAT is reverse osmosis and advanced oxidation similar to that provided by Orange County Water District and others. As such, it is not being considered at this time.

YVWD recycled water is expected to remain at a maximum of 330 mg/L TDS as a result of the YVWD implementing desalting.

Nitrate concentrations are known to be increasing in some of BCVWD's wells. This was discussed previously in this section. This is caused by agricultural fertilizers and septic tanks. This impact could cause BCVWD to abandon the "offending" wells and drill new wells outside of the nitrate influence or provide wellhead treatment for nitrate removal (very expensive). It is likely that nitrate concentrations in some of wells will become an issue by the year 2020 – 2030 time frame. Refer to Figure 5-3 presented previously.

A sewer system could be constructed to serve the areas with the highest density of septic tanks and this would eventually eliminate or greatly reduce the nitrate impact. This would require the formation of a separate agency such as a community services district, county service area, etc. to construct the system and either contract with the City of Beaumont for treatment or build its own treatment facility. Sewer service could not be provided by BCVWD since Measure B failed passage in a special election in 2007. For BCVWD to provide sewer service, another ballot measure would likely be needed to authorize its latent sewer authority.

Imported State Project Water

State Project Water does experience some changes in water quality in response to wet and dry cycles in the Northern California Watershed. Data from the Metropolitan Water District of Southern California, shown in Figure 5-3, shows the TDS in their imported water supplies from

[13] California Department of Public Health (CDPH) (2011). Revised Draft Groundwater Replenishment Reuse Regulations, November 21.

1977 to 2007 – a 30-year period. The TDS of the Silverwood Reservoir supply is identical to that received by the San Gorgonio Pass Water Agency. During the high flow year of 1983 the TDS actually dipped below 100 mg/L; during the drought period of the early 1990s, TDS hovered over 400 mg/L. The last 6 or 7 years the TDS has been in the 200 to 300 mg/L range. The nitrate concentration (as nitrate) in the imported water for 2007 was 2.7 mg/L, (0.6 mg/L as TIN).

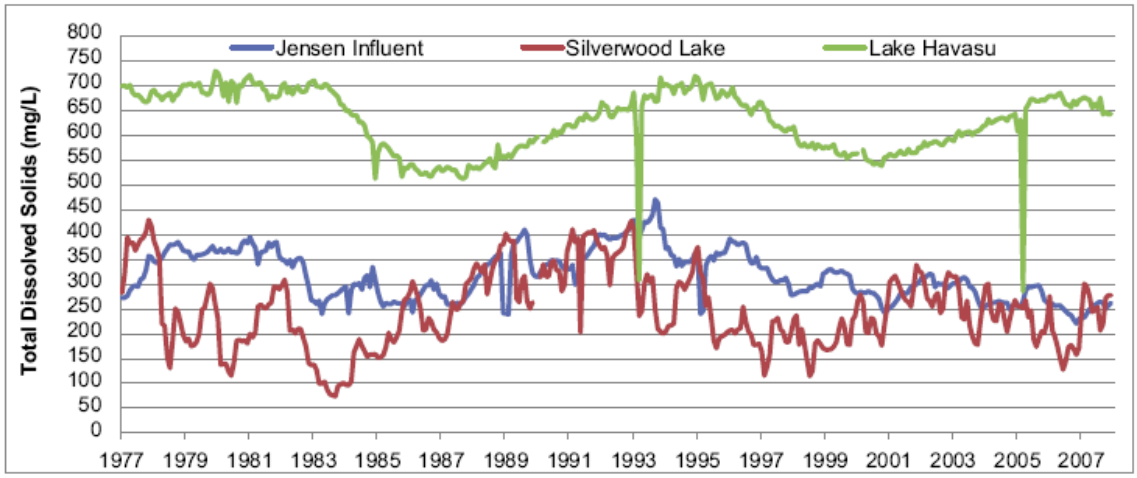

*Figure 3-1. Total Dissolved Solids in East Branch SWP (Silverwood Lake), West Branch SWP (Jensen Influent), and CRA (Lake Havasu)**

Figure 5-3
Quality of Imported Water Supply[14]

Article 19 of the Department of Water Resources contract with SGPWA states that it is the objective of the State and the State shall take all reasonable measures to make available project water of such quality that the TDS concentration does not exceed 440 mg/L on a monthly average or 220 mg/L as an average during any 10-year period.[15]

The average TDS for the period January 2004 through January 2010 was 249 mg/L. . This matches the TDS for the 25-year period from 1972-97[16]. For the 10-year period 1988-97 the TDS averaged 300 mg/L. This indicates that there could be some 10-year periods in the future where the SPW could exceed 250 mg/L and careful salinity management will be necessary. In their salinity management plan, Metropolitan Water District of Southern California used an average TDS of the East Branch of the SWP is 250 mg/L.[17]

Implementation of the Bay Delta Conservation Plan should help maintain or improve the quality of the State Project Water; so a TDS concentration of 250 mg/L as a 10-year average should be maintained throughout the planning period in the UWMP Update.

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[14] Metropolitan Water District of Southern California (Metropolitan 2007) Annual Report 2007. Chapter 3

[15] State of California Department of Water Resources (1962), Contract between the State of California, Department of Water Resources and San Gorgonio Pass Water Agency for a Water Supply. November 16.

[16] California Urban Water Agencies (1999). Recommended Salinity Targets and Program Actions for the CalFed Water Quality Program, December.

[17] Metropolitan Water District of Southern California (2012). Salinity in Metropolitan Supplies, Historical Perspective, Handout #2. Presented at Salinity Management Update Study Workshop, Southern California Salinity Coalition, June 1.

Other Sources of Water

Stormwater captured in water quality basins (urban runoff) and recharged stormflows are expected to remain essentially constant for the next 20 years. These waters a relatively low in TDS. Wildermuth Environmental used a value of 100 mg/L TDS in their study of salinity in the Beaumont Management Zone.[18]

Water Quality Summary

Table 5-10 presents a summary of the projected water quality for BCVWD's water sources over the planning period for the UWMP Update. TDS in in the Beaumont Basin groundwater will gradually increase over the years as part of a natural process of using the groundwater and applying it to the land. Water recycling will also be a contributing factor; the Regional Board's requirement that the TDS of the water in the non-potable system, not exceed 330 mg/L on a 10-year running average will mitigate this to some degree. However, the increase in TDS presented in Table 5-10, developed from studies of the groundwater by Wildermuth Environmenta,[19] is not likely to increase at the rate shown due to the assumptions in the model as discussed previously. The increase in TDS in the groundwater will bring about an increase in TDS in recycled water too.

The increases in nitrates in the Beaumont basin will likely be occurring in the areas underlying Cherry Valley and will need to be monitored. However, there is no immediate concern and projections indicate that even by 2035, the nitrates will be at only 40% of the MCL. There is some projected increase in nitrates in the groundwater from Edgar Canyon but again, this is not of any immediate concern. However, BCVWD must be vigilant to closely monitor on-site disposal systems and require the installation of advanced, nitrogen reducing systems in and adjacent to Edgar Canyon

The imported water and captured stormwater and urban runoff will remain constant over the 20 year planning period of the UWMP.

Drought Planning

> 10631(c)(1) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following: (A) an average water year, (B) a single dry water year, (C) multiple dry water years.

The District experienced extended droughts during1948 - 1952, 1960 - 1965, 1976 – 1977, 1987 – 1992, 1999 – 2002 and 2007-2009. In fact the rainfall in 2009 was one of the lowest on record[20]. In all of these drought events the BSU and Edgar Canyon areas continued to provide adequate water supplies without the need to restrict water use. This can be attributed to the large amount of groundwater in storage in the BSU. This stored water is replenished during wet years. During 2010, approximately 83% of the District's current water supply came from the BSU; the rest came from Edgar Canyon.

[18] Wildermuth Environmental (2011). Total Dissolved Solids and Nitrate-nitrogen Projections for the Beaumont Management Zone, April 21.

[19] Ibid

[20] San Gorgonio Pass Water Agency (2012). Annual Report of Water Conditions, Reporting Period 2010, March

Table 5-10 (DWR Table 30)
Summary of Water Quality for BCVWD's Water Sources

Water Source	Condition	Concentration, mg/L					
		2010	2015	2020	2025	2030	2035
Beaumont Recycled Water [a]	Changes in TDS	400	400	412	426	430	430
YVWD Recycled Water	Changes in TDS	--	330	330	330	330	330
Beaumont Basin GW [a]	Changes in TDS	285	290	302	316	330	330
	Changes in Nitrate as N (MCL 10 mg/L	2.6	2.8	3.1	3.4	3.6	4.1
Edgar Canyon GW	Changes in Nitrate as N (MCL 10 mg/L)	2.5	2.5	2.6	2.7	2.8	3
Imported SPW	Changes in TDS	250	250	250	250	250	250
Captured Stormwater incl. Urban Runoff	Changes in TDS	100	100	100	100	100	100

[a] From Wildermuth Environmental [21]. BCVWD believes this rapid change will not occur due to simplifying assumptions in the Wildermuth model. Assumes that desalting will be initiated when TDS reaches 330 mg/L

The Beaumont Basin was Adjudicated in 2004 as described in Section 4 of this UWMP Update. Between 2004 and 2014 the appropriators, BCVWD included, were allowed to continue pumping up to 16,000 AFY for the 10-year period (total 160,000 AF) to create more useable storage to accommodate conjunctive use. This was a deliberate lowering of the water table to better manage the groundwater supply. After 2014, the Beaumont Basin will operate on a safe yield basis.

Between 2000 and 2006 wells 2S/1W-33L01 and -27L01 near the center of the Beaumont Basin dropped about 6.3-6.4 ft/year. Between 2006 and 2011, well 2S/1W-33L01 dropped about 15 ft/year. A well near the western edge of the basin (2S/2W-25B01) dropped about 3.9 ft/year from 2000 to 2010. Well 2S/1W-27L01 which showed the dramatic drop also showed a rapid response to the recharge of imported water and climbed about 7.5 ft/year from 2007 to 2011[22]. This is clear indication the basin responds well to recharge and can be managed conjunctively with the imported water.

The Beaumont Basin provides BCVWD with a huge storage reservoir to supply water during drought periods. As stated in Section 4, STWMA estimated there may be as much as 2.4 million acre-ft of groundwater in storage in the Beaumont Basin. BCVWD has drilled wells to 1500 ft below ground surface and has still not reached the limit of useable groundwater.

[21] Ibid

[22] San Gorgonio Pass Water Agency (2012). Annual Report of Water Conditions, Reporting Period 2010, March

Table 5-11 presents a summary of the specific years used in the critical drought and dry period analysis.

Table 5-11 (DWR Table 27)
Basis of Water Year Data

Water Year Type	Average Year	Critical Dry Year	3-yr Dry Year
	Base Year(s)	Base Year	Base Year(s)
Edgar Canyon and other groundwater basins	1983-2011	1991	1989-1991
State Water Project	1922-2003	1977	1990-1992

The following sections evaluate BCVWD's ability to provide water during the planning period under average (normal) conditions, single dry year and multiple dry year (3 dry years in a row) conditions

Water Supply Under Normal, Dry and Multiple Dry Water Years

> §10635(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier .

Normal Year

Table 5-12 presents a summary of the water supply and demand for a normal year. This is essentially the same as Table 4-23 presented in Section 4. The table shows a deficiency which will be made up with imported water and water from BCVWD's storage account.

Table 5-12 (and Table 4-23) represent a "worst case" condition which is based on the 64% reliability of the SWP and the Pass area agencies allocation agreement which reduces BCVWD's share of the Pass Agency's imported water supply to 3,040 AFY. The "allocation agreement" allows the reallocation of any unused or unneeded SPW to other Pass area agencies who need the water. This is the typical case initially where YVWD and the City of Banning are taking only a portion of their allocation. As a resultt BCVWD has been taking about 7000 AFY or more of SPW. That extra 4,000 AFY or so is enough to offset the "shortfall" shown in Table 5-12.

Gradually as YVWD, City of Banning and other Agencies begin to grow and take more Pass Agency water, BCVWD's annual amount of SPW will gradually decrease. This will be occurring over the next 5 possibly 10 year period. It is imperative that during this time additional Table A water is procured and every opportunity to purchase and recharge Article 21 water and Turnback Pool water is exercised by the Pass Agency.

The Pass Agency is also recharging SPW water on their own in the spreading grounds at the mouth of Little San Gorgonio Creek to "help offset overdraft." The Beaumont Basin "overdraft" really no longer exists since the basin overdraft is managed by the Adjudication which has set

the basin on a safe yield basis. This water could be purchased and recharge by BCVWD and the other agencies on their behalf.

Critical Dry Year and 3-year Dry Period Supply

Edgar Canyon Groundwater

The record of Edgar Canyon groundwater pumping for the period 1983 -2011 (period of maximum pumping) was analyzed as discussed in Section 4 (see Table 4-4). The results are repeated in Table 5-13.

Table 5-13
Summary of Edgar Canyon Pumping (1983 – 2011)

Condition	Acre-ft/yr
Average Pumping	2,259
Minimum Pumping (1991) = Critical Dry Year	1,117 (49.4% of average)
Minimum 3-year Moving Average Pumping (1989-91) = 3-yr Dry Period	1,230 (54.4% of Average)

Beaumont Groundwater Basin

For the Beaumont Groundwater Basin, BCVWD's share of the appropriator "pool" is 6802 AFY before 2014 and zero after 2015. So BCVWD will have to rely on imported water recharge, re-allocation of unused overlier rights, forebearance water, imported water which is recharged, and water in BCVWD's storage account.

Re-allocation Overlier Pumping Rights

Unused overlier pumping rights are reallocated back to the appropriators according to the Adjudication. BCVWD's share is 42.51% of the total unused rights. The reallocation is based on a 5-year moving average and the amounts have been quantified for the 5-year periods in Section 4, Tables 4-8 and 4-17.

The water the overliers pump varies from year to year and are likely dependent on climate conditions. During droughts, they might be inclined to irrigate more which would reduce the amount of unused rights available for distribution. But the fact the re-allocation is based on a 5-year moving average, the impact of very dry years is tempered. There has been no dry period experienced since the judgment, so there is no history. For this UWMP Update, it is estimated during a dry period, the amount reallocated is 75% of average. This will be used for the critical dry period and the 3-year dry period.

Direct *Deliveries of Potable Water to Overliers*

The direct deliveries of potable water to overliers varies from year to year as the area grows and develops. The water BCVWD provides to the overliers for their development is equalized by a transfer of an equivalent amount of the overliers pumping right. So this equals out in any one year and is not expected to be impacted by droughts.

Table 5-12 (DWR Table 32)
BCVWD Water Demand and Supply Summary Normal Year

Year	2010	2015	2020	2025	2030	2035
Demands						
Potable Water Demand, AFY	9,201	10,953	11,912	13,287	14,789	16,587
Total Non-potable Demand incl GCs, AFY	1,822	1,500	2,330	2,410	2,490	2,580
Total Water Demand incl. GCs, AFY	11,023	12,453	14,242	15,697	17,279	19,167
Sources of Water Supply						
Edgar Canyon Groundwater, AFY	1,897	2,260	2,260	2,260	2,260	2,260
Beaumont Basin Groundwater, AFY	6,802	0	0	0	0	0
BCVWD Share of Unused Overlier Rights, AFY, based on 6000 AF Safe Yield	2,249	1,560	1,590	1,500	1,190	1,010
Overlier Forebearance of Pumping for Potable Water Supply, AFY	451	451	576	701	801	872
Overlier Forebearance of Pumping for Recycled Water Supply, AFY	0	0	780	810	840	870
Subtotal Groundwater Extractable without Replacement (Total Groundwater Available), AFY	11,399	4,271	5,206	5,271	5,091	5,012
Recycled Water, AFY	0	775	1,310	1,260	1,295	1,335
Imported Water in Non-potable Water System, AFY	0	724	1,020	1,150	1,195	1,245
Imported Water Recharged, AFY	5,727	2,316	2,020	1,890	1,845	1,795
Total Supply, AFY	17,126	8,086	9,556	9,571	9,426	9,387
Supply - Demand, AFY	6,103	-4,367	-4,686	-6,26	-7,853	-9,780
Difference as % of Supply	35.6%	-54.0%	-49.0%	-64.0%	-83.3%	-104.2%
Difference as % of Demand	55.4%	-35.1%	-32.9%	-39.0%	-45.4%	-51.0%

Direct Deliveries of Recycled Water to Golf Courses and Other Overliers

The direct deliveries of recycled water to the golf courses and other overliers varies from year to year depending on climate. The recycled water BCVWD provides to the overliers for their development and the golf courses is equalized by a transfer of an equivalent amount of the overliers pumping right. So this equals out in any one year and is not expected to be impacted by droughts.

State Project Water

The reliability of imported water from the SWP was discussed previously in this Section. On the average the SWP will be able to deliver 64% of a contractor's Table A amount and when considering the draft allocation agreement amongst the member agencies in the SGPWA, BCVWD can expect 3,040 AFY on the average. This is based on simulation of the SWP operation by DWR for the period from 1922 through 2003 – over 80 years.

DWR provided annual estimates of the amount available under future development conditions on a year-by-year basis in the 2011 reliability report[23]. The least amount available in any one year, (critical dry year, 1977) was 10% of Table A. Adjusting for the terms of the draft Pass Area allocation agreement, BCVWD can be expected to get 470 AFY in a critical dry year.

To estimate the 3-year dry period yield of the SWP, a 3-year moving average of the annual yields was determined in the 2011 Reliability Report. The minimum 3-year moving average was 21.3% of a contractor's Table A amount. This occurred from 1990-1992. This would be 3,680 AFY for the SGPWA; BCVWD's share would be 1,000 AFY on the basis of the draft allocation agreement.

Recycled Water

Recycled water amounts are affected to some degree by droughts and the "use water wisely," "conserve water" message. People are aware of their water usage inside and outside of house. They typically shorten up the shower time, make sure that only "full loads" are washed, etc. So it is reasonable to expect some reduction in indoor water use during droughts. However, there is more recycled water available from the City of Beaumont and YVWD that can be used over the year due to the seasonal variation in demand and the need to meet the maximum benefit TDS objective of 330 mg/L. It should be pointed out that during the critical dry year and the 3-year drought that the TDS objective will likely not be met since there is insufficient imported water available to dilute the recycled water. This may mean using more imported water in the non-potable water system during the following years to ensure compliance with the 10-year moving average.

Summary of Specific Years Used in the Analysis

Tables 5-14 and 5-15 show the water supply and demand summaries during a critical dry year and a 3-year dry period respectively. The tables show a deficiency based on a worst case condition. As discussed above the deficiency is not going to be as great in the initial years due to fact that not all of the Pass Agency members will be taking their full allocation of SPW, leaving the opportunity for BCVWD to purchase this water. However, as explained above, it is important to use this time to secure more Table A and other firm water supply.

[23] State Water Project Final Delivery Reliability Report 2011 (2012). Department of Water Resources, (June).

During single and 3-year droughts, water will be made up with water from BCVWD's storage account. During the critical dry year; during the 3-year drought there will be reduced amounts of SPW available.

During the critical dry year there will be a small amount of imported water available but there will be a shortfall of supply ranging from 3,848 to 3,190 AFY respectively in years 2015 and 2035. This can be made up from the District's storage account which currently has about 32,000 acre-ft. BCVWD will be managing the account to try to keep at least 1 to 2 years of total annual demand in storage.

During the 3-year drought, the shortfall is 3,460 AFY in 2015 and 3072 in 2035. This is a little less than the critical dry year and can easily be made up with water from the District's storage account.

Minimum Water Supply Available During Next 3 Years

> §10632(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

Table 5-16 presents a summary of the water supply and demand over the next 3 years (2013, 2014, 2015) based on the historic 3 year drought described previously. For the SPW supply for 2013, the allocation to each Contractor is 35%; so the Pass Agency will receive 35% of 17,300 AFY, their Table A amount. This will be 6,055 AF. It is assumed BCVWD will take 5,000 AF of that amount, i.e., about 82%. For the succeeding years, it is assumed that only 1,000 AFY will be available to BCVWD, which is the 3-year drought amount.

Recycled water is assumed to be starting in 2015 which will use a portion of the available SPW for blending to meet the maximum benefit objective of 330 mg/L in the non-potable water system. Table 5-16 shows a reduction in the amount of SPW available for recharge as a result. BCVWD will continue to pump from the temporary surplus in 2013 and 2014.

Table 5-16 shows a net deficiency of supply over the next 3 years based on 3-year drought conditions continuing for years 2014 and 2015. The deficiency is projected to be just under 6600 AF over the 3-year period. This can easily be met from the District's groundwater storage account which has about 32,000 AF in storage.

Mechanism for Determining Actual Reductions in Water Use

> 10632(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

The District keeps historic and current pumping records on all of its wells. The imported water delivered by the Pass Agency is metered both by the Pass Agency/DWR Meter and BCVWD's own meter. BCVWD has a computer accounting system on its customer's water usage and can monitor each customer's use. Included in the data base are years of historical water use by the customer. These records can be used to determine seasonal and annual fluctuations in water use. Since total water pumped closely approximates water use, BCVWD can compare pumping records from one year to the next to determine actual reductions in water use. The District, through its accounting system, is also able to determine historic and current use by service account and therefore track customer usage during a drought and evaluate the effectiveness of each conservation measure implemented under this plan.

Table 5-14 (DWR Table 33)
BCVWD Water Demand and Supply Summary Critical Dry Year

Year	2010	2015	2020	2025	2030	2035
Demands						
Potable Water Demand, AFY	9,201	10,953	11,912	13,287	14,789	16,587
Total Non-potable Demand incl GCs, AFY	1,822	1,500	2,330	2,410	2,490	2,580
Total Water Demand incl. GCs, AFY	11,023	12,453	14,242	15,697	17,279	19,167
Sources of Water Supply						
Edgar Canyon Groundwater, AFY	1,897	1,117	1,117	1,117	1,117	1,117
Beaumont Basin Groundwater, AFY	6,802	0	0	0	0	0
BCVWD Share of Unused Overlier Rights, AFY, based on 6000 AF Safe Yield	2,249	1,170	1,192	1,125	893	758
Overlier Forebearance of Pumping for Potable Water Supply, AFY	451	451	576	701	801	872
Overlier Forebearance of Pumping for Recycled Water Supply, AFY	0	0	780	810	840	870
Subtotal Groundwater Extractable without Replacement (Total Groundwater Available), AFY	11,399	2,738	3,665	3,753	3,650	3,616
Recycled Water, AFY	0	1,030	1,860	1,940	2,020	2,110
Imported Water in Non-potable Water System, AFY	0	470	470	470	470	470
Imported Water Recharged, AFY	5,727	0	0	0	0	0
Total Supply, AFY	17,126	4,238	5,995	6,163	6,140	6,196
Supply - Demand, AFY	6,103	-8,215	-8,246	-9,534	-11,138	-12,970
Difference as % of Supply	35.6%	-193.8%	-137.5%	-154.7%	-181.4%	-209.3%
Difference as % of Demand	55.4%	-66.0%	-57.9%	-60.7%	-64.5%	-67.7%

Table 5-15 (DWR Table 34)
BCVWD Water Demand and Supply Summary 3-Year Drought

Year	2010	2015	2020	2025	2030	2035
Demands						
Potable Water Demand, AFY	9,201	109,53	11,912	13,287	14,789	16,587
Total Non-potable Demand incl GCs, AFY	1,822	1,500	2,330	2,410	2,490	2,580
Total Water Demand incl. GCs, AFY	11,023	12,453	14,242	15,697	17,279	19,167
Sources of Water Supply						
Edgar Canyon Groundwater, AFY	1,897	1,230	1,230	1,230	1,230	1,230
Beaumont Basin Groundwater, AFY	6,802	0	0	0	0	0
BCVWD Share of Unused Overlier Rights, AFY, based on 6000 AF Safe Yield	2,249	1,170	1,192	1,125	893	758
Overlier Forebearance of Pumping for Potable Water Supply, AFY	451	451	576	701	801	872
Overlier Forebearance of Pumping for Recycled Water Supply, AFY	0	0	780	810	840	870
Subtotal Groundwater Extractable without Replacement (Total Groundwater Available), AFY	11,399	2,851	3,778	3,866	3,763	3,729
Recycled Water, AFY	0	775	1,330	1,410	1,490	1,580
Imported Water in Non-potable Water System, AFY	0	470	1,000	1,000	1,000	1,000
Imported Water Recharged, AFY	5,727	530	0	0	0	0
Total Supply, AFY	17,126	4,626	6,108	6,276	6,253	6,309
Supply - Demand, AFY	6,103	-7,827	-8,133	-9,421	-11,025	-12,858
Difference as % of Supply	35.6%	-169.2%	-133.2%	-150.1%	-176.3%	-203.8%
Difference as % of Demand	55.4%	-62.9%	-57.1%	-60.0%	-63.8%	-67.1%

Table 5-16
Minimum Water Supply Available Next 3 Years

Year	**2013**	**2014**	**2015**
Demands			
Potable Water Demand, AFY	10,381	10,667	10,953
Total Non-potable Demand incl GCs, AFY	1,500	1,500	1,500
Total Water Demand incl. GCs, AFY	11,881	12,167	12,453
Sources of Water Supply			
Edgar Canyon Groundwater, AFY	1,230	1,230	1,230
Beaumont Basin Groundwater, AFY	6,802	6,802	0
BCVWD Share of Unused Overlier Rights, AFY, based on 6000 AF Safe Yield	1,170	1,170	1,170
Overlier Forebearance of Pumping for Potable Water Supply, AFY	451	451	451
Overlier Forebearance of Pumping for Recycled Water Supply, AFY	0	0	0
Subtotal Groundwater Extractable without Replacement (Total Groundwater Available), AFY	9,653	9,653	2,851
Recycled Water, AFY	0	0	775
Imported Water in Non-potable Water System, AFY	0	0	470
Imported Water Recharged, AFY	5,000	1,000	530
Total Supply, AFY	14,653	10,653	46,26
Supply - Demand, AFY	2,772	-1,514	-7,827
Net over 3-years	-6,569		

Stages of Action in Response to Water Supply Shortages

> 10632(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

Previously in Section 5, short term water supply interruptions, primarily related to "mechanical" or "infrastructure" outages and corresponding water reduction percentages were discussed. The conditions under which these would be implemented and some examples of prohibitions under each stage were presented. Penalties and charges for excessive water use were identified.

This section is related to that presented previously, but is for extended periods of water shortages due to climatic conditions. However, the stages presented herein are the same as those presented previously in this section.

The District proposes a five-stage plan of action in the event of an extended drought condition or loss of supply. The action levels for each stage are presented in the subsections that follow, and the water supply reduction stages are provided in Table 5-17.

Table 5-17
Water Supply Reduction Stages and Consumption Reduction Percentages

Reduction Stage No.	1	2	3	4	4 Plus
Water Supply Shortage below "normal" long term water supply, %	20%	20%	25%	30%	50%
Reduction Expected,%	10% Voluntary	10%	20%	30%	50%

Stage 1

Stage 1 occurs when the District declares a water shortage and imposes voluntary water conservation. In this stage the District shall notify all its customers that water deliveries may be reduced. The District will recommend a voluntary 10 percent water use reduction based on an established base year to be determined by the District at the time Stage 1 is implemented. At the same time the District shall start its own public awareness program to encourage the efficient use of water. This will be accomplished by printing articles in the local newspaper and distributing literature and publications to its customers. Public awareness programs will also include educational conservation programs that would be introduced in the schools.

Stage 2

Stage 2 occurs when the District determines voluntary water reduction goals are not being met and the declared water shortage has been in effect for two years. In this stage the District will recommend a 10 percent mandatory reduction in water use and continue its public awareness efforts. The District at this time will begin to establish a water conservation advisory committee. This committee will comprise of officials from the District, the City of Beaumont, and the Cherry Valley community.

Stage 3

Stage 3 occurs if the water shortage continues for four consecutive years. In this stage the District will recommend a mandatory 20 percent water use reduction from the established base year. The District will adopt a rate structure with financial incentives to encourage efficient water use. The District will also develop a plan and ordinance to enforce penalties for excessive water use and include prohibition against specific wasteful practices such as gutter flooding, open hose car washing, and driveway washdown, etc. The District will analyze the impacts of the plan on the revenues and expenditures of the District and propose measures to overcome those impacts, such as adjustments in customer rates, to help pay for additional sources of water.

Stage 4

Stage 4 occurs if the declared water shortage continues for one year after Stage 3. In this stage the District will recommend a mandatory 30 percent water use reduction consider enforcing penalties described in the ordinance developed under Stage 3.

Stage 4 Plus –Up to 50% Reduction in Water Supply

Stage 4 Plus will be recommended if the drought continues for 1 year beyond Stage 4 and mandate a 50 percent reduction in water use and mandate enforcing penalties to ensure compliance.

Implementation

Implementation of any of the above stages will require action by the Board of Directors and should only be considered after a public hearing wherein the conditions that bring about the reduction in supply and current consumption are discussed, options considered, and impacts on the revenue stream and public are presented. The public will be provided an opportunity to comment. Their support of the water conservation stage is essential.

Section 5 contained some suggested prohibitions in water use. These should be considered for implementation during the drought stages discussed above. Additional prohibitions could be considered.

In Stage 2, it may be necessary to discontinue the use of potable water for construction water even if a permit has been issued. Recycled water may be used for construction without restriction. In Stage 3, consider banning all use of water for nonessential uses, such as new landscaping and filling pools.

Penalties or Charges

In Section 5, penalties for excessive water consumption were presented. Again these should not be implemented without a public hearing explaining the necessity.

DRAFT

RESOLUTION _____

**RESOLUTION OF THE BOARD OF DIRECTORS
OF THE BEAUMONT CHERRY VALLEY WATER DISTRICT
WATER SHORTAGE CONTINGENCY REGULATIONS**

The Board of Directors of the Beaumont Cherry Valley Water District (District) does hereby resolve:

WHEREAS, the Urban Water Management Plan (UWMP), 2013 Update, adopted by the Board contains provisions relating to water shortages and contingencies due to catastrophic outage of state, regional and District supply facilities, hydrologic conditions resulting in lower than normal water supply or other factors which prevent the District from providing as much water as is customary; and

WHEREAS, the District endeavors to supply water in sufficient quantities to protect public health; and

WHEREAS, the District has established four stages of action in the UWMP 2013 Update which impose both voluntary and mandatory reductions in water use depending on the severity of the shortage,

NOW, THEREFORE, BE IT RESOLVED, by the Board of Directors of the District as follows:

1. The General Manager is hereby authorized to declare a Water Shortage according to the Water Shortage Contingency Plan in the UWMP 2013 Update
2. The General Manager is hereby authorized and directed to implement the various stages identified in the UWMP 2013 Update
3. The General Manager shall monitor water use and recommend to the Board of Directors additional measures as may be required to conserve water resources and ensure public health.

ADOPTED this _____

BEAUMONT CHERRY VALLEY WATER DISTRICT

_____

President of the Board of Directors of the

Beaumont Cherry Valley Water District

Section 6

Demand Management Measures

Introduction

(10631(f)(1) and (2) (Describe and provide a schedule of implementation for) each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following: (A) water survey programs for single-family residential and multifamily residential customers; (B) residential plumbing retrofit; (C) system water audits, leak detection, and repair; (D) metering with commodity rates for all new connections and retrofit of existing connections; (E) large landscape conservation programs and incentives; (F) high-efficiency washing machine rebate programs; (G) public information programs; (H) school education programs; (I) conservation programs for commercial, industrial, and institutional accounts; (J) wholesale agency programs; (K) conservation pricing;(L) water conservation coordinator; (M) water waste prohibition; (N) residential ultra-low flush toilet replacement programs.

(10631(f)(3)) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(10631(f)(4)).An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand

(10631(g)) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following: (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors; (2) Include a cost-benefit analysis, identifying total benefits and total costs; (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost; (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

Although BCVWD is very conscious of water conservation, the District is not signatory to the Memorandum of Understanding (MOU) regarding Urban Water Conservation in California but the District does implement several of the Best Management Practices (BMPs) identified in the MOU.

BCVWD applied to the SWRCB Division of Financial Assistance for a Facilities Planning Grant to connect the District's existing non-potable (recycled) water system YVWD's recycled water system for a second recycled water connection. As a condition of receiving funding, BCVWD needed to comply with AB-1420 and AB-2572 to be considered for funding. AB-2572 related to metering of all services and the District is in compliance with that requirement. AB-1420 relatives to certification relative to the BMPs listed above.

BMP 1-Water Survey Programs for Single-family and Multi-family Residential Customers

The District presently does not implement this demand management measure in performing water audits for single-family and multi-family residential sites. We do use an alternative "Flex Track" methods listed on the CUWCC Website www.cuwcc.org/resource-center/mou/flex-track-menu.aspx

Residential Flex Track Methods (Methods 2, 3, and 8):

2, Educate Residential Customers about behavioral aspects of water conservation through the District's website: www.bcvwd.org/tips.asp. In addition, BCVWD constructed a demonstration garden using drought tolerant landscaping at the District's Groundwater Recharge Facility. About 20 acres are planted and the plants are identified. There are marked trails and pathways through the garden and picnic tables and barbecue pits. The public is free to enjoy the gardens anytime. The system is irrigated with a drip system that is solar-power controlled.

3. Notify residential customers of leaks on the customer's side of the meter by the meter readers or as observed by District Personnel driving by. Front desk staff works with customers who have high bills and discuss ways of reducing water consumption.

8. Implemented an automatic meter reading program for new residential customers. The system has had some operation problems but the District is attempting to work through them. This began several years ago. The slow down in the housing construction has resulted in few meters being installed. It is expected this program will be expanded when the housing construction begins to accelerate.

Landscape Flex Track Method (Method 4a):

4a. Collaborate with planning agencies at the local and regional level, other water suppliers in the area and stakeholders in response to state or federal requirements such as the State **Model Water Efficient Landscape Ordinance** and AB 1881. Participate in the development, review, implementation, and enforcement of requirements for new developments. Provide water use data to planning agencies. BCVWD collaborated with the City of Beaumont on implementing water efficient landscape ordinance Chapter 17.06 in the City's Landscape Ordinance. BCVWD adopted a Water Efficient Landscape Ordinance in 2010.

Implementation or Scheduled Implementation

This education program is on-going.

BMP 2-Residential Plumbing Retrofit

In 2009, the City of Beaumont did an analysis of the age of the City's housing stock. This is shown in Table 6-1.

Table 6-1
City of Beaumont Housing Stock Age

Year Constructed	Number	Percent
Prior to 1991	3639	30.1
1991-1995	403	69.9
1996-1999	216	
2000-2009	7830	
Total	12088	100

Most of the housing stock is new, with 65% constructed since the year 2000. The houses constructed since 2000 have the latest plumbing fixtures; many have been furnished with high efficiency washing machines and dishwashers. The anticipated water savings is not significant.

Implementation or Scheduled Implementation

This BMP will not be implemented.

BMP 3- System Water Audits, Leak Detection and Repair

Much of the BCVWD water system is new having been installed within the last 12 years or so with the housing boom. Older leak-prone lines are replaced. The most recent 5-year Capital Improvement Program identified 20 distribution pipeline replacement projects which total 24,000 ft which are to be replaced within the next 5 years. The cost has been built into the latest water rate increase adopted in June 2010.

Water distribution lines are routinely checked and/or tested for leaks; when leaks are found they are promptly repaired.

BCVWD annually performs a distribution system water audit comparing the amount of water produced (from wells, surface supplies to the amount of water used by consumers (as reported by metering readings). The District meters construction water and private fire systems. Very little water is unmetered. After allowing for authorized unmetered uses such as fire fighting, main flushing, and public use, it can be assumed that the remaining unmetered water is explained by inaccurate meter readings, malfunctioning valves and leakage, and theft. The District has very little unaccounted-for or non-revenue water.

Implementation or Scheduled Implementation

The District has an ongoing schedule to inspect facilities and periodically calibrate master water meters. The District has already implemented leak detection. Water system audits are generally done at least once a year

Methods to Evaluate Effectiveness

The District annually reviews data records to confirm that unaccounted for water losses stay within an acceptable range of 5% to 7%.

BMP 4-Metering with Commodity Rates for All New Connections and Retrofits of Existing

Purveyors are required to place water meters on all new service connections per California State law. The District fully meters all customer sectors, including construction water and on-site, private fire services. Customers are charged a service charge for the meter and a commodity charge for water use. The District currently has a 2-tier rate structure for water use.

Implementation or Scheduled Implementation

Prior to the 1980s, the District's method of billing on any land 0.81 acres or more was a fixed rate schedule independent of water use. In 1982 the District changed the billing method to reflect a varying rate structure based on water use.

The District presently replaces old meters under the Meter Exchange Program, which started in the early 1980s. The District continues to change out every meter on ten year intervals, if possible. The District plans to continue to conduct its meter calibration and replacement program.

The District has implemented a 2-tier rate structure

Methods to Evaluate Effectiveness

Use daily District-wide pumping records to evaluate consumption. Utilize customer water bills to analyze water use consumption patterns.

BMP 5-Large Landscape Conservation Programs and incentives

The District presently does not implement this demand management measure We do use an alternative "Flex Track" methods listed on the CUWCC Website www.cuwcc.org/resource-center/mou/flex-track-menu.aspx .

Both the City of Beaumont and the County of Riverside have implemented Low Water Using Landscape Ordinances. This approved Landscape Ordinance for New Construction encourages landscaping using low-water-using plants. Irrigation systems with automatic controllers and valves are required on new developments and major landscape improvement projects.. Presently the City of Beaumont reviews, on a project-by-project basis, the conditions of approval for landscape practices.

Many developers in Beaumont are going even further with their "smart home construction" which uses drought tolerant, low water using materials, minimizes turf and greatly reduces the amount of water-using landscaping. Common areas, new parks, schools and street medians within Beaumont will be converted to recycled water. Most of these areas are now served by the District's non-potable water system; over 30-miles of main transmission pipeline has been installed. The connections are currently served potable water; but the conversion to recycled water should be occurring by 2015 or before.

Landscape Flex Track Methods (Method 3f):

3f. Conversion to Recycled Water. Currently there are 275 landscape irrigation connections connected to a non-potable (untreated and recycled) water system. The District has installed over 30 miles of recycled water transmission main and a 2 MG reservoir for recycled water. This system is currently supplied with potable water. A recycled water use permit is pending with the regional water quality control board (Region 8). A facilities planning grant application to bring in recycled water from the Yucaipa Valley Water District is under review by the SWRCB and negotiations are on-going with the City of Beaumont for recycled water. Any recycled water which is introduced into the system will offset the existing potable water demand on a gallon for gallon basis. Currently about 1500 acre-ft/yr (measured through the irrigation meters) is supplied to the landscape irrigation services. The potable demand will be reduced once recycled water is available.

Implementation or Scheduled Implementation

The City of Beaumont's landscape ordinance has been implemented and in effect since 2010 or so. Recycled water will most likely be introduced into the non-potable water system by 2015.

Methods to Evaluate Effectiveness

Water usage in new landscaped areas particularly during the typical dry months from May through September may be compared on a "per acre" basis with existing landscaped areas, which were not affected nor required prior to the implementation of the Landscape Ordinance.

Surveys, landscape information training, water bill historical water use and other programs will also assess effectiveness.

Estimate of Existing Conservation Savings

A 20 percent or more savings in water use through water efficient landscape is possible, compared to traditional landscaping water use for existing commercial, industrial, or governmental landscape.

Evaluation

Because many new developments are currently under construction, a current evaluation of the method has not been determined. However, future assessments should be possible to more accurately estimate the cost savings and water demand reduction of this method.

BMP 6-High-efficiency Washing Machine Rebate Programs

The District and the City of Beaumont presently do not have a rebate program in place for the replacement of old clothes washers.

BCVWD did an analysis as part of the preparation of the 2005 update of the UWMP and found that even at $100 rebate the program was not cost effective. The benefit cost ratio to the District was 0.73. When sewer costs were included and other customer benefits were included, it was cost effective. However, the District does not handle wastewater and has no sewering authority. It may be possible at some later date to implement this program with cooperation and

participation from the City of Beaumont. But at this point in time, the economic situation in the area precludes this type of expenditure.

BMP7-Public Information Programs

BCVWD provides water conservation literature in the lobby where customers pay their bills or enter for District Board Meetings. The District's web site http://www.bcvwd.org/tips.asp has water conservation tips and information about the District's water conservation garden. The District constructed its own demonstration garden that is open 24/7 around the District's groundwater recharge facilities. About 20 acres are planted and the plants are identified. There are marked trails and pathways through the garden and picnic tables and barbecue pits. The public is free to enjoy the gardens anytime. An annual fishing derby is held at the site in cooperation with the Parks and Recreation District

Implementation or Scheduled Implementation

The public information programs are ongoing and information is provided as needed.

BMP 8-School Education Programs

The District presently does not make a special effort to promote water conservation at local schools. District staff is available on an "as requested" basis however. Teachers at the schools may periodically discuss with students, awareness and importance of water conservation.

Implementation or Scheduled Implementation

District staff may consider coordinating with School District staff, events where information packets on water conservation and water savings techniques can be distributed to students. Once recycled water is provided to the schools, BCVWD will be much more active with the schools as part of the on-site inspections and working with the school's on-site recycled water site supervisor. This could evolve into a regular presentation to all entering freshmen and transfer students to educate them in the recycled water system and the need for water conservation programs.

BMP 9-Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

The District does not make a special effort to audit water use by commercial and industrial users but does work with local commercial and industrial users to promote water conservation as needed particularly with recycled water use. The District provides separate metering of on-site fire protection systems to minimize water loss.

The District presently does not implement this demand management measure We do use an alternative "Flex Track" methods listed on the CUWCC Website www.cuwcc.org/resource-center/mou/flex-track-menu.aspx .

CII Flex-Track Method (Method 1):

1. Process Water Use Reduction. The District works with existing and new commercial and industrial users to determine if recycled water can be incorporated and used in their operation such as a concrete ready mix business. Where feasible, recycled water is to be used. District has an agreement with Rancho Ready Mix Concrete supplier to require them to use recycled

water for concrete mixing when recycled water is available from the District's system. Golf courses are required to take recycled water for their lakes and water hazards and fountains and water features

Implementation or Scheduled Implementation

The District will continue to implement this measure on an as need basis.

Methods to Evaluate Effectiveness

Water bills show the water customer the amount of water used in previous billing period. All commercial and industrial users are provided with historical usage on their bill. This allows customers to compare their water usage with the same period of the previous year and to monitor their water usage over time. The District is available to assist customers, if requested, to review methods to improve water use effectiveness.

BMP 10-Wholesale Agency Assistance Programs

The District is not a wholesale water supplier and therefore does not provide financial assistance or resources to advance water conservation efforts to retail water suppliers.

BMP 11-Conservation Pricing

BCVWD has rate schedule (effective 1/1/2013) that includes:

- Service (meter) charge which depends on the size of the meter. The larger the meter, the larger the bi-monthly service charge
- Commodity charge which is two tiered. For single family residences from 0 – 44 ccf and greater than 45 ccf. The unit price for water use over 45 ccf is a little over 9% more than the unit price from 0 to 44 ccf. For multi-family residential, the first block rate is from 0 – 35 ccf; the second is over 36 ccf. The unit price for the second block rate is about 2% more than the first block rate. This accounts for the generally lower family incomes in multi-family residences.
- SCE Power Charge per ccf to cover a portion of the cost of pumping power. This is applied to all water sold.
- State Project Water Charge per ccf to cover the cost of importing SPW.

The rate structure encourages conservation. As a result of the rate structure, BCVWD receives about 78.8% of its revenue from volumetric (commodity) charges and 21.2% from fixed meter charges. (Based on data from 2009). The ratio exceeds the "target" value of 70%; this ratio is still believed to be current.

Implementation or Scheduled Implementation

The District will continue to review their rate structure to eliminate non-conserving pricing structures.

Methods to Evaluate Effectiveness

Review billing records and pricing structures versus water consumption on a periodic basis.

BMP 12-Conservation Coordinator

The District presently does not have a designated conservation coordinator. BCVWD has been operating at reduced staff levels to keep expenditures to a minimum so that water rates do not have to be raised. There have been many foreclosures in the area and the area is depressed. Both Beaumont and Cherry Valley have been classified by the Santa Ana Watershed Project Authority (SAWPA) as disadvantaged or partially disadvantaged communities.

During these economic times, it is very difficult to justify such a position when BCVWD staff has been reduced to a minimum

There is no funding for this program. To have the current staff take on this task at this time would put an undue burden on our staff.

Implementation or Scheduled Implementation

The District is a small agency and funding a full time water conservation coordinator would have significant financial impacts – perhaps as much as $5 per household per year for just salary and benefits. The District will investigate opportunities to incorporate water conservation "duties" within the existing staffing or if this can be accomplished regionally through the Pass Agency.

BMP 13-Water Waste Prohibition

Section 9.6 of the District's Rules Governing Water Service states the following:

> It is a violation of these Regulations:
>
> 3) To cause or permit the waste of water from the water system or to maintain or cause or permit to be maintained any leaky outlets, apparatus or plumbing fixtures through which water is permitted to waste;
>
> 4) To use water for washing sidewalks and driveways in a manner that prevents the usual and customary use of public streets and sidewalks by others;
>
> 5) To permit water sprinklers to spray onto sidewalks and streets or to permit water to run from the consumer's property onto public sidewalks and streets to cause risk and/or damage to the public or to public and private property;

Section 15 of the District's Rules Governing Water Service states the following:

> No person, firm or corporation shall use, deliver, or apply waters received from this District in any manner that causes the loss, waste, or the application of water for unbeneficial purposes. Within the meaning of this Regulation, any waters that are allowed to escape, flow, and run into areas which do not make reasonable beneficial use of such waters, including but not limited to streets, gutters, drains, channels, and uncultivated lands, shall be presumed to be wasted contrary to the prohibitions of these Rules and Regulations.

The Regulations for Water Service have a series of warnings/penalties. The first notice is a written warning; the second offense results in a doubling of the water charges until full compliance is attained. After the third offense, the District can terminate water service to the customer.

Implementation or Scheduled Implementation

The District already has the ordinance regulation in place. There is sufficient flexibility in the rules to allow the District to preclude non-

recirculating cooling towers, fountains, water features etc. Also, recycled water shall be used wherever available.

BMP 14-Residential Ultra-Low-Flush Toilets (ULFT) Replacement Programs

The California Code of Regulations, Title 24, regulated by Part 5 of the California Plumbing Code, which is a division of the California Building Standards, requires ULFTs in all new construction starting January 1,1994. The District does not presently have a program for replacement or a rebate program for replacement of old pre-1994 toilets.

The City of Beaumont requires all new construction and remodel projects to install ULFTs.

Almost 70 percent of the housing stock has been constructed since 1991 (see BMP 2) when low flow toilets were mandated in new construction. Almost 65% were constructed since the year 2000. This age distribution is assumed District-wide for this analysis.

The District did a cost effective analysis in the 2005 UWMP Update and it did not appear cost effective at that time. On the basis of 3 people per residence and 4.5 flushes per person per day, the ULF toilet would save 9300 gallons of water/year over the old style 3.5 gallon/flush toilet. Based on the population, there are about 12,700 residential units in the District in 2012. About 4000 are prior to 1994, when ULFTs were required. Of these it is assumed that 25% have replaced the old toilets with new toilets voluntarily or as required if the bathroom was remodeled. That leaves 3000 residences with old style, 3.5 gal/flush toilets. If these were all replaced with 1.6 gal/flush toilets, 80 acre-ft of water would be saved. Considering the District's annual water demand is about 11,000 AFY, the 80 acre-ft saved is negligible. It does not appear to be cost effective to spend the administrative effort for such a small savings in water.

Implementation or Scheduled Implementation

This BMP will not be implemented since the cost to administer would not generate an equivalent benefit.

Section 7

Climate Change

Introduction

Climate change, according the USEPA[1], refers to any significant changes in temperature, precipitation or other climate patterns lasting for extended periods of time. Throughout history, locations on the earth have experienced climate change – a notable example is the ice age which blanketed much of the Midwestern US with glaciers. These are continuing to occur whether impacted by mans' activities or purely a natural phenomenon. There is evidence the earth's average temperature is rising ever so slowly and this is projected to continue for several centuries. Places have experienced changes in rainfall, reduced snowfall, changes from snow to rain, warming of the oceans, melting of icecaps and resulting sea level rises. Even small changes in temperature can result in measureable changes in climate and weather. The cause is believed to be due to increases in concentration of "greenhouse gases[2]" in the atmosphere.

A DWR White Paper published in 2008[3] on the climate change strategies for California water stated the following:

> *Climate change is already affecting California's water resources. Bold steps must be taken to reduce greenhouse gas emissions. However, even if emissions ended today, the accumulation of existing greenhouse gases will continue to impact climate for years to come. Warmer temperatures, altered patterns of precipitation and runoff, and rising sea levels are increasingly compromising the ability to effectively manage water supplies, floods and other natural resources. Adapting California's water management systems in response to climate change presents one of the most significant challenges of this century.*
>
> *While the exact conditions of future climate change remain uncertain, there is no doubt about the changes that have already happened. Analysis of paleoclimatic data (such as tree-ring reconstructions of stream flow and precipitation) indicates a history of naturally and widely varying hydrologic conditions in California and the west, including a pattern of recurring and extended droughts. The average early spring snowpack in the Sierra Nevada decreased by about 10 percent during the last century, a loss of 1.5 million acre-feet of snowpack storage (one acre-foot of water is enough for one to two families for one year). During the same period, sea level rose seven inches along California's coast. California's temperature has risen 10F, mostly at night and during the winter, with higher elevations experiencing the highest increase. A disturbing pattern has also emerged in flood patterns; peak natural flows have increased on many of the state's rivers during the last 50 years. At the other extreme, many Southern California cities have experienced their lowest recorded annual precipitation twice within the past decade. In a span of only two years, Los Angeles experienced both its driest and wettest years on record.*

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[1] http://www.epa.gov/climatechange/basics/ accessed 4/2/2013

[2] Water vapor, carbon dioxide, methane, nitrous oxide and other gases which reflect light and infrared radiation back to the earth's surface.

[3] State of California Department of Water Resources, (2008). Managing an Uncertain Future, Climate Change Adaptation Strategies for California Water, October.

The Report further goes on to state:

What we know:

- *Historic hydrologic patterns can no longer be solely relied upon to forecast the water future;*
- *Precipitation and runoff patterns are changing, increasing the uncertainty for water supply and quality, flood management, and ecosystem functions;*
- *Significant and ongoing investments must be made in monitoring, researching, and understanding the connection between a changing climate, water resources and the environment;*
- *Extreme climatic events will become more frequent, necessitating improvements in flood protection, drought preparedness and emergency response;*

These changes will bring challenges to water supply agencies like BCVWD and impact BCVWD in both its imported water supply and it local supply – snow fall and rainfall runoff.

Climate Change Impacts on BCVWD Imported Water Supply

The DWR 2011 Reliability Report took climate change into consideration, but there are some specific issues that should be mentioned.

- Reduction in Sierra snow pack
- Rising sea levels on levee integrity

Reduction in Sierra Snowpack

The Sierra snowpack is California's best and least expensive reservoir. The precipitation falls as snow in the winter in the mountains through the winter, building up a large, "on the surface" water reservoir. During the spring and early summer this begins to melt gradually, trickling water into surface reservoirs. These reservoirs are able to capture the water and move it downstream to users maintaining flow releases that do not threaten levees or cause flooding. The peak of the runoff period is late spring or early summer.

In 1989 the USEPA issued a report on what would happen to global temperatures with a two-fold increase in the carbon dioxide concentration in the atmosphere. The reported indicated a 1.5 to 4.5°C (2.7 to 8.1°F) increase over the next 100 years if fossil fuel usage continued at the rate at the time. DWR made some very approximate estimates of what that would do to the snowpack based on a rise of 1500 ft elevation in the historical winter snowline. Assuming no change in the amount of precipitation, DWR estimated that spring snowmelt runoff would decrease by 1/3, with more occurring in the northern Sierra versus the southern Sierra where the mountains are higher in elevation and capture more high elevation snow.[4] These are certainly dire predictions; whether this will actually occur is uncertain.

DWR did plot the April to July runoff in both the Sacramento River and San Joaquin River, reflecting the northern and southern Sierras respectively as a percent of the water year runoff. The April to July runoff would represent the snowmelt runoff. These are shown in Figure 7-1 and 7-2. There is a downward trend evident with a steeper slope in the Sacramento River

[4] Department of Water Resources, State of California, Roos, Maury, Chief Hydrologist. (2012). Snowpack and Snowmelt Changes, January 3.

validating at least the general hypothesis determined in 1989.[5] From DWR's data, there appears to be solid evidence that at least some changes are occurring. Maybe these are cyclical; maybe more long term; maybe very long term.

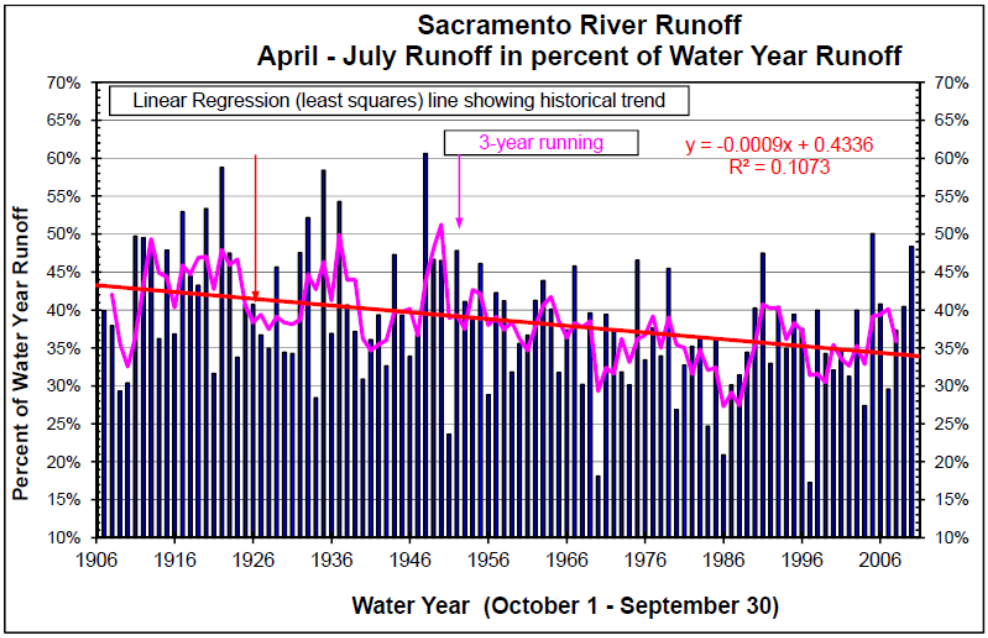

Figure 7-1
Sacramento River Runoff, April-July

With climate change, things will be different. Precipitation will be principally in the form of rain. This will runoff rapidly quickly filling the surface reservoirs the Department of Water Resources counts on to store water to supply users over the summer and fall till the next "season." The rainfall runoff occurs rapidly and in large quantities bringing with it significant sediment which will eventually silt up the storage reservoirs. The reservoirs will fill up and spill releasing the high flows into the rivers leading to the Delta, straining levees which are already unstable. This water, which previously was captured as snowfall, will not be lost to the ocean. The SWP does not have the storage or conveyance facility capacity to manage all of these high flows and put them to beneficial use or convey the flows to groundwater recharge facilities for storage.

There are many legislators and members of the public opposed to surface storage. This is unfortunate because without additional surface storage, the impacts of climate change will be felt by all of the water users in the State and the Delta ecosystem.

It is likely there will be less Table A water and more Article 21 water available as the reservoirs are quickly filled with rainfall runoff. If this Article 21 can be conveyed to the Pass Area, BCVWD is in a good position to recharge this water with the expanded recharge facility. Perhaps this is sufficient to overcome the reduction in Table A water.

[5] Ibid

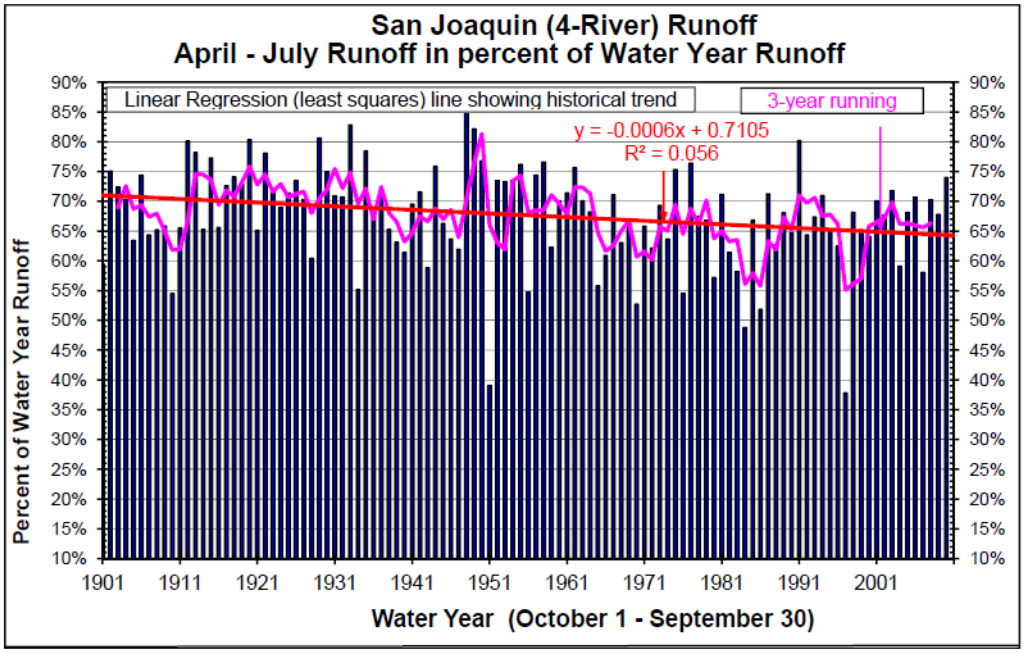

Figure 7-2
San Joaquin River Runoff, April-July

Sea Level Impact on Levees

Climate change reportedly will result in sea level rise. The higher sea level will result in greater forces on the existing levees in the Delta. The islands that comprise the Delta are now well below sea level. Levees have broken in the past due to a wide variety of reasons. They are threatened by spring floods and seismic activity. Failure of a levee is akin to a dam break. Water from the Delta rivers will rush in to flood the island. This brings about a corresponding inflow of saline water from San Francisco Bay into the Delta contaminating the imported water flowing through the Delta with salt degrading its quality and making it potentially unusable for extended periods of time.

The levees in the Delta are week. They were constructed over a century ago with the construction and compaction techniques of the time. They are certainly not up to today's standards and are vulnerable. Higher sea levels and higher spring flows due to the lack of snowpack will exacerbate the problems with the levees. Seismic activity during saturated condition could be devastating.

Because BCVWD can rely on the Beaumont Basin for groundwater, the District should be able to weather any short to medium term interruptions of imported water supply. But it will be important to make sure the storage account has adequate water.

Climate Change Impacts on BCVWD's Local Supply

Locally climate change will have similar effects.

- Reduced snow pack and higher runoff
- Increased wildfire risk
- Water demand increase

Warmer temperatures from climate change will reduce the local snow pack, but not to the degree described above for the Sierra Nevada mountains. The local snow pack is not a major supply source for BCVWD, though it does provide some gradual recharge, particularly the wells in Edgar Canyon. Higher rates of runoff can be expected with more intense storms. This will bring down substantial amounts of sediment. At this point BCVWD is in a good position to deal with the sediment having recently constructed additional desilting basins at the mouth of Edgar Canyon to supplement the numerous percolation ponds and basins along the length of Edgar Canyon. Construction of Phase 2 of the recharge facility is underway which allows the District to capture any large storm flows which make it "out of the canyon." It is believed the number of larger storm flows will increase over time due to climate change.

The warmer temperatures will bring an increased risk of wildfires in the watershed. Although some may consider wildfires an ecological benefit, there are some devastating consequences to water suppliers such as BCVWD. A burned watershed will result in enormous amounts of sediment moved down into the canyon streams which could cause flooding in the canyon and flood out some of the District's well pumps. Wildfires have burned portions of the watershed in the recent past and BCWWD has been able to minimize the impacts. The District has installed a water tank at the 3900 foot elevation between Edgar and Wallace Canyons and a fire protection piping loop in the vicinity of the "middle houses" to respond to brush fires in the canyon.

Water demand is expected to increase due to hotter days and nights. Irrigation water needs will increase due to potential reduction in precipitation and warmer days.

Mitigation

One of the best ways of mitigating climate change is by reducing energy consumption, particularly energy produced by fossil fuels and becoming more energy efficient. Although consumers have no control over the use of energy and fossil fuels by BCVWD directly, consumers can assist BCVWD by reducing water consumption. To supply water to the customers in the District's service area takes energy to pump the water out of the ground and pressurize it for use. The bulk of the District's supply is from the Beaumont basement where the groundwater table is 500 or more feet below the ground surface. To boost the pressure for consumers' use requires another 200 ft or so of pumping. A tremendous amount of energy is expended pumping this water. Saving water at home means saving energy; saving energy reduces greenhouse gas emissions.

Prepared by

BCVWD