SECTION 2

WATER SOURCES

2.1 LAW

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments [to 20 years or as far as data is available.] 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) A 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 an 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 the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.

(3) A detailed description and analysis of the location, amount and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available including, but not limited to, historic use records.

2.2 WATER SUPPLY SOURCES

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). Groundwater is the District's only current water source. However, this is changing as described below.

- In the late 1980s the District developed a recycled water master plan and

developed an agreement with the City of Beaumont to distribute recycled water. Developer have been required to install the backbone recycled water system as well as "in Tract" systems to irrigate common greenbelt areas, street medians, parks, and schools. An extensive piping system is currently "in the ground." The City of Beaumont is in the process of designing the recycled water pump system to pressurize the recycled water distribution system. The District expects to be distributing recycled water in 2006.

- The East Branch Extension of the State Water Project is now complete and operational. (There are some operational constraints however, that limit its ability to import large quantities of water.) The District has been collecting fees from developers to purchase supplemental water over and above the San Gorgonio Pass Agency's (Pass Agency) Table A amount.
- The District purchased an 80 acre parcel, referred to as the Oda Property, on both sides of Noble Creek for the purpose of developing a groundwater recharge area. Over $1,000,000 in engineering and hydrogeologic investigations have been conducted and the site is clearly an ideal place to recharge water – either captured stormwater, recycled water, or imported water. Bids have been received for the first phase of the project, construction of percolation ponds on the northwest portion of the site, the contract has been awarded and construction is about to start (late 2005).
- A pipeline has been designed to convey State Project Water from a SGPWA Turnout at Noble Creek to the groundwater recharge area described above. The design of the turnout by the SGPWA is underway.
- The District has initiated design of a stormwater capture and recharge program to take storm runoff from Little San Gorgonio Creek, desilt it, and convey it to the Oda Property spreading grounds for recharge.
- The City of Beaumont, as a condition of development, has required developers to install detention basins for stormwater percolation. Once such system adjacent to the Pardee Sundance Development on the east side of Beaumont proved to be very effective at capturing runoff and percolating it during the winter 2004-05.

Future water sources will include recycled water, captured stormwater in Edgar and Noble Canyons and its subsequent recharge, urban runoff capture and recharge, captured underflow from the Edgar Canyon, return flows from new development, and imported water. Each of these will be described in more detail in subsequent subsections.

Table 2-1 depicts the water sources which are or planned to be used by the District to meet future demands.

Table 2-1
Current and Future Water Sources

	2005	2010	2015	2020	2025	2030
Groundwater, Edgar Canyon	√	√	√	√	√	√
Groundwater, BSU	√	√	√	√	√	√
Storm Water Capture and Recharge		√	√	√	√	√
Urban Runoff & Groundwater Recharge	√	√	√	√	√	√
Captured Infiltration from Edgar Canyon		√	√	√	√	√
Recycled Water to Offset Existing Uses Currently on wells		√	√	√	√	√
Conversion of Existing Potable Water Uses to Recycled Water and Replenishment of Groundwater Using Recycled Water		√	√	√	√	√
Imported Water purchased through SGPWA		√	√	√	√	√

The following section presents a description and analysis of the current and future water sources and describes planned projects.

2.2.1 Groundwater

Table 2-2 presents a summary of the District's wells and their current capacity.

The District currently owns and operates a total of 23 groundwater wells of which only 22 are used to any great degree. These 22 wells have a total production capability of approximately 34.6 million gallons per day (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)
- BSU (Riverside County)

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

Table 2-2
Groundwater Well Capacity Summary

Area / Location	No. of Wells	Pump Capacity	
		(mgd)	(acre-ft/yr)
Upper Edgar Canyon	9[a]	2.9	3,230
Middle Edgar Canyon	1	0.9	960
Lower Edgar Canyon	3	1.6	1,850
BSU	10[b]	29.2	32,700
TOTALS	**23**	**34.6**	**38,740**

[a]Well 13 in Upper Edgar Canyon is standby
[b] Well 2 is inactive and will be replaced in 2005-06; includes Wells 25 and 26 which are scheduled to come on line in 2006, construction has started.

The District will begin constructing 2 additional wells (Well 25 and 26) in the Beaumont Basin in 2005 and will have them on line in 2006. Well No. 2 in the Beaumont Basin will be replaced in 2006 also.

2.2.1.1 Edgar Canyon

Groundwater in Edgar Canyon primarily occurs in the younger and older alluvium valleys and within the rock fractures 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. Groundwater aquifer material is limited and storage is small. Groundwater levels vary from just few feet below ground surface to about 200 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.

The District 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.

The District has operated numerous percolation ponds in the canyon. Surface flows in Little San Gorgonio Creek are diverted into the percolation ponds which then recharge the shallow aquifers. The District has been doing this since the late 1800s and has a pre-1914 water right to divert up to 3,000 miners inch hours (MIH) or approximately 45,000 acre-feet per year (acre-ft/yr) 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.

Table 2-3 presents the 5-year production from the wells in Edgar Canyon for the years 2000 - 2004.

Table 2-3
Groundwater Extractions from Edgar Canyon Wells (2000 – 2004)

Year	Total Production Acre-ft
2000	2671
2001	806
2002	592
2003	923
2004	895
5-year average	1177

From 1957 to 2000 the average production from the Edgar Canyon Wells was 1950 ac-ft/yr. However, prior to 1983, the ability to utilize the water pumped from Edgar Canyon was limited. In 1983, the District installed the Edgar Canyon Transmission Main which enabled larger quantities of water to be conveyed from the Edgar Canyon to Cherry Valley and Beaumont. Since 1983, the average amount pumped was 2454 ac-ft/yr. This is far more indicative of Edgar Canyon's ability to produce water.

For the period 1983 to 2000 statistical information on the Edgar Canyon production is presented in Table 2-4:

Table 2-4
Groundwater Extraction Statistics from Edgar Canyon Wells (1983 -2004)

Parameter	Annual Production Acre-ft
Average	2,280
Maximum	3,738
Minimum	1,117
90th Percentile	3,336
10th percentile	1,241

In Table 2-4, the term "10th 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 1,241 ac-ft/yr.

The San Timoteo Watershed Management Authority (STWMA) estimated the safe yield from Edgar Canyon to be 2,600 ac-ft/yr.[1] This amount appears reasonable in light of the statistical data on historical pumping in Table 2-4 and will be used as the yield from Edgar Canyon.

[1] 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.

The District currently maintains 40 to 50 ponds in Upper Edgar Canyon to capture and recharge winter runoff in Little San Gorgonio Creek to supplement the groundwater in the canyon and minimize the amount of water the District extracts from the BSU. These ponds have contributed to the productivity of the Edgar Canyon wells since early in the Twentieth Century. On an average annual basis, the wells have shown increased production in the canyon of approximately 800 acre-ft/yr; however the District estimates that approximately 2,600 acre-ft/yr has been captured and percolated in the Upper Edgar Canyon ponds. This estimate is based on historic pumping records and evaluation of the corresponding weather conditions. It could be overly conservative due to the fact that the historic pumping records matched the water demand on the system.

The District does not know where the difference between 2600 acre-ft/yr recharged and additional extraction has gone. It is not known if this water passes over the Banning Fault into the BSU or Singleton Storage Unit or if it flows southeasterly behind the fault barrier.

Because of this uncertainty, the District is proposing to change the diversion point to the lower end of Edgar Canyon and convey the captured water to spreading basins overlying the Beaumont Basin. This is discussed as part of the stormwater capture and recharge project to follow.

After construction of the stormwater capture project and the relocation of the diversion point downstream to the desilting basins at the mouth of the canyon, the resulting production from Edgar Canyon will be reduced since the percolation ponds in the upper and middle canyon areas will not be used as much. The District believes this will reduce the production from the Edgar Canyon wells by about 800 acre-ft/yr. Thus, one the stormwater capture and recharge project is completed the annual production from Edgar Canyon will be reduced to 1,800 acre-ft/yr, i.e., 2,600 acre-ft/yr less 800 acre-ft/yr.

The quality of the groundwater in Edgar Canyon is excellent. The total dissolved solids are in the lower 200 mg/L range; nitrate levels are low since development around the well fields is limited.

2.2.1.2 Beaumont Basin (Beaumont Storage Unit)

***Beaumont Basin*.** 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 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. With the recent information developed by the District which shows the aquifer extending an additional 500 ft below that previously know, STMWA estimates the amount of water in the Beaumont Basin could be as much as 2.4 million acre-ft.[2]

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 BSU is approximately 27 sq. mi. oriented in a northwest-southeast direction. The Cherry Valley Fault is the dividing line between the BSU and the Singleton storage

[2] "*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.

unit.

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.

It should be noted that the BSU has been drawn down from the steady state groundwater elevations computed in the Bloyd (1971) report. 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.[3]

Groundwater flow in the BSU generally follows the ground surface topography. However, there is a 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)[4]. They designated the aquifer systems beneath the recharge site as:

- Perched -- 300 to 400 ft bgs
- Shallow -- 478 to 485 ft bgs
- 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. This the primary production zone of most of the municipal wells in the BSU. As part of the pilot recharge project a well was drilled to 1500 ft bgs and test pumped at 3000 gpm. The water quality from this well is excellent, wth 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. Geoscience indicated that there were several other wells that were drilled to that depth and tapped into that deeper aquifer. In 2005, BCVWD drilled Well No. 24 into the deep aquifer and it too was test pumped at 3000 gpm. That well is due to come on line in late summer

[3] "*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

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

2005. The finding of this deep aquifer greatly extends the amount of usable groundwater in the BSU.

Table 2-5 presents the BCVWD's groundwater extractions in the BSU.

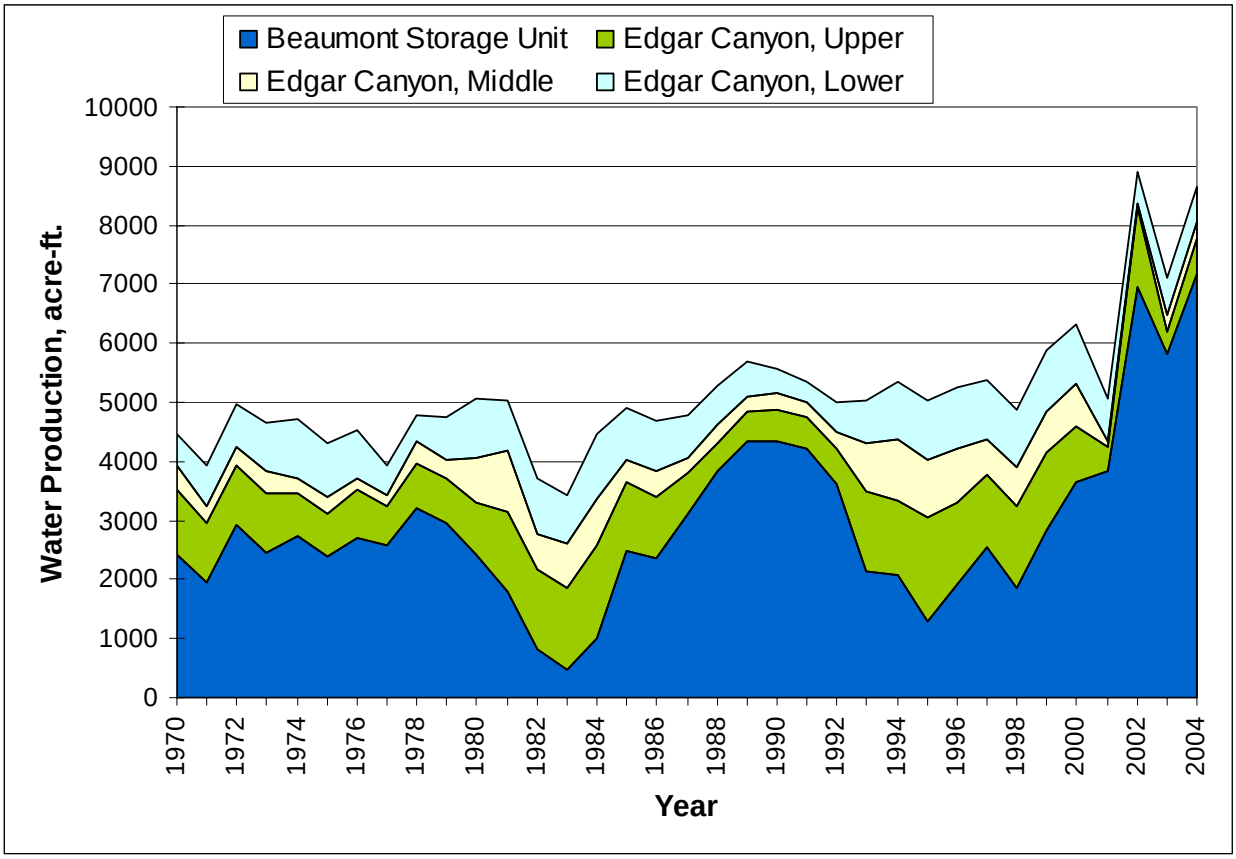
Table 2-5
BCVWD's Groundwater Extractions from Beaumont Basin Wells (2000 – 2004)

Year	Total Production Acre-ft
2000	3637
2001	3827
2002	6936
2003	5822
2004	7158
5-year average	5476

2.2.1.3 Total BCVWD Groundwater Extractions

The District's annual groundwater production from 1970 through 2004 is depicted in Figure 2-1. From 1970 to 2004, the District's average annual production was 5,166 acre-feet. The minimum annual production of 3,417 acre-feet occurred in 1983 and the maximum annual production of 8,896acre-feet resulted in 2002. For the 1970 – 2004 period, the BSU supplied approximately 57% of the total groundwater production while 19, 9% and 15% were produced from the Upper, Middle, and Lower Edgar Canyon areas, respectively. Total production in any given year is a function of the hydrologic conditions and usually mirrors the annual rainfall.

Figure 2-1
Groundwater Production from 1970 through 2004



2.2.1.4 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., the BCVWD. Some of the essential elements of the Judgment are as follows:

- The Safe Yield of the Basin is established at 8,650 acre-ft/yr.
- A controlled overdraft of the basin is allowed to create more usable storage capacity in the Basin. In the Judgment this is termed "Temporary Surplus." This has been established at 160,000 acre-ft.
- During the first ten years after adoption of the Judgment (until 2014), the Overlying Parties can extract, in total, a maximum of 8,650 acre-ft/yr. There after, the Overlying Parties can extract, in total, a maximum of 5,845 acre-

ft/yr. If, after the first 10 years, an Overlying Party pumps more than its share of the operating safe yield, the overlying producer shall provide Watermaster with sufficient funds to replace the overproduction. In the accounting, Watermaster uses a 5-year (consecutive) period. So the extractions over a consecutive 5-year period cannot exceed 5 times the annual extraction share.

- 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. There after the Appropriating Parties can extract, in total, a maximum of 2,805 acre-ft/yr. If, after the first 10 years, an Appropriator Party pumps more than its share of the operating safe yield, 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 and for the first 10 years (until 2014) can extract 6,802 acre-ft/yr.**
- An Overlying Party can request water service from an Appropriator Party. For example, if an Overlying Party subdivides its property and requests 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.
- On a year-to-year basis, 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.
- There is a provision which requires the BCVWD to set aside 2,400 acre-ft/yr of projected water demand in the 2005 Urban Water Management Plan update specifically for Oak Valley Partners LP. For the 2010 update, the Judgment states this figure should be reviewed. This was done in exchange for Oak Valley forgoing any overlying water rights in excess of that stipulated in the Judgment.
- If any Overlying Party produces less than the Overlying Party's right under the Judgment, the unused portion shall be apportioned to the Appropriator Parties as follows: BCVWD 42.51%, Yucaipa Valley Water District 13.58%, South Mesa Water Company 12.48%, and the City of Banning 31.43%.
- The 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.

The entire Judgment is contained in Appendix P.

The projected quantities of water from the from the transfer of unused Overlying Party rights to BCVWD have been estimated and are included in the water supply. These amounts are projected as follows:

Table 2-5a
Projected Transfer of Unused Overlying Party Rights to BCVWD

Year	Total Transferred Acre-ft/yr
2005	2280
2010	1507
2015	1049
2020	1049
2025	1049
2030	1049

The source of the amounts in Table 2-5a are SunnyCal Egg Ranch, California Oak Valley Golf and Resort LLC (2005, 06, and 07 only), Oak Valley Partners, Southern California PGA (through 2008 only), and the minor overlying parties.

2.2.2 Storm Water Capture and Groundwater Recharge

The District has been diverting surface flows in Edgar Canyon for groundwater recharge since 1902. Over the last twenty years the District has found that the amount of water diverted was considerably more than the amount that could be retrieved via the District wells. (Refer to the previous discussion for Edgar Canyon Wells.) It is believed that a large quantity of the diverted and percolated water flow is lost from the service area due to the severely faulted underground geology of Edgar Canyon.

In 2000 the District initiated a study of the Little San Gorgonio Creek and Noble Creek watershed areas to determine the amount of available runoff these canyons produce. Two reports were prepared by BCVWD documenting the estimate of annual runoff.

- *Resource Development, Surface Water Capture for Little San Gorgonio Creek and Other Locations*, prepared by Parsons, Pasadena, CA, September 12, 2000
- *Hydrology Study, Resource Development Program on Little San Gorgonio & Noble Creeks*, prepared by Parsons, Pasadena, CA, January 2003.

The methodology is described in detail in these reports. But the following is a brief summary.

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 4610 acres.) Average daily flows are highly variable ranging from 0 to over 1000 cfs. The average

flow at the gauging station during the gauged period is 0.7 cfs (about 500 acre-ft/yr). On January 25, 1969 a flow 5,900 cfs was recorded at the gauge.

Historic precipitation data was obtained from stations in the watershed, namely Oak Glen, Oak Glen Conservation Camp and Cherry Valley. Data was available from 22 to 99 years depending on the station. From this data, an annual rainfall-runoff relationship was developed correlating the streamflow in Little San Gorgonio Creek with the rainfall. Since the amount of precipitation in a given year affects the soil moisture (more runoff in a wet year than a dry year for a given amount of rainfall), plots of rainfall versus runoff were developed for dry, wet and average years. Also since the gauged watershed was only a portion of the entire watershed, the yield for Little San Gorgonio Creek watershed was proportioned. There was no runoff data for the Noble Creek watershed, so it was estimated the runoff would be 75 percent of that of Little San Gorgonio Creek. This accounts for the lower mean sea level elevation of the watershed and the reduced orographic effect.

The study determined that from the Little San Gorgonio Creek watershed there are approximately 2,600 acre-ft/yr long-term average runoff and 1,500 acre-ft/yr long-term average runoff from the Noble Creek watershed tributary up to Orchard Avenue. Table 2-5 presents the amount of runoff from Little San Gorgonio Creek and Noble Creek.

Table 2-6
Estimated Runoff at the Mouth of Little San Gorgonio and Noble Creek

Watershed Area	Average Annual Precipitation, inches	Average Annual Water Yield, AF
Noble Creek	23	1,500
Little San Gorgonio Creek	26	2,600
TOTAL		4,100

The mean annual runoff is based on relatively long records and a reasonable approach was used to obtain the projections.

Since the preparation of these estimates, the STWMA used a proprietary model developed by their engineer to estimate the runoff from this watershed. Their results vary somewhat from the estimates in Table 2-6. STWMA is the in the process of verifying these estimates at the time of this writing. For purposes of this UWMP update, 4,100 acre-ft per year will be used as the estimated runoff from Little San Gorgonio and Noble Creeks. This may be revised as data is collected when the system is in actual operation. Subsequent updates of this UWMP can be used as the vehicle to monitor and review the water yield.

The District is currently in the final design stage for the Recharge Program. Under the Recharge Program Plan, the existing Little San Gorgonio Creek spreading grounds would be modified for use as desilting basins. These desilting basins would capture stormwater runoff from Little San Gorgonio Creek and the adjoining Wallace Canyon. Stormwater

currently captured in the Upper Edgar Canyon percolation ponds would be allowed to flow down to the modified spreading grounds (converted to desilting basins) unless the existing Upper Edgar ponds are required for flood control. Should all of the ponds downstream be full, the District will then start to impound water in the Upper and Middle Edgar Canyon percolation ponds to conserve the water and reduce the flood impact downstream. In essence, with this operation, under normal conditions, the District is moving it pre-1914 right diversion point from upper Little San Gorgonio Creek to the mouth of the canyon.

Desilted water will be conveyed down to the groundwater recharge facilities constructed on 80 acres of District-owned land at the intersection of Cherry Valley Blvd. and Beaumont Avenue. Phase 1 of the groundwater recharge ponds will be under construction in late 2005 r early 2006. Phase 2 of the recharge ponds is anticipated be constructed in late 2006.

The District also plans the construction of wetlands habitat areas on Noble Creek, and pipelines to transfer captured and desilted stormwater flows from Noble Creek. Recycled water will be released into Noble Creek in Bogart Park and allowed to flow through the wetlands before being recaptured and percolated in the recharge facilities.

The groundwater recharge facilities would be developed into a recreational park for additional beneficial use by the surrounding community.

In 2002 and 2003, the District performed a pilot test to determine percolation rates at the groundwater recharge site. This is documented in:

- "*Geohydrologic Investigation Noble Creek Artificial Recharge Study*" prepared by Geoscience Support Services Inc., July 2002
- "*Groundwater Recharge Implementation Plan, Nobel Creek Artificial Recharge Facility*," prepared by Geoscience Support Services Inc., Sept. 19, 2005.

Short term subsurface infiltration rates measured during the pilot artificial recharge testing ranged from 1 to 6 ft/day. The average short-term infiltration rate considering all of data collected over the 80-acre site was 5.5 ft/day. Geosciences estimates the long term infiltration rate to be about 3 ft/day. It was estimated that the entire 80 acre site could recharge about 18,000 ac-ft annually when fully developed. This clearly demonstrates the recharge area can easily recharge the runoff from Edgar and Noble Canyons and have capacity to recharge recycled and imported water as required.

2.2.3 Urban Runoff and Groundwater Recharge

The City of Beaumont is developing plans and requirements for urban stormwater management that will require new development to construct recharge structures along Noble, Marshall, and Potrero Creeks. This will allow for collection of storm flows for recharge from the developed areas of Cherry Valley and Beaumont, as well as from the new construction currently being planned.

In the estimate of the additional captured urban runoff, the following methodology was used:

- Only the Pardee Sundance, Oak Valley Greens and Marshall Creek areas were considered
- Impervious area was estimated to be 25% of the total gross area of the development
- Average annual rainfall is 18 inches
- Prior to development an estimated 30% of rainfall reaches the groundwater table

Captured additional urban runoff is projected to increase from 380 ac-ft/yr in 2005 to 1130 ac-ft/yr in 2025 as development occurs and more areas become covered with impermeable surfaces such as pavement and roofs..

2.2.4 Captured Infiltration from Edgar Canyon

The capture of shallow groundwater or infiltration appears feasible based on the operation of the District's resource recovery well RR1, which captures underflow of unknown origin during the winter months in the lower Edgar Canyon. The District estimates 300 acre-ft/yr could be captured by additional recovery wells.

2.2.5 Recycled Water

Currently, the District is installing recycled water pipelines as part of the overall recycled water distribution system. The pipelines and appurtenances are being installed as development occurs. As of 2005 about 18 to 20 miles of recycled water pipeline is "in the ground." Service lines are installed to irrigation systems in parks and common areas in Pardee Sundance, Three Rings Ranch, Oak Valley Greens, Pardee Tournament Hills, and elsewhere. Pipelines extend to the Oak Valley and the two PGA West golf courses.

Currently the City of Beaumont treats all of the wastewater to meet Title 22 regulations for recycled use. Presently all flows, about 2 mgd, are being discharged to Cooper Creek which is tributary to San Timoteo Creek. (The effluent percolates underground prior to reaching San Timoteo Creek.) The City is in the final stages of expanding the treatment facility to 4.0 mgd and is starting the design for the recycled water pumping station. BCVWD is in design on the first phase (2 MG) of a non-potable water storage reservoir on the site of the Phase 1 Stormwater Capture and Recharge Project. The system is designed so that any surplus recycled/non-potable water will overflow into the percolation basins and recharge the BSU. A new pipeline will also bring State Project Water to the site to blend with and supplement the recycled water. The design for the pipeline is complete and the Pass Agency is in design on the turnout and metering station on the East Branch Extension. Recycled water should be available for delivery by mid-2006.

The District's service area is in a unique position. At this point in time there is more demand for recycled water (parks, playgrounds, school yards, medians and common areas, golf courses, etc.) than the available supply.

Table 2-7
Recycled Water Available for Use

Year	Total Recycled Water Produced mgd	Total Recycled Water Produced acre-ft/yr	Total Recycled Water Available for Use acre-ft/yr
2000	1.2	1340	1050
2005	1.7	1850	1470
2010	5.4	6100	5500
2015	7.9	8885	8160
2020	8.4	9465	8710
2025	8.7	9780	9006
2030	8.9	9980	9200

The total recycled water which is available for use assumes a 300 acre-ft/yr set aside for environmental mitigation/evapotranspiration etc. and assuming only 95 percent of the net remaining can be reused either for irrigation or groundwater recharge. The recycled water flow also is based on sewering Cherry Valley beginning in 2010. It is assumed that 95% of the population of Cherry Valley will be served with a wastewater collection system. Flow from Cherry Valley in the year 2030 is 1 mgd.

2.2.5.1 Offset Existing Uses on Wells

The Beaumont Basin Adjudication states that if an Overlying Party receives recycled water for an Appropriator, .e.g., the District, the Appropriator which serves the recycled water shall have the right to use that portion of the Overlying Water Right of the Overlying Party offset by the provision of recycled water. In other words the Appropriator gets credit for the recycled water provided and can pump an equal amount from the groundwater basin. The Overlying Party must reduce his/her groundwater pumping accordingly for that period of time.

Currently recycled water pipelines extended to Oak Valley Golf Course (18 holes) and the Southern California Professional Golf Association Golf Courses (36 holes). The Adjudicated Rights for these Overlying Producers are presented in Table 2-8. It is important to note that the users in Table 2.8 can take recycled water today.

Table 2-8
Overlying Parties Which Could Substitute Recycled Water for Pumping

Overlying Party	Overlying Right acre-ft/yr	Estimated Recycled Water Use [1] acre-ft/yr
California Oak Valley Golf and Resort LLC	950	950
So. California Professional Golf Association	2,200	2,200
Total	3,150	3,150

2.2.6 Imported Water

As discussed in Section 1, the District has historically served its customers with groundwater produced from Edgar Canyon and the BSU. Wells in the canyon were supplemented by surface water capture and percolation. Recycled water will become a larger source of local supplies along with stormwater and urban runoff capture and percolation. However, these sources alone are not able to meet the needs of the District through 2030 and the District must rely on imported water delivered through the State Water Project's East Branch Extension (EBX). The local State Water Contractor is the San Gorgonio Pass Water Agency (SGPWA). The Agency has a maximum current Table A amount of 17,300 acre-ft/yr; however, the EBX Phase I is limited to 8,650 acre-ft/yr. The planning to bring the EBX to full Table A amount has begun.

The BCVWD is taking the approach that the SGPWA Table A amount is already "spoken for" and has a fee structure in place for the following:

- To purchase additional Table A water through the SGPWA from other State Water Contractors or non-State Water Contractors and have that water delivered to the BCVWD through the EBX
- Purchase Turnback Pool water through the SGPWA when available for delivery
- Purchase Article 21 Water through the SGPWA when available for delivery

The 80-acre groundwater recharge facility which will begin construction in late 2005 or early 2006 will provide the opportunity to take advantage of Article 21 water, which is typically available only on very short notice. This will allow BCVWD to "bank" water for later use.

BCVWD has included a water treatment facility fees as part of the impact fees collected from each new development. This fee is collected to construct a water treatment plant on District-owned land immediately adjacent to the State Water Project Cherry Valley Pump Station. The treatment plant would treat State Project Water for direct delivery to consumers within the District. The City of Banning and BCVWD have had preliminary discussions on a joint treatment plant, with BCVWD wheeling treated water through its

system to the City of Banning. BCVWD has constructed major transmission facilities and stubbed out transmission mains on the joint boundary between the City of Banning and BCVWD. Several years ago BCVWD purchased land for a treatment plant.

The hydraulic grade line for the inflow to the Cherry Valley Pump Station is such that the treated water can flow into the BCVWD's 2750 Pressure Zone. A 4 million gallon reservoir (Taylor Reservoir) is already constructed on the site which can serve as a clear well for the future water treatment plant. The District envisions a membrane treatment plant – most likely a microfiltration/ultrafiltration facility (MF/UF).

Initial projections for imported water range from about 3950 acre-ft per year in the year 2006 to 6870 acre-ft/yr by the year 2030. When BCVWD purchases additional Table A water, BCVWD will purchase more than the required amount to take into account the State Water Project reliability.

The Department of Water Resources has just issued a draft reliability report (November 2005) for public comment. The results of this study will be factored in to the actual purchase amount.

2.2.7 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.

The District is collecting a "new water source" fee from all new developments. This fee structure has been in place for a number of years. The fee structure was reviewed in 2004 and an upward adjustment was made to ensure that enough money is collected to purchase new water for the development. The District periodically reviews that fee structure to make sure it is current. This fee can be used to purchase additional Table A water, Turnback Pool water or Section 21 Water as described above. It can also be used to "buy into" other agency water resource projects in exchange for imported water which can be delivered through the SGPWA via the EBX. These "other agency water resource 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 and others. BCVWD could participate in one or more of these projects in exchange for State Project Water. BCVWD sees transfers and exchanges as very viable solution to providing long term water supplies.

2.2.8 Surface Water Sources

Although the BCVWD has pre-1914 rights to the waters or Little San Gorgonio Creek (Edgar Canyon) as described previously, the District does not divert these waters for direct use. To the extent possible the water is percolated into the ground for recharge. Currently significant recharge is occurring in ponds constructed by the District in the

Upper and Middle Edgar Canyon. With the construction of the Stormwater Capture and Recharge Project, the water will be percolated first in the Beaumont Basin and secondarily during floods in the existing ponds in Edgar Canyon.

The District believes this is much more efficient that constructing a surface water treatment plant for these flashy, often turbid, seasonal streamflows. As a result, direct surface deliveries is not considered a viable source of supply.

2.2.9 Summary of Water Supply Sources to Year 2030

Table 2-9 presents a "water balance" for BCVWD for each year to 2030. The Table takes into account banking of unused portions of the temporary surplus, recharge, direct deliveries of non-potable water, transfers of unused rights from Overlying Parties etc.

Table 2-9 is based on average year water supply conditions. Water sources and quantities are based on the data presented in this section. Water demands and wastewater production are based on the development rates presented in Table 1-5.

2.3 SUMMARY

The key elements for supporting the continued growth in the District are the completion of construction of a recycled water distribution system, the implementation of the Stormwater Capture and Recharge Program, the development of an urban runoff/recharge program, and the delivery and recharge of SWP water. With these projected available water sources along with the incidental water sources planned for the next twenty-five years, the District will have ample water available in 2030 and will have over 31,000 acre-ft in storage in the Beaumont Basin as is shown in Table 2-9.

Construction of a recycled water distribution system to make recycled water available to parks, playgrounds, golf courses, street medians, and freeway landscaping, will save valuable potable water resources for their highest and best use (domestic consumption).

The District's proposed Recharge Program, as discussed in Section 2.2.2, will also provide new water supply to the District for potable use. The Recharge Program with an estimated 4,100 acre-ft/yr will provide 6,700 EDU with potable water. Both the Recharge Program and recycled water distribution combined will provide a total water source for over 22,000 EDU.

Table 2-9
Water Supply and Demand and Overall Beaumont Basin Water Balance
(2005-2030)

Line	WATER BALANCE -- SOURCES vs DEMANDS	Comment	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Water Supply Sources														
1	State Project Water via San Gorgonio Pass Water Agency														
2	For Direct Non-potable Reuse	Same as line 19	0	0	133	805	949	448	222	0	0	0	0	0	0
3	For Recharge	Adjusted to maintain positive storage		3950	3999	4179	5029	6017	6498	6755	6782	6803	6814	6821	6827
4	Total Imported Water	line 2 + 3		3950	4132	4983	5978	6464	6721	6755	6782	6803	6814	6821	6827
5	Groundwater Produced from Edgar Canyon	Reduced when stormwater capture project comes on line	2600	2600	2600	2600	1800	1800	1800	1800	1800	1800	1800	1800	1800
6	Groundwater Produced from Beaumont Storage Unit from Temporary Surplus up to BCVWD Adjud. Right	From Judgement -- goes away after 2014	6802	6802	6802	6802	6802	6802	6802	6802	6802				
7	Total Overlier Rights Distributed to BCVWD	Based on data from watermaster	2280	1986	2595	2090	1650	1507	1364	1221	1078	1049	1049	1049	1049
8	Potable Water Supplied to Overlying Parties (Sunny Cal Egg Ranch and Surroundings)	Based on data from watermaster adjusted to include all of the adjacent areas.	0	0	69	137	206	275	343	412	480	549	549	549	549
9	Recycled or Non-potable Water Supplied to Overlying Parties	Based on data from watermaster -- golf courses	0	800	1600	2450	3150	3150	3150	3150	3150	3150	3150	3150	3150
10	Urban Runoff/Groundwater Recharge		379	470	560	651	742	832	847	862	877	892	907	921	936
11	Captured Infiltration (shallow groundwater)		0	0	0	0	0	300	300	300	300	300	300	300	300
12	Stormwater Capture/Groundwater Recharge		0	0	0	2600	2600	4100	4100	4100	4100	4100	4100	4100	4100
13	Recycled Water Recharged	Same as line 18	0	610	0	0	0	0	0	226	712	1096	1328	1440	1487
14	Total Allowable Extractions from Beaumont Storage Unit	Line 3 +(Lines 6 thru 13)	9461	14618	15624	18909	20179	22982	23404	23828	24281	17939	18196	18330	18398
15	Total Potable Water Supply	Line 5 + 14	12061	17218	18224	21509	21979	24782	25204	25628	26081	19739	19996	20130	20198
16	Water Demand (includes existing demands which can be served by non-potable water)	Estimated by BCVWD based on development	8767	10708	12689	14609	16472	18029	19421	20814	21923	22781	23213	23513	23739
17	Water Demand less existing potable water users converted to non-potable water	Estimated by BCVWD	8767	9908	11189	13109	14872	16329	17421	18661	19770	20628	21060	21360	21586
18	Recycled Water Available for Recharge	Line 24 - 23 - 22 - 21;if less than zero, indicate makeup shortfall amount	0	610	0	0	0	0	0	226	712	1096	1328	1440	1487
19	Imported Water to Recycled System to make up shortfall	See comment line 18	0	0	133	805	949	448	222	0	0	0	0	0	0
20	Subtotal Non Potable Water Demand	Lines 21 thru 23	0	1691	3282	4775	5716	5957	6400	6628	6703	6778	6828	6878	6928
21	Existing Potable Water Users Converted to Recycled Water	Estimated by BCVWD	0	800	1500	1500	1600	1700	2000	2153	2153	2153	2153	2153	2153
22	Future Recycled Water Users (not including recharge)	Estimated by BCVWD	0	91	182	825	966	1107	1250	1325	1400	1475	1525	1575	1625
23	Recycled Water Suplied to Overlying Parties	Same as line 9	0	800	1600	2450	3150	3150	3150	3150	3150	3150	3150	3150	3150
24	Recycled Water Available	Includes sewering of Cherry Valley up to 95% of households	1471	2301	3149	3970	4767	5509	6178	6854	7415	7874	8156	8318	8415
25	Water to BCVWD Storage Account	Line 15 - 17	3294	7310	7035	8400	7106	8454	7783	6967	6311	-889	-1064	-1229	-1388
26	Accumulated Water in BCVWD Storage Account			10604	17639	26039	33146	41599	49382	56349	62660	61771	60707	59478	58090

Table 2-9
Water Supply and Demand and Overall Beaumont Basin Water Balance
(2005-2030)

Line	WATER BALANCE -- SOURCES vs DEMANDS	Comment	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
	Water Supply Sources														
1	State Project Water via San Gorgonio Pass Water Agency														
2	For Direct Non-potable Reuse	Same as line 19	0	0	0	0	0	0	0	0	0	0	0	0	0
3	For Recharge	Adjusted to maintain positive storage	6832	6838	6843	6849	6854	6856	6858	6861	6863	6865	6867	6870	6872
4	Total Imported Water	line 2 + 3	6832	6838	6843	6849	6854	6856	6858	6861	6863	6865	6867	6870	6872
5	Groundwater Produced from Edgar Canyon	Reduced when stormwater capture project comes on line	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
6	Groundwater Produced from Beaumont Storage Unit from Temporary Surplus up to BCVWD Adjud. Right	From Judgement -- goes away after 2014													
7	Total Overlier Rights Distributed to BCVWD	Based on data from watermaster	1049	1049	1049	1049	1049	1049	1049	1049	1049	1049	1049	1049	1049
8	Potable Water Supplied to Overlying Parties (Sunny Cal Egg Ranch and Surroundings)	Based on data from watermaster adjusted to include all of the adjacent areas.	549	549	549	549	549	549	549	549	549	549	549	549	549
9	Recycled or Non-potable Water Supplied to Overlying Parties	Based on data from watermaster -- golf courses	3150	3150	3150	3150	3150	3150	3150	3150	3150	3150	3150	3150	3150
10	Urban Runoff/Groundwater Recharge		951	966	981	995	1010	1025	1040	1055	1069	1084	1099	1114	1129
11	Captured Infiltration (shallow groundwater)		300	300	300	300	300	300	300	300	300	300	300	300	300
12	Stormwater Capture/Groundwater Recharge		4100	4100	4100	4100	4100	4100	4100	4100	4100	4100	4100	4100	4100
13	Recycled Water Recharged	Same as line 18	1534	1581	1678	1770	1862	1901	1939	1978	2016	2055	2093	2132	2171
14	Total Allowable Extractions from Beaumont Storage Unit	Line 3 +(Lines 6 thru 13)	18465	18532	18650	18762	18874	18929	18985	19041	19096	19152	19208	19263	19319
15	Total Potable Water Supply	Line 5 + 14	20265	20332	20450	20562	20674	20729	20785	20841	20896	20952	21008	21063	21119
16	Water Demand (includes existing demands which can be served by non-potable water)	Estimated by BCVWD based on development	23965	24191	24417	24631	24845	24936	25028	25119	25211	25302	25394	25485	25577
17	Water Demand less existing potable water users converted to non-potable water	Estimated by BCVWD	21812	22038	22264	22478	22692	22783	22875	22966	23058	23149	23241	23332	23424
18	Recycled Water Available for Recharge	Line 24 - 23 - 22 - 21;if less than zero, indicate makeup shortfall amount	1534	1581	1678	1770	1862	1901	1939	1978	2016	2055	2093	2132	2171
19	Imported Water to Recycled System to make up shortfall	See comment line 18	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Subtotal Non Potable Water Demand	Lines 21 thru 23	6978	7028	7028	7028	7028	7028	7028	7028	7028	7028	7028	7028	7028
21	Existing Potable Water Users Converted to Recycled Water	Estimated by BCVWD	2153	2153	2153	2153	2153	2153	2153	2153	2153	2153	2153	2153	2153
22	Future Recycled Water Users (not including recharge)	Estimated by BCVWD	1675	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725
23	Recycled Water Suplied to Overlying Parties	Same as line 9	3150	3150	3150	3150	3150	3150	3150	3150	3150	3150	3150	3150	3150
24	Recycled Water Available	Includes sewering of Cherry Valley up to 95% of households	8512	8609	8706	8798	8890	8929	8967	9006	9044	9083	9121	9160	9199
25	Water to BCVWD Storage Account	Line 15 - 17	-1547	-1705	-1814	-1916	-2018	-2054	-2090	-2126	-2161	-2197	-2233	-2269	-2305
26	Accumulated Water in BCVWD Storage Account		56543	54838	53023	51107	49089	47036	44946	42820	40659	38462	36229	33960	31655