Big Bear Watermaster

Thirty-Eighth Annual Report

For Calendar Year 2014

photo courtesy Jay Woolwine Photography

Big Bear Municipal Water District vs. North Fork Water District, et al
Case No. 165493 - County of San Bernardino

Bear Valley Mutual Water Company

Big Bear Municipal Water District — Est. 1984

SBV Water Conservation District — Our Name is Our Mission

Watermaster Members:
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BIG BEAR WATERMASTER

FOR
BIG BEAR MUNICIPAL WATER DISTRICT VS. NORTH FORK WATER CO. ET AL
CASE NO. 165493--COUNTY OF SAN BERNARDINO

WATERMASTER MEMBERS:
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March 26, 2015

To: Clerk of the Superior Court of San Bernardino County and All Parties

Subject: Watermaster Report for Calendar Year 2014

Gentlemen:

We have the honor of submitting the Thirty-Eighth Annual Report of the Big Bear Watermaster for Calendar Year 2014.

Paragraph Twenty (20) of the Judgment requires that the Watermaster Report be submitted to the Court and the Parties before April 1 of each year on all significant Watermaster activities and provide an accounting of water deliveries for the preceding calendar year as set forth in Section VI, Physical Solution, of the Judgment.

We and each of us hereby certify that this is a true and correct report of the Watermaster work performed by us and under our supervision during 2014 pursuant to the requirements of the Judgment.

Respectfully submitted,

By: Donald E. Evenson
Donald E. Evenson

By: Daniel B. Cozad
Daniel B. Cozad

By: Michael L. Huffstutler
Michael L. Huffstutler

THIRTY-SEVENTH ANNUAL REPORT
BIG BEAR WATERMASTER
CALENDAR YEAR 2014

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I. INTRODUCTION

The Big Bear Watermaster presents the Thirty-Eighth Annual Report of its activities for calendar year 2014. The Watermaster's activities ensure that the rights of all parties subject to the Judgment rendered in Case No. 165493 are protected. The Watermaster generally oversees watershed conditions that may affect the Judgment and attempts to improve the conditions to the benefit of all parties.

This report describes the 2014 activities of the Watermaster including the status of accounts and various tabulations as required by the Judgment.

In 2014, the Big Bear Watermaster Committee was composed of Donald E. Evenson, President, representing Big Bear Municipal Water District; Michael L. Huffstutler, representing Bear Valley Mutual Water Company; and Daniel B. Cozad, Secretary, representing San Bernardino Valley Water Conservation District.

The Watermaster Committee met four times during 2014. These meetings were held on the following dates:

January 21, 2014
March 12, 2014
July 15, 2014
November 18, 2014

Appendix A contains the minutes of these meetings. Minutes of the meetings are also on file at the office of each of the representatives.

II. SUMMARY

2014 WATERMASTER ACCOUNTS

2014 was a below average precipitation year. Annual precipitation at the two gages in the Big Bear Lake watershed averaged 20.92 inches, which is 84 percent of the 24.85 inches of average annual rainfall since 1977. Precipitation at Bear Valley Dam was 29.61 inches, which is 84 percent of the 105-year (1910-2014) average of 35.29 inches.

Inflow to Big Bear Lake in 2014 was also below average. The 2014 calculated lake inflow was 5,776 acre-feet, which is 36 percent of the average inflow since 1977. The average inflow for the 38 years since the Judgment was rendered is 15,834 acre-feet per year.

Actual lake levels dropped 2.64 feet in 2014 and ended the year 11.01 feet below the top of the dam. Accordingly, lake contents decreased by 6,551 acre-feet during the year. On December 31, 2014, the lake contained 43,543 acre-feet of water. When full, the lake level is 72.33 feet and it holds 73,320 acre-feet. **Figure 1** shows the history of the actual lake contents since the Judgment was rendered in 1977.

Mutual's lake account held 26,252 acre-feet at the end of 2014. Their lake account decreased by 9,806 acre-feet during the year. **Figure 1** also shows the history of Mutual's lake account since 1977. Under a "Mutual Operation", lake releases would be made to meet Mutual's water demands and their lake account is credited with the net wastewater exported from the Big Bear Lake watershed. Under these conditions, the lake level would have ended the year 19.28 feet below the top of the dam or 8.27 feet lower than the actual year-end lake level. If Mutual had not been credited with the net wastewater exports, their lake account balance would have been 18,292 acre-feet and the lake would have been 23.88 feet below the top of dam, or 12.87 feet lower than it actually was.

In 2014, Mutual received 7,301 acre-feet of water from Big Bear MWD. Big Bear MWD has the option to provide in-lieu supplies or to release water from the lake. In 2014, Mutual received 6,408 acre-feet of in-lieu water and no water was released for Mutual from Big Bear Lake. In 2014, the in-lieu deliveries to Mutual consisted of 1,716 acre-feet of State Water Project (SWP) and 4,692 acre-feet of local groundwater. Also, Mutual was able to use 893 acre-feet of water from Big Bear Lake that was required for fish protection purposes as required under SWRCB Order No. 95-4.

At the beginning of the year, Big Bear MWD had 14,036 acre-feet in their lake account. By the end of the year, their lake account had increased by 3,255 acre-feet to 17,291 acre-feet. Big Bear MWD's lake account is the difference between the actual lake contents and Mutual's lake account as shown on **Figure 1**.

The Basin Make-up Account provides an estimate of the water supply impacts of the operation of Big Bear Lake under the Judgment on the San Bernardino Groundwater Basin. A positive account balance means there has been an increase in groundwater recharge as a result of the Big Bear MWD operation of the lake. If the account becomes negative, Big Bear MWD is required to correct the deficiency by providing additional water for groundwater recharge.

In 2014 the Basin Make-up Account balance decreased by 2,323 acre-feet. The Basin Make-up Account began the year with a balance of 29,287 acre-feet and ended the year with a balance of 26,964 acre-feet. The decrease resulted primarily as a result of the use of local groundwater to meet a significant portion of the in-lieu deliveries to Mutual. In addition there was a small increase from higher basin additions from lake releases made to meet the requirements of SWRCB Order 95-4 under a Big Bear MWD lake operation as compared to a Mutual Operation.

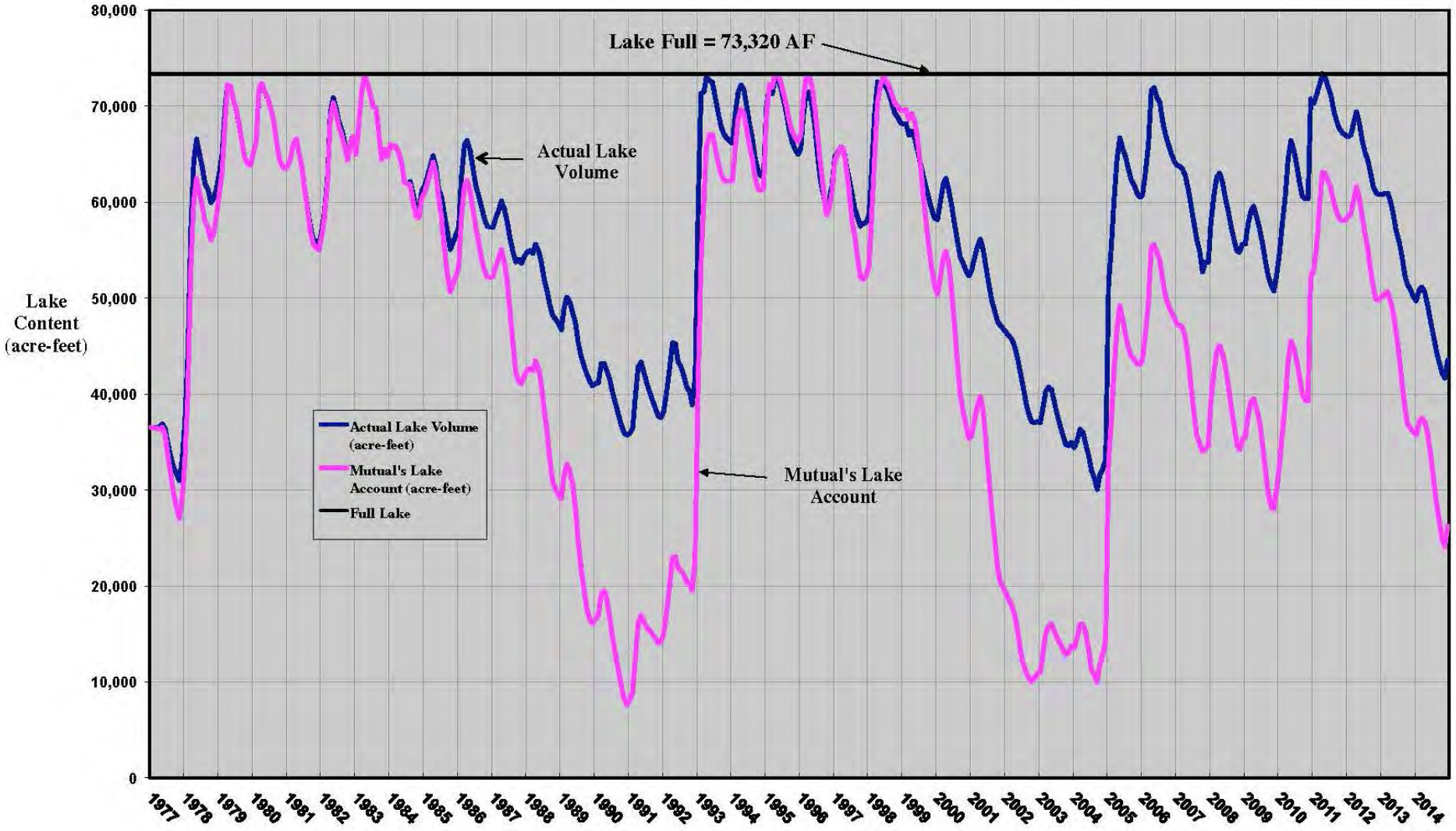
OTHER WATERMASTER ACTIVITIES

The Watermaster has the responsibility to undertake studies and investigations, collect and maintain data and records, and monitor related activities necessary to implement the physical solution contained in the Judgment. In 2014, the Watermaster was involved in monitoring and discussing two issues. These issues are:

- Impacts of Seven Oaks Dam,
- Protecting Big Bear Lake from Quagga Mussels

These issues are discussed in Chapter V.

FIGURE 1
ACTUAL LAKE CONTENTS AND MUTUAL'S LAKE ACCOUNT 1977 - 2014
Calendar Year 2014 - Big Bear Watermaster



III. BASIC DATA

BIG BEAR LAKE

Summary

The Watermaster conducts a water balance of Big Bear Lake for each month. This water balance is based on measurements of lake levels, releases, leakages and air temperature, as well as calculated values of spills, evaporation and inflows. For 2014, the overall water balance for the lake was:

Initial Storage (1-01-14)	50,094 acre-feet
Inflows	5,776 acre-feet
Evaporation	10,942 acre-feet
Releases for Mutual	-0- acre-feet
Releases for Valley District	-0- acre feet
Releases & Leakage for SWRCB Order 95-4	1,014 acre-feet
Spills & Flood Control Releases	-0- acre-feet
Net Snowmaking Withdrawal	372 acre-feet
Ending Storage (12-31-14)	43,543 acre-feet
Change-in-Storage	-6,551 acre-feet

In 2014, the volume of water in Big Bear Lake decreased by 6,551 acre-feet. The following subsections of this chapter describe each of the components in this water balance.

Lake Levels and Storage

Water levels in Big Bear Lake are measured continuously based on a reference mark located on the upstream side of the dam. In July 1998, Big Bear MWD completed installation of a continuous lake level recorder. The lake level recorder is a Global Water Model WL300 and is enclosed in a stilling well, which is attached to the upstream face of the dam. Lake level data is continuously transmitted by a remote telemetry unit (RTU) in the control building at the dam. From there, data

are transmitted via radio to a central computer in the administrative offices of Big Bear MWD. The automatically recorded values have been used since July 1998. The recorder can only record lake levels when the lake is within 15 feet of the top of the dam (i.e. above a gage height of 57.33 feet). In 2014, the lake was within the top 15 feet for the entire year.

The lake began the year at a gage height of 63.96 feet and ended the year at a gage height of 61.32 feet. Over the year, the lake level dropped 2.64 feet. The lowest recorded lake level was 60.49 feet or 11.84 feet below the top of the dam, and it occurred on December 1, 2014. The highest recorded lake level was 64.51 feet, which occurred on March 7, 2014. The lake is full at a gage height reading of 72.33 feet (6,743.20 feet above msl) and is empty at a gage height of zero.

The Watermaster uses an established gage height-lake capacity table to estimate the volume of water in the lake from the measured gage heights. At the beginning of the year, the lake contained 50,094 acre-feet of water. At the end of the year, there were 43,543 acre-feet of water in the lake. The lake content decreased by 6,551 acre-feet during 2014. When full, the lake contains 73,320 acre-feet of water.

Lake Evaporation

The Watermaster calculates evaporation from the lake surface using the Blaney Criddle formula to estimate monthly evaporation rates. The 1977 Annual Watermaster report describes the formula as follows:

> "The Blaney Criddle empirical formula, utilizing average temperatures and daylight hours, has been used. The constant K for each month was calculated based on float pan empirical data at Long Valley Reservoir in Mono County, California, which is at elevation 6,796 feet, compared to the elevation of Big Bear Lake which is 6,743 feet."

Monthly lake evaporation is calculated using the estimated evaporation rate and the average surface area of the lake during the month. If a negative value for lake inflow is calculated, the monthly evaporation rate is increased to achieve a zero lake inflow. Calculated negative lake inflows occurred three times in 2014. These occurred in May, June and October. Total

evaporation from the lake for 2014 was calculated to be 10,942 acre-feet. This amount is equivalent to an annual evaporation rate of 53.1 inches.

Precipitation

Precipitation in the Big Bear Lake watershed varies significantly from Bear Valley Dam to Big Bear City at the east end of the watershed. **Table III-1** shows the monthly precipitation at Bear Valley Dam and the Big Bear City Community Services District for 2014. 2014 precipitation at the two stations was 29.61 and 12.23 inches, respectively. June and October were the driest months with no precipitation. February and December were the wettest months with approximately 68 percent of the annual precipitation.

Table III-1 also compares the 2014 precipitation at the two stations with their corresponding averages for the thirty-eight years since the Judgment was rendered. At the Bear Valley Dam station, precipitation was 84 percent of its thirty-eight year average, and at the Big Bear Community Services District station, precipitation was also 84 percent of its thirty-eight year average. For both stations, 2014 precipitation averaged 84 percent of their thirty-eight year combined average.

Table III-2 shows the annual precipitation for both stations for the thirty-eight years since the Judgment was rendered. As shown in **Table III-2**, 2014 was a below average year for precipitation. For the Bear Valley Dam station, precipitation was 84 percent of the 105-year (1910–2014) average of 35.29 inches.

Lake Inflow

Inflows to Big Bear Lake are not measured. Consequently, inflows naturally tributary to Big Bear Lake above Bear Valley Dam are calculated for each month using a water balance on the actual operation of the lake. This calculation, which utilizes observed basic data along with the calculated evaporation losses described previously, creates a water balance for each month to determine the amount of natural flow into the lake. The formula used is:

TABLE III - 1

MONTHLY PRECIPITATION FOR TWO STATION IN BIG BEAR AREA (Inches)

Calendar Year 2014 - Big Bear Water Master

Month	Bear Valley Dam*	Big Bear Community Services District**	Average	Percent of Annual Total
January	0.70	0.18	0.44	2.10%
February	8.27	1.97	5.12	24.47%
March	0.48	1.31	0.90	4.28%
April	2.16	1.02	1.59	7.60%
May	0.38	0.31	0.35	1.65%
June	0.00	0.00	0.00	0.00%
July	0.28	1.04	0.66	3.15%
August	0.48	0.79	0.64	3.04%
September	1.54	0.44	0.99	4.73%
October	0.00	0.00	0.00	0.00%
November	1.62	0.66	1.14	5.45%
December	13.70	4.51	9.11	43.52%
2014 Totals	29.61	12.23	20.92	100.00%
1977-2014 38-yr average	35.21	14.48	24.85	
2014 % of 38-yr average	84.1%	84.5%	84.2%	

Average of the 38-year average for both stations	24.85
Average of the 2014 precipitation for both stations	20.92
2014 average as a percent of the 38-year average	84.2%

Source:
* Big Bear MWD
** Big Bear Community Services District

Table III-2

THIRTY-EIGHT YEARS OF PRECIPITATION DATA FOR TWO STATIONS IN BIG BEAR AREA (Inches)

Calendar Year 2014 - Big Bear Watermaster

Year	Bear Valley Dam*	Big Bear Community Services District**
1977	31.95	13.35
1978	68.43	26.09
1979	34.87	15.84
1980	63.00	29.86
1981	16.67	8.42
1982	49.14	26.53
1983	56.97	24.29
1984	20.19	16.66
1985	22.40	14.11
1986	35.16	15.26
1987	27.49	12.52
1988	24.18	8.15
1989	17.32	6.85
1990	22.20	11.02
1991	38.47	19.81
1992	44.03	16.64
1993	73.81	19.45
1994	31.78	12.24
1995	49.00	15.89
1996	41.04	15.47
1997	27.00	12.92
1998	50.40	12.07
1999	13.22	6.06
2000	24.82	5.21
2001	30.62	9.10
2002	15.02	3.82
2003	32.44	12.70
2004	39.50	13.51
2005	54.74	19.56
2006	37.96	9.98
2007	16.11	4.89
2008	37.87	8.58
2009	30.70	12.23
2010	64.14	33.23
2011	27.61	14.81
2012	23.70	16.41
2013	14.38	14.53
2014	29.61	12.23
	---	---
38-Year Average	35.21	14.48
	84.1%	84.5%
105-Year Average	35.29	N/A
	83.9%	

Source:
* **Big Bear MWD**
** **Big Bear City Community Services District**

Inflow = Evaporation + Releases + Spills + Leakage +
Net Withdrawals - Change in Storage

If the calculated monthly inflow is a negative value, it is reset to zero, and the monthly evaporation rate is recalculated to achieve a lake water balance. Calculated negative lake inflows occurred three times in 2014. These occurred in May, June and October.

Total annual inflow for 2014 into the lake was calculated to be 5,776 acre-feet. The largest monthly inflow was 2,343 acre-feet, and it occurred in December. The average annual lake inflow for the 38 years since the Judgment was rendered (1977–2014) is 15,834 acre-feet. The median annual inflow for this same period is 10,033 acre-feet.

Table III-3 lists the annual lake inflows for the period 1977–2014. This table also ranks the inflows from the lowest (1,717 acre-feet in 2002) to the highest (48,613 acre-feet in 1993). Inflow to the lake for 2014 was well below average for the thirty-eight years since the judgment was rendered in 1977. Only seven other years had lower lake inflows.

SWRCB Order No. 95-4

On February 16, 1995, the State Water Resources Control Board (SWRCB) issued Order No. 95-4. This order directed the Big Bear MWD and Bear Valley Mutual Water Company to release enough water from the lake to maintain a minimum seven-day average flow of 1.2 cfs and a minimum average daily flow of 1.0 cfs in Bear Creek no more than 500 feet downstream of its confluence with West Cub Creek. This location is referred to as Station A. In 1998, Big Bear MWD completed construction of a continuous flow recording device at Station A to measure compliance with SWRCB Order No 95-4.

SWRCB Order No. 95-4 also required sufficient releases to maintain a minimum flow of 0.3 cfs at a location approximately 300 feet downstream from the toe of the dam. This location is referred to as Station B. In 1998, Big Bear MWD also completed construction of a continuous recording device at this location to measure compliance with SWRCB Order No. 95-4.

Table III - 3
Big Bear Lake Inflows 1977-2014
(acre-feet / year)
Calendar Year 2014 - Big Bear Watermaster

Year	Lake Inflows (AF/year)		Rank	Plotting Position	Year	Lake Inflow (AF/year)
1977	7,103		**Min.**	**1**	**2.6%**	**2002**	**1,717**
1978	40,743			2	5.1%	2007	2,841
1979	25,318			3	7.7%	2013	3,129
1980	42,336			4	10.3%	1999	3,774
1981	6,529			5	12.8%	1988	4,551
1982	25,310			6	15.4%	1990	4,856
1983	35,072			7	17.9%	1989	4,967
1984	10,569			8	20.5%	**2014**	**5,776**
1985	9,497			9	23.1%	1981	6,529
1986	13,812			10	25.6%	2001	6,915
1987	8,005			11	28.2%	2000	6,930
1988	4,551			12	30.8%	1977	7,103
1989	4,967			13	33.3%	1987	8,005
1990	4,856			14	35.9%	2012	8,175
1991	11,658			15	38.5%	2003	8,295
1992	15,543			16	41.0%	2004	8,404
1993	**48,613**	Max.		17	43.6%	1997	8,757
1994	11,015			18	46.2%	2009	9,212
1995	33,340		Median	19	48.7%	1985	9,497
1996	13,119		Median	20	51.3%	1984	10,569
1997	8,757			21	53.8%	1994	11,015
1998	34,600			22	56.4%	1991	11,658
1999	3,774			23	59.0%	1996	13,119
2000	6,930			24	61.5%	1986	13,812
2001	6,915			25	64.1%	2008	14,182
2002	**1,717**	Min.		26	66.7%	1992	15,543
2003	8,295			27	69.2%	2011	16,908
2004	8,404			28	71.8%	2006	17,564
2005	39,600			29	74.4%	1982	25,310
2006	17,564			30	76.9%	1979	25,318
2007	2,841			31	79.5%	2010	32,959
2008	14,182			32	82.1%	1995	33,340
2009	9,212			33	84.6%	1998	34,600
2010	32,959			34	87.2%	1983	35,072
2011	16,908			35	89.7%	2005	39,600
2012	8,175			36	92.3%	1978	40,743
2013	3,129			37	94.9%	1980	42,336
2014	**5,776**		**Max.**	**38**	**97.4%**	**1993**	**48,613**

1977 - 2014		
Maximum	**48,613**	**38**
Average	**15,834**	
Median	**10,033**	
Minimum	**1,717**	

Flow at Station B is measured by a compound weir with a v-notch section and a rectangular section. It is attached to a reinforced concrete structure in the riverbed. The v-notch section has a flow range of 0 and 0.44 cfs and the rectangular section has a flow range of 0.44 to 5.03 cfs. A water level transmitter is located in a stilling well just upstream of the weir structure. The water level data are transmitted to a remote telemetry unit (RTU) located in the control building at the dam. From there, data are transmitted to a central computer at the administrative offices of Big Bear MWD where average daily flow rates at Station B are calculated based on the rating curve of the weir plate.

On December 29, 2004, data transmission from Station A ceased. In January of 2005, major storms hit the Bear Creek watershed with significant snowfall. Consequently, Big Bear MWD staff could not access Station A until May. On their first visit to the site, they found the data transmission facilities destroyed, the stilling basin filled with sediment and the weir plate damaged. The staff estimated the flow in Bear Creek at this time to be in the range of 10 to 15 cfs, well above the 1.20 cfs requirement.

Beginning in June 2005, the staff visited the site every two weeks and made velocity and water depth measurements. From these measurements, they used two methods to estimate the flow at Station A. Flow estimates ranged between 11.8 cfs and 2.3 cfs. Consequently, in 2005 Station A was well in compliance with the 1.20 cfs, seven-day flow requirement.

During the summer and fall of 2005, Big Bear MWD repaired the weir plate, cleaned out the stilling basin, and installed a battery operated, pressure transducer to record weir water depth information. Since 2005, when weather conditions permit, Big Bear MWD retrieves the recorded information and calculates the flows at Station A.

In December 2010, major storms again hit the Bear Creek watershed, destroyed the data recording equipment and filled the stilling basin with sediment and rock at Station A. In November 2011, Big Bear MWD cleaned out the stilling basin and downstream creek bed and installed a new battery operated, pressure transducer to record weir water depth information.

When weather conditions permit, Big Bear MWD staff retrieves the recorded information, which again allows the flow at Station A to be calculated.

During 2005, Big Bear MWD, working with State Water Resources Control Board (SWRCB) and the State Department of Fish and Game, developed a proposed plan to keep Station A in compliance with both the 1.0 cfs average daily flow requirement and the 1.2 cfs seven-day average flow requirement. This proposed plan involved increasing the Station B flow requirements to insure the Station A requirements would be met. The new Station B requirements vary by month and hydrologic year type. The hydrologic year type is based on year-to-date precipitation at Bear Valley Dam. Water years (October 1 to September 30) are used to determine the hydrologic year type. The adopted plan is referred to as the "Exhibit A Flow Compliance Plan" and is presented in the following table. The plan was approved by the SWRCB on January 08, 2009. The amended order also required Big Bear MWD to monitor the flows at Station A for ten years to confirm that the Exhibit A Flow Compliance Plan would satisfy the minimum flow requirements at Station A. Starting in December of 2005, Big Bear MWD followed the Exhibit A Flow Compliance Plan for Station B. The Station B flow requirements for the period January through June 2014 are highlighted in yellow.

Effective July 1, 2014, Big Bear MWD adopted a "Revised Flow Compliance Plan" that increased the minimum flow requirements at Station B in some months based on their experience over the six years since the SWRCB approved the Exhibit A Flow Compliance Plan. The Revised Flow Compliance Plan is shown on the following table. The Station B flow requirements for the period July through December 2014 are highlighted in yellow.

Based on these two tables and the actual water year-to-date precipitation at Bear Valley Dam, the plan for minimum daily average flows at Station B in 2014 were as follows:

Exhibit A Flow Compliance Plan
Table to Determine Minimum Daily Flows at Station B
Based Upon Water Year-to-Date Precipitation at Bear Valley Dam
for January through June in Calendar Year 2014

Date	Enter Water Year-to-date Precipitation at Bear Valley Dam (inches)	Dry Year		Below Normal Year		Above Normal Year		Wet Year	
		If year-to-date precipitation is less than (inches)	Station B Minimum Flow is (cfs)	If year-to-date precipitation is between (inches)	Station B Minimum Flow is (cfs)	If year-to-date precipitation is between (inches)	Station B Minimum Flow is (cfs)	If year-to-date precipitation is more than (inches)	Station B Minimum Flow is (cfs)
October 1	0.00	n.a.	0.95	n.a.	0.95	n.a.	0.95	n.a.	0.95
November 1	1.65	0.03	0.90	0.03 and 0.56	0.90	0.57 and 1.93	0.70	1.93	0.70
December 1	3.27	1.59	0.85	1.59 and 3.04	0.85	3.05 and 5.60	0.80	5.60	0.60
January 1, 2014	4.43	3.73	0.90	3.73 and 8.14	0.75	8.15 and 12.84	0.75	12.84	0.30
February 1, 2014	5.13	8.94	1.00	8.94 and 13.84	0.85	13.85 and 20.79	0.50	20.79	0.30
March 1, 2014	13.40	14.42	0.80	14.42 and 20.05	0.40	20.06 and 31.47	0.40	31.47	0.30
April 1, 2014	13.88	19.29	0.75	19.29 and 25.84	0.50	25.85 and 40.30	0.40	40.30	0.30
May 1, 2014	16.04	21.61	0.95	21.61 and 28.65	0.70	28.66 and 41.16	0.55	41.16	0.30
June 1, 2014	16.42	22.18	1.15	22.18 and 30.01	0.80	30.02 and 41.86	0.75	41.86	0.30
July 1	Not Used	22.42	1.20	22.42 and 30.01	0.95	30.02 and 41.86	0.95	41.86	0.30
August 1	Not Used	22.93	1.25	22.93 and 30.69	1.05	30.70 and 42.48	0.95	42.48	0.30
September 1	Not Used	23.30	1.00	23.30 and 30.86	0.95	30.87 and 43.69	0.95	43.69	0.30

Highlighted values are the monthly Flow Compliance Requirements

Revised Flow Compliance Plan
Table to Determine Minimum Daily Flows at Station B
Based Upon Year-to-Date Precipitation at Bear Valley Dam
for July through December in Calendar Year 2014

Date	Enter Year-to-date Precipitation at Bear Valley Dam (inches) Note 1	Dry Year		Below Normal Year		Above Normal Year		Wet Year	
		If year-to-date precipitation is less than (inches)	Station B Minimum Flow is (cfs)	If year-to-date precipitation is between (inches)	Station B Minimum Flow is (cfs)	If year-to-date precipitation is between (inches)	Station B Minimum Flow is (cfs)	If year-to-date precipitation is more than (inches)	Station B Minimum Flow is (cfs)
October 1, 2014	0.00	n.a.	1.20	n.a.	1.20	n.a.	1.20	n.a.	1.20
November 1, 2014	0.00	0.03	1.10	0.03 and 0.56	1.00	0.57 and 1.93	0.95	1.93	0.90
December 1, 2014	1.62	1.59	0.90	1.59 and 3.04	0.85	3.05 and 5.60	0.85	5.60	0.85
January 1	Not Used	3.73	0.90	3.73 and 8.14	0.85	8.15 and 12.84	0.85	12.84	0.85
February 1	Not Used	8.94	1.00	8.94 and 13.84	0.85	13.85 and 20.79	0.50	20.79	0.30
March 1	Not Used	14.42	0.95	14.42 and 20.05	0.85	20.06 and 31.47	0.40	31.47	0.30
April 1	Not Used	19.29	0.75	19.29 and 25.84	0.50	25.85 and 40.30	0.40	40.30	0.30
May 1	Not Used	21.61	0.95	21.61 and 28.65	0.70	28.66 and 41.16	0.55	41.16	0.30
June 1	Not Used	22.18	1.15	22.18 and 30.01	1.00	30.02 and 41.86	0.75	41.86	0.30
July 1, 2014	16.42	22.42	1.50	22.42 and 30.01	1.30	30.02 and 41.86	0.95	41.86	0.55
August 1, 2014	16.70	22.93	1.50	22.93 and 30.69	1.50	30.70 and 42.48	1.25	42.48	0.55
September 1, 2014	17.18	23.30	1.35	23.30 and 30.86	1.20	30.87 and 43.69	1.20	43.69	1.15

1.50

Highlighted values are the monthly Flow Compliance Requirements
Blue values are revisions that increased the Flow Compliance Requirements

Month 2014	Hydrologic Condition	Minimum Daily Average Flow (cfs)
January	Below Normal	0.75
February	Dry Year	1.00
March	Dry Year	0.80
April	Dry Year	0.75
May	Dry Year	0.95
June	Dry Year	1.15
July	Dry Year	1.50
August	Dry Year	1.50
September	Dry Year	1.35
October	Start Water Year	1.20
November	Dry Year	1.10
December	Below Normal	0.85

Flows at Station B normally consist of leakage from the dam and spillway gates, releases and leakage from the outlet works, spills from the lake, and inflows and consumptive losses between the dam and Station B.

In 2014, the daily average flows recorded at Station B were above the minimum flows shown above except for two days. These days were August 28 and September 6. On August 28 flow through the 6-inch Bypass Pipeline was stopped for a few hours while divers inspected and filmed the upstream face of the dam. This short-term shut down reduced the daily average flow to 1.41 cfs. which was just below the Revised Flow Compliance Plan goal of 1.50 cfs.

On September 6 there was an unexpected drop in the recorded flow in the 6-inch Bypass Pipeline. On September 7, Big Bear MWD staff opened the control valve to flush out any sediment that might be blocking the flow and the flow recovered. A temporary blockage in the pipeline is believed to have caused the flow reduction. This episode caused the Station B flow to be out of compliance by only 0.01 cfs. on September 6.

To handle the SWRCB Order No 95-4 lake release and in-lieu delivery conditions, the Watermaster Committee, in 2002, clarified the accounting procedures. In 2003, the Watermaster made further improvements to these procedures. In 2005, they made a further change to better

reflect actual lake management. This change was to include leakage with the flows from the outlet works in the accounting for flows to meet SWRCB Order 95-4. For the lake accounts, the accounting procedures are:

1. The outlet works flows and dam leakage will be deducted from both Mutual's and BBMWD's lake accounts in proportion to the amount of water in their respective lake accounts on days when Mutual is not fully utilizing all the flow in the Santa Ana River at the point of diversion to the forebay of SCE Power Plant No. 1.

2. The outlet works flows and dam leakage releases will be deducted entirely from Mutual's lake account on days when:
   a) Mutual is fully utilizing all the flow in the Santa Ana River at the point of diversion to the forebay of SCE Power Plant No. 1
   b) Mutual is requesting releases from the lake and BBMWD is releasing water from the lake or providing in-lieu supplies, or
   c) Mutual is purchasing SWP.

Prior to 2012, the term "fully utilized" was defined as days when the "net amount" of water the SBVWCD diverted from the forebay of SCE Power Plant No. 3 was less than the amount of the fish release. The "net amount" of water diverted from the forebay was defined as the actual amount diverted by SBVWCD for groundwater recharge less the amount of water delivered to the forebay by the Bear Valley Pick-up on the Santa Ana River below Seven Oaks Dam. In prior years, the Committee noticed there were some operational conditions when this definition did not accurately depict if Mutual was "fully utilizing" all the flow in the Santa Ana River at the point of diversion to the forebay of SCE Power Plant No. 1. When this occurred, adjustments were made in the accounting to better reflect actual operating conditions.

In 2012, the Committee reviewed the conditions and adopted a revised definition of the term "fully utilized." The revised definition of when Mutual is "fully utilizing" all the flow in the Santa Ana River is when:

- Mutual's Deliveries of Santa Ana River water are greater than or equal to the SCE Santa Ana River Diversions, and
- The SCE Santa Ana River Diversions are greater than the Outlet Works Flows and Dam Leakage used to meet SWRCB Order No. 95-4.

The daily values of Mutual's Deliveries and the Santa Ana River Diversions will be made using the Daily Flow Reports prepared by the San Bernardino Valley Water Conservation District.

Mutual's Deliveries of Santa Ana River Water will be determined as the sum of the following four deliveries:

- BVMWC Highline (B1) delivery,
- Northfork Canal Weir (G2) delivery,
- Edwards Canal (H2) delivery, and
- Redlands Aqueduct Weir (W1) delivery less the Redlands Tunnel (I1) inflow plus the Redlands Sandbox Spills (YI).

The daily SCE Santa Ana River Diversions will be determined as the sum of the following flows:

- PH#3 Penstock (CALC) (A1) flow,
- BVMWC Highline (B1) flow,
- Greenspot Spill (F1) to PH#3, and
- Deliveries to the Greenspot Pipeline (C1).

The daily Outlet Works Flows and Dam Leakage from Big Bear Lake used to meet SWRCB Order No. 95-4 are determined by the Watermaster Committee using measured releases and leakage estimates provided by Big Bear MWD.

In 2014 the estimated Outlet Works Flows and Dam Leakage was 1,013.9 acre-feet and Mutual was determined to have "fully utilized" the Santa Ana River Diversions on 320 days, which resulted in the following allocation:

1. 121.0 acre-feet were deducted from both Mutual's and BBMWD's lake accounts in proportion to the amount of water in their respective lake accounts on the 45 days when Mutual did not "fully utilize" the Santa Ana River Diversions, and
2. 892.9 acre-feet was deducted from Mutual's lake account on the 320 days they "fully utilized" the Santa Ana River Diversions.

The Committee will continue to review these accounting methods in 2015 to make sure the determinations of the allocation of the "outlet works flows and dam leakage" accurately reflect actual operations.

The input data and allocation of releases under SWRCB Order No. 95-4 in **Table 2.C** of **Appendix B** reflect the above revised procedures.

For the Basin Make-up Account, the accounting procedures are:

1. Under a Big Bear MWD operation, the actual fish releases used by Mutual under Item 2 above will be considered a "release actually made under District Operation (R_d)" and the actual releases under Item 1 above will be treated as "spills which actually occurred under District Operation (S_d)".

2. Under a Mutual operation, the fish releases used by Mutual under Item 2 above will be considered a "release which would have been made under a Mutual Operation (R_m)", and the releases allocated to Mutual under Item 1 above will be considered a "spill which would have occurred under a Mutual Operation (S_m)."

Tables 4.A and **4.B** of **Appendix B** reflect these accounting procedures.

The Watermaster Committee will continue to work on these accounting procedures in 2015 to make sure they will be accurate for all possible river flow and diversion conditions that could occur in future years.

Dam and Spillway Gate Leakage

Minor leakage through the dam and spillway gates occurs in Bay 1 and Bay 10. The structural reinforcement project completed in 2006 eliminated the leakage from cracks in the upper arches of Bays 5, 6 and 8. In 2014, the lake level was above the spillway crest (Elevation 6,731.00 feet which is 12.20 feet below a full lake) for the entire year so some minor leakage occurred in Bays 1 and 10. Big Bear MWD estimates the leakage from Bays 1 and 10 by visual observations. The estimated monthly leakages are shown in **Table III-4**. The estimated leakage from Bays 1 and 10 for 2014 was estimated to be 4.1 acre-feet.

TABLE III-4
ESTIMATES OF
MONTHLY DAM LEAKAGE
(acre-feet)
Calendar Year 2014
Big Bear Watermaster

Month	Bay 1 and Bay 10 Leakage Estimates (AF)	Additional Foundation Leakage (AF)	Total Estimated Leakage (AF)
January	0.4	-0-	0.4
February	0.4	-0-	0.4
March	0.4	-0-	0.4
April	0.4	-0-	0.4
May	0.3	-0-	0.3
June	0.3	-0-	0.3
July	0.3	-0-	0.3
August	0.3	-0-	0.3
September	0.3	-0-	0.3
October	0.3	-0-	0.3
November	0.2	-0-	0.2
December	0.5	-0-	0.5
Annual Total	**4.1**	**-0-**	**4.1**

In late November 2009 during excavation of foundations for the new highway bridge below the dam, workers noticed water entering the excavation and seeping to the surface below. During meetings with Caltrans engineers and the District's engineer in January 2010, Caltrans indicated they were convinced the new seepage was not related to their blasting efforts but the result of the removal of overburden and bedrock resulting in the opening of new pathways for seepage water to move through the abutment rock. Caltrans promised to prepare a remedial grouting plan and submit it to the District for engineering review and approval.

In late 2011, Caltrans prepared a remedial grouting program to control seepage at the left abutment of the dam. After review and approval by the Big Bear MWD, the program was submitted for technical review to the Division of Safety of Dams and Caltrans received their approval in concept. The Caltrans proposal included four rows of grout holes. Two parallel rows parallel to the edge of the lake beginning at the left abutment and two rows perpendicular to the first rows beginning at the left abutment. While the intent of Caltrans is to protect their new highway bridge foundation, the project should dramatically reduce seepage at the left abutment of the dam. In mid-2012, Caltrans conducted the left abutment grouting on the roadbed approach (now the parking area) of the old highway bridge. Two rows of holes were drilled and grouted during the process along with three verification holes. After completion of this effort in August 2012 observed downstream seepage at the left dam abutment was significantly reduced. As a result of this observation Caltrans determined that the second set of grout holes would be unnecessary and Caltrans closed the project.

The additional foundation leakage cannot be directly measured and has been estimated from flow measurements at Station B that are in excess of the measured releases and estimated spillway gate leakage from the lake. Beginning in September 2013, no additional foundation leakage has been identified which indicates the grouting program may have reduced or perhaps eliminated the foundation leakage. The Committee will continue to monitor this source of leakage before drawing any conclusions concerning the effectiveness of the grouting program.

The total estimated dam leakage in 2014 was 4.1 acre-feet and was included in the outflows from the Lake to meet the requirements of SWRCB Order 95-4.

Outlet Works Releases

Water is released from the lake through the outlet works. These releases can be for flood control purposes, for Mutual, or for fishery protection in accordance with SWRCB Order No. 95-4.

Releases are made either through a 36-inch outlet works or a 6-inch bypass pipeline that is connected to the 36-inch outlet works. A 36-inch butterfly valve is the primary control mechanism on the outlet works. Flows in the outlet works are measured by an in-line 36-inch flow meter that was installed on the outlet piping downstream of the butterfly valve in December

1993 to replace an older meter. The meter is an Electromatic Flow Meter Model 655 manufactured by Sparling Instruments, Inc. Downstream of the flow meter, the outlet works splits into a 24-inch pipeline and a 14-inch pipeline. Flows through these two pipelines are controlled by two motorized sluice gates. The two sluice gates are 24-inch by 24-inch and 14-inch by 14-inch. The 36-inch meter was calibrated with an accuracy of ± 0.5 percent between 7.07 and 212 cfs. When the sluice gates were fully opened and the lake was full, the meter measured a flow of 256 cfs, which is the maximum that can be discharged through the outlet works. When the lake is full and only the 14-inch sluice gate is open, the flow from the outlet works is estimated to be 68 cfs. When only the 24-inch sluice gate is open, the maximum discharge from the Outlet Works is estimated to be 195 cfs. The rate of flow and totalized flow are recorded at the flow meter and also at the control building. There is usually a small amount of leakage through the two sluice gates.

There is also a 3-inch Relief Line, meter and valve on the 36-inch outlet pipeline. During the winter months this valve is usually opened to allow a small amount of flow (usually 4 to 6 gpm) to pass through the 36-inch pipeline and prevent water in the pipeline from freezing. The 3-inch Relief Line had been used to provide water for the construction of the new highway bridge downstream of the Dam that replaced the bridge that was on the top of Bear Valley Dam. The bridge construction was completed in November 2011, and Big Bear MWD is no longer releasing any water for the bridge construction project. The winter water releases through the 3-inch Relief Line were 2.9 acre-feet in 2014, and they flowed down Bear Creek and were measured as part of

the flow at Station B. These releases are considered as part of the releases to comply with SWRCB Order N0. 95-4.

Flow through the 6-inch Bypass Pipeline was metered beginning in August 2006 when Big Bear MWD replaced a 4-inch Bypass Pipeline with a 6-inch bypass pipeline, valve and meter. Releases to comply with SWCRB Order No. 95-4 are normally made through the 6-inch Bypass Pipeline.

In 2014, Big Bear MWD released water from the lake through the Outlet Works to comply with SWRCB Order No. 95-4. **Table III-5** summarizes the monthly amounts of water discharged from the outlet works in 2014. The total from the Outlet Works in 2014 was estimated to be 1,009.8 acre feet.

Mutual Releases

There were no lake releases for Mutual in 2014.

San Bernardino Valley MWD Releases

There were no lake releases for San Bernardino Valley MWD in 2014.

Flood Control Releases

There were no flood control releases in 2014.

Spills

Spills are flows that leave the lake over the spillway of the dam. They are calculated from lake gage height readings and spillway gate settings at the dam during the time of the spill. In 2014, there were no spills from the lake.

TABLE III-5

MONTHLY DISCHARGES FROM
THE OUTLET WORKS OF BEAR VALLEY DAM
(acre-feet)
Calendar Year 2014
Big Bear Watermaster

Month	Flood Control Releases (AF)	Mutual Releases (AF)	Test Release Program (AF)	SWRCB Discharges (AF)	Total Discharges (AF)
January	-0-	-0-	-0-	78.5*	78.5
February	-0-	-0-	-0-	72.0*	72.0
March	-0-	-0-	-0-	80.5*	80.5
April	-0-	-0-	-0-	76.4*	76.4
May	-0-	-0-	-0-	77.4*	77.4
June	-0-	-0-	-0-	77.7*	77.7
July	-0-	-0-	-0-	95.1*	95.1
August	-0-	-0-	-0-	102.1*	102.1
September	-0-	-0-	-0-	94.3*	94.3
October	-0-	-0-	-0-	94.3*	94.3
November	-0-	-0-	-0-	79.9*	79.9
December	-0-	-0-	-0-	81.5*	81.5
Total	**-0-**	**-0-**	**-0-**	**1,009.8***	**1,009.8**

* These releases were also used to partially or wholly meet Mutual's needs for lake water.

Station B Flows

Leakage estimates and outlet works flows are confirmed by comparing the sum of dam leakage plus the amount released from the lake through the outlet works with the flow measured at Station B, which is 300 feet downstream of the dam. The differences can be either gains or losses. Although small, these differences illustrate the impacts of rainfall/snowfall and plant evapotranspiration between the dam and Station B. **Table III-6** shows this comparison. In 2014, the measured and estimated flow at Station B was 58.1 acre-feet more than the estimated amount leaving Big Bear Lake from releases, leakage and spills. The gains in the January to May period were the result of local runoff and snowmelt from the area between the Dam and Station B. June and July also showed small gains and August had small evaporation losses between the Dam and Station B. The September to November period showed minor gains, which were probably from the fall rainfall events. December showed a significant gain as a result of the heavy rains that month. Overall, there was a fair correlation between the outflows from the Lake and the measurements at Station B. The Watermaster Committee reviewed the estimated gains in June and July, which are months that normally show small losses, and concluded they could be the result of either measurement errors or minor amounts of foundation leakage. The Watermaster Committee will continue to monitor this condition in 2015.

Lake Withdrawals for Snowmaking

Big Bear MWD sells water from Big Bear Lake for use in snowmaking, fire protection and re-vegetation for ski areas within the watershed. In 2014, 672 acre-feet of water was withdrawn from the lake for these purposes. The withdrawals for snowmaking occurred in seven winter months (January, February, March, April, October, November and December). The withdrawals for fire protection and re-vegetation occurred in five summer and fall months (May, June, July, August and September).

Big Bear MWD began selling water from the lake for snowmaking purposes in 1980 and the Watermaster accounting assumed 50 percent would return to the lake as snowmelt. In 1989, Big Bear MWD retained James M. Montgomery, Consulting Engineers to evaluate this assumption.

TABLE III-6

COMPARISON OF FLOWS AT STATION B WITH ESTIMATED LEAKAGE AND FLOWS FROM OUTLET WORKS

Calendar Year 2014 - Big Bear Watermaster

Month	Flows from Outlet Works (AF)	Dam Leakage (AF)	Spillway Gate Release (AF)	Total Flows From Lake (AF)	Flow at Station B (AF)	Gains/ (Losses) (AF)
January	78.5	0.4	-	78.9	79.9	1.02
February	72.0	0.4	-	72.3	80.2	7.83
March	80.5	0.4	-	80.9	86.3	5.39
April	76.4	0.4	-	76.8	79.8	2.97
May	77.4	0.3	-	77.7	83.2	5.48
June	77.7	0.3	-	77.9	83.2	5.25
July	95.1	0.3	-	95.4	97.9	2.49
August	102.1	0.3	-	102.4	102.2	(0.18)
September	94.3	0.3	-	94.6	95.4	0.79
October	94.3	0.3	-	94.6	96.1	1.50
November	79.9	0.3	-	80.2	81.4	1.20
December	81.5	0.5	-	82.1	106.5	24.41
Total	1,009.8	4.1	-	1,013.9	1,072.0	58.14

Their report was completed in May 1989 and concluded the return flow factors would range between 0.48 and 0.52 depending on the air temperature during snowmaking. The report recommended the Watermaster continue using a return flow factor of 0.50. The Watermaster Committee adopted the recommendation in 1989.

Based on this report, Watermaster estimates that half of the monthly amount pumped from the lake for snowmaking in the winter months returns to the lake in the form of snowmelt during the same month In 2014, the withdrawal from the lake for snowmaking was 600 acre-feet and 300 acre-feet returned to the lake. In the summer and fall months, 72 acre-feet of water was used and none was returned to the lake. The "net withdrawal" for all purposes was 372 acre-feet.

Net Wastewater Exports

The Watermaster Committee calculates "net" wastewater exports as the difference between the wastewater that leaves the Big Bear Lake watershed and the water supply that is imported into the Big Bear Lake watershed from the Baldwin Lake watershed. The methodology used to make these calculations is documented in a report entitled "Development of a Methodology for Estimating Gross Sewage Export from Upper Bear Creek Watershed", prepared by James M. Montgomery, Consulting Engineers, Inc., in September 1989 for Big Bear Municipal Water District.

Wastewater is exported from the Big Bear Lake watershed to the Baldwin Lake watershed from the following three areas:

- City of Big Bear Lake
- San Bernardino County Service Area 53B
- Airport area served by Big Bear City CSD

Wastewater flows from the first two areas are measured by the Big Bear Area Regional Wastewater Authority (BBARWA). Wastewater flows from the airport area within the Big Bear Lake watershed are estimated based upon the number of connections in the area.

Water is imported into the Big Bear Lake watershed from the Baldwin Lake watershed by the following three activities:

- City of Big Bear Lake imports groundwater from the Baldwin Lake watershed.

- Big Bear City CSD provides water to the airport area from the Baldwin Lake watershed
- Big Bear City CSD occasionally provides emergency water to the City of Big Bear Lake

The City of Big Bear Lake imported supplies and emergency supplies are both metered, while the airport area supplies are estimated based on the number of service connections.

In 2014, the "net" wastewater exported from the Big Bear Lake watershed was 732 acre-feet. **Table III-7** contains the 2014 monthly net exports. The 2014 net exports were less than the 2013 net exports. The lower level of net exports is from less inflow and infiltration (I&I) into the sewer system, which reflects the below average spring runoff in 2014.

TABLE III-7

NET WASTEWATER EXPORTS
(acre-feet**)**
Calendar Year 2014
Big Bear Watermaster

Month	**Net Wastewater Exports (acre-feet)**
January	65.8
February	58.1
March	67.0
April	60.8
May	58.4
June	52.1
July	54.3
August	58.5
September	53.7
October	64.2
November	62.4
December	76.4
Total	**731.7**

SANTA ANA RIVER

Bear Valley Mutual Water Company Water Needs

Mutual meets the water needs of its shareholders primarily by diverting water from the Santa Ana River. When river flow is inadequate to meet their needs, Mutual can call upon water stored in Big Bear Lake, pump ground water from the San Bernardino ground water basin, buy State Water Project (SWP) water from San Bernardino Valley MWD, or reduce the delivery rate to its shareholders.

In 2014, Mutual reported they would need up to 6,500 acre-feet of water from Big Bear MWD including the portion of the SWRCB 95-4 outflows they could beneficially use. Their intent was to limit their deliveries from BBMWD to 6,500 acre-feet in 2014. Mutual met their overall 2014 water needs by in-lieu supplies from Big Bear MWD, diversions from the Santa Ana River, purchases of imported water from San Bernardino Valley Municipal Water District, and local groundwater. Mutual also got some water from the lake releases and dam leakage for fish protection in Bear Creek.

Summary of Flows and Diversions at Mouth of the Santa Ana River Canyon

Exhibit D, Section 1(f) of the Judgment calls for data to be included in each Watermaster annual report summarizing the river flows at the mouth of the Santa Ana River Canyon and diversions at the mouth of the Santa Ana River Canyon. Specifically, it requests quantities of water diverted into the following facilities:

1. Bear Valley High Line
2. Redlands Canal
3. North Fork Canal
4. Edwards Canal
5. San Bernardino Valley Water Conservation District Spreading Grounds

Exhibit D also requires the annual report to estimate the amount of Santa Ana River flow not diverted for beneficial use. **Table III-8** contains this information for 2014.

TABLE III-8

SUMMARY OF DIVERTED FLOW AT MOUTH OF SANTA ANA RIVER CANYON
(ACRE-FEET)
Calendar Year 2014
Big Bear Watermaster

Flow Component		Amount (AF)
FLOW OF SANTA ANA RIVER AT MOUTH OF CANYON		
Flow Reported for U.S.G.S. Gage 11051501-provisional		13,871
less BVMWC Canyon Well No. 1 Production		-0-
Estimated Santa Ana River Flow Below Seven Oaks Dam		**13,871**
plus Annual Storage Change in Seven Oaks Reservoir		+1,611
Estimated Santa Ana River Flow at Mouth of Canyon		**15,482**
DIVERSIONS BY BEAR VALLEY MUTUAL WATER COMPANY		
Diversions:	Greenspot Metering Station	0
	Edwards Line	410
	North Fork Canal	1,893
	Bear Valley Highline	2,662
	Redlands Aqueduct (includes Redlands Tunnel)	4,590
	SBVMWD Morton Canyon Connector Deliveries	-0-
	Redlands Sandbox Spreading (observed)	17
		9,572
Adjustments:	Water pumped from BVMWC Canyon Well No. 1	-0-
	Redlands Tunnel Diversion	-405
	Total MUTUAL Diversions	**9,167**
DIVERSIONS BY SBVWCD		
	Diversion by San Bernardino Valley Water Conservation District	2,022
	SBVMWD Morton Canyon Connector Deliveries to SBVWCD	-0-
	Total SBVWCD Diversions	**2,022**
TOTAL DIVERSIONS FROM THE SANTA ANA RIVER		
Total Diversions by Mutual and SBVWCD		**11,189**
AMOUNT NOT DIVERTED		
Santa Ana River Flow at Mouth of Canyon		**15,482**
Mutual and SBVWCD Diversions		**- 11,189**
Amount Released from Storage Behind Seven Oaks Dam		**-1,611**
Estimated Not Diverted		**2,682**
Estimated Flow Downstream of Diversions*		**16**
Estimated Losses and Measurement Errors **		**2,666 or 17.2%**

* This value equals the amount observed at the Cuttle Weir (2 AF) plus spills from PH #3 (14 AF)

** See written text for explanation

Flow of Santa Ana River at Mouth of Canyon

The United States Geological Survey (USGS) reports flow in the Santa Ana River at the mouth of the Santa Ana Canyon under Station No. 11051501. This station is the combination of flow records from three gages (USGS Station No. 11049500, 11051499, and 11051502). Flow in the flume between the afterbay of SCE Power House No. 1 (SCE Power House No. 2 was removed due to the construction of Seven Oaks Dam) and the forebay of SCE Power House No. 3 is estimated by the USGS using a meter installed by SCE and reported as Station No.11049500. Note that this metered flow includes the overflow from the old SCE Powerhouse No.3 forebay as reported on the Daily Flow Report. In addition, the USGS maintains two gauging stations near the mouth of the Santa Ana River Canyon below Seven Oaks Dam. Station No. 11051499 measures the flow in the main river channel while Station No. 11051502 measures river flow diverted into the afterbay of SCE Power House No. 3 through the Bear Valley River Pick-up. The measured flows at this gage also includes the over-flow from the old SCE Powerhouse No. 3 forebay. The records from these three sources are summarized, adjusted for the overflow from the old SCE Powerhouse No. 3 forebay, and reported as the total flow in the Santa Ana River, USGS Station No. 11051501.

During 2014, the total river flow reported by the USGS, currently provisional, was 13,871 acre-feet. However, measurements at Station No. 11049500 include the amount of groundwater pumped by Mutual and discharged into the flume above the gage. Thus, to get the actual Santa Ana River Flow, the canyon well production must be deducted from the reported flows. In 2014, there was no canyon well production. Thus, the resulting estimated River flow was 13,871 acre-feet in 2014. However, this valve does not reflect the storage change in the reservoir behind Seven Oaks Dam. In 2014, an estimated 1,611 acre-feet of river flow was stored behind the dam and not released in 2014. Thus, the estimated flow of the Santa Ana River at the mouth of the canyon above Seven Oaks Dam was 15,482 acre-feet in 2014.

Diversions by Bear Valley Mutual Water Company

Amounts diverted by Mutual and associated prior right companies are reported to the State Water Resources Control Board under Recordation Numbers 36-00021, 36-00022 and 36-00028. In 2014, Mutual's measured diversions were 9,572 acre-feet. The vast majority, 9,167 acre-feet, was

water diverted from the Santa Ana River. They did not pump any groundwater from their well located in the Santa Ana Canyon above the major points of diversion, but they did produce 405 acre-feet of water from the Redlands Tunnel. Mutual's diversions were used for agricultural and domestic purposes. In 2014, domestic deliveries were made to the City of Redlands for their Horace P. Hinckley Water Treatment Plant and to East Valley Water District's water treatment plant.

Diversions by San Bernardino Valley Water Conservation District

Water diverted by the San Bernardino Valley Water Conservation District for groundwater recharge is by virtue of licenses, pre-1914 rights and diversion rights of San Bernardino Valley MWD and Western MWD; all diversions are reported to the State Water Resources Control Board. In 2014, they diverted 2,022 acre-feet of Santa Ana River water for ground water recharge.

Amount Not Diverted

The sum of the diversions mentioned above are subtracted from the total river flow, as reported by USGS Gage 11051501 plus the annual storage change in Seven Oaks Reservoir to determine the "Amount Not Diverted". The "Amount Not Diverted" represents the amount of water that flows past the mouth of the Santa Ana River Canyon without being diverted for beneficial use.

Losses and Measurement Errors

During preparation of the 1996 report, the Watermaster Committee discovered significant discrepancies between the value for "Amount Not Diverted", as calculated by the method contained in previous Watermaster Reports, and observed flows in the Santa Ana River just downstream from the last diversion point. Since 1994, San Bernardino Valley Water Conservation District staff have been estimating the amount of water flowing past the Greenspot Road Bridge at the Cuttle Weir, which is just downstream from the mouth of the Santa Ana River Canyon, on a daily basis. In past years the difference between the estimated flows at the Greenspot Road Bridge and the "Amount Not Diverted" were significantly different. The Watermaster has conducted extensive research with regards to the discrepancy and provided the following five explanations:

1. Leakage Losses between Inflows and Outflows. The first explanation was unmeasured losses between the points where inflows and outflows are measured. These include:

1. Leakage in the tailrace from SCE Power House No. 3 afterbay,
2. Leakage in the Redlands Aqueduct between SCE Power House No. 3 afterbay and the Redlands Sandbox, and
3. Leakage around the Redlands Sandbox weir.

2. Unmeasured Diversions. The second explanation was that Mutual can divert water for spreading at the Redlands Sandbox without it being measured. San Bernardino Valley Water Conservation District staff now observes and reports this diversion on a daily basis. These estimates are based on known flows delivered to the Redlands Sandbox and are fairly accurate. This possible source of error has been corrected and the amount diverted for spreading is included in Table III-8.

3. USGS Gage Accuracy. The third possible explanation for the disparity is the accuracy of the USGS flow records. The USGS reports that this combined flow measurement of three gage stations is considered to have an accuracy rating of "fair". A "fair" rating means that 95 percent of the daily discharge measurements are within 15 percent of the true value. According to Jeffrey Agajanian of the USGS, this means the error band for the entire year should be within approximately 15 percent of the total measured flow. This value is a conservative estimate of the possible measurement errors and the flow is likely to be well within this error band, especially during the summer months when flows are generally constant and lower.

4. Water Delivery Flow Measuring Device Accuracy. A fourth reason for the difference could be inaccuracies in the diversion measuring devices, which should be less than +/- 10 percent at any given time. Most of these measurements are obtained through the use of stable, long-term weirs and parshall flumes, but small, though not insignificant, errors are possible. Some of the measurement devices provide daily readings and are equipped with totalizer equipment providing monthly data. The San Bernardino Valley Water Conservation District (SBVWCD) will continue to update totalizer equipment on any of the measurement devices that are not equipped with totalizer equipment.

5. Observed Flow at the Cuttle Weir. A fifth possible explanation was the accuracy of the flow estimates at the Cuttle Weir. These estimates are based on daily flow observations. Total flow quantities are difficult to determine because of the high degree of short-term variability in the river flows during storm events.

The construction of the Seven Oaks Dam required the reconstruction of the SCE flume between the old Power House No. 2 and No. 3. This eliminated any losses in the flume from the old Power House No. 2 and No. 3 and required the USGS to move Station No. 11049500 to the old forebay of Power House No. 3. Flow at this station is estimated by using the Daily Flow Report provided by the San Bernardino Valley Water Conservation District and is reported as Station No. 11049500. As of August 2001, SCE has installed a new meter in the forebay of Power House No. 3. In addition, improved efforts were taken to monitor diverted water at the Redlands Sand Box for ground water recharge and observed flows at the Cuttle Weir. The Watermaster has concluded that these efforts have reduced the losses and measurement inaccuracies such that the large errors that occurred in the past should no longer occur.

6. Storage behind Seven Oaks Dam. There is, however, an additional factor that must be considered when the Watermaster Committee estimates the "amount not diverted". This factor is the amount of water that has been stored behind Seven Oaks Dam (SOD) and not released by year-end. This stored water is Santa Ana River flow that has not yet been measured by the two USGS stream gages below the dam. In addition, water stored behind the dam from inflow in the previous year and released in the current year must also be taken into account. The amount stored behind SOD at the end of 2013 was 282 acre-feet (water surface elevation of 2,151.32 feet). The amount stored behind SOD at the end of 2014 was 1,893 acre-feet (water surface elevation of 2,188.98 feet). In other words, water has been stored behind the dam from inflow in the current year that was not released in 2014. This amount was 1,611 acre-feet and was not included in the USGS provisional value of 13,871 acre-feet. Adding the amount of water stored behind SOD in 2014 to the USGS provisional value increases the estimate of Santa Ana River flow to 15,482 acre-feet for 2014.

7. Spills from SCE PH No. 3. In 2012, the Committee identified an additional location where Santa Ana River water that is not diverted is measured by the San Bernardino Valley Water Conservation District. This location is the afterbay of SCE Power House No. 3. On occasion, all of the water delivered to the afterbay is not diverted and some of it is spilled to a small channel that discharges to the Santa Ana River below Cuttle Weir. The Committee agreed that these spills should be added to the observed flows at Cuttle Weir to estimate the "Flow Downstream of Diversions" as reported in **Table III-8**.

2014 Estimate of Amount Not Diverted

In 2014, San Bernardino Valley Water Conservation District observed river flow past the Cuttle Weir at the Greenspot Road Bridge and the spills to the Santa Ana River from the afterbay of SCE Power House No. 3. Their estimate of these flows, which represents the amount not diverted, was 2 acre-feet and 14 acre-feet, respectively. In other words, all except 16 acre-feet of the flow in the Santa Ana River was diverted in 2014. The 2014 Santa Ana River flow is estimated as the total flow reported by the USGS less the canyon well production plus the Santa Ana River flow that was stored behind Seven Oaks Dam in 2014. In 2014, the estimated Santa Ana River flow was 15,482 acre-feet. The total diversion of Santa Ana River flow by Mutual and San Bernardino Valley Water Conservation District was 11,189 acre-feet. In addition, 1,611 acre-feet was stored behind Seven Oaks Dam. The difference between estimated inflow and total diversions plus storage is 2,682 acre-feet. Comparing this difference with the observed flows past the Cuttle Weir at Greenspot Road Bridge and the spills from the afterbay of SCE PH No. 3 (16 acre-feet), results in leakage losses and measurement errors of 2,666 acre-feet. These losses and errors represent 17.2 percent of the estimated Santa Ana River flow (15,482 acre-feet) and is above the probable error range of the flow measurements. The Watermaster Committee will investigate this issue in 2015.

Lake Releases/In-Lieu Water Deliveries

Santa Ana River flows are often insufficient to meet Mutual's water needs; as a result, they frequently request lake releases from Big Bear MWD to meet their needs. Big Bear MWD has the choice of releasing water from the lake or providing an in-lieu supply. At their meeting on May 1, 1987, the Board of Directors of the Big Bear Municipal Water District voted unanimously to approve the following policy for providing in-lieu supplies.

1. *Adopt the following 1987 in-lieu policy:*

    A. *When the lake is in the top 4 feet, the irrigation demands from the lake will be met by releasing water from Big Bear Lake.*

    B. *When the lake is between 4 feet and 6 feet down, the District intends to purchase in-lieu water between the months of May 1st and October 31st from either wells or the*

State Water Project; between November 1st and April 30, water required would be released from Big Bear Lake.

C. *When the lake is between 6 and 7 feet down, the Board shall determine whether to release from the lake.*

D. *In the unlikely event that the lake is more than 7 feet down, the District intends to buy in-lieu water throughout the year.*

E. *The General Manager shall inform the Board each time water is released.*

On November 16, 2006, the Board of Directors of BBMWD modified their Lake Release Policy to eliminate items C, D and E and to use in-lieu water whenever the lake is more than 6 feet below full. The revised Lake Release Policy is:

1. *When the Lake is within the top 4 feet, the water demands from Bear Valley Mutual will be met with Lake releases;*

2. *When the Lake is between 4 and 6 feet below full, the District intends to obtain in-lieu water between the months of May 1 and October 31. Between November 1 and April 30, water required would be released from Big Bear Lake;*

3. *When the Lake is more than 6 feet below full, the District intends to obtain in-lieu water throughout the year.*

In 2014, the lake level was more than 6 feet below full for the entire year. The lake ended the year 11.01 feet below full.

In July 2012, Big Bear MWD and San Bernardino Valley MWD (Valley District) entered into a Memorandum of Understanding that allowed Valley District to deliver In-Lieu Water to Mutual when the Lake Release Policy would normally call for lake releases, and, in return, Valley District would get credit for an equal amount of water stored in Big Bear Lake. The amount of water in their storage account would be reduced monthly by the amount of additional evaporation resulting from the increased surface area of the lake. This in-lieu program began on July 1, 2012 is scheduled to run through December 31, 2015. During this period, the two agencies will be working on modifications to their existing In-Lieu Agreement to determine if they can increase the times

Valley District would make in-lieu deliveries to Mutual during non-emergency conditions (which would reduce the times Big Bear MWD would have to release water from Big Bear Lake for Mutual) and would provide Valley District with the opportunity to reduce their in-lieu deliveries to Mutual during emergency years when their State Water Project (SWP) deliveries are significantly reduced. At the end of 2014, Valley District had stored 2,172 acre-feet of water in Big Bear Lake and the Lake is 0.91 feet higher than it would have been without the Memorandum of Understanding. **Table III-9** shows the account details of Valley District's portion of Big Bear MWD's lake account.

Mutual received 7,301 acre-feet of water from Big Bear MWD in 2014. This year Mutual's needs were met by in-lieu deliveries of SWP water, in-lieu deliveries of local groundwater, and water discharged from the lake for fishery protection under SWRCB Order No. 95-4. **Table III-10** shows Big Bear MWD monthly water deliveries to Mutual during 2014. The amount of water delivered to Mutual consisted of 1,716 acre-feet of in-lieu SWP water, 4,692 acre feet of in-lieu groundwater, and 893 acre-feet of lake water they were able to use from the fish outflows.

The amount of water Big Bear MWD is obligated to deliver to Mutual is limited by the Judgment. According to the Physical Solution Agreement, Article III.A.1.(b), Mutual has the right to:

> *"divert water, or cause water to be diverted, at such rate as may be reasonably necessary to meet the requirements of Mutual's stockholders, not exceeding 65,000 acre-feet in any ten (10) year period, as determined by the Board of Directors of Mutual in its sole discretion."*

Table III-11 summarizes the deliveries to Mutual since the agreement went into effect. For the ten-year period ending with calendar year 2014, the amount of water delivered to Mutual by Big Bear MWD was 47,293 acre-feet. For the 38-year period the Judgment has been in effect, the average annual deliveries by Big Bear MWD to Mutual has been 4,366 acre-feet.

In 2014, Mutual can request up to 20,071 acre-feet of water from Big Bear MWD. This value is the amount that they are below the 65,000 limitation at the end of 2014 (which was 17,707 acre-feet), plus the deliveries made in 2005 (which was 2,364 acre-feet), that will be dropped from the ten-year period ending in 2015. The 20,071 acre-feet total includes in-lieu deliveries, lake releases, and fishery outflows that Mutual is able to divert.

Mutual's Equivalent Water Diversions

Table III-12 shows the amount of water that Mutual would have diverted from the Santa Ana River if the Judgment had not been rendered. This figure is determined by adding the in- lieu water deliveries as reported in **Table III-10** to the river diversions by Mutual and Mutual's groundwater production from their Canyon Wells No. 1 and 2, as shown in **Table III-8**. The value for river diversions includes the supply from the Redlands Tunnel. This equivalent diversion is the amount of Santa Ana River water Mutual would have diverted if their demands for water from Big Bear MWD had been met by lake releases. In 2014, Mutual's equivalent diversions were 15,980 acre-feet, which is the sixth smallest amount since the Judgment was rendered in 1977. Mutual's 2014 net Santa Ana River diversions was the second smallest amount since 1977.

TABLE III-9

ALLOCATION OF BIG BEAR MWD LAKE ACCOUNT

Calendar Year 2014

Big Bear Watermaster

LAKE ACCOUNTS (acre-feet)	Big Bear WM Account	Valley District Subaccount	Big Bear Subaccount
Initial Storage	14,036	2,378	11,658
Lake Inflows	-	-	-
In-Lieu Supplies to Mutual	6,408	-	6,408
Lake Releases (Mutual & BBMWD)	-	-	-
Releases & Leakage (SWRCB 95-4)	(45)	-	(45)
Net Snowmaking Withdrawals	(372)	-	(372)
Lake Spills & Flood Control Releases	-	-	-
Leakage	-	-	-
Evaporation from Lake	(2,005)	(206)	(1,799)
Net Wastewater Exports	(732)	-	(732)
Advances and Repayment of Advances	-	-	-
Ending Storage	17,291	2,172	15,119

TABLE III-10
WATER DELIVERIES TO MUTUAL BY
BIG BEAR MUNICIPAL WATER DISTRICT
(Acre-feet)
Calendar Year 2014
Big Bear Watermaster

Month	Releases from Big Bear Lake for Mutual	Mutual's Use of Fish Releases*	"In-Lieu" State Water Project	"In-Lieu" Groundwater	Total Deliveries to Mutual
January	-0-	78.9	100.5	-0-	179.4
February	-0-	69.7	-0-	-0-	69.7
March	-0-	57.5	-0-	-0-	57.5
April	-0-	69.2	-0-	-0-	69.2
May	-0-	77.7	6.1	-0-	83.8
June	-0-	77.9	12.0	881.0	970.9
July	-0-	95.4	410.4	906.5	1,412.3
August	-0-	95.7	575.8	667.5	1,339.0
September	-0-	88.2	274.3	832.7	1,195.2
October	-0-	94.6	207.4	817.6	1,119.6
November	-0-	77.5	127.7	586.6	791.8
December	-0-	10.6	1.8	-0-	12.4
Total	**-0-**	**892.9**	**1,716.0**	**4,691.9**	**7,300.8**

* Also required to comply with SWRCB Order No. 95-4

TABLE III-11
SUMMARY OF WATER DELIVERIES TO MUTUAL 1977-2014

(acre-feet)

Calendar Year 2014 Big Bear Watermaster

Calendar Year	Releases From Big Bear Lake	SWRCB Releases to Mutual	In Lieu from Wells	In Lieu SWP	In Lieu EVWD	In Lieu Stock *	Total Deliveries to Mutual	Ten Year Totals
1977	868		4,412	0	0	0	5,280	N/A
1978	0		0	0	0	0	0	N/A
1979	0		0	0	0	0	0	N/A
1980	0		0	0	0	0	0	N/A
1981	2,250		0	672	0	0	2,922	N/A
1982	657		0	56	0	0	713	N/A
1983	0		0	0	0	0	0	N/A
1984	1,700		0	993	0	0	2,693	N/A
1985	2,466		842	2,994	0	0	6,302	N/A
1986	1,358		1,139	190	0	0	2,687	20,597
1987	0		3,301	4,762	0	84	8,147	23,464
1988	0		1,864	5,432	0	63	7,359	30,823
1989	0		1,593	8,555	0	0	10,148	40,971
1990	0		561	7,722	0	0	8,283	49,254
1991	79		0	0	151	0	230	46,562
1992	0		0	0	0	0	0	45,849
1993	0		0	0	0	0	0	45,849
1994	1,141		0	0	0	0	1,141	44,297
1995	88		0	0	0	0	88	38,083
1996	3,461		0	4,027	0	0	7,488	42,884
1997	364		0	6,780	0	0	7,144	41,881
1998	0		0	0	0	0	0	34,522
1999	124	147	0	10,436	0	0	10,706	35,080
2000	-0-	510	0	12,878	0	0	13,388	40,185
2001	46	493	48	14,212	0	0	14,799	54,754
2002	0	614	0	5,000	0	0	5,614	60,368
2003	0	484	0	0	0	0	484	60,853
2004	0	512	0	2,500	0	0	3,012	62,724
2005	0	146	0	2,218	0	0	**2,364**	65,000
2006	0	467	0	2,070	0	0	**2,537**	60,050
2007	0	486	0	6,500	0	0	**6,986**	59,892
2008	0	474	0	4,634	0	0	**5,108**	65,000
2009	0	510	0	5,990	0	0	**6,500**	60,793
2010	123	276	0	2,479	0	0	**2,878**	50,283
2011	0	385	0	789	0	0	**1,174**	36,658
2012	-	641	-	4,696	-	-	**5,337**	36,380
2013	-	653	0	6,454	-	-	**7,107**	43,004
2014	-	**893**	**4,692**	**1,716**	-	-	**7,301**	**47,293**
Average							**4,366**	

N/A = Not Applicable

TABLE III-12

EQUIVALENT WATER DIVERSIONS BY MUTUAL 1977-2014

(acre-feet)
Calendar Year 2014
Big Bear Watermaster

Calendar Year	Net Santa Ana River Diversion by BVMWC*	Groundwater Production From Wells No. 1 & 2	Big Bear MWD In-Lieu Deliveries	Equivalent Total Water Diversions
1977	14,420	1,546	4,412	20,378
1978	16,809	282	-	17,373
1979	19,470	114	-	19,584
1980	20,479	188	-	20,667
1981	20,449	1,130	672	22,251
1982	18,565	246	56	18,867
1983	19,209	53	-	19,262
1984	23,392	739	993	25,124
1985	19,837	872	3,836	24,545
1986	23,160	894	1,9	25,383
1987	16,373	947	8,147	25,467
1988	14,170	612	7,359	21,141
1989	11,449	672	10,148	22,269
1990	11,242	1,576	8,283	21,101
1991	13,715	368	151	14,234
1992	16,840	97	-	16,937
1993	26,591	-	-	26,591
1994	23,819	594	-	24,413
1995	30,794	60	-	30,853
1996	19,529	1,131	4,027	24,687
1997	19,490	1,559	6,780	27,829
1998	26,625	105	-	26,730
1999	21,336	484	10,436	32,256
2000	17,171	2	12,878	30,371
2001	12,355	140	14,260	26,755
2002	8,007	58	5,000	13,065
2003	13,301	114	-	13,415
2004	11,815	67	2,500	14,382
2005	13,615	-	2,218	15,833
2006	18,733	-	2,070	20,803
2007	12,445	182	6,500	19,127
2008	14,144	182	4,634	18,960
2009	11,022	-	5,990	17,012
2010	18,153	-	2,479	20,632.
2011	17,601	-	789	18,390
2012	15,560	-	4,696	20,250
2013	11,310	-	6,454	17,764
2014	9,572	-	6,408	15,980

* Includes 2013 Redlands Tunnel Diversions

IV. DETERMINATIONS AND ACCOUNTS

ACCOUNTING REQUIREMENTS

In accordance with Article 29 of the Judgment, "Watermaster shall maintain three basic accounts, in accordance with Watermaster Operating Criteria, as follows:

(a) District's Lake Water Operation. A detailed account to reflect actual operation of the Lake by District shall be maintained.

(b) Mutual's Lake Water Operations. In addition, a corollary account shall be maintained to simulate the effect of Mutual's operations with regard to Lake water under the In-Lieu Water operations.

(c) Basin Make-up Account. An account of District's annual and cumulative obligation for Basin Make-up Water shall also be maintained."

In 1986, the Watermaster Committee developed a computer program for keeping these accounts. This program was designed to operate on an IBM (or IBM compatible) personal computer using Lotus 1-2-3. To standardize all years of operations under the Judgment, all past accounts were re-calculated using the program and were included in the 1986 Annual Report.

In 1990, the Watermaster Committee decided how to account for wastewater exports from the Big Bear Lake watershed and delivery of water on Mutual stock owned by Big Bear MWD. Only the Basin Make-up Account was affected by these decisions. Consequently, the 1990 Watermaster Report contained revised tables for the Basin Make-up Accounts for calendar years 1986, 1987, 1988 and 1989, as well as the status of all the 1990 accounts.

For the 1994 report, the Watermaster Committee updated the accounting procedures to reflect 1994 Watermaster decisions and to clarify the reports.

In 1995, the Watermaster made several additional revisions to the accounting procedures. However, in preparing the 1996 accounts, the Watermaster Committee discovered some errors in the changes made in 1995. These errors were corrected and, as a result, the 1995 accounts were recomputed and were included in the 1996 Annual Watermaster Report.

2014 ACCOUNT BALANCES

Appendix B contains the 2014 accounts. The first four pages of the appendix present the input data used to calculate the various accounts. The fifth page summarizes the status of the various accounts. The remaining pages of **Appendix B** are the detailed monthly tables of the accounts.

Actual Lake Account

Figure 2 illustrates the water balance for the actual operation of Big Bear Lake in 2014. **Table 1** of **Appendix B** provides additional detail. This information shows that:

1) the lake level dropped 2.64 feet, from a gage height of 63.96 feet to 61.32 feet; 72.33 feet is full;

2) lake storage decreased by 6,551 acre-feet, it began the year with 50,094 acre-feet and ended the year with 43,543 acre-feet; when the lake is full, it contains 73,320 acre-feet of water;

3) lake surface area varied between 2,592 and 2,341 acres;

4) evaporation was 10,942 acre-feet;

5) lake inflow was 5,776 acre-feet,

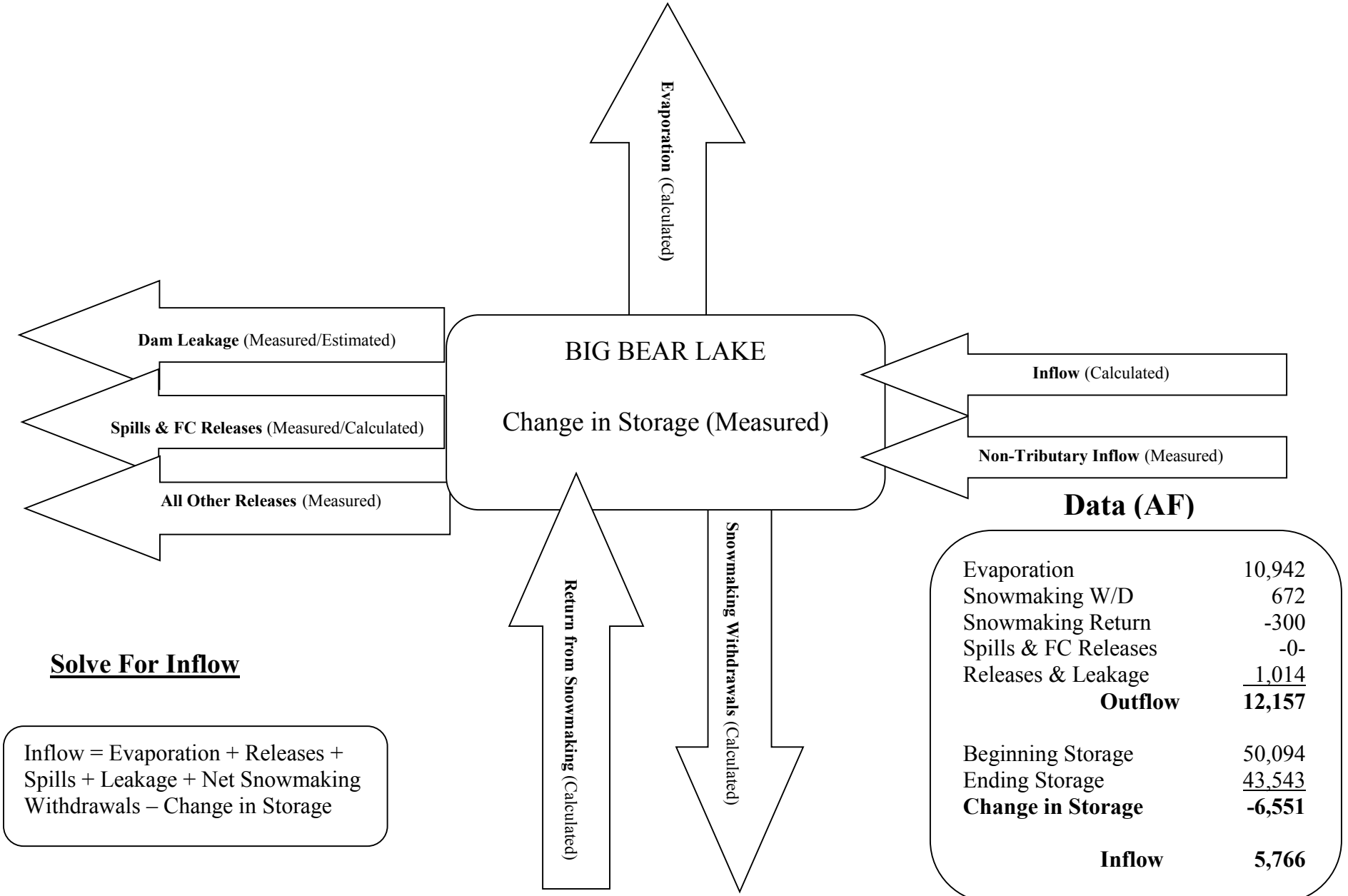
6) the total of spills, releases, leakage and net lake withdrawals was 1,386 acre-feet.

Tables 1A through **1D** provide additional details to support **Table 1**.

Mutual's Lake Account

Figure 3 illustrates the water balance for Mutual's synthesized operation of Big Bear Lake in 2014. Mutual's operation shows what would have happened if:

Figure 2
Water Balance for 2014 Actual Lake Operations



Solve For Inflow

Inflow = Evaporation + Releases + Spills + Leakage + Net Snowmaking Withdrawals – Change in Storage

Data (AF)

Evaporation	10,942
Snowmaking W/D	672
Snowmaking Return	-300
Spills & FC Releases	-0-
Releases & Leakage	1,014
Outflow	**12,157**
Beginning Storage	50,094
Ending Storage	43,543
Change in Storage	**-6,551**
Inflow	**5,766**

1) Mutual had owned the lake,

2) The in-lieu program was not in place, and

3) The net wastewater exported from Big Bear Lake watershed entered the lake as supplemental inflow.

In this synthesized case, Mutual's demands for lake water would have been met entirely from lake releases.

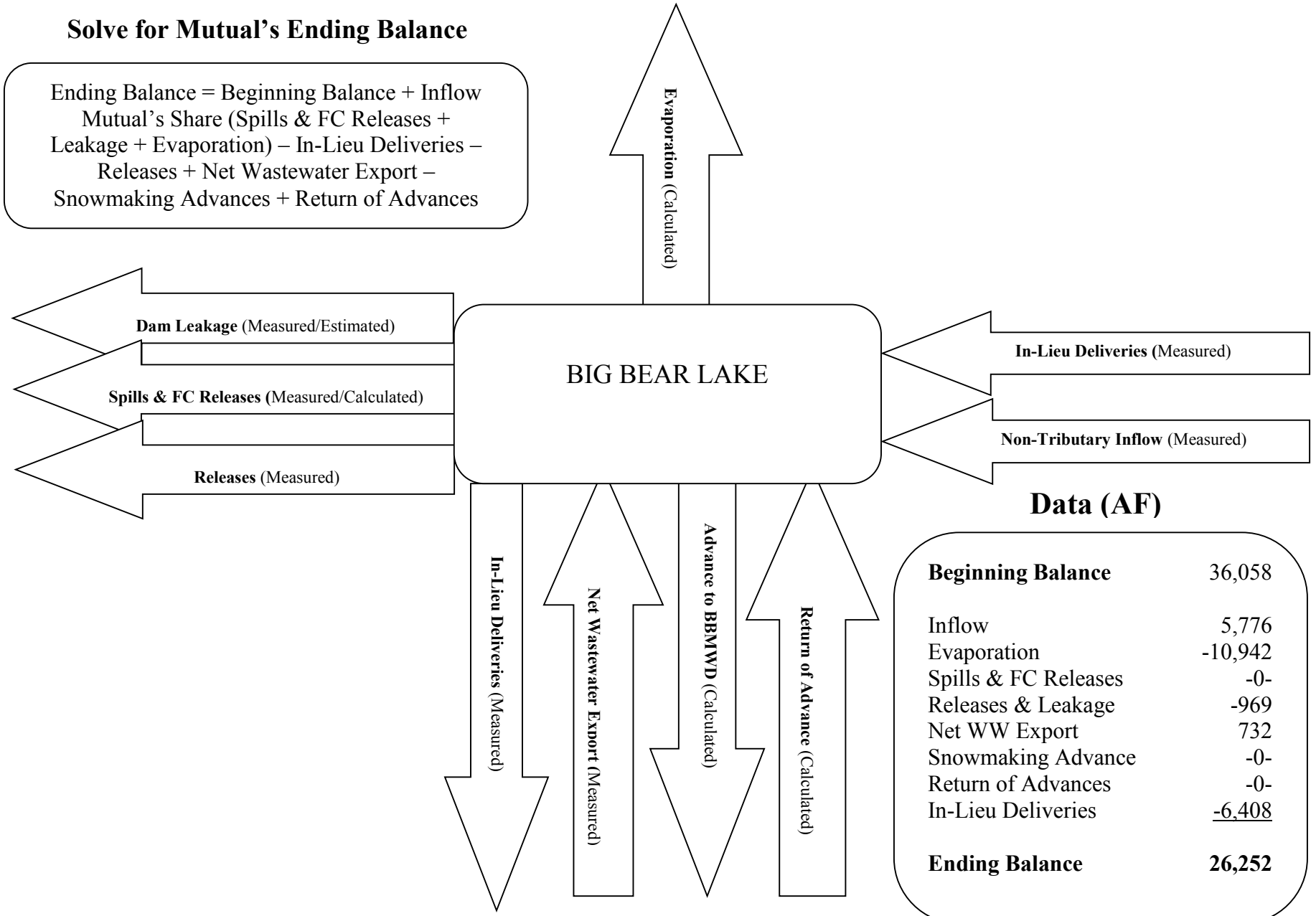
Figure 3 and **Table 2** of **Appendix B** show that Mutual had 26,252 acre-feet in its lake account at the end of 2014. This account balance is 9,806 acre-feet less than was in their lake account at the end of 2013. **Table 2** also shows that in 2014 Mutual's lake account was credited with all the lake inflow (5,776 acre-feet), the total of their releases, spills, leakage was 969 acre-feet and their in-lieu deliveries were 6,408 acre-feet. In 2014, supplemental inflow of 732 acre-feet was added to Mutual's Lake Account for net wastewater exported from the basin,. In 2014, there were no advances to Big Bear MWD for snowmaking within the watershed. Evaporation that would have taken place under a Mutual operation was 8,937 acre-feet.

The cumulative effect of changes in lake releases and supplemental inflows that would have taken place since 1977 under a "Mutual Operation" would be a lake level that would have been 53.05 feet at the end of 2014 or 19.28 feet below the top of the dam. This synthesized lake level is 8.27 feet lower than it actually was. This lower lake level reflects the impact of what Mutual's lake withdrawals would have been without the in-lieu program and with the credits they receive from the net wastewater exports. **Tables 2A** through **2C** provide additional details to support **Table 2**.

Article 4.(b) of the Watermaster Operating Criteria (Exhibit "D" of the Judgment discusses how to handle the export of wastewater from and the import of water to the Upper Bear Creek Watershed. Specifically, it says:

> *In the event gross export from Upper Bear Creek Watershed to any area not tributary to the Santa Ana River Watershed within Upper Bear Creek Watershed, calculated inflow to the Lake shall be increased each year, beginning with the calendar year 1986 by the amount by which such gross export exceeds imports. If gross import exceeds gross export, said excess shall be credited against District's Basin Make-up Water obligation.*

Figure 3
Water Balance for 2014 Mutual's Lake Operation
(Synthesized Conditions)



In 1986, the Watermaster Committee decided to handle the net wastewater exports (gross exports-gross imports) entirely in the District's Basin Make-up water obligations. This decision was contingent upon implementation of a wastewater reclamation project in the Upper Bear Creek Watershed by December 31, 1994. A reclamation project was not implemented by that date so the Watermaster Committee, in 1994, decided to add the net wastewater credits to the calculated lake inflows effective January 1990. This decision adds the net wastewater credits to Mutual's lake account. Essentially, it transfers the amount of the credit from Big Bear MWD's lake account to Mutual's lake account.

Table IV-1 shows the impacts of crediting Mutual's lake account (and debiting Big Bear MWD's lake account) with the net wastewater exports. Since 1990, Mutual has been credited with 33,272 acre-feet of net wastewater exports. After 25 years of getting these credits, Mutual's lake account has 7,960 acre-feet more water than it would have had if it hadn't received the credits. This additional increase raised their simulated lake level by 4.60 feet. In other words, without the credits, Mutual's lake account would have been 18,292 acre-feet and their lake level would have ended the year at 48.45 or 23.98 feet down. In other words, it would have been 12.87 feet below the actual lake level of 61.32 feet and 4.60 feet lower than reported in Mutual's lake account tables (53.05 feet).

There are two primary reasons why the increase in their lake account (7,960 acre-feet) is less than the cumulative credits they have received (33,272 acre-feet). The first reason is spills. When the lake fills, Big Bear MWD's water spills first, and then Mutual's water spills. The credits they receive will spill during very wet years, like 1998. The second reason is evaporation. Mutual's lake level increases with the credits. With higher lake levels, their share of the evaporation losses increases. The end result is that at the end of 2014 Mutual's lake account had 7,960 acre-feet more and Big Bear MWD's lake account had 7,960 acre-feet less as a consequence of the net wastewater export credits.

Big Bear MWD's Lake Account

Section 3(b), District's Water in Storage, of the Watermaster Operating Criteria of the Judgment describes the procedure to determine Big Bear MWD's storage account as follows:

TABLE IV-1
EFFECT OF WASTEWATER EXPORT CREDITS
ON MUTUAL'S LAKE ACCOUNT
Calendar Year 2014
Big Bear Watermaster

End Of Calendar Year	Net Wastewater Export Credit (AF)	w/Wastewater Credits		w/o Wastewater Credits		Differences	
		Storage Account (AF)	Lake Level (Feet)	Storage Account (AF)	Lake Level (Feet)	Storage Account (AF)	Lake Level (Feet)
1989	-	16,905	47.00	16,905	47.00	-	-
1990	857	7,627	40.30	6,864	39.50	763	
1991	940	14,226	45.75	12,772	44.65	1,454	1.10
1992	723	22,787	51.15	20,886	50.05	1,901	1.10
1993	2,223	62,165	68.40	58,271	67.00	3,894	1.40
1994	1,397	61,407	68.15	56,451	66.35	4,956	1.80
1995	2,012	66,308	69.90	65,019	69.45	1,289	0.45
1996	1,540	60,875	67.95	58,229	67.00	2,646	0.95
1997	1,427	52,407	64.80	48,663	63.35	3,744	1.45
1998	2,427	69,566	71.00	68,282	70.60	1,284	0.40
1999	1,339	51,390	64.40	48,922	63.45	2,468	0.95
2000	1,337	35,335	57.65	31,900	56.00	3,435	1.65
2001	1,317	19,898	49.45	15,732	46.75	4,166	2.70
2002	889	10,856	43.15	6,897	39.55	3,959	3.60
2003	1,044	13,718	45.35	9,695	42.20	4,023	3.15
2004	1,024	14,200	45.70	10,233	42.65	3,967	3.05
2005	1,750	43,041	61.05	37,900	58.85	5,141	2.20
2006	1,462	48,034	63.10	42,067	60.65	5,967	2.46
2007	997	34,655	57.35	28,588	54.30	6,067	3.05
2008	1,207	35,251	57.60	28,855	54.45	6,396	3.15
2009	1,074	30,034	55.05	23,496	51.55	6,538	3.50
2010	1,715	52,208	64.75	44,898	61.85	7,310	2.90
2011	1,781	58,121	66.95	49683	63.75	8,438	3.20
2012	1,175	49,881	63.85	41,167	60.25	8,714	3.60
2013	883	36,058	58.00	27,657	53.80	8,402	4.20
2014	732	26,252	53.05	18,292	48.45	7,960	4.60
TOTAL	**33,272**						

" Any water actually in storage in excess of Mutual's water in Storage, as calculated above, shall be for the account of District. So long as District has water in storage, all spills from the Lake shall be deemed District Water."

Figure 4 illustrates the water balance for Big Bear MWD's lake account in 2014. Table 3 of **Appendix B** summarizes the results. This information shows the water actually in storage (from **Table 1** of **Appendix B**), Mutual's water in storage (from **Table 2** of **Appendix B**), and the difference between the two, which is the amount in Big Bear MWD's account. In 2014, Big Bear MWD's account balance began with 14,036 acre-feet and ended the year with 17,291 acre-feet. The increase in their account was 3,255 acre-feet. This increase was because the in-lieu deliveries to Mutual during the year were more than the evaporation losses, SWRCB releases, net snowmaking withdrawals and net wastewater exports.

Table 3 of **Appendix B** also shows the status of Big Bear MWD's "Advance Account". This account represents the net amount of water Big Bear MWD has "borrowed" from Mutual for snowmaking in the Big Bear Lake watershed. In 2014, Big Bear MWD's advance account was zero throughout the year.

Tables 3.A and **3.B** of **Appendix B** provide supporting information to Table 3.

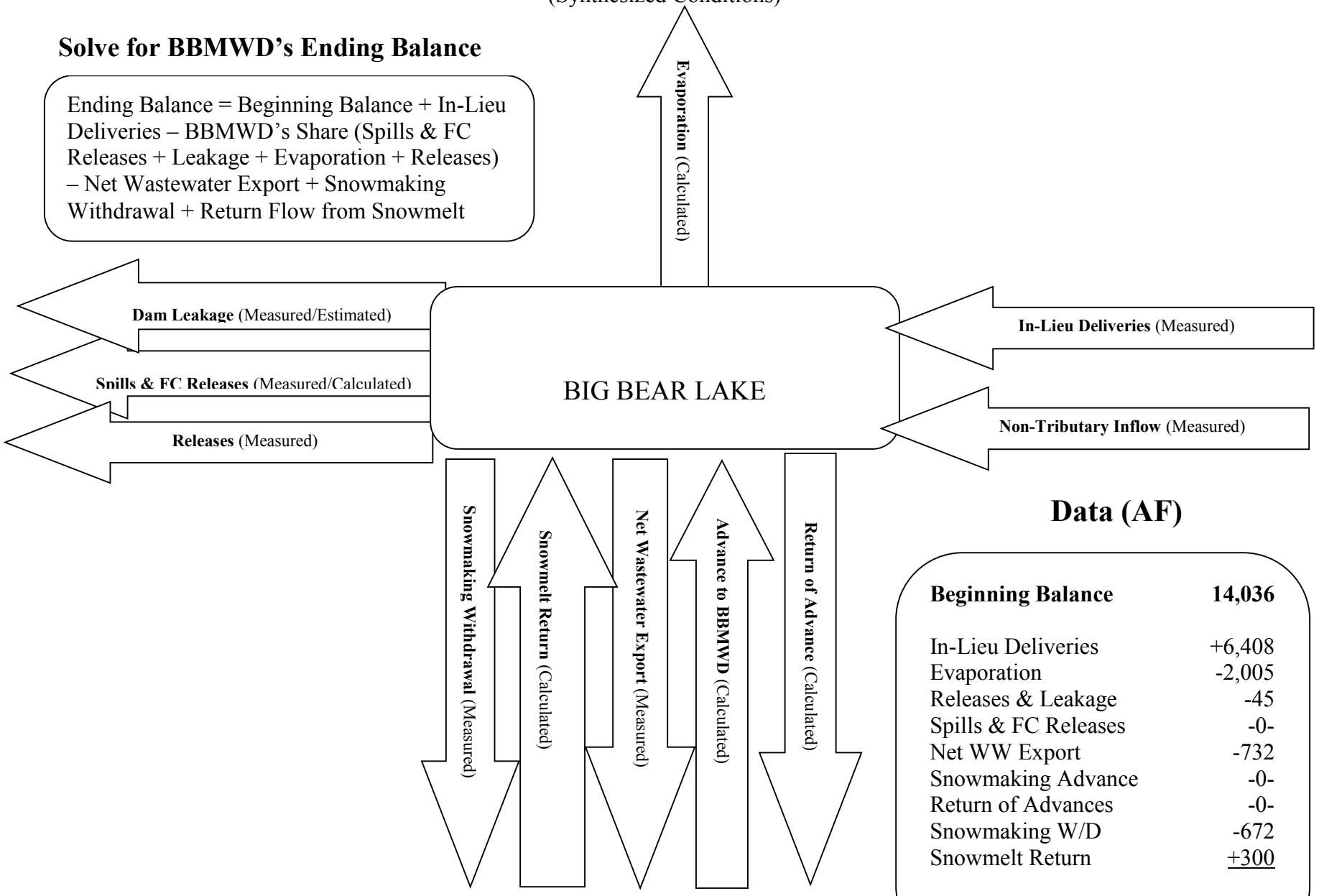
Basin Make-up Account

Exhibit D of the Judgment contains a formula to be used for determination of the amount of Basin Make-up Water, if any, that is needed to offset deficiencies in the recharge supply to the San Bernardino Groundwater Basin. **Tables 4, 4A, 4B** and **4C** in **Appendix B** follow the formula presented in the Judgment for calculating the credit or deficiency in the Basin Compensation Account. The formula contained in the Judgment is:

Deficiency or Credit =

$$[(.50)\,(R_d) + (.51)\,(S_d) + (.50)\,(P_d)] - [(.50)\,(R_m) + (.51)\,(S_m)]$$

Figure 4
Water Balance for 2014 BBMWD's Lake Operation
(Synthesized Conditions)



wherein:

R_d = Releases actually made under District Operation.

S_d = Spills which actually occurred under District Operation.

P_d = In lieu water purchased by District from San Bernardino Valley MWD or the Management Committee of the Mill Creek Exchange and delivered under District Operation to Mutual for service area requirements.

R_m = Releases which would have been made under a Mutual Operation.

S_m = Spills which would have occurred under a Mutual Operation.

The first three terms in the equation represent the recharge that occurs under Big Bear MWD's lake operation. These are referred to as the "Big Bear's Basin Additions" in **Table 4**. **Table 4.A** shows the details of the calculations for these three terms.

The last two terms in the equation represent the recharge that would have occurred if Mutual had owned and operated the lake and met its supplemental water needs from lake releases. Collectively these terms are referred to as "Mutual's Basin Additions" in **Table 4**. **Table 4.B** shows the detailed calculations for these two terms.

The monthly net credit or deficiency in recharge to the San Bernardino Basin is shown in Column 5 of **Table 4**. These calculations are in accordance with the formula in the Judgment.

The Judgment also requires Big Bear MWD to make-up for deficiencies in recharge that would occur as a result of their lake operations. Column 7 of **Table 4** shows the amount of water recharged by Big Bear MWD in the San Bernardino Basin to correct (or prevent) deficiencies in recharge. **Table 4.C** presents details of the sources of water used to replenish the Basin Compensation Account.

Table 4 of **Appendix B** presents the status of the Basin Make-up Account for 2014. The account balance began the year with a balance of 29,287 acre-feet and ended the year with 26,964 acre-

feet. There was a 2,323 acre-foot decrease in the Basin Make-up Account in 2014. The main reason for the decrease was the use of local groundwater by Valley District for in-lieu deliveries to Mutual. In-lieu groundwater deliveries were 4,692 acre-feet in 2014. The Judgment assumes 50 percent of the delivered water returns to the groundwater basin as return flows (2,346 acre-feet). The difference is 2,346 acre-feet and is deducted from the Basin Make-up Account. There was also a small recharge credit (23 acre-feet) for the additional fish releases under a District operation.

V. OTHER WATERMASTER ACTIVITIES

IMPACTS OF SEVEN OAKS DAM

Previous Activities

Construction of Seven Oaks Dam by the U.S. Army Corps of Engineers (Corps) has been underway since 1990. The construction contract for the 550-foot high dam embankment was issued in 1994 and was completed in December 1998. Various clean-up and other miscellaneous contracts were completed in late 1999.

The plunge pool by-pass pipeline, which routes low flows through the dam, around the plunge pool and back to the river channel was completed in 2001. The low flows will be diverted for beneficial use by either Mutual through its "River Pick-up" or by SBVWCD at its main river diversion.

Subsequent to authorizing the project and beginning construction, the U.S. Fish and Wildlife Service (Service) listed the Slender Horned Spine Flower and the San Bernardino Merriam's kangaroo rat as endangered species. This action generated new official biological mitigation consultations with the Service, as required by Section 7 of the Federal Endangered Species Act.

There are two features of Seven Oaks Dam that could affect future Watermaster activities. The first is that Seven Oaks Dam will prevent natural, subsurface flow of groundwater from leaving the Santa Ana River Canyon and will cause all groundwater coming from upstream of the dam to rise to the surface. This subsurface flow will then pass through the dam outlet structure. The plunge pool by-pass line will help to overcome the loss of these subsurface flows.

The second feature is related to impounding storm flows behind the dam. The San Bernardino Valley MWD and Western Municipal Water District of Riverside County provided funding to the Corps for a water conservation study, which began in November 1993, to evaluate Seven Oaks

Dam as a dual use structure for flood control and water conservation which continued through late 2013

In 1995, the San Bernardino Valley MWD and Western Municipal Water District of Riverside County filed a petition to revise the Declaration that the Santa Ana River Stream System is Fully Appropriated and an application to Appropriate Water by Permit with the State Water Resources Control Board. The petition and application is to give the two local agencies the right to impound water behind Seven Oaks Dam, subject to the operational directions of the dam for flood control.

The possible impoundment of waters of the Santa Ana River for other than flood control raises a number of water rights issues that are yet to be resolved. Several diversion points for SBVWCD, North Fork Water Company, Mutual, and Redlands Water Company ("Below the Dam Diverters") are downstream of Seven Oaks Dam, and the operation of these historical diversion points will be altered by the dam. During 1998 and 1999, discussions between the water rights holders and the San Bernardino Valley MWD began with an attempt to understand what and how much water would be impounded at various times of the year, along with the manner in which releases of storm flows from Seven Oaks Dam would be made.

It was the intent of the "below the dam diverters" to have releases from Seven Oaks Dam approximate average annual natural flows, recognizing that flood control release flows are expected to have less silt at low release rates than previous flows and may be more evenly distributed. Their request is to have the amount of water to be impounded behind Seven Oaks Dam for other than flood control determined after the combined needs have been met for (1) the water supply agencies to provide direct delivery water and (2) the integrity of the groundwater basin is stabilized by assuring groundwater levels are maintained within an appropriate operating range. These are the primary elements of discussion between the agencies. These discussions did not result in any agreement prior to the State Water Resources Control Board public hearing on the petition on December 7 and 8, 1999.

A Biological Assessment (BA) by the Corps was submitted to the Service in June 2000; however, in a November 2000 letter, the Service rejected the BA, and requested additional information, with particular emphasis on the Corps' position related to the future water conservation element that

had not been addressed by the Service. It is the apparent position of the Service that the biological mitigation requirements for operating the dam as a flood control facility must be negotiated before any attempt to address the biological impacts of the water conservation element of Seven Oaks Dam.

On September 21, 2000, the State Water Resources Control Board (SWRCB) adopted Order WR2000-12 to allow for processing the application filed by the San Bernardino Valley MWD and Western Municipal Water District of Riverside County. SWRCB Order WR2000-12 also allowed for processing a water right application filed by Orange County Water District. The Chino Basin Water Conservation District filed a petition requesting the SWRCB to reconsider its decision, but in November 2000 the State Board denied the petition and upheld its September order. This decision meant that the applications for appropriation of the right to use water that will be impounded behind Seven Oaks Dam could be processed.

2001 Activities

The U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service continued meeting during 2001, but most of their discussions were focused on flood control issues at Prado Dam. Neither the flood control nor biological issues related to Seven Oaks Dam had been resolved.

On March 21, 2001, the water rights application (AO31165) filed by San Bernardino Valley MWD and Western Municipal Water District of Riverside County was accepted for processing by the State Water Resources Control Board. On April 20, 2001, the water rights application (31174) filed by Orange County Water District was accepted.

In May and June 2001, respectively, the San Bernardino Valley MWD filed a second application, and the San Bernardino Valley Water Conservation District (SBVWCD) filed an application for the right to use Santa Ana River water that would initially be impounded behind Seven Oaks Dam, then released for downstream use. As with the prior applications, accompanying each of the new applications was a petition requesting the fully appropriated steam designation for the Santa Ana River be overturned. Combined with the petition and application received in September 2000 from the Chino Basin Watermaster, there were three additional petitions pending. The State Board indicated a preference to hold hearings on all of the water rights applications together.

2002 Activities

On January 11, 2002, the SWRCB noticed the water rights applications filed by San Bernardino Valley MWD - Western Municipal Water District of Riverside County and Orange County Water District (Applications 31165 and 31174, respectively), which triggered a 60-day protest period. However, on March 4 the SWRCB extended the protest period until a hearing was conducted on additional filings for water rights and accompanying petitions to revise the fully appropriated stream designation for the Santa Ana River.

On March 19, 2002, a Pre-Hearing Conference and Public Hearing was noticed for the water rights applications filed by the Chino Basin Watermaster, San Bernardino Valley MWD - Western Municipal Water District of Riverside County (second application), San Bernardino Valley Water Conservation District, and the City of Riverside. During the Pre-Hearing Conference on April 16, 2002, all parties agreed to accept the evidence, which resulted in Order WR 2000-12 revising the fully appropriated stream designation for the Santa Ana River, as evidence that they would have presented again in their petitions. Consequently, the SWRCB adopted WR 2002-6 during its Public Hearing on July 2, 2002. Following the hearing on July 2, the protest period for Applications 31165 and 31174 was closed on July 17. Several protests were submitted and responses provided, but no further action occurred.

Also on July 2, 2002, the SWRCB staff notified all parties (all 6 applications) by letter that it was the SWRCB's intent to process all the applications in a similar time frame and requested each party to provide a schedule for completing its environmental documents for its respective application. A hearing on all the applications will be scheduled when the environmental analyses are completed.

The Corps and Service continued meeting during 2002. On December 19, 2002, a Biological Opinion outlining the mitigation requirements for Seven Oaks Dam was finalized and accepted. Various agencies in the San Bernardino Valley were given an opportunity to review the final draft and submit comments before it was finalized. With the Biological Opinion finalized, the Corps could complete any required environmental analyses for operating Seven Oaks Dam as a flood control facility. When that work is completed, the issue of a conservation pool of water detained

behind Seven Oaks Dam can be reviewed, and any needed biological consultations can be initiated. The impacts that a conservation pool may have on water rights remain unknown.

2003 Activities

In 2003 the Corps and the Local Sponsors, (San Bernardino and Orange County Flood Control Districts) continued to operate the dam under the Interim Water Control Plan. When a storm event occurred, the gates were closed until the water behind the dam stabilized. at which time large volumes of water were released until the water level behind the dam reached the dead pool elevation. There were four events when large amounts of water were accumulated and released from the dam, one in February, two in March and one in April. All but 616 acre-feet of Santa Ana River water was diverted for beneficial use by Bear Valley Mutual Water Company and SBVWCD in 2003. The Corp and the Local Sponsors continued to operate the dam under the Interim Water Control Plan until December 30th, at which time they adopted the final plan and began to develop a debris pool. The dam will be operated in 2004 under the Water Control Manual for the Seven Oaks Dam & Reservoir.

The dam has been in operation for several years, and the Watermaster has identified an issue with regards to the river flow data collection. All of the USGS gages are located downstream of the dam. The dam prevents the gages from recording the actual stream flow during a storm event. The Watermaster Committee has found it important enough to investigate the location of a stream flow gage upstream of the dam. This location will allow the Watermaster to correlate precipitation data with stream flow data and to estimate inflow to the reservoir. The gages downstream of the dam will provide the amount of water released from the dam. Watermaster Committee members have conducted a field trip to locate a gage upstream of the inundation pool and have initiated discussion with the USGS and the Corps for assistance.

The review of the water rights applications proceeded in 2003. As of the end of 2003, a hearing date had not been set and no environmental documents had been distributed for review. Parties continue to negotiate to find common ground and interest.

2004 Activities

2004 started with the Army Corp of Engineers (ACOE) and the Local Sponsors releasing a base flow of approximately 3 cfs. The Water Control Manual required that during the storm season (October to May) a debris pool (water surface elevation of 2,200 feet) be formed for the purposes of protecting the intake tower from sediment intrusion. As of the beginning of May, the debris pool elevation had reached 2,180 feet and contained approximately 1,700 acre-feet of water. At this time, the ACOE began releasing water from the debris pool so they could begin their maintenance activities. As raw water was released, two water treatment plants, one owned by East Valley Water District (EVWD) and the other owned by the City of Redlands (COR), began to receive water from the debris pool. It was quickly noted that the raw water discharged from Seven Oaks Dam (SOD) was of poor quality and adversely impacted the ability of EVWD and the COR to successfully treat this water at their respective plants. This poor quality water is related to releases of water from the debris pool. If the upstream flow is diverted around the debris pool, such as when the Edison Facility is operational, there are no adverse impacts at their respective plants.

Because of this difficulty to treat water from SOD, EVWD hired a consultant, Camp Dresser & McKee, to perform a study on the treatability of the SOD discharges at their Plant 134. The report looked at two periods when water was released from SOD, May and November of 2004. The report concluded that local source water quality in November of 2004 showed significant degradation when it passed through the debris pool as compared to historical water quality. The results showed turbidity increasing from 2 NTU to between 5 to 80 NTU. Similar affects were noted with an increase in color units, iron, manganese, and TOC. All of these are indicative of poorer quality water than historical Santa Ana River water quality conditions. Limited source water quality sampling by the COR confirmed some of these adverse water quality trends during a period in May 2004 when discharges were also made from the debris pool. The water agencies impacted by the degradation of the water quality of the debris pool are meeting and working closely with the ACOE and the Local Sponsors to find a solution to the problem.

At the end of November 2004, the ACOE and the Local Sponsors completed their maintenance activities and began building the debris pool for the upcoming storm season. By the end of

December 2004, the debris pool was at a water surface elevation of 2,165 and contained approximately 900 acre-feet.

2005 Activities

The 2005 year began with abnormal rainfall. Late rains in 2004 had begun to fill the debris pool behind the dam. By the first of the year, the debris pool had reached elevation 2,165. Heavy rains in January and February more than filled the debris pool and by the end of March there was approximately 40,000 acre-feet of water stored behind the dam. The flood pool was at an elevation of approximately 2,390. In accord with operational guidelines, the Corps and local sponsors began to make releases at a rate of approximately 500 cfs. As happened in 2004, the water quality was unsuitable for surface diversion to the two local water treatment facilities. The NTU's were in excess of 400 and the water had the look of liquid milk chocolate. The Edison facilities were off line due to the storms. Surface water diverters were again faced with unusable water for domestic treatment purposes. The Conservation District initially diverted some of the degraded water for groundwater percolation but ultimately had to greatly reduce diversions due to the excessive turbidity and poor water quality.

A group was formed by the Upper Santa Ana River Water Resources Association to take another look at the water quality situation. East Valley Water District engaged the services of Camp Dresser & McKee (CDM) to prepare a detailed report addressing the problem as well as identifying potential solutions. Representatives from the Basin met with Congressman Jerry Lewis to describe the situation and seek Federal assistance to solve the problem. Congress appropriated $1,000,000 to study the issue. By the end of 2005, CDM and the working committee from the Upper Santa Ana River Basin had completed their study. The study was been distributed to the Corps, Local Sponsors and to Congressman Lewis' office.

Because of the large body of water contained behind the SOD, the Corps decided to test the operating valves for flood releases in mid-spring. During the test period when high velocity releases were taking place, a portion of the outlet tunnel failed and the tests were terminated. For the balance of the spring, summer and fall seasons the releases from the SOD were minimal and averaged between 3 and 80 cfs, until the debris pool was emptied. The repairs to the tunnel were

completed in November and it was anticipated that in early 2006, testing would again be resumed. However, rainfall after March 2005 was inadequate to retest the tunnel for several years.
Water quality remains a priority concern. While 2005 was one of the wettest years on record, local diverters, who normally rely on the flows from the Santa Ana River for their source of treatable water for domestic purposes, had to purchase State Water Project water. The saving grace for the local water users is that Edison was able to repair all their upstream facilities by early fall. Their diversions by-pass SOD and they were able to deliver good quality water to the two local water treatment facilities. However, by the end of 2004 the debris pool was non-existent and slowly beginning to rise. Water quality again became poor.

2006 Activities

At their January 17, 2006 meeting, the Watermaster Committee received a copy of the "Seven Oaks Dam Water Impact Study" report prepared by Camp, Dresser & McKee, Inc. (CDM). This report identified the water quality and water supply impacts of Seven Oaks Dam on downstream water users, and recommended comprehensive alternatives to mitigate these impacts. Water quality impacts included longer durations and elevated levels of turbidity, total organic carbon, color, iron, manganese, algae, and taste and odor causing compounds. Water supply impacts included less supply in dry hydrologic years, reduced supplies in Fall through Winter as the Debris Pool behind the Dam is filled, and extended periods of time the SCE facilities are out of service after flood events. During these extended periods, the SCE facilities cannot be used to divert high quality Santa Ana River (and Bear Creek) water around Seven Oaks Dam.

The CDM report recommended long-term comprehensive alternatives and an interim solution. The long-term comprehensive alternatives included pretreatment of the water delivered from Seven Oaks Dam to achieve the water quality levels that existed before the Dam was constructed, and hardening of the SCE facilities so they would be more reliable and remain in-service for longer periods of time. The recommended interim solution is to purchase imported SWP water from San Bernardino Valley MWD to replace the water that could not be used because of water quality problems or that was not available due to dam operations and unavailability of SCE facilities.

At the May 16, 2006 meeting, the Watermaster Committee was advised that the ACOE was going to undertake a two-year $3.5 million study of these issues. At the October 10, 2006 meeting, the Watermaster Committee was further notified that the ACOE staff had initiated their study, and they were in the data gathering phase.

The Watermaster Committee was concerned that the current operations of Seven Oaks Dam could restrict the operations of Big Bear Dam and the in-lieu program as described in the 1977 Judgment. These restrictions could include, at a minimum, reduced releases and increased in-lieu requirements when:

- SCE facilities are out of service and the quality of water behind Seven Oaks Dam is unacceptable to Mutual.
- SCE facilities are operating at capacity and the quality of water behind Seven Oaks Dam is unacceptable to Mutual.
- SCE facilities are out of service or operating at capacity in the fall and winter months when the Debris Pool is being filled and there are no releases from Seven Oaks Dam.

In addition, any reduction in releases from the Lake would increase lake evaporation and decrease the long-term average deliveries to Mutual. These restrictions could also constrain Big Bear MWD's opportunities to beneficially use the flood control releases they would make from Big Bear Lake in the late fall and winter months.

2007 Activities

2007 began with a release of approximately 3 cfs from Seven Oaks Dam. USACOE slowly raised the reservoir elevation. As of January 9, 2007 the elevation was 2,157.25 feet. The debris pool's desired elevation is 2,200.00 feet. Due to the abnormally dry weather conditions in January and February, SBVWCD began spreading State Project Water in the Santa Ana River spreading basins. By the end of February, the debris pool elevation was 2,175.20 feet and rising.

During the last two weeks in April, USACOE and local sponsors had hoped to accumulate enough water to test the Seven Oaks Dam tunnel repairs which were completed in early 2006, but never

subjected to test flows. Unfortunately there was insufficient water behind the Dam and the "high flow" testing lasted only approximately six (6) hours.

Very little to no water was released from Seven Oaks Dam from summer through November 2007. Southern California Edison was offline due to repairs on their facilities and on the intake.

In the spring of 2007, the capacity of the Foothill Feeder was tested. San Bernardino Valley Municipal Water District (Valley) was building a pump station on the Foothill Pipeline at the interconnect between Valley's and Metropolitan Water District's (MWD) pipeline to help improve the water pressure towards the east end of the valley when making large deliveries to MWD. It would also be used by MWD until their Inland Feeder Project tunnels are completed. In the future, the pumping station will help increase the flow capacity to the east end of the valley and the San Gorgonio Pass Water Agency. The results of the capacity testing are unknown.

In late November and early December 2007, the Upper Santa Ana Integrated Regional Water Management Plan (IRWMP) was approved. A press release in October 2007 by San Bernardino Valley Municipal Water District (Valley) summarized the main goal of the IRWMP is to improve water supply reliability in the region. To improve water supply reliability, the region must reduce demands as much as possible and capture and store wet year supplies for use during drought periods and other emergencies. The Plan is designed to meet this objective, and it addresses the following topics: water conservation and recycling, surface water management, groundwater management, diversification of water supplies, disaster preparedness, protection of water quality, ecosystem restoration and environmental improvement, and climate change.

2008 Activities

In 2008, the San Bernardino Valley Water Conservation District partnered with the San Bernardino Valley Municipal Water District in conducting a study of the capacity of the water spreading facilities downstream of the Seven Oaks Dam. The field work was conducted during March through December, collected and analyzed samples, performed flow testing of structures and assessed percolation capability and installed wells to identify enhancements to the facilities.

- Major conclusions of the study were that the area is ideal for recharge and not inhibited by clay or silt, faulting may interfere with recharge in the eastern end and very high flow years will saturate the spreading grounds. Additionally structure capacities limit regular use to 300cfs and further to the west the regular flows are limited to about 150CFS. This study would give rise to the Enhanced Recharge Project.

The missing upstream gaging station has not been replaced yet by the USACE. This is having a negative effect on the water flow monitoring capabilities of the Seven Oaks Dam as well as the downstream watershed.

The U.S. Army Corps of Engineers (USACE) has completed its draft study of the steps taken to address the degradation of the Santa Ana River water quality resulting from the construction of Seven Oaks Dam. That study has been reviewed by CDM, a consultant engineering firm hired by Bear Valley Mutual Water Company, Lugonia Water Company, Redlands Water Company, North Fork Water Company, San Bernardino Valley Conservation District, and the San Bernardino Valley Mutual Water District, and other interested water purveyors. The USACE report verifies original methodology used in calculating the effects of placing a dam interrupting the natural flow of the Santa Ana River for purposes of flood control and water retention to maintain a predictable daily controlled water flow for downstream users. The USACE report notes through modeling techniques based on field records data, that there appears to be no negative effect on the Santa Ana River water quality. The downstream uses contend otherwise, that the very nature of the water being retained behind the dam for lengthy periods of time causes algae and bacterial growth, causes water to become stale and stagnant, and tends to plug up the pervious rock and soil layers of the downstream spreading basins. Several of the downstream water purveyors with water treatment facilities have difficulty, or cannot treat the stagnant water at all since the treatment facilities were not designed to treat water of this poor quality. The debate continues.

2009 Activities

In May, the Seven Oaks Dam Orange County Flood Control district operators emptied the reservoir behind the dam. With the advent of a drought breaking rainy season that began in

October, the dam is now about 30 percent full. To view a daily activities record of the SOD, as well as information about other area dams, use the web address of: http//www.spl.usace.army.mil/cgibin/cgiwrap/zinger/slProjReport.cgi?allRes.in.

The Corps continued to address degraded water quality of river runoff retained for long time periods behind the dam. At Congressman Lewis's urging, the US Army Corps of Engineers (USACE) resumed bi-monthly talks with interested downstream prior rights and permitted water users to reach a conclusion about the change in operation of the SOD to decrease the impact of dam retention on degradation of good quality stream water. A final study report was to be issued in April 2010. Two general conclusions have been offered on how to deal with the water quality problem: (1) do not fill the debris pool with runoff that is high in organic materials; with less organic material contained in the stored water, less contamination of the water will result, and (2) use the volume for long term water storage to form a lake, thereby reducing the impact of plant life on pooled water (weeds, bushes, other plants that have grown since the last reservoir filling) and there will be no dry land for the plants to regenerate on when the reservoir is drained each spring. The USACE was willing to change its method of operations if the downstream users agree to accept responsibility for downstream water quality.

Another issue of importance to Bear Valley Mutual Water Company and downstream water users, and to the water volume calculations of the Big Bear Watermaster Report is the upstream bypass of high quality water that is collected upstream of the SOD and conveyed past the dam in Southern California Edison Electric Company pipelines to the SCE Power Plant No. 3. There the water is used to power a 3 MW generator. This better quality water is then distributed to Redlands Water Company, East Valley Water District, and Bear Valley Mutual Water Company for their usage. The water is clean and easily treatable by the respective water purveyors' treatment plants. When the reservoir level surpasses the access road to the upstream valves controlling the SCE Highline, water cannot be directed to the downstream SCE Power Plant No. 3. Then the high quality upstream water flows into the SOD reservoir and the water stored behind the SOD is distributed to the above entities. Most of the time that water is not usable. The access to the upstream valves when the reservoir levels are higher than the access road is now an issue that has to be resolved. Although the debate continues, at least there is the beginning of a consensus of how the water above the SOD can best be utilized by the water users downstream of the dam.

2010 Activities

For most of 2010 Seven Oaks Dam's reservoir was operated for flood control by the operators on behalf of Orange Flood Control District. The calendar year began with levels below the Debris pool level of 2200 based on telemetry data. Inflow was stored until high flow testing in April. This test flow and subsequent flows were discharged from the dam. A minimum flow of 3 CFS was discharged when significant rainfall and the reservoir level rose to approximately elevation 2,279 feet with 13,177 acre-feet in storage (based on telemetry) with 3 CFS outflow.

USACOE Reservoir Regulation branch maintains the referenced website as a public record or reservoir status: http//www.spl.usace.army.mil/cgibin/cgiwrap/zinger/slProjReport.cgi?allRes.in

The quality of the water impounded behind the dam was visually degraded but generally better quality when compared to 2005 conditions. The USACOE is still studying the quality of the water and changes that may make better quality water available in the future. Some participants feel this study should be combined with the reoperation of the reservoir for water conservation. The general result of the latter will be the discharge of 250-500 CFS average when water is impounded and there is room available in Prado Reservoir.

2011 Activities

In December 2010 heavy rains began and the increased Santa Ana River flows were stored in the reservoir behind Seven Oaks Dam. In mid-February 2011 the USACOE and Orange County Flood Control District operators utilized the stored flows to complete testing of the high flow capability of the Dam, ultimately releasing approximately 7,000 cfs in March 2011 from the dual gates at the outlet works. The flow was reduced shortly thereafter and flows of 1,000 cfs was maintained for several days, almost emptying the reservoir. At this time the flows were reduced further to facilitate water conservation and Santa Ana Sucker spawning. At the conclusion of successful testing, the facility was considered complete and operation was further transferred to the local sponsors. To view a daily activities record of the SOD, as well as information about other area dams, use the web address of:
http//www.spl.usace.army.mil/cgibin/cgiwrap/zinger/slProjReport.cgi?allRes.in.

A final study report on the degraded water quality was projected to be completed in 2012. Based on the draft report Orange County Flood Control District asked the USACOE to design a drained debris basin to reduce water held by the dam in low water conditions. This would improve water quality but slightly reduce the water conserved. Other conclusions could be rolled into the Water Conservation Study by the USACOE. No final project management plan schedule is available for this study. The USACOE was still conducting a study for water conservation, which may provide additional basin benefits and provide guidance on how the supplemental water supply can be best utilized.

2012 Activities

In contrast to 2011, precipitation in 2012 was about 50% of normal and this reduction in rainfall was seen in the watershed for Seven Oaks Dam. Little water was stored behind SOD, and most outflow was clean and useable by surface diverters. Most water entering the dam was allowed to flow out at the same rate for use by surface diverters and for conservation.

Despite continued work, the US Army Corps of Engineers and the local sponsors of the SOD Project were not able to complete the documentation and environmental clearance for water quality improvements to the reservoir. While there was very little water, there was no issue of degraded water quality behind the dam as in earlier years. The final study report is now expected in late 2013 or 2014. As noted in 2010 the USACOE and Orange County Flood Control District continued design efforts for a drained debris basin to reduce water held by the dam in low water conditions. Environmental clearance for water conservation is expected to be separated from the study and provided by the local agencies through a river wide HCP.

2013 Activities

Precipitation in 2013 was about 50% of a normal year, and the low precipitation had impacts throughout the watershed and impacted flows into Seven Oaks Dam. Little water was stored behind SOD in 2013, and the outflow has been clean and almost exclusively used by surface diverters. Most water entering the dam was allowed to flow out at the same rate for use by surface diverters and conservation.

Scheduled water quality improvement work by the US Army Corps of Engineers and the local sponsors of the SOD Project was not completed due to environmental clearances being delayed. Very little water was stored in the reservoir and there were no issues with degraded water quality behind the dam as there had been in earlier years.

The final water quality study report on this important topic is expected in 2014. Based on the draft report, Orange County Flood Control District and the USACOE are designing a drained debris basin to reduce the amount of water held by the dam in low water conditions. This change would improve water quality but slightly reduce the water conserved. The USACOE put the water conservation study on hold based on a request from San Bernardino Valley Municipal Water District, due to difficulties with the environmental planning related to the project. The environmental clearance for this project will be included in the Santa Ana River HCP by the local water agencies.

2014 Activities

2014 Precipitation was very similar to 2013 and the region struggled with drought and the limitations caused by loss of State Project Water. The effect of the drought on the SOD and Operations was similar to that of 2013. Very little water was stored behind SOD during the year and almost all water was clean and mostly used by surface diverters, further reducing recharge and groundwater levels. Virtually all water entering the dam was allowed to flow out at the same rate for use by surface diverters. With significant delays in the work on conservation storage the local sponsors determined to stop work on the study and develop a River Habitat Conservation Plan to ensure the Santa Ana Sucker can be protected while water management and flood control is operated.

Despite work on the effort water quality improvement work by the US Army Corps of Engineers and the local sponsors of the SOD Project was not completed due to environmental clearances being delayed and limited water flows. Very little water was stored in the reservoir and there were no issues with degraded water quality behind the dam as there had been in earlier years.

QUAGGA MUSSEL PROTECTION PROGRAM

The invasive Quagga Mussel became a significant threat to Big Bear Lake in 2008. Big Bear Municipal Water District launched a major program at the beginning of the boating season to prevent the mussel from getting into the lake. While once only a problem east of the 100th meridian, the mussel reached western lakes, and most significantly Lake Mead in January 2007. By the fall of 2008 the mussel was pervasive in Lake Mojave, Lake Havasu, and boaters traveling to and from the lake were transporting the microscopic larvae in bilges and out drives creating a threat to Big Bear Lake. The California mussel population expanded via the Colorado River aqueduct turnout at Parker Dam into receiving reservoirs in San Diego County. Other southern California lakes became infested when infected boats transported the microscopic mussel larvae.

The Quagga mussel is a prolific reproducer and colonizes on every solid object it encounters, Fouled boat hulls, sinking buoys, clogged water pipes and screens are just some of the problems caused by the Quagga mussel. Also, because each mature mussel can filter feed about one liter of water daily, huge mussel masses significantly reduce concentrations of plankton that are an essential food supply for fisheries.

In our situation the potential impact of an infestation is great because Big Bear Lake is at the top of the Santa Ana River watershed. Every water body and stream below the lake could become infected, and the resulting impacts to Bear Creek fisheries, the pool behind Seven Oaks Dam, the Edison generating station, and the Santa Ana River could be disastrous.

In response to the threat the District imposed new rules on launching, installed traffic control structures to prevent unauthorized launching, and strictly regulated the launch ramp hours to provide constant staffing at the start of the boating season in 2008. All boats entering the lake at public launch ramps were required to complete a questionnaire to determine if and when they might have been in an infected lake. They were also checked for standing water in bilges, lockers, bait live wells, etc. All vessels that the District inspectors were suspicious about were decontaminated at no charge to the boat owner with pressurized hot (140 degree) water. Some limited training was also provided to commercial ramp operators who were responsible for sending suspicious vessels to a District facility for decontamination.

Both the City of Big Bear Lake and Snow Summit Resort contributed funds to help defray the costs associated with unexpected burden on the financial resources of the District. Nearly $100,000 was spent during the summer of 2008 for educational materials, signs, additional summer staffing and capital improvements to fund the Quagga Prevention Program.

Sampling at the end of the 2008 boating season revealed that Big Bear Lake was free of visible mussels. Beginning in 2009 sampling for the microscopic mussel larvae will begin as soon as the lake warms to 45 degrees, the minimum temperature at which the mussels can reproduce.

In 2009 a Quagga Prevention Program surcharge will be added to boat permits to defray the costs associated with the program. The surcharge will remain in place as long as a threat exists. With the number of Quagga Mussel infested lakes in southern California increasing, and the proximity of recreational boating opportunities at the Colorado River, the threat of infestation becomes greater. New, more stringent protective measures will be instituted at the start of the 2009 boating season. These will include training the entire public and private marina work force operating on the lake, requirements for commercial marinas to staff launch ramps with certified Quagga mussel inspectors, significant limitations on the use of private launch ramps and an expanded program of boat decontamination with pressurized hot water at both public launch ramps and the District office.

2009 Activities

Several new initiatives were launched in 2009 intended to keep Big Bear Lake Quagga Mussel free. Before the start of the boating season the BBMWD hosted a Level 1 Quagga Inspection training for all District and private marina workers. The 8 hour course was completed by nearly 50 workers who were then authorized by the District to perform boat inspections at all boat launching sites. The District also began collecting a boat permit surcharge of five dollars to help defray the costs associated with the Quagga Prevention Program. In an attempt to gain control of risks posed by privately owned launch ramps on single family properties, the District adopted strict standards for their use. District regulation required each of these individual ramps to be secured from unauthorized use with a chain and lock attached to steel posts set in concrete footings. The

owners were also required to meet personally with District personnel to educate them regarding Quagga mussel risks and transport mechanisms. At the two public launch ramps District ramp personnel used hot water to decontaminate more than 1,200 boats and sealed more than 10,000 boats to their trailers as they left the lake. Sealing boats to trailers allows the boater to return to the launch ramp at a later date without having to be inspected.

Static sample media suspended in the lake at each marina and the launch ramps were free of Quagga Mussels in November for the second full year of monitoring. Also lake water sampling conducted during the entire boating season did not find any Quagga larvae. Big Bear Lake continues to be Quagga Mussel free.

2010 Activities

Lake water samples as well as inspection of static sample media suspended in the Lake at the conclusion of the 2010 boating season indicate Big Bear Lake remains Quagga Mussel free. The Big Bear Municipal Water District in conjunction with District trained private marina owners, continued to enforce pre-launch inspection of all registered vessels entering the Lake. Permits sold to non-registered vessels capable of being hand launched obligated the owners to assure the District that their vessels, mostly kayaks and canoes, were clean, drained and absolutely dry before entering the Lake. District personnel control the two public launch ramps and only fully inspected and/or decontaminated vessels are permitted to launch. Over the course of the 2010 summer, 6,504 vessel inspections were performed and 1,251 were decontaminated with hot water. Roughly another 10,000 boats were sealed to their trailers after recovery allowing them to launch without inspection at a later date.

2011 Activities

In 2011 Big Bear MWD sent 3 employees to obtain their Level II Quagga Mussel training certification. This certification is to “train the trainer”. The entire United States only has 200 level 2 certified trainers. Currently, Big Bear MWD has 4 staff members trained to this level.

In the spring of each year, the Level II Quagga Mussel trainers conducted a Level 1 Quagga Mussel class to certify new and returning inspectors. The class was an all-day course taught by the Big Bear MWD Level II trained staff. The class was offered to marina employees and Big Bear MWD employees.

In 2011 Big Bear MWD employed 7 seasonal launch ramp attendants whose job was to inspect and decontaminate vessels as they arrive at the public launch ramps. In total, Big Bear MWD inspected 4,613 boats at the public launch ramps. Of this number 2,696 vessels were clean and no decontamination was necessary (58%), and about 1,917 vessels were decontaminated.

At the end of the season, Big Bear Lake remained Quagga Mussel free. The program of vessel inspection before launching on the Lake was continued in 2012.

2012 Activities

Starting with the boating season of 2008, the Big Bear MWD has implemented a Quagga Mussel prevention program aimed at preventing the spread of Quagga Mussels in Big Bear Lake. The general policy is clean, drained and dry before a vessel can launch. If a vessel does not meet these criteria, the vessel will be decontaminated at one of the three public launch ramps. Private marinas along the lake are required to have a Level I certified Quagga Mussel inspector available to inspect boats prior to launch. If they encounter a vessel that does not meet the policy, the vessel is sent to one of the public launch ramps for decontamination.

Big Bear MWD has 3 decontamination stations. The East Ramp and West Ramp handle the bulk of the decontaminations. The third station is located at the District's main office and is only run on holidays or special events. The decontamination is conducted by flushing suspect areas of the vessel with hot water. The entire process can take 5 to 45 minutes depending on the size of the vessel and level of decontamination.

In the spring of 2012, Big Bear MWD's Level II Quagga Mussel inspection trainers conducted a Level I Quagga Mussel training class to certify new and returning inspectors. The class was free-of-charge and was an all-day course for both private marina employees and Big Bear MWD staff.

In 2012 Big Bear MWD employed 7 seasonal ramp attendants whose job was to inspect and decontaminate vessels as they arrived at the public launch ramps. In total, the Big Bear MWD inspected 5,018 boats at the public launch ramps. Of this number 2,672 vessels were clean and no decontamination was necessary, and 2,346 vessels were decontaminated.

At the end of the season, Big Bear Lake remained Quagga Mussel free. The program of vessel inspection before launching on Big Bear Lake was continued in 2013.

2013 Activities

During the 2013 boating season the District employed 9 seasonal ramp attendants whose job was to inspect and decontaminate vessels as they arrive at the District's two public launch ramps. In total, the District inspected 4,843 boats at the public launch ramps. Of this number 2,482 vessels were clean and no decontamination was necessary and 2,278 vessels were decontaminated.

In addition to training new and returning District seasonal personnel the District conducted a Level 1 Quagga Mussel training class to certify new and returning inspectors for private marina employees. The training was provided free of charge by District Level II Certified Quagga Mussel inspection instructors.

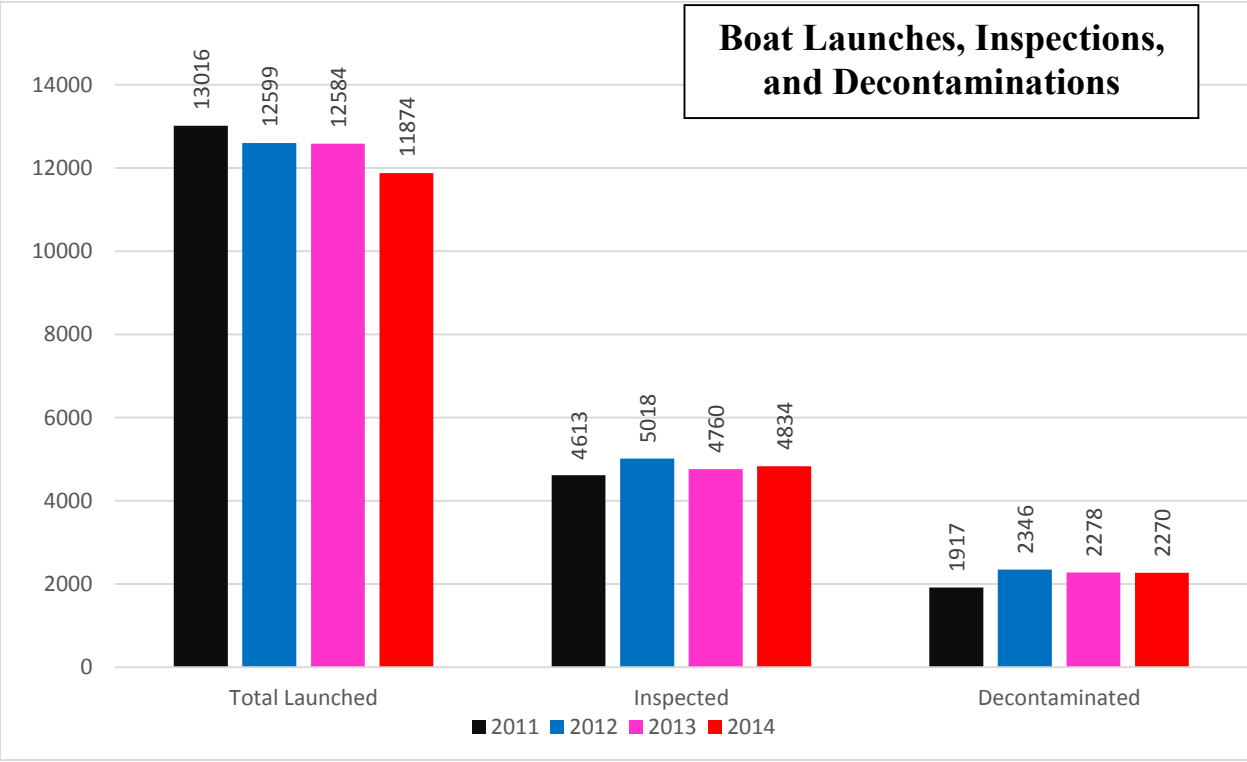
2014 Activities

During the 2014 boating season, the District employed 10 seasonal ramp attendants in addition to a Launch Ramp Supervisor. These ramp personnel inspected and decontaminated vessels as they arrived at the District's two public launch ramps. In total, the District inspected 4,834 vessels at the public launch ramps. Of this number, 2,503 were clean and no decontamination was necessary. 2,270 vessels were decontaminated. The graph below depicts 2010 through 2014 decontamination statistics.

In 2014, the District had ten Quagga related incidents where mussels were found on inspected vessels prior to launch. In four of those incidents, what appeared to be live or viable mussels were

discovered on the vessels. These vessels were impounded, stored at the District's main office and decontaminated prior to the vessels being allow to launch. The remaining six vessels contained shells or dead mussels and were decontaminated at the east launch ramp.

In addition to training new and returning District seasonal personnel, the District conducted two Level One Quagga Mussel Inspection training classes to certify new and returning inspectors for private marina employees. This training, conducted by District employees who are Level Two certified Quagga Inspectors, was provided free of charge.



APPENDIX A

MINUTES OF WATERMASTER MEETINGS

Dates

January 21, 2014

March 12, 2014

July 15, 2014

November 18, 2014

BIG BEAR WATERMASTER
MINUTES OF THE MEETING OF JANUARY 21, 2014

PLACE: San Bernardino Valley Water Conservation District
1630 W. Redlands Blvd., Suite A
Redlands, CA 92373

PRESENT:	Watermaster Committee	Representing
	Don Evenson	Big Bear MWD, Chair
	Daniel Cozad	SBV Water Conservation District
	Mike Huffstutler	Bear Valley Mutual Water Company
	Others	
	Scott Heule	Big Bear MWD
	Skip Suhay	Big Bear MWD
	John Eminger	Big Bear MWD
	David Raley	SBV Water Conservation District
	Athena Monge	SBV Water Conservation District

1. WELCOME AND CALL TO ORDER

The Big Bear Watermaster meeting was called to order by Don Evenson at 1:30 p.m.

2. APPROVAL OF MINUTES

Approval of the minutes from the October 15, 2013 meeting were deferred until the next meeting when all minutes have to be approved.

3. LAKE AND BEAR CREEK STATUS

Scott Heule reported that the lake was down 8.49 feet below full. Station B is measuring 0.95 CFS and BBMWD is releasing 1.2 CFS from the lake. Mr. Evenson indicated that the probe may be out of calibration. Mr. Heule stated that the precipitation level so far this water year is 4.12 inches.

4. SANTA ANA RIVER STATUS AND FLOW REPORT/EDISON FACILITIES

Daniel Cozad provided a brief status of the river and operations of the spreading basins. The year continues to be dry. The total combined flow from the upper watershed is 18 CFS. The gates at SOD remain open. Mr. Cozad indicated that most of the flow is coming through SCE facilities and the water is being diverted for direct use and irrigation. There has been an estimated 700 AF recharged this water year to date. Mr. Cozad stated the most of the recharge has been on the Mill Creek side. He indicated that everything is operational and reported that the clean-up for the silt in Dike D will begin later this week. Mr. Heule asked if there was any water coming from the Mill Creek side through the mouth of the canyon. Mr. Cozad said that there is minor leakage, but that it does not travel beyond 30 feet past the bridge. Mr. Huffstutler stated that the leakage is caused from spring water out of German Hill spring near SBVMWD's pipeline.

5. MUTUAL'S PROJECTION OF NEEDS FOR LAKE RELEASES/IN-LIEU WATER

Mike Huffstutler's projected that Mutual's estimated need will be up to 6,500 AF consistent with prior projections. Mr. Evenson stated that the State Water Project (SWP) allocation is currently 5% this year and that SBVMWD's allocation would be less than 6,500 AF. The SWP allocation could possibly be reduced down to 0%; which will create a challenge when dealing with in-lieu needs. Mr. Cozad stated that SBVMWD has SWP carry over storage plus current storage and may potentially call on their storage. Mr. Evenson asked if the Ford Park wells are functional. Mr. Huffstutler indicated they are used occasionally.

6. GROUNDWATER PRODUCTION AND DEVELOPMENT IN BIG BEAR VALLEY

Mr. Huffstutler made no report. Mr. Heule stated that DWP is drilling a well at the east end of the valley near Camp Oaks and that they should have well online in October.

7. UPDATE ON NEW STORAGE AGREEMENT WITH SBVMWD

Mr. Heule stated that discussions with SBVMWD continue regarding an amendment to In-Lieu Agreement. Mr. Headrick of SBVMWD has requested sensitivity analysis be conducted. The the term sheet requires more detail to ensure that future operators understand the intent clearly. This will alleviate any negative impact to SBVMWD and ensure they receive any credits and Mutual remains whole. Preliminary results for the 53-year period used in the analyses indicates the lake levels would be higher than they would be without the amendment except for the 3 years when it would be a foot lower. Mr. Evenson indicated that they have been performing modeling iterations with the SBVMWD consultants. There are two views being evaluated: 1) How to increase the yield for SBVMWD and 2) How to meet all of Mutual's in-lieu needs. Currently 80% of the water developed goes to Mutual from the Storage Agreement. There will be minor changes to be evaluated to get closer to 100%. When the SWP water allocation is 25% or less then SBVMWD would be able to draw water out of their storage accounts because that would be considered an emergency need. If Mutual does not have any needs, SBVMWD would like to deliver stored lake water to other customers. When Mutual has a need for lake water, instead of Mutual obtaining SWP water in-lieu they would obtain water from SBVMWD's lake storage account. Discussion ensued. Under the current draft term sheet, SBVMWD would be able to store up to 5,600 AF in the lake in wet and above normal years. In critically dry years (Emergency events) SBVMWD would be able to withdraw up to 2,800 AF of lake water for Mutual and the remaining balance would have to be met by SWP water.

Mr. Evenson stated that during the times SBVMWD draws down their lake account, Big Bear has to have water in their account in order to advance it to SBVMWD. The preliminary cost estimate is under $500 an AF for emergency water. When advanced it would draw the lake down a small amount (over a foot) until it can be repaid. Mr. Cozad indicated that he would like to review the final In-Lieu Agreement and proposed operations at the next meeting. Mr. Evenson indicated that another item that needs to be discussed is how the water related to the test releases will be accounted for. He stated that the water came out of SBVMWD's lake account. However 2/3 of it was used by Mutual. Mr. Evenson stated that it may need to be indicated as a footnote that it was used by Mutual but originated from SBVMWD.

8. ANNUAL WATERMASTER REPORT

Mr. Evenson handed out the schedule stating that the final report has be submitted to the court by April 1st, therefore delivery date is Friday, March 28, 2014. He indicated that key dates are the dates that the Conservation District submits their data to Big Bear as well as the data required by Mutual, which is due by the end of February. Mr. Evenson will coordinate with the District to submit fish release information. The anticipated completion date for the Draft Watermaster Report is March 4th for circulation amongst the Committee. Discussion of schedule continued.

Mr. Evenson provided handouts for the preliminary results of the Watermaster accounting. Handout #1 – showed lake levels in blue and red line was the Big Bear Lake Release Policy for Mutual Releases. In-lieu deliveries are required when lake levels fall under red line. The first four months of year BBMWD would have released water for Mutual. However due to the In-Lieu Agreement they did not make lake releases. The in-lieu water delivered to Mutual during this period was placed in their Storage Account. Handout #2- shows the current status of the lake account. The releases and leakages numbers indicated in red are preliminary numbers. The lake account is estimated to end the year with 50,000 AF in it; with 36,300 AF in Mutuals' account and 13,700 in Big Bears' account. These numbers also include SBVMWD's water, which is estimated to be 2,400 AF. Discussion ensued regarding lake account. Mr. Cozad inquired as to whether there should be a line item included in the lake account spreadsheet for SBVMWD. Mr. Evenson stated that the data related to the subaccount for SBVMWD's Storage Agreement is included in the Watermaster Report. He indicated that the Committee may want to include an additional table with the breakout of Big Bear and SBVMWD accounts within the report. Handout #3 – shows the status of the 65,000 AF in 10-year Mutual deliveries. Mr. Evenson indicated that the 605 AF used for test releases will end up being shown as a zero on this table. Mr. Heule said that the reason it would be beneficial for the SBVMWD numbers to be shown to determine actual lake level. Mr. Evenson said that he would add additional columns for actual versus what it should have been if the lake release policy was adhered to. Mr. Cozad stated that will make the transition easier to keep track of it now versus waiting until the question is asked. Handout #4 – shows the required Minimum daily average flows at Station B for 2013. The required flows vary between 0.75 and 1.25 CFS. This water year began above normal because of rainfall but in December it was below normal. Discussion ensued. Mr. Evenson estimates that January will be a dry year. Last water year there was 18 inches of rain and last calendar year there was 14.38 inches. The last handout shows the flows at Station B versus the requirements. Flows were consistently above 1.5 CFS. September was the test release program when the flows went up to 25 CFS. During the period where it indicates the flows were less than requirement it was because the transducer, which provides the data to calculate the flows, was damaged during the test releases. Both probe and transducer have been replaced. Mr. Evenson reiterated that Draft Watermaster Report will be sent out to Committee on March 4th.

Mr. Cozad reviewed the updated website with Committee to inform them of where Watermaster information is being kept. He asked that the Committee review and advise of any necessary changes that need to be made.

9. DATE FOR NEXT MEETING

The next meeting will be on Tuesday, March 11, 2014 at 1:30 p.m., at the SBV Water Conservation District.

10. ADJOURN

There being no further business, the meeting was adjourned by acclimation.

Donald E. Evenson | Michael L. Huffstutler | Daniel Cozad

BIG BEAR WATERMASTER
MINUTES OF THE MEETING OF MARCH 12, 2014

PLACE: San Bernardino Valley Water Conservation District
1630 W. Redlands Blvd., Suite A
Redlands, CA 92373

PRESENT:	Watermaster Committee	Representing
	Don Evenson	Big Bear MWD, Chair
	Daniel Cozad	SBV Water Conservation District
	Mike Huffstutler	Bear Valley Mutual Water Company
	Others	
	Scott Heule	Big Bear MWD
	Maryanne Lewis	Big Bear MWD
	John Eminger	Big Bear MWD
	David Raley	SBV Water Conservation District
	Athena Monge	SBV Water Conservation District

1. WELCOME AND CALL TO ORDER

The Big Bear Watermaster meeting was called to order by Don Evenson at 10:00 a.m.

2. APPROVAL OF MINUTES

The minutes from the October 15, 2013 and January 21, 2014 meetings were approved.

3. LAKE AND BEAR CREEK STATUS

Scott Heule reported that before the rain last week the lake was at 8.75 ft. below full. Big Bear received 10.5 inches of precipitation and lake is currently 7.83 ft. below full. Station B flow rate is 1.36 CFS.

4. SANTA ANA RIVER STATUS AND FLOW REPORT/EDISON FACILITIES

Daniel Cozad reported that SCE turned out water in Mill Creek and Santa Ana River for 3-4 days but have turned back in both facilities as of last weekend. There is approximately 10 CFS being released from SOD dam; water is beginning to clear up. EVWD measured it at 115 NTU; they turned it out until it got to 80 NTU.SBVWCD took all water available. The recharge basins are dry; all recharge occurring in canal at approximately 10 CFS. Mr. Cozad indicated that there was no significant amount of water received during the storms. The water level behind the dam rose 5 ½ ft., but the COE is releasing at the same rate they are taking water. Mr. Heule asked if the COE was storing water in Prado dam. Mr. Cozad indicated that they have elevation 505 water storage behind Prado dam. Brief discussion ensued.

5. SEVEN OAKS DAM OPERATION AND WATER QUALITY

Mr. Cozad said that if we started to receive rain or snow melt that SBVWCD would likely coordinate with the COE to release the 300 CFS or less to help flush out the silt water first. He said that most of the water being released by the COE is not useable for surface water direct

users due to the amount of silt in it. Redlands Tate plant is down and SBVWCD is currently recharging water in Mill Creek basins. Mutual is currently taking the water for delivery. Mr. Huffstutler stated that there is 10.2 CFS currently at sandbox. The Partial Flume was at 7 CFS as of this morning. Mr. Huffstutler indicated that the water for the Redlands Tate plant is diverted upstream and comes through SCE number one powerhouse, through Mill Creek, connects to SWP and ultimately splits between Crafton and Redlands. Mr. Cozad said that the Redlands aqueduct water is the only other way to get water to Mill Creek.

6. MUTUAL'S PROJECTION OF NEEDS FOR LAKE RELEASES/IN-LIEU WATER

Mr. Huffstutler indicated Mutual's projected needs are still at 6500 AF of in-lieu water. He said that there is hardly any SWP water. Mr. Evenson said the allocation is at zero. Mr. Huffstutler indicated that it is at zero this year, but there will be carry over. SBVMWD may possibly call on Lake storage. Mr. Cozad confirmed an estimated 4500 AF of groundwater storage is being kept for SBVMWD in Kern Water Bank. It is believed that it has been called on recently. Mr. Cozad indicated that a Drought Task Force has been coordinated by SBVMWD and they are currently developing water delivery schedule. Mr. Cozad indicated that anytime we are not recharging it is the equivalent of borrowing from next year. Discussion ensued regarding previous drought conditions. Mr. Huffstutler stated that his contractual obligation to prior rights of 6500 AF has to be satisfied before stockholders get any water. He indicated that prior rights consist of a set amount of water from June-November approximately 600 inches a day. Mr. Cozad reported in the District's Engineering Investigation Report that the Basin is 130,000 AF below where it was last year. Mr. Evenson asked if Mutual's wells are operable. Mr. Huffstutler indicated that they are however some are not useable due to groundwater contamination. Mr. Cozad said that the District has recharged approximately 88,000 AF; of the total 133,000 AF recharged over the past 3 years to the basin to make it whole. He indicated that there was a 7-30 ft. average water level loss in groundwater from last year. The rain we have received so far is just refilling soil moisture. Outreach efforts are being increased to raise awareness of drought. Mr. Heule indicated that there is still a lot of water usage that can be reduced; particularly in regards to landscaping.

7. GROUNDWATER PRODUCTION AND DEVELOPMENT IN BIG BEAR VALLEY

Mr. Heule indicated that groundwater levels have decreased but not dramatically. He said the demand has gone down. Mr. Heule said that outreach efforts down the hill are having positive affect on groundwater levels in Big Bear. He noted that the per capita demand is less than previous years. Mr. Heule stated that unaccounted water is now 5-8% which is down significantly. He said that the Community Services District is rehabbing wells. There is currently no new well construction.

8. UPDATE ON NEW STORAGE AGREEMENT WITH SBVMWD

Mr. Heule indicated that the agreement is in the negotiating process. The agreement seems to be growing in complexity. He indicated that Big Bear and SBVMWD are working on developing a program where it is less complex and easier to manager and that satisfies Mutual's requirements.

9. ANNUAL WATERMASTER REPORT

Mr. Evenson stated that comments for the Annual Watermaster Report (Report) are needed by end of the week. He noted that Station B flows were not calculated correctly for the period that

the meter was inoperable and that an estimate was needed. The State Water Resource Control Board needed those numbers to show that we are in compliance with order #95-4. Mr. Evenson indicated that these estimates at Station B do not affect the overall Report. Review of Report continued.

Mr. Evenson said that in regard to fish releases they are reevaluating for accuracy to make sure it is getting allocated properly between Mutual and Big Bear. The procedures developed years ago show a period that Mutual was taking water and that the only water Mutual was taking was from the Redlands Tunnel. This has been corrected. Also, the fish releases account was shown to have been used by Mutual, but it was actually water being released from SOD to Northfork. Once information is obtained from SBVWCD this will be corrected. These corrections will most likely only affect 1/2 dozen days of the year. Mr. Evenson indicated that the long term goal is to develop a more efficient method of calculating these to alleviate the need for manual calculations or corrections. Mr. Evenson said that the estimates of leakage in regards to CalTrans still need to be fixed. It is a tenth of a CFS for a couple months and that will reduce the amount of water coming out of the lake. The amount not diverted has to include spills from Powerhouse #3. This does not change Report accounting; only the table showing how much was not diverted from SAR. At the last meeting with SBVMWD they requested the addition of a table reflecting the allocation for their account versus what is in Big Bear's account. Mr. Evenson handed out table and indicated that the need to potentially add this table to Report. Review concluded with Mr. Evenson noting that Report should be done on time and delivered to court by April 1st.

10. DATE FOR NEXT MEETING

The next meeting will be on Tuesday, June 25, 2014 at 1:30 p.m., at the SBV Water Conservation District.

11. ADJOURN

There being no further business. the meeting was adjourned by acclimation.

Donald E. Evenson Michael L. Huffstutler Daniel Cozad

BIG BEAR WATERMASTER
MINUTES OF THE MEETING OF JULY 15, 2014

PLACE: San Bernardino Valley Water Conservation District
1630 W. Redlands Blvd., Suite A
Redlands, CA 92373

PRESENT:	Watermaster Committee	Representing
	Don Evenson	Big Bear MWD, Chair
	Daniel Cozad	SBV Water Conservation District
	Mike Stephenson	Big Bear MWD
	Others	
	Todd Murphy	Big Bear MWD
	Vince Smith	Big Bear MWD
	David Raley	SBV Water Conservation District
	Athena Monge	SBV Water Conservation District

1. WELCOME AND CALL TO ORDER

The Big Bear Watermaster meeting was called to order by Don Evenson at 1:30 p.m.

2. APPROVAL OF MINUTES

The minutes from the March 12, 2014 meetings were approved.

3. LAKE AND BEAR CREEK STATUS

Mike Stephenson reported that the lake was at 9.8 ft. below full. He estimates the lake is losing 2 5/8 inches per week. Station B flow rate is 1.66 CFS with a release rate of 1.5 CFS currently from the outlet works. Station A data has been retrieved, but not analyzed yet. Satellite equipment was tested for real time data collection; however it malfunctioned therefore Big Bear MWD returned it. Readings will now be downloaded monthly.

4. SANTA ANA RIVER STATUS AND FLOW REPORT/EDISON FACILITIES

Daniel Cozad reported that flows have been minimal. The COE released any water behind the SOD dam in mid-April. The back basin was contoured by the flows this year; most of the flows going through the watershed flowed through SCE facilities. There were small amounts of flow through the diversion into the river pick up. Don Evenson indicated that it may have been spill over from the fore bay. SCE was down for a day or two and flows have been low. Mr. Cozad briefly reviewed the purpose of the DFR report prepared by the District and advised new members of the Committee to be added to the list. He stated that the District is working on revising this report so any feedback provided is appreciated.

5. SEVEN OAKS DAM OPERATION AND WATER QUALITY

Mr. Cozad said that SOD gates have been open since April 15th and flows have not exceeded 5 CFS. The water is unable to be picked up and goes to tributaries below.

6. MUTUAL'S PROJECTION OF NEEDS FOR LAKE RELEASES/IN-LIEU WATER

Mr. Evenson stated that Mutual is continuing operating flow of up to 6500 AF per year. SBVMWD anticipates meeting Mutual's needs by delivering SWP water and groundwater to their customers. In reviewing handout, he noted that out of the 636 AF of in-lieu delivered only 6 AF was SWP water. Mutual projects that 6000 AF will be delivered of in-lieu water between now and October 2014; there are no scheduled deliveries for the remaining two months of the year. All the SAR water that is being diverted by SCE is going to the highline and SBVMWD is delivering to Redlands and EVWD to meet their needs. SBVMWD indicated that Bunker Hill Basin levels are historically low and that customers have reduced their demand of SWP water by 50%. He said that SBVMWD will carry over 10,000 AF of unused SWP into next year.

7. GROUNDWATER PRODUCTION AND DEVELOPMENT IN BIG BEAR VALLEY

Mr. Stephenson stated that CSD is installing a few replacement wells. There are drilling and testing being done. Additional information will be given at the next meeting.

8. UPDATE ON NEW STORAGE AGREEMENT WITH SBVMWD

Mr. Evenson said that Big Bear MWD is in the process of developing operational concepts related to SBVMWD's storage usage in the lake based on the conjunctive use concept. They will be meeting with SBVMWD on August 18th to further discuss this item. It would seem the most cost effective thing for SBVMWD to do would be to utilize groundwater supplies. Mr. Evenson said that the idea is that when SWP gets to be less than 25% SBVMWD would then use groundwater to provide in-lieu needs. Upon exhaustion of groundwater capacity they would then utilize the water stored by them in the lake. Mr. Cozad indicated that given the condition of the basin ensuring that groundwater goes back into the basin will be the primary concern. He indicated that you cannot operate the basin to benefit the lake and not take into account the need to keep the basin whole. Mr. Evenson stated that SBVMWD will need to be sure that in wet years SWP water is being spread. He recommended spreading SWP water in wet years and indirectly storing groundwater. Mr. Cozad said that summer carry over is important and that you can potentially lose capacity to use the water if not coordinated properly. He expressed his appreciation to Big Bear MWD and SBVMWD for continuing discussions to identify the best functionality for the basin.

9. ANNUAL WATERMASTER REPORT

Mr. Evenson introduced this item for discussion. He reviewed Table III-8 of the report; where he indicated that the Conservation District is working with SBVMWD to improve the data included within table to make sure that it is consistent with the Conservation District's water rights filings. Mr. Cozad discussed historic practices of taking readings at the Parshall Flume where there were different meters which gave at times conflicting data. He indicated that now we are down to one meter and that the Conservation District will now be the one maintaining it. The modernization of the DFR is part of this process. There will be a new Table for III-8 for next year. Mr. Evenson said that the invoices for the Big Bear Watermaster Report preparation will be sent out soon with there being two invoices sent out for the past couple of years. He said that the report will be done in house to reduce costs.

10. DATE FOR NEXT MEETING

The next meeting will be on Wednesday, October 15, 2014 at 1:30 p.m., at the SBV Water Conservation District.

11. ADJOURN

There being no further business, the meeting was adjourned by acclimation.

Donald E. Evenson Michael L. Huffstutler Daniel Cozad

BIG BEAR WATERMASTER
MINUTES OF THE MEETING OF November 18, 2014

PLACE: San Bernardino Valley Water Conservation District
1630 W. Redlands Blvd., Suite A
Redlands, CA 92373

PRESENT:	Watermaster Committee	Representing
	Don Evenson	Big Bear MWD, Chair
	Daniel Cozad	SBV Water Conservation District
	Mike Stephenson	Big Bear MWD
	Mike Huffstutler	Bear Valley Mutual Water Company
	Others	
	Vince Smith	Big Bear MWD
	John Eminger	Big Bear MWD
	David Raley	SBV Water Conservation District
	Athena Monge	SBV Water Conservation District

1. WELCOME AND CALL TO ORDER

The Big Bear Watermaster meeting was called to order by Don Evenson at 1:30 p.m.

2. APPROVAL OF MINUTES

The minutes from the July 15, 2014 meetings were approved.

3. LAKE AND BEAR CREEK STATUS

Mike Stephenson reported that the flow from dam is 1.4 CFS with Station B at 1.52 CFS currently. There is sand blasting and painting of struts that are being completed so releases are being coordinated around those. The lake is down 11 ft. 7 ¾ inches. Don Evenson handed out lake levels for this year through October. He indicated that preliminary storage numbers for the end of the year are Mutual 26,179 AF; and Big Bear 16,059 AF with a total of 42,238 AF in the Lake at the end of October. Station A data was pulled and reviewed for compliance on October 10th and is confirmed to be in full compliance for entire year. In order to be in compliance, the average daily flow at Station A must be at least 1 CFS and the seven-day average flow must be 1.2 CFS or more; both were in full compliance. The Committee discussed the lack of tributary flows. Mr. Evenson indicated that it has been a dry year; not the driest though. This year the rainfall at Bear Valley Dam was at 14.29 inches through October. Mr. Evenson indicated that the driest years have been 1999 (13.2 in.) and 2013 (since the implementation of the Judgment in 1977. Mr. Cozad as to what the lowest lake level has been where it becomes an inconvenience. Mr. Stephenson indicated that 15 ft. down is where it really has an adverse impact on recreational operations. He indicated that in 2003-2004 the lake was 17.6 down and caused usage to drop 38%. Mr. Evenson stated that the inflow to the lake this year is slightly over 3000 AF. In 2002 and 2007 the lake was less than 3000 AF; last year was 3132 AF.

4. SANTA ANA RIVER STATUS AND FLOW REPORT/EDISON FACILITIES

Daniel Cozad reported that flows have been minimal. The District has been able to perform recharge from the small storms that occurred mainly in Mill Creek. Mr. Cozad indicated that the well owners indicate that they are getting a third and a half of the water they normally receive. SCE continually turns out; except for minor stoppage. Mr. Evenson indicated that SCE has minor flows and that Powerhouse #2 & #3 are shut down. He said that the DFR shows low amounts of flow in Santa Ana. Mr. Cozad said that it's new beginning of a new water year that is why AF seems low.

5. SEVEN OAKS DAM OPERATION AND WATER QUALITY

Mr. Cozad said that SOD gates remain open. He said inflow equals outflow and that flows are mainly going into North Fork and Big Bear. Bear Valley is using groundwater as well to make up for the lack of SWP water.

6. MUTUAL'S PROJECTION OF NEEDS FOR LAKE RELEASES/IN-LIEU WATER

Mr. Evenson stated that Mutual is continuing their policy of requesting up to 6500 AF per year of In-Lieu deliveries. Mr. Evenson said that the last update received is that there was 4,380 AF of in-lieu water delivered and that 264 AF of that was groundwater and 1,116 AF was SWP water. Mutual is pumping 5 or 6 wells and delivering some SWP water to North Fork. Mr. Evenson is optimistic that Mutual will reach their year-end goal of 6,500 AF.

7. GROUNDWATER PRODUCTION AND DEVELOPMENT IN BIG BEAR VALLEY

Mr. Stephenson stated that DWP and CSD are looking at site, but there have been no new developments so far. Mr. Evenson asked if we should keep this item on the agenda. Mr. Huffstutler indicated that it can be added as needed. Mr. Cozad confirmed that he will remove this item from the next agenda.

8. UPDATE ON NEW STORAGE AGREEMENT WITH SBVMWD

Mr. Stephenson said that he and Mr. Evenson have held meetings with SBVMWD and are still discussing details. The storm releases and spills that are captured at Seven Oaks Dam and can be diverted to recharge the local groundwater basin seem to have value to Big Bear but not to SBVMWD. Mr. Stephenson indicated that SBVMWD water spills first on flood release so Valley is concerned there may be significant losses between the Bear Valley Dam and Seven Oaks Dam. Big Bear believes there should be a credit or some value associated with those flows. When looking at the alternatives for augmenting their water supplies, groundwater seems to be the most cost effective option for them. There may be additional analysis to be performed. However, further evaluations may cease if the parties do not see any significant benefits from such an agreement. Discussion ensued regarding EBX issues. The MOU may be extended through completion of the EBX construction, which is expected to be next year. Mr. Cozad asked for additional information regarding groundwater being the best alternative for SBVMWD. Mr. Evenson said that SBVMWD is looking at three alternatives for storage aside from Big Bear Lake Storage: 1) Groundwater: pre-store in basin through conjunctive use between groundwater and SWP; 2) Conjunctive use of well water and SWP in conjunction with Kern Water Bank and they have an agreement with MET to store water in the Kern Water Bank and 3) Conjunctive use of SWP, local groundwater, and Big Bear Lake. The least expensive alternatives for SBVMWD seems to be options one and two based on SBVMWD analysis. Discussion ensued.

Mr. Evenson indicated that based on SBVMWD analysis they believe there will be no loss in utilizing groundwater. Mr. Cozad stated that there is less loss from a production standard. Mr. Evenson said that groundwater levels are at a historic low. Mr. Cozad noted that in January/February time frame the District will have new data to review.

9. DATE FOR NEXT MEETING

The next meeting will be on Wednesday, January 20, 2015 at 1:30 p.m., at the SBV Water Conservation District.

10. ADJOURN

There being no further business, the meeting was adjourned by acclimation.

Donald E. Evenson | Michael L. Huffstutler | Daniel Cozad

APPENDIX B

TABLE OF
ACCOUNTS OF OPERATION OF BIG BEAR LAKE

ACCOUNTS FOR
CALENDAR YEAR 2014

INPUT DATA
BIG BEAR WATERMASTER REPORT
CALENDAR YEAR
2014

Calandar Year		2014	
Mutual's Lake Account Balance on Jan.1	=	36,058	acre-feet
Basin Make-Up Account Balance on Jan. 1	=	29,287	acre-feet
Account Balance for Mutual's Advances to BBMWD	=	-	acre-feet
Repayment Premium for Mutual's Advances to BBMWD	=	0%	
Recharge Factor for Lake Deliveries to Mutual	=	0.500	
Recharge Factor for Imported Water Deliveries to Mutual	=	0.500	
Recharge Factor for Lake Spills	=	0.510	
Snowmelt Return Factor	=	0.500	Jan,Feb, Mar,Apr,Oct,Nov,Dec
Snowmelt Return Factor	=	0.000	May, June,July,Aug,Sept

Monthly Evaporation Rate Calculation Factors	C1	C2	C3
January	7.09	0.42	1,200
February	6.90	0.50	1,200
March	8.36	0.74	1,200
April	8.82	0.87	1,200
May	9.73	1.02	1,200
June	9.72	1.10	1,200
July	9.90	1.13	1,200
August	9.34	1.22	1,200
September	8.36	1.25	1,200
October	7.89	1.22	1,200
November	7.01	1.07	1,200
December	6.91	0.50	1,200

Evaporation rate (feet/month) = Average air temperature x C1 x C2 / C3

INPUT DATA
BIG BEAR WATERMASTER REPORT
CALENDAR YEAR
2014
(continued)

Month	Gage* Height 1st of Month (feet)	Actual Mutual Shareholder Releases (acre-feet)	Mutual Other Releases (acre-feet)	Actual Spillway Flood Control Releases (acre-feet)	Actual Outlet Works & Flood Control Releases (acre-feet)	Big Bear's Spreading Releases (acre-feet)	Big Bear's Other Releases (acre-feet)	Leakage (Not used, included in Fish Releases) (acre-feet)
	63.96							
January		-	-	-	-	-	-	-
	63.81							
February		-	-	-	-	-	-	-
	64.26							
March		-	-	-	-	-	-	-
	64.34							
April		-	-	-	-	-	-	-
	64.17							
May		-	-	-	-	-	-	-
	63.60							
June		-	-	-	-	-	-	-
	62.95							
July		-	-	-	-	-	-	-
	62.33							
August		-	-	-	-	-	-	-
	61.73							
September		-	-	-	-	-	-	-
	61.24							
October		-	-	-	-	-	-	-
	60.77							
November		-	-	-	-	-	-	-
	60.50							
December		-	-	-	-	-	-	-
	61.32							
Change	2.64							

* Gage at Bear Valley Dam

INPUT DATA
BIG BEAR WATERMASTER REPORT
CALENDAR YEAR
2014
(continued)

Month	Big Bear's Withdrawals for Snowmaking (acre-feet)	Big Bear's Withdrawals for Flatiron (acre-feet) Not Used	Mutual Spills of Wastewater Exports (acre-feet)	In-Lieu Imported Supplies (SBVMWD) (acre-feet)	In Lieu Supplies from SBVMWD's Contract Wells (acre-feet)	In Lieu Supplies from Mutual's Wells (acre-feet)	Other In Lieu Supplies (acre-feet)
January	68.39	-	-	100.50	-	-	-
February	119.51	-	-	-	-	-	-
March	12.78	-	-	-	-	-	-
April	8.37	-	-	-	-	-	-
May	16.76	-	-	6.10	-	-	-
June	15.96	-	-	12.00	881.00	-	-
July	17.67	-	-	410.40	906.50	-	-
August	15.81	-	-	575.80	667.50	-	-
September	5.55	-	-	274.30	832.70	-	-
October	33.89	-	-	207.40	817.60	-	-
November	106.56	-	-	127.70	586.60	-	-
December	250.74	-	-	1.80	-	-	-
	671.99			1,716.00	4,691.90		

6,407.90

INPUT DATA
BIG BEAR WATERMASTER REPORT
CALENDAR YEAR
2014
(continued)

Month	SWRCB Order 95-4 Releases & Leakage (acre-feet)	Mutual's Direct Use of Order 95-4 Releases (acre-feet)	Basin Replenishment from SBVMWD (acre-feet)	Basin Replenishment from Others (acre-feet)	2014 Net Wastewater Exports (acre-feet)	Average Air Temperature (degrees F)
January	78.87	78.87	-	-	65.84	41.9
February	72.32	69.72	-	-	58.15	40.9
March	80.93	57.46	-	-	66.99	41.9
April	76.78	69.24	-	-	60.80	46.3
May	77.71	77.71	-	-	58.44	52.2
June	77.94	77.94	-	-	52.06	60.4
July	95.41	95.41	-	-	54.30	64.4
August	102.42	92.33	-	-	58.51	62.7
September	94.63	88.22	-	-	53.73	60.1
October	94.62	94.62	-	-	64.15	53.4
November	80.17	77.46	-	-	62.35	34.5
December	82.08	10.55	-	-	76.38	36.1
	1,013.88	889.53			731.70	

SUMMARY RESULTS
CALENDAR YEAR
2014

LAKE ACCOUNTS (acre-feet)	Big Bear	Mutual	Actual
Initial Storage	14,036	36,058	50,094
Lake Inflows	0	5,606	5,606
In-Lieu Supplies to Mutual	6,408	-6,408	0
Lake Releases (Mutual & BBMWD)	0	0	0
Releases & Leakage (SWRCB 95-4)	-46	-968	-1,014
Net Snowmaking Withdrawals from Lake	-372	0	-372
Lake Spills & Flood Control Releases	0	0	0
Leakage from Dam	0	0	0
Evaporation from Lake	-1,967	-8,804	-10,771
Net Wastewater Exports	-732	732	0
Advances & Repayment of Advances	0	0	0
Ending Storage	17,327	26,216	43,543
BASIN MAKE UP ACCOUNT (acre-feet)			
Beginning Balance	n.a.	n.a.	29,287
Recharge From Releases of Lake Water Used by Mutual	445	3,649	-3,204
Recharge From In-lieu SWP Water Delivered to Mutual	858	n.a.	858
Recharge from Spills & Other Lake Releases	63	40	23
Account Credit (Debit)	**1,366**	**3,689**	**-2,323**
Amount Replenished	0	n.a.	0
Ending Balance			26,964

CALENDAR YEAR
2014
BIG BEAR WATERMASTER

TABLE 1
ACTUAL OPERATION OF BIG BEAR LAKE

Month	1 Gage Height 1st of Month (Input Data) (feet)	2 Volume in Storage (ac-ft)	3 Change in Storage (ac-ft)	4 Lake Surface Area (acres)	5 Spills Releases Leakage Withdrawals (see Table 1.A) (feet)	6 Estimated Lake Evaporation (see Table 1.D) (ac-ft)	7 Calc. Total Inflow (ac-ft)	8 Adjusted Lake Inflow * (ac-ft)	9 Adjusted Lake Evap * (ac-ft)	10 Adjusted Evap Rate * (feet/month)
	63.96	50,094		2,571						
January	63.81	49,714	-380	2,560	113	267	-0	0.00	267	0.104
February	64.26	50,871	1,157	2,587	132	303	1,592	1,591.68	303	0.118
March	64.34	51,131	260	2,592	87	559	907	906.67	559	0.216
April	64.17	50,612	-519	2,582	81	766	328	327.88	766	0.296
May	63.60	49,206	-1,406	2,545	94	1,107	-205	0.00	1,312	0.512
June	62.95	47,561	-1,645	2,496	94	1,356	-195	0.00	1,551	0.615
July	62.33	46,083	-1,478	2,452	113	1,485	120	120.39	1,485	0.600
August	61.73	44,622	-1,461	2,412	118	1,448	105	105.19	1,448	0.595
September	61.24	43,423	-1,199	2,383	100	1,255	156	155.96	1,254.8	0.523
October	60.77	42,238	-1,185	2,355	112	1,015	-59	0.00	1,073	0.453
November	60.50	41,653	-585	2,341	133	506	55	54.78	506	0.216
December	61.32	43,543	1,890	2,386	207	246	2,343	2,343.11	246	0.104
TOTALS			-6,551		1,386	10,313	5,147	5,605.7	10,770.9	4.353

* NOTE: Evaporation adjusted to eliminate negative inflow

CALENDAR YEAR
2014
BIG BEAR WATERMASTER

TABLE 1.A
ACTUAL OPERATION OF BIG BEAR LAKE
Summary Details

Month	1	2 Actual Spillway Flood Control Releases (Input Data) (ac-ft)	3 Actual Outlet Works Flood Control Releases (Input Data) (ac-ft)	4 Actual Lake Releases (see Table 1.B) (ac-ft)	5 Actual Estimated Leakage (not used) (Input Data) (ac-ft)	6 Estimated Net Lake Withdrawal (see Table 1.C) (ac-ft)	7	8	9 Total Spills Releases Leakage Withdrawals (ac-ft)
January		-	-	78.9	-	34.2			113.1
February		-	-	72.3	-	59.8			132.1
March		-	-	80.9	-	6.4			87.3
April		-	-	76.8	-	4.2			81.0
May		-	-	77.7	-	16.8			94.5
June		-	-	77.9	-	16.0			93.9
July		-	-	95.4	-	17.7			113.1
August		-	-	102.4	-	15.8			118.2
September		-	-	94.6	-	5.6			100.2
October		-	-	94.6	-	16.9			111.6
November		-	-	80.2	-	53.3			133.5
December		-	-	82.1	-	125.4			207.5
TOTALS		**-**	**-**	**1,013.9**	**-**	**371.9**			**1,385.7**

CALENDAR YEAR
2014
BIG BEAR WATERMASTER

TABLE 1.B
ACTUAL OPERATION OF BIG BEAR LAKE
Release Details

Month	1 Mutual's Shareholder Releases (Input Data) (ac-ft)	2 Mutual's Other Releases (Input Data) (ac-ft)	3 Mutual's Total Releases (Col.1 + Col.2) (ac-ft)	4	5 Big Bear's Spreading Releases (Input Data) (ac-ft)	6 Big Bear's Other Releases (Input Data) (ac-ft)	7 Big Bear's Total Releases (Col.5 + Col.6) (ac-ft)	8 SWRCB Order NO. 95-4 Releases (Input Data) (ac-ft)	9 Total Actual Releases (Cols.5+ 7+ 8) (ac-ft)
January	-	-	-		-	-	-	78.9	78.9
February	-	-	-		-	-	-	72.3	72.3
March	-	-	-		-	-	-	80.9	80.9
April	-	-	-		-	-	-	76.8	76.8
May	-	-	-		-	-	-	77.7	77.7
June	-	-	-		-	-	-	77.9	77.9
July	-	-	-		-	-	-	95.4	95.4
August	-	-	-		-	-	-	102.4	102.4
September	-	-	-		-	-	-	94.6	94.6
October	-	-	-		-	-	-	94.6	94.6
November	-	-	-		-	-	-	80.2	80.2
December	-	-	-		-	-	-	82.1	82.1
TOTALS	**-**	**-**	**-**		**-**	**-**	**-**	**1,013.9**	**1,013.9**

CALENDAR YEAR
2014
BIG BEAR WATERMASTER

TABLE 1.C
ACTUAL OPERATION OF BIG BEAR LAKE
Lake Withdrawal Details

Month	1	2 Snowmaking Withdrawals (Input Data) (ac-ft)	3 Flatiron Withdrawals (Input Data) (ac-ft)	4	5 Total Lake Withdrawals (ac-ft)	6	7 Return from Snow melt @ 50.0% (ac-ft)	8	9 Estimated Net Lake Withdrawals (ac-ft)
January		68.39	-		68.39		34.20		34.19
February		119.51	-		119.51		59.76		59.75
March		12.78	-		12.78		6.39		6.39
April		8.37	-		8.37		4.19		4.18
May		16.76	-		16.76		-		16.76
June		15.96	-		15.96		-		15.96
July		17.67	-		17.67		-		17.67
August		15.81	-		15.81		-		15.81
September		5.55	-		5.55		-		5.55
October		33.89	-		33.89		16.95		16.94
November		106.56	-		106.56		53.28		53.28
December		250.74	-		250.74		125.37		125.37
TOTALS		**671.99**	**-**		**671.99**		**300.14**		**371.85**

CALENDAR YEAR
2014
BIG BEAR WATERMASTER

TABLE 1.D
ACTUAL OPERATION OF BIG BEAR LAKE
Evaporation Details

Month	1	2	3 Lake Surface Area (acres)	4 Average Lake Area (acres)	5 Average Air Temperature (Input Data) (deg F)	6 Calculated Evaporation Rate (feet/month)	7	8	9 Estimated Lake Evaporation (ac-ft)
January			2,571	2,566	41.90	0.104			266.7
February			2,560	2,574	40.90	0.118			302.6
March			2,587	2,590	41.90	0.216			559.4
April			2,592	2,587	46.30	0.296			765.9
May			2,582	2,564	52.20	0.432			1,106.7
June			2,545	2,521	60.40	0.538			1,356.4
July			2,496	2,474	64.40	0.600			1,485.3
August			2,452	2,432	62.70	0.595			1,448.0
September			2,412	2,398	60.10	0.523			1,254.8
October			2,383	2,369	53.40	0.428			1,014.8
November			2,355	2,348	34.50	0.216			506.3
December			2,341	2,364	36.10	0.104			245.7
TOTALS			2,386			4.171			10,312.6

CALENDAR YEAR
2014
BIG BEAR WATERMASTER

TABLE 2
SYNTHESIZED MUTUAL OPERATION OF BIG BEAR LAKE

Month	1 Gauge Height 1st of Month (feet)	2 Mutual's Lake Account (ac-ft)	3 Change in Storage (*) (ac-ft)	4 Lake Surface Area (acres)	5 Mutual's Lake Inflow (see Table 1) (feet)	6 Mutual's Net Wastewater Export Credit (see Table 2.A) (ac-ft)	7 Mutual's Lake Evap. (see Table 2.B) (ac-ft)	8 Mutual's Snowmaking Advances to Big Bear (see Table 3) (ac-ft)	9 Mutual's Credit for Return of Advances (see Table 3) (ac-ft)	10 Mutual's Releases Leakage Spills & In-lieu Del. (see Table 2.A) (ac-ft)
	58.00	36,058		2,162						
January			-338		-	65.8	224.3	-	-	179.4
	57.85	35,720		2,150						
February			1,323		1,591.7	58.2	255.5	-	-	71.6
	58.45	37,043		2,196						
March			423		906.7	67.0	476.0	-	-	74.6
	58.65	37,466		2,211						
April			-339		327.9	60.8	653.0	-	-	74.8
	58.50	37,127		2,200						
May			-1,140		-	58.4	1,114.8	-	-	83.8
	57.95	35,987		2,158						
June			-2,221		-	52.1	1,301.9	-	-	970.9
	56.90	33,766		2,073						
July			-2,455		120.4	54.3	1,217.8	-	-	1,412.3
	55.70	31,311		1,984						
August			-2,341		105.2	58.5	1,161.9	-	-	1,342.5
	54.50	28,970		1,919						
September			-1,980		156.0	53.7	990.0	-	-	1,199.4
	53.45	26,990		1,864						
October			-1,888		-	64.2	832.8	-	-	1,119.6
	52.45	25,102		1,812						
November			-1,064		54.8	62.4	387.4	-	-	793.4
	51.85	24,038		1,781						
December			2,178		2,343.1	76.4	188.3	-	-	53.6
	53.05	26,216		1,843						
TOTALS			**-9,842**		**5,605.7**	**731.7**	**8,803.7**	**-**	**-**	**7,375.8**

(*) Col. 3 = Col. 5 + Col. 6 - Col. 7 - Col. 8 + Col. 9 - Col. 10

CALENDAR YEAR
2014
BIG BEAR WATERMASTER

TABLE 2.A
SYNTHESIZED MUTUAL OPERATION OF BIG BEAR LAKE
Lake Outflow Details

Month	1 Mutual's Spills & FC Releases from Table 2.C (ac-ft)	2 Mutual's Lake Releases from Table 1.B (ac-ft)	3 Mutual's Leakage from Table 2.C (ac-ft)	4 Mutual's Order No. 95-4 Releases from Table 2.C (ac-ft)	5 Big Bear's In-lieu Supply Delveries (see Table 3.B) (ac-ft)	6 Mutual's Releases Leakage Spills & In-lieu Del. (to Table 2) (ac-ft)	7	8 Net Credit for Wastewater Exports (Input Data)	9 Spilled from Mutual's Lake Acct. (Input Data) (ac-ft)	10 Net Wastewater Export Credit (to Table 2) (ac-ft)
January	-	-	-	78.9	100.5	179.4		65.8	-	65.8
February	-	-	-	71.6	-	71.6		58.2	-	58.2
March	-	-	-	74.6	-	74.6		67.0	-	67.0
April	-	-	-	74.8	-	74.8		60.8	-	60.8
May	-	-	-	77.7	6.1	83.8		58.4	-	58.4
June	-	-	-	77.9	893.0	970.9		52.1	-	52.1
July	-	-	-	95.4	1,316.9	1,412.3		54.3	-	54.3
August	-	-	-	99.2	1,243.3	1,342.5		58.5	-	58.5
September	-	-	-	92.4	1,107.0	1,199.4		53.7	-	53.7
October	-	-	-	94.6	1,025.0	1,119.6		64.2	-	64.2
November	-	-	-	79.1	714.3	793.4		62.4	-	62.4
December	-	-	-	51.8	1.8	53.6		76.4	-	76.4
TOTALS	**-**	**-**	**-**	**967.9**	**6,407.90**	**7,375.8**		**731.7**	**-**	**731.7**

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TABLE 2.B
SYNTHESIZED MUTUAL OPERATION OF BIG BEAR LAKE
Synthesized Evaporation Calculation

Month	1 Starting Volume (ac-ft)	2 Starting Area (acres)	3 Assumed Evap (ac-ft)	4 Estimated Ending Volume (ac-ft)	5 Estimated Ending Area (acres)	6 Average Area (acres)	7 Mutuals Lake Evap. (to Table 2) (ac-ft)	8 Big Bear's Lake Evap. (to Table 3.A) (ac-ft)	9 Revised Ending Volume Estimate (ac-ft)	10
January	36,058.0	2,162.0	225.0	35,719.5	2,150.0	2,156.0	224.3	42.6	35,720.2	
February	35,720.2	2,150.0	252.8	37,045.6	2,196.0	2,173.0	255.5	47.1	37,042.9	
March	37,042.9	2,196.0	474.4	37,467.7	2,211.0	2,203.5	476.0	83.4	37,466.0	
April	37,466.0	2,211.0	654.6	37,125.3	2,200.0	2,205.5	653.0	112.9	37,126.9	
May	37,126.9	2,200.0	1,125.6	35,976.0	2,158.0	2,179.0	1,114.8	196.7	35,986.8	
June	35,986.8	2,158.0	1,328.0	33,739.9	2,073.0	2,115.5	1,301.9	249.2	33,766.0	
July	33,766.0	2,073.0	1,244.6	31,283.8	1,984.0	2,028.5	1,217.8	267.5	31,310.6	
August	31,310.6	1,984.0	1,181.2	28,950.6	1,919.0	1,951.5	1,161.9	286.1	28,969.9	
September	28,969.9	1,919.0	1,004.3	26,975.9	1,864.0	1,891.5	990.0	264.8	26,990.2	
October	26,990.2	1,864.0	844.6	25,090.1	1,812.0	1,838.0	832.8	240.6	25,101.9	
November	25,101.9	1,812.0	390.7	24,034.9	1,781.0	1,796.5	387.4	118.9	24,038.3	
December	24,038.3	1,781.0	185.1	26,219.0	1,843.0	1,812.0	188.3	57.4	26,215.9	
TOTALS							**8,803.7**	**1,967.2**		

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BIG BEAR WATERMASTER

TABLE 2.C
SYNTHESIZED MUTUAL OPERATION OF BIG BEAR LAKE
Mutual's Leakage, Spills & FC Releases, and SWRCB Releases

Month	1 Total Leakage from Input Data (ac-ft)	2 Mutual's Leakage to Table 2.A (ac-ft)	3 Big Bear's Leakage to Table 3.B (ac-ft)	4 Actual Spills & FC Releases from Input Data (ac-ft)	5 Big Bear's Spills & FC Releases to Table 3.B (ac-ft)	6 Mutual's Spills & FC Releases to Table 2.A (ac-ft)	7 SWRCB Order 95-4 Releases from Input Data (ac-ft)	8 Mutual's Order 95-4 Releases from Input Data (ac-ft)	9 Mutual's Order 95-4 Releases to Table 2.A (ac-ft)	10 Big Bear's Order 95-4 Releases to Table 3.B (ac-ft)
January	-	-	-	-	-	-	78.9	78.87	78.9	-
February	-	-	-	-	-	-	72.3	69.72	71.6	0.7
March	-	-	-	-	-	-	80.9	57.46	74.6	6.4
April	-	-	-	-	-	-	76.8	69.24	74.8	2.0
May	-	-	-	-	-	-	77.7	77.71	77.7	-
June	-	-	-	-	-	-	77.9	77.94	77.9	-
July	-	-	-	-	-	-	95.4	95.41	95.4	-
August	-	-	-	-	-	-	102.4	92.33	99.2	3.2
September	-	-	-	-	-	-	94.6	88.22	92.4	2.2
October	-	-	-	-	-	-	94.6	94.62	94.6	-
November	-	-	-	-	-	-	80.2	77.46	79.1	1.1
December	-	-	-	-	-	-	82.1	10.55	51.8	30.2
TOTALS	-	-	-	-	-	-	**1,013.88**	**889.53**	**967.92**	**45.96**

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BIG BEAR WATERMASTER

TABLE 3
DETERMINATION OF BIG BEAR'S LAKE ACCOUNT STATUS
Lake Account and Advance Account

Month	1 Actual Lake Account (see Table 1) (ac-ft)	2 Mutual's Lake Account (see Table 2) (ac-ft)	3 Big Bear's Lake Account (calc.) (ac-ft)	4 Change in Big Bear's Lake Account (calc.) (ac-ft)	5	6 Big Bear's Advances From Mutual (calc.) (ac-ft)	7 Big Bear's Payments Against Advances (calc.) (ac-ft)	8 Big Bear's Advance Account Balance (calc.) (ac-ft)	9 Big Bear's 0% Repayment Premium (calc.) (ac-ft)	10 Mutual's Credit for Return of Advances (to Table 2) (ac-ft)
	50,094	36,058	14,036					-		
January				(42.2)		-	-		-	-
	49,714	35,720	13,994					-		
February				(165.7)		-	-		-	-
	50,871	37,043	13,828					-		
March				(163.1)		-	-		-	-
	51,131	37,466	13,665					-		
April				(179.9)		-	-		-	-
	50,612	37,127	13,485					-		
May				(265.8)		-	-		-	-
	49,206	35,987	13,219					-		
June				575.8		-	-		-	-
	47,561	33,766	13,795					-		
July				977.4		-	-		-	-
	46,083	31,311	14,772					-		
August				879.7		-	-		-	-
	44,622	28,970	15,652					-		
September				780.7		-	-		-	-
	43,423	26,990	16,433					-		
October				703.3		-	-		-	-
	42,238	25,102	17,136					-		
November				478.6		-	-		-	-
	41,653	24,038	17,615					-		
December				(287.6)		-	-		-	-
	43,543	26,216	17,327					-		
TOTALS				3,291.1		-	-		-	-

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BIG BEAR WATERMASTER

TABLE 3.A
DETERMINATION OF BIG BEAR'S LAKE ACCOUNT STATUS
Lake Inflow Details

Month	1 In-lieu Water from SBVMWD (Input Data) (ac-ft)	2 In-lieu Water from Other's Wells (Input Data) (ac-ft)	3 In-lieu Supplies from Mutual's Wells (Input Data) (ac-ft)	4	5 Other Sources of In-lieu Supplies (Input Data) (ac-ft)	6 Big Bear's In-lieu Deliveries to Mutual (calc.) (ac-ft)	7	8 Big Bear's Advances From Mutual (from Table 3) (ac-ft)	9	10 Big Bear's Total Lake Inflows (calc.) (ac-ft)
January	100.5	-	-		-	100.5		-		100.5
February	-	-	-		-	-		-		-
March	-	-	-		-	-		-		-
April	-	-	-		-	-		-		-
May	6.1	-	-		-	6.1		-		6.1
June	12.0	881.0	-		-	893.0		-		893.0
July	410.4	906.5	-		-	1,316.9		-		1,316.9
August	575.8	667.5	-		-	1,243.3		-		1,243.3
September	274.3	832.7	-		-	1,107.0		-		1,107.0
October	207.4	817.6	-		-	1,025.0		-		1,025.0
November	127.7	586.6	-		-	714.3		-		714.3
December	1.8	-	-		-	1.8		-		1.8
TOTALS	1,716.0	4,691.9	-		-	6,407.9		-		6,407.9

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BIG BEAR WATERMASTER

TABLE 3.B
DETERMINATION OF BIG BEAR'S LAKE ACCOUNT STATUS
Lake Outflow Details

Month	1 Big Bear's Snowmaking Withdrawals (Input Data) (ac-ft)	2 Big Bear's Flatiron Withdrawals (Input Data) (ac-ft)	3 Return Flow from Snowmelt 50.0% (Table 1.C) (ac-ft)	4 Big Bear's Net Lake Withdrawal (calc.) (ac-ft)	5 Big Bear's Payments Against Advances (see Table 3) (ac-ft)	6 Big Bear's Spills & FC Releases from Table 2.C (ac-ft)	7 Big Bear's Leakage + SWRCB Rel. from Table 2.C (ac-ft)	8 Big Bear's Lake Evaporation from Table 2.B (ac-ft)	9 Net Wastewater Export Credit (from Table 2.A) (ac-ft)	10 Big Bear's Total Lake Outflows (calc.) (ac-ft)
January	68.4	-	34.2	34.2	-	-	-	42.6	65.8	**142.7**
February	119.5	-	59.8	59.8	-	-	0.7	47.1	58.2	**165.7**
March	12.8	-	6.4	6.4	-	-	6.4	83.4	67.0	**163.1**
April	8.4	-	4.2	4.2	-	-	2.0	112.9	60.8	**179.9**
May	16.8	-	-	16.8	-	-	-	196.7	58.4	**271.9**
June	16.0	-	-	16.0	-	-	-	249.2	52.1	**317.2**
July	17.7	-	-	17.7	-	-	-	267.5	54.3	**339.5**
August	15.8	-	-	15.8	-	-	3.2	286.1	58.5	**363.6**
September	5.6	-	-	5.6	-	-	2.2	264.8	53.7	**326.3**
October	33.9	-	17.0	16.9	-	-	-	240.6	64.2	**321.7**
November	106.6	-	53.3	53.3	-	-	1.1	118.9	62.4	**235.7**
December	250.7	-	125.4	125.4	-	-	30.2	57.4	76.4	**289.4**
TOTALS	**672.0**	**-**	**300.1**	**371.9**	**-**	**-**	**46.0**	**1,967.2**	**731.7**	**3,116.8**

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BIG BEAR WATERMASTER

TABLE 4
BASIN MAKE-UP ACCOUNT

Month	1 Big Bear's Basin Additions (see Table 4.A) (ac-ft)	2	3 Mutual's Basin Additions (see Table 4.B) (ac-ft)	4	5 Net Credit (Debit) (ac-ft)	6	7 Total Basin Replenishment (see Table 4.C) (ac-ft)	8	9 Basin Comp. Account Balance (ac-ft)
									29,287
January	89.7		89.7		-		-		29,287
February	36.2		35.8		0.4		-		29,287
March	40.7		37.4		3.3		-		29,291
April	38.5		37.4		1.0		-		29,292
May	41.9		41.9		-		-		29,292
June	45.0		485.5		(440.5)		-		28,851
July	252.9		706.2		(453.3)		-		28,398
August	339.2		671.3		(332.1)		-		28,066
September	184.5		599.7		(415.2)		-		27,651
October	151.0		559.8		(408.8)		-		27,242
November	104.0		396.7		(292.7)		-		26,949
December	42.7		27.2		15.4		-		26,964
TOTALS	1,366.2		3,688.7		-2,322.5		0.0		

CALENDAR YEAR
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BIG BEAR WATERMASTER

TABLE 4.A
BIG BEAR'S BASIN ADDITIONS

Month	SPILLS			LAKE RELEASES		IN LIEU SUPPLIES			
	1 Actual Spills & FC Releases (ac-ft)	2 Actual SWRCB 95-4 Releases (ac-ft)	3 Basin Addition @ 51.0% (ac-ft)	4 Lake Release for Mutual (ac-ft)	5 SWRCB 95-4 Releases for Mutual (ac-ft)	6 Basin Addition @ 50.0% (ac-ft)	7 Imported In Lieu Deliveries (ac-ft)	8 Basin Addition @ 50.0% (ac-ft)	9 Big Bear's Basin Additions (ac-ft)
January	-	-	-	-	78.9	39.4	100.5	50.3	89.7
February	-	2.6	1.3	-	69.7	34.9	-	-	36.2
March	-	23.5	12.0	-	57.5	28.7	-	-	40.7
April	-	7.5	3.8	-	69.2	34.6	-	-	38.5
May	-	-	-	-	77.7	38.9	6.1	3.1	41.9
June	-	-	-	-	77.9	39.0	12.0	6.0	45.0
July	-	-	-	-	95.4	47.7	410.4	205.2	252.9
August	-	10.1	5.1	-	92.3	46.2	575.8	287.9	339.2
September	-	6.4	3.3	-	88.2	44.1	274.3	137.2	184.5
October	-	-	-	-	94.6	47.3	207.4	103.7	151.0
November	-	2.7	1.4	-	77.5	38.7	127.7	63.9	104.0
December	-	71.5	36.5	-	10.6	5.3	1.8	0.9	42.7
TOTALS	**0.0**	**124.4**	**63.4**	**0.0**	**889.5**	**444.8**	**1,716.0**	**858.0**	**1,366.2**

CALENDAR YEAR
2014
BIG BEAR WATERMASTER

TABLE 4.B
MUTUAL'S BASIN ADDITIONS

Month	SPILLS & FISH RELEASES 1 Mutual's Spills (ac-ft)	2 Mutual's SWRCB 95-4 Releases (ac-ft)	3 Basin Addition @ 51.0% (ac-ft)	LAKE RELEASES 4 Mutual's Lake Demands (ac-ft)	5 SWRCB 95-4 Releases for Mutual (ac-ft)	6 Basin Addition @ 50.0% (ac-ft)	7 Total Basin Additions (ac-ft)
January	-	-	-	100.5	78.9	89.7	89.7
February	-	1.9	1.0	-	69.7	34.9	35.8
March	-	17.1	8.7	-	57.5	28.7	37.4
April	-	5.5	2.8	-	69.2	34.6	37.4
May	-	-	-	6.1	77.7	41.9	41.9
June	-	-	-	893.0	77.9	485.5	485.5
July	-	-	-	1,316.9	95.4	706.2	706.2
August	-	6.9	3.5	1,243.3	92.3	667.8	671.3
September	-	4.2	2.1	1,107.0	88.2	597.6	599.7
October	-	-	-	1,025.0	94.6	559.8	559.8
November	-	1.6	0.8	714.3	77.5	395.9	396.7
December	-	41.3	21.1	1.8	10.6	6.2	27.2
TOTALS	**0.0**	**78.4**	**40.0**	**6,407.9**	**889.5**	**3,648.7**	**3,688.7**

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BIG BEAR WATERMASTER

TABLE 4.C
BASIN REPLENISHMENTS

Month	1	2 Amount Replenished From SBVMWD (ac-ft)	3	4	5 Amount Replenished From Releases (ac-ft)	6 Amount Replenished From Others (ac-ft)	7	8 Total Amount Replenished (ac-ft)	9
January		-			-	-		-	
February		-			-	-		-	
March		-			-	-		-	
April		-			-	-		-	
May		-			-	-		-	
June		-			-	-		-	
July		-			-	-		-	
August		-			-	-		-	
September		-			-	-		-	
October		-			-	-		-	
November		-			-	-		-	
December		-			-	-		-	
		0.0			0.0	0.0		0.0	