

# Big Bear Watermaster

## Forty-Eighth Annual Report

---

### For Calendar Year 2024



BIG BEAR MUNICIPAL WATER DISTRICT v. NORTH FORK WATER COMPANY, et al.,  
Case No. SCV 165493 – County of San Bernardino



**Watermaster Members:**

Donald E. Evenson  
Samuel H. Fuller  
Katelyn A. Scholte

**Mailing Address:**

P.O. Box 2863  
Big Bear Lake, CA 92315  
(909) 866-5796

**BIG BEAR WATERMASTER**  
**FOR**  
**BIG BEAR MUNICIPAL WATER DISTRICT v.**  
**NORTH FORK WATER COMPANY, et al.,**  
**CASE NO.165493---COUNTY OF SAN BERNARDINO**

**WATERMASTER MEMBERS:**  
DONALD E. EVENSON  
KATELYN A. SCHOLTE  
SAMUEL H. FULLER

**MAILING ADDRESS**  
PO BOX 2863  
BIG BEAR LAKE, CA 92315  
909-866-5796

April 16, 2025

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

Subject: Calendar Year 2024

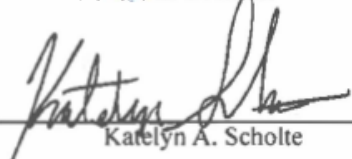
Gentlemen:

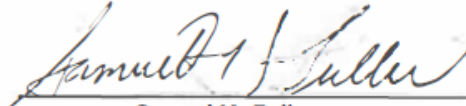
We have the honor of submitting a corrected Forty-Eighth Annual Report of the Big Bear Watermaster for Calendar Year 2024. The Committee detected some errors in the initial report submitted on March 28, 2025 and elected to make the necessary corrections and resubmit the report. The initial report should be discarded

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 2024 pursuant to the requirements of the Judgment.

Respectfully Submitted,

By:   
Donald E. Evenson

By:   
Katelyn A. Scholte

By:   
Samuel H. Fuller

# **FORTY-EIGHTH ANNUAL REPORT BIG BEAR WATERMASTER CALENDAR YEAR 2024**

## **TABLE OF CONTENTS**

|  | <u>Page</u> |
|--|-------------|
| I. INTRODUCTION                                      | 6           |
| II. SUMMARY  | 7-9         |
| III. BASIC DATA                                      | 10-54       |
| IV. DETERMINATIONS AND ACCOUNTS                      | 55-65       |
| V. OTHER WATERMASTER ACTIVITIES                      | 66-76       |
| APPENDICES   |             |
| Appendix A - Plankton Tow Sheets and Surface Surveys | 77-91       |
| Appendix B - Minutes of Watermaster Meetings in 2024 | 92-105      |
| Appendix C - Accounts for Calendar Year 2024         | 106-127     |

# **FORTY-EIGHTH ANNUAL REPORT BIG BEAR WATERMASTER CALENDAR YEAR 2024**

## **LIST OF TABLES**

|                     |   | <u>Page</u> |
|---------------------|---|-------------|
| TABLE III-1         | Monthly Precipitation for Two Stations in Big Bear Area                             | 13          |
| TABLE III-2         | Forty-Seven Years of Precipitation for Two Stations in the Big Bear Area            | 14          |
| TABLE III-3         | Big Bear Lake Inflows 1977-2024   | 16          |
| TABLE III-4         | Estimates of Monthly Dam Leakage  | 30          |
| TABLE III-5         | Monthly Discharges from Leakage and the Outlet Works of Bear Valley Dam             | 33          |
| TABLE III-6         | Comparison of Flows at Station B with Estimated Leakage and Flows from Outlet Works | 35          |
| TABLE III-7         | Net Wastewater Exports  | 38          |
| TABLE III-8         | Summary of Diverted Flow at Mouth of Santa Ana River Canyon                         | 41          |
| TABLE III-9         | Allocation of Big Bear MWD Lake Account   | 49          |
| TABLE III-10        | Water Deliveries to Mutual by Big Bear Municipal Water District                     | 50          |
| TABLE III-11        | Summary of Water Deliveries to Mutual 1977-2024                                     | 52          |
| TABLE III-12        | Equivalent Water Diversions by Mutual 1977-2024                                     | 54          |
| TABLE IV-1          | Effect of Wastewater Export Credits on Mutual's Lake Account                        | 61          |
| TABLE V-1<br>→ V-12 | Plankton Tow Sample Sheets  | 78-82       |

**FORTY-EIGHTH ANNUAL REPORT  
BIG BEAR WATERMASTER  
CALENDAR YEAR 2024**

**LIST OF FIGURES**

|          |  | <u>Page</u> |
|----------|--|-------------|
| FIGURE 1 | Actual Lake Contents and Mutual's Lake Account,<br>1977 through 2024 | 8           |
| FIGURE 2 | Water Balance for 2024 Actual Lake Operations                        | 57          |
| FIGURE 3 | Water Balance for 2024 Mutual's Lake Operation                       | 59          |
| FIGURE 4 | Water Balance for 2024 Big Bear MWD's Lake Operation                 | 63          |

# I. INTRODUCTION

The Big Bear Watermaster presents the Forty-Eighth Annual Report of its activities for calendar year 2024. 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 2024 activities of the Watermaster including the status of accounts and various tabulations as required by the Judgment.

In 2024, the Big Bear Watermaster Committee was composed of Donald E. Evenson, President, representing Big Bear Municipal Water District; Samuel H. Fuller, representing Bear Valley Mutual Water Company; and Katelyn A. Scholte, Secretary, representing San Bernardino Valley Water Conservation District.

The Watermaster Committee met four times during 2024. These meetings were held on the following dates:

January 16, 2024

March 19, 2024

August 13, 2024

October 22, 2024

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

## II. SUMMARY

### 2024 WATERMASTER ACCOUNTS

2024 was an average precipitation year. Annual precipitation at the two gauges in the Big Bear Lake watershed averaged 25.44 inches, which is 102.7 percent of the 24.77 inches of average annual rainfall since 1977. Precipitation at Bear Valley Dam was 33.70 inches, which is 98.7 percent of the 115-year (1910-2024) average of 35.01 inches.

Inflow to Big Bear Lake in 2024 was also average. The 2024 calculated lake inflow was 15,697 acre-feet, which is 104 percent of the average inflow since 1977. The average inflow for the 48 years since the Judgment was rendered is 15,050 acre-feet per year.

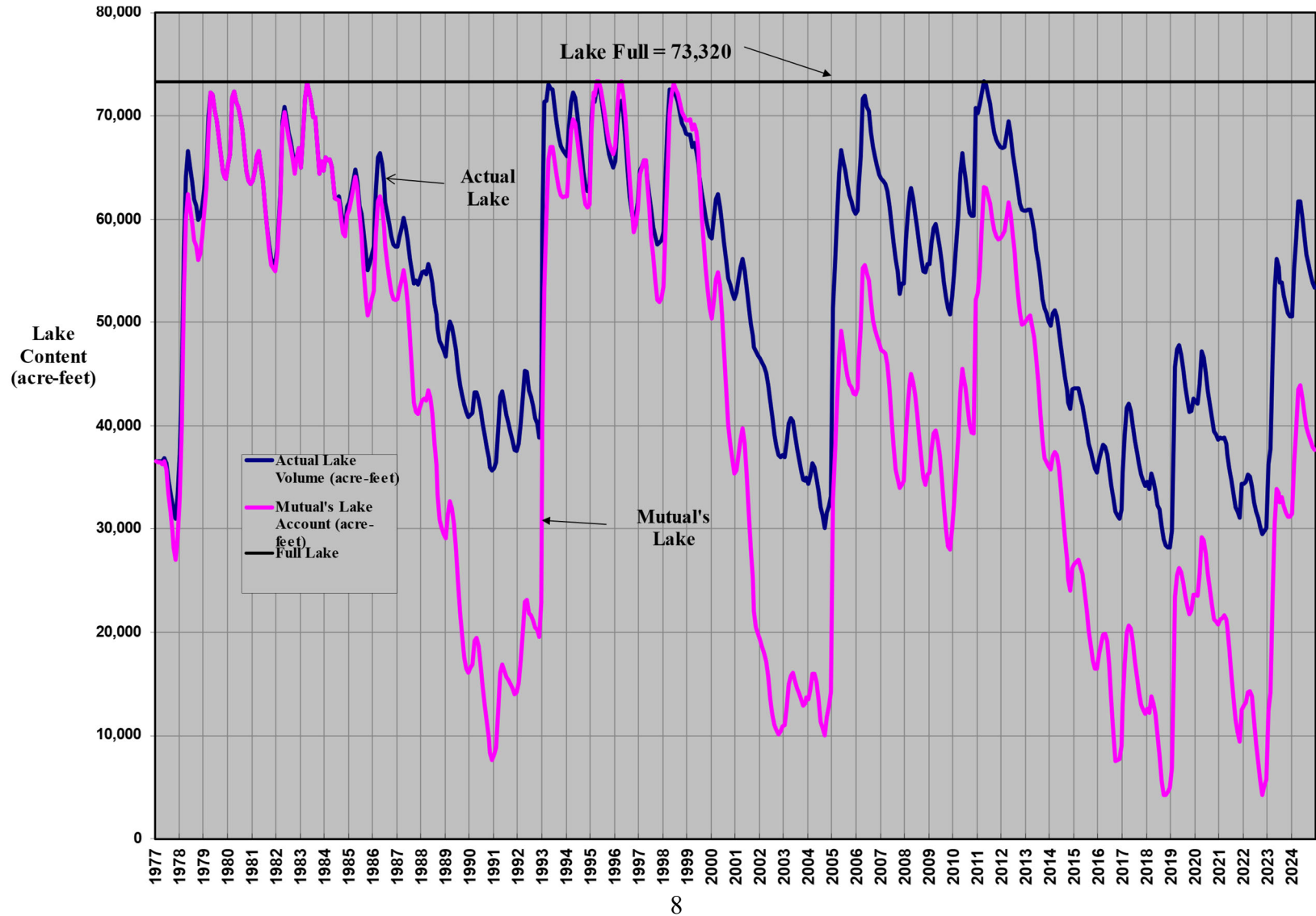
Actual lake levels rose 1.08 feet in 2024 and ended the year at 65.21 feet, which is 7.12 feet below the top of the dam. Accordingly, lake contents increased by 2,739 acre-feet during the year. On December 31, 2024, the lake contained 53,351 acre-feet of water. When full, the lake level is 72.33 feet 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 37,659 acre-feet at the end of 2024. Their lake account increased by 6,487 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 ended the year at 58.75 feet or 13.58 feet below the top of the dam and 6.46 feet lower than the actual year-end lake level of 65.21 feet. If Mutual had not been credited with the net wastewater exports, their lake account balance would have been 32,482 acre-feet and their lake level would have been 56.30 feet or 16.03 feet below the top of dam and 8.91 feet lower than it actually was.

In 2024, Mutual received only 88.4 acre-feet of water from Big Bear MWD. Big Bear MWD has the option to provide In Lieu Water supplies or to release water from the lake. 2024 was an average year and Mutual did not need any In Lieu water. They were able to meet their low elevation water needs from releases from the Seven Oaks Dam, which included the 88.4 acre-feet of water from Big Bear Lake that was required for fish protection purposes as required under SWRCB Order No. 95-4.

**FIGURE 1**  
**ACTUAL LAKE CONTENTS AND MUTUAL'S LAKE ACCOUNT 1977-2024**

Calendar Year 2024 – Big Bear Watermaster



At the beginning of the year, Big Bear MWD had 19,440 acre-feet in their lake account. By the end of the year, their lake account had decreased by 3,748 acre-feet to 15,692 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 2024 the Basin Make-up Account balance increased by 93 acre-feet. The Basin Make-up Account began the year with a balance of 21,069 acre-feet and ended the year with a balance of 21,162 acre-feet. The increase resulted primarily as a result of the unused Fishery releases from Big Bear Lake that was recharged to the San Bernardino Groundwater Basin. In 2025, the Watermaster Committee will continue its efforts to determine how to adjust the Basin Make-up Account when Mutual uses In Lieu Water deliveries for groundwater recharge.

## **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 2024, the Watermaster was involved in monitoring and discussing two issues. These issues are:

- Impacts of Seven Oaks Dam, and the Southern California Edison Hydro-electric facilities,
- Protecting Big Bear Lake from Quagga Mussels,

These issues are discussed in Chapter V.

### 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 2024, the overall water balance for the lake was:

|  |                  |
|--|------------------|
| Initial Storage (1-1-24)                   | 50,612 acre-feet |
| Inflows                                    | 15,697 acre-feet |
| Evaporation                                | 11,791 acre-feet |
| Releases for Mutual                        | -0- acre-feet    |
| Releases for Valley District               | -0- acre-feet    |
| Releases & Leakage for SWRCB<br>Order 95-4 | 675 acre-feet    |
| Spills & Flood Control Releases            | -0- acre-feet    |
| Net Snowmaking Withdrawal                  | 493 acre-feet    |
| Ending Storage (12-31-24)                  | 53,351 acre-feet |
| Change-in-Storage                          | 2,739 acre-feet  |

In 2024, the volume of water in Big Bear Lake increased by 2,739 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 is 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 gauge height of 57.33 feet). In August of 2024, there were problems with the lake level recorder and manual lake measurements were made to provide the needed lake level data.

The lake began the year at a gauge height of 64.13 feet and ended the year at a gauge height of 65.21 feet. Over the year the lake level rose 1.08 feet. The lowest lake level was 64.00 feet or 8.33 feet below the top of the dam, and it occurred on January 16, 2024. The highest recorded lake level was 68.46 feet, which occurred on May 13, 2024. The lake is full at a gauge height reading of 72.33 feet (6,743.20 feet above msl) and is empty at a gauge height of zero.

The Watermaster uses an established gauge height-lake capacity table to estimate the volume of water in the lake from the measured gauge heights. At the beginning of the year, the lake contained 50,612 acre-feet of water. At the end of the year, there were 53,351 acre-feet of water in the lake. The lake content increased by 2,739 acre-feet during 2024.

## **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 twice in 2024. The monthly evaporation rates totaled 4.345 feet (52.4 inches) for 2024. However, with an average period of inflow seen, the full evaporation was realized. Total evaporation from the lake for 2024 was calculated to be 11,791 acre-feet.

### **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 2024. The 2024 precipitation at the two stations was 33.70 and 17.18 inches, respectively. During the month of June there was no precipitation. February and March were the wettest months with approximately 79 percent of the annual precipitation.

**Table III-1** also compares the 2024 precipitation at the two stations with their corresponding averages for the forty-eight years since the Judgment was rendered. At the Bear Valley Dam station, precipitation was 98 percent of its forty-eight-year average, and at the Big Bear City Community Services District station, precipitation was 115 percent of its forty-eight-year average. For both stations, 2024 precipitation averaged 103 percent of their forty-eight-year combined average.

**Table III-2** shows the annual precipitation for both stations for the forty-eight years since the Judgment was rendered. As shown in **Table III-2**, 2024 was an above average year for precipitation. For the Bear Valley Dam station, precipitation was 99 percent of the 115-year (1910–2024) average of 35.01 inches.

**TABLE III - 1**  
**MONTHLY PRECIPITATION FOR TWO STATIONS**  
**IN BIG BEAR AREA (Inches)**

Calendar Year 2024 - Big Bear Watermaster

| Month                     | Bear Valley Dam* | Big Bear City<br>Community<br>Services District** | Average      | Percent of<br>Annual Total |
|---------------------------|------------------|---|--------------|----------------------------|
| January                   | 3.20             | 1.40  | 2.30         | 9.04%                      |
| February                  | 18.09            | 8.85  | 13.47        | 52.95%                     |
| March                     | 8.57             | 4.52  | 6.55         | 25.73%                     |
| April                     | 2.46             | 1.01  | 1.74         | 6.82%                      |
| May                       | 0.00             | 0.10  | 0.05         | 0.20%                      |
| June                      | 0.00             | 0.00  | 0.00         | 0.00%                      |
| July                      | 0.00             | 0.18  | 0.09         | 0.35%                      |
| August                    | 0.00             | 0.28  | 0.14         | 0.55%                      |
| September                 | 0.35             | 0.42  | 0.39         | 1.51%                      |
| October                   | 0.00             | 0.08  | 0.04         | 0.16%                      |
| November                  | 1.03             | 0.34  | 0.69         | 2.69%                      |
| December                  | 0.00             | 0.00  | 0.00         | 0.00%                      |
| <b>2024 Totals</b>        | <b>33.70</b>     | <b>17.18</b>                                      | <b>25.44</b> | <b>100.00%</b>             |
| 1977-2024 48-year Average | 34.55            | 14.98   | 24.77        |                            |
| 2024 % of 48-year Average | 97.5%            | 114.7%  | 102.7%       |                            |

|   |        |
|---|--------|
| Average of the 48-year Average for both stations    | 24.77  |
| Average of the 2024 precipitation for both stations | 25.44  |
| 2024 Average as a percent of the 48-year average    | 102.7% |

Source:

\* Big Bear MWD

\*\* Big Bear City Community Services District

Table III-2

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

Calendar Year 2024 - Big Bear Watermaster

| Year                        | Bear Valley Dam* | Big Bear City<br>Community Services<br>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            | 17.18   |
| 2010                        | 64.14            | 33.23   |
| 2011                        | 27.25            | 14.81   |
| 2012                        | 23.70            | 16.41   |
| 2013                        | 14.38            | 14.53   |
| 2014                        | 29.61            | 12.23   |
| 2015                        | 19.72            | 8.17  |
| 2016                        | 31.93            | 15.42   |
| 2017                        | 24.55            | 14.81   |
| 2018                        | 27.84            | 12.74   |
| 2019                        | 54.46            | 24.87   |
| 2020                        | 21.50            | 11.43   |
| 2021                        | 29.63            | 21.13   |
| 2022                        | 24.70            | 13.68   |
| 2023                        | 52.94            | 24.52   |
| 2024                        | 33.70            | 17.18   |
| <b>48-Year Average</b>      | <b>34.55</b>     | <b>14.98</b>                                      |
| Percent of 48-year Average  | 97.5%            | 114.7%  |
| <b>115-Year Average</b>     | <b>35.01</b>     | <b>N/A</b>  |
| Percent of 114-Year Average | 96.3%            |   |

Source:

\* Big Bear MWD

\*\* Big Bear City Community Services District

## 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:

$$\text{Inflow} = \text{Evaporation} + \text{Releases} + \text{Spills} + \text{Leakage} + \\ \text{Net Withdrawals} - \text{Change in Storage}$$

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 twice in 2024.

Total annual inflow for 2024 into the lake was calculated to be 15,697 acre-feet. The largest monthly inflow was 4,965 acre-feet, and it occurred in February. The average annual lake inflow for 48 years (1977-2024) since the Judgment was rendered is 15,050 acre-feet. The median annual inflow for this same period is 9,355 acre-feet.

**Table III-3** lists the annual lake inflows for the period 1977–2024. 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 2024 was just above average inflow for the forty-eight years since the Judgment was rendered in 1977. Thirty-three years had lower lake inflows, and fourteen years had higher lake inflows.

**Table III - 3**  
**Big Bear Lake Inflows 1977-2024**  
 (acre-feet / year)  
 Calendar Year 2024 - Big Bear Watermaster

| Year        | Lake Inflows (AF/year)    | Rank                 | Plotting Position | Year        | Lake Inflow (AF/year) |
|-------------|---------------------------|----------------------|-------------------|-------------|-----------------------|
| 1977        | 7,103                     | <b>Min.</b> 1        | 2.0%              | <b>2002</b> | <b>1,717</b>          |
| 1978        | 40,743                    | 2                    | 4.1%              | 2007        | 2,841                 |
| 1979        | 25,318                    | 3                    | 6.1%              | 2013        | 3,129                 |
| 1980        | <b>41,302</b>             | 4                    | 8.2%              | 2015        | 3,677                 |
| 1981        | 6,529                     | 5                    | 10.2%             | 1999        | 3,774                 |
| 1982        | 25,310                    | 6                    | 12.2%             | 1988        | 4,551                 |
| 1983        | <b>34,492</b>             | 7                    | 14.3%             | 2018        | 4,818                 |
| 1984        | 10,569                    | 8                    | 16.3%             | 1990        | 4,856                 |
| 1985        | 9,497                     | 9                    | 18.4%             | 1989        | 4,967                 |
| 1986        | 13,812                    | 10                   | 20.4%             | 2014        | 5,776                 |
| 1987        | 8,005                     | 11                   | 22.4%             | 2022        | 5,958                 |
| 1988        | 4,551                     | 12                   | 24.5%             | 2021        | 6,401                 |
| 1989        | 4,967                     | 13                   | 26.5%             | 1981        | 6,529                 |
| 1990        | 4,856                     | 14                   | 28.6%             | 2001        | 6,915                 |
| 1991        | 11,658                    | 15                   | 30.6%             | 2000        | 6,930                 |
| 1992        | 15,543                    | 16                   | 32.7%             | 2016        | 7,027                 |
| <b>1993</b> | <b>48,613</b> <b>Max.</b> | 17                   | 34.7%             | 1977        | 7,103                 |
| 1994        | 11,015                    | 18                   | 36.7%             | 2020        | 7,945                 |
| 1995        | 33,340                    | 19                   | 38.8%             | 1987        | 8,005                 |
| 1996        | 13,119                    | 20                   | 40.8%             | 2012        | 8,175                 |
| 1997        | 8,757                     | 21                   | 42.9%             | 2003        | 8,295                 |
| 1998        | <b>34,629</b>             | <b>22</b>            | <b>44.9%</b>      | 2004        | 8,404                 |
| 1999        | 3,774                     | 23                   | 46.9%             | 1997        | 8,757                 |
| 2000        | 6,930                     | <b>Median</b> 24     | <b>49.0%</b>      | 2009        | 9,212                 |
| 2001        | 6,915                     | <b>Median</b> 25     | <b>51.0%</b>      | 1985        | 9,497                 |
| <b>2002</b> | <b>1,717</b> <b>Min.</b>  | 26                   | 53.1%             | 1984        | 10,569                |
| 2003        | 8,295                     | 27                   | 55.1%             | 1994        | 11,015                |
| 2004        | 8,404                     | 28                   | 57.1%             | 1991        | 11,658                |
| 2005        | 39,600                    | 29                   | 59.2%             | 1996        | 13,119                |
| 2006        | 17,564                    | 30                   | 61.2%             | 2017        | 13,213                |
| 2007        | 2,841                     | 31                   | 63.3%             | 1986        | 13,812                |
| 2008        | 14,182                    | 32                   | 65.3%             | 2008        | 14,182                |
| 2009        | 9,212                     | 33                   | 67.3%             | 1992        | 15,543                |
| 2010        | 32,959                    | 34                   | 69.4%             | <b>2024</b> | <b>15,697</b>         |
| 2011        | 16,908                    | 35                   | 71.4%             | 2011        | 16,908                |
| 2012        | 8,175                     | 36                   | 73.5%             | 2006        | 17,564                |
| 2013        | 3,129                     | 37                   | 75.5%             | 1982        | 25,310                |
| 2014        | 5,776                     | 38                   | 77.6%             | 1979        | 25,318                |
| 2015        | 3,677                     | 39                   | 79.6%             | 2019        | 25,381                |
| 2016        | 7,027                     | 40                   | 81.6%             | 2023        | 32,195                |
| 2017        | 13,213                    | 41                   | 83.7%             | 2010        | 32,959                |
| 2018        | 4,818                     | <b>42</b>            | <b>85.7%</b>      | 1995        | 33,340                |
| 2019        | 25,381                    | <b>43</b>            | <b>87.8%</b>      | 1983        | <b>34,492</b>         |
| 2020        | 7,945                     | <b>44</b>            | <b>89.8%</b>      | 1998        | <b>34,629</b>         |
| 2021        | 6,401                     | <b>45</b>            | <b>91.8%</b>      | 2005        | 39,600                |
| 2022        | 5,958                     | <b>46</b>            | <b>93.9%</b>      | 1978        | 40,743                |
| 2023        | 32,195                    | <b>47</b>            | <b>95.9%</b>      | 1980        | <b>41,302</b>         |
| <b>2024</b> | <b>15,697</b>             | <b>Max</b> <b>48</b> | <b>98.0%</b>      | <b>1993</b> | <b>48,613</b>         |

**1977 - 2024**

|                |               |
|----------------|---------------|
| <b>Maximum</b> | <b>41,302</b> |
| <b>Average</b> | <b>15,050</b> |
| <b>Median</b>  | <b>9,355</b>  |
| <b>Minimum</b> | <b>1,717</b>  |

**Notes:** 1980 and 1983 values were corrected to delete non-tributary inflows to the Lake  
 1998 inflows were corrected to reflect actual value in the 1998 Annual Report

## **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.

### **Station B History**

Flow at Station B was initially measured by a compound weir with a v-notch section and a rectangular section. It was attached to a reinforced concrete structure in the riverbed. The v-notch section had a flow range of 0 to 0.44 cfs and the rectangular section had 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 were calculated based on the rating curve of the weir plate.

In late 2015, vandalism at Station B impaired the reliability and accuracy of the flow measurements at Station B. To confirm compliance with the SWRCB Order No. 95-4, Big Bear MWD used the measured flows from the 6-inch Bypass Pipeline plus the estimated leakage from the sluice gates until Station B was repaired.

In October 2016, the Station B weir plate was replaced to improve the accuracy of the water level measurements and the calculated flow values. The weir plate was changed from the compound

weir to a 90-degree, 12-inch v-notch weir. Big Bear MWD reprogrammed the SCADA/PLC for the new weir and the flow values at Station B showed improved accuracy.

However, in 2017 measurement problems at Station B continued so Big Bear MWD continued to rely on using releases from the 6-inch Bypass Pipe Line to maintain flows at Station B. Big Bear MWD contracted with XiO, Inc. to install a new transducer probe and cloud SCADA system to record flows through the new weir plate at Station B. The new system was expected to be operational in early 2018 but problems with the data transmission cable delayed implementation. On December 12, 2018, the cable was repaired and the Station B data collection became operational and worked throughout 2024.

### **Station A History**

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 2.3 cfs and 11.8 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. However, there was some damage to the weir plate that could not be repaired.

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

To determine if Station A was determining flows accurately, Big Bear MWD retained a consultant, Jericho Systems, Inc., to manually measure the Bear Creek flows above and below Station A on two occasions. The consultant found that the measured flows were 0.5 to 1.0 cfs higher than the flows calculated from water level data applied to the damaged weir plate. In 2017, Big Bear MWD began discussing options for Station A with the State Water Resources Control Board. These discussions will continue in 2025.

### **Flow Compliance Plans**

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 ensure the Station A requirements would be met. The new Station B requirements vary by month and hydrologic year type. The monthly hydrologic year type is based on water 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.

**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**

| 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   |  | n.a.  | 0.95                            | n.a.  | 0.95                            | n.a.  | 0.95                            | n.a.  | 0.95                            |
| November 1  |  | 0.03  | 0.90                            | 0.03 and 0.56                                     | 0.90                            | 0.57 and 1.93                                     | 0.70                            | 1.93  | 0.70                            |
| December 1  |  | 1.59  | 0.85                            | 1.59 and 3.04                                     | 0.85                            | 3.05 and 5.60                                     | 0.80                            | 5.60  | 0.60                            |
| January 1   |  | 3.73  | 0.90                            | 3.73 and 8.14                                     | 0.75                            | 8.15 and 12.84                                    | 0.75                            | 12.84   | 0.30                            |
| February 1  |  | 8.94  | 1.00                            | 8.94 and 13.84                                    | 0.85                            | 13.85 and 20.79                                   | 0.50                            | 20.79   | 0.30                            |
| March 1     |  | 14.42   | 0.80                            | 14.42 and 20.05                                   | 0.40                            | 20.06 and 31.47                                   | 0.40                            | 31.47   | 0.30                            |
| April 1     |  | 19.29   | 0.75                            | 19.29 and 25.84                                   | 0.50                            | 25.85 and 40.30                                   | 0.40                            | 40.30   | 0.30                            |
| May 1       |  | 21.61   | 0.95                            | 21.61 and 28.65                                   | 0.70                            | 28.66 and 41.16                                   | 0.55                            | 41.16   | 0.30                            |
| June 1      |  | 22.18   | 1.15                            | 22.18 and 30.01                                   | 0.80                            | 30.02 and 41.86                                   | 0.75                            | 41.86   | 0.30                            |
| July 1      |  | 22.42   | 1.20                            | 22.42 and 30.01                                   | 0.95                            | 30.02 and 41.86                                   | 0.95                            | 41.86   | 0.30                            |
| August 1    |  | 22.93   | 1.25                            | 22.93 and 30.69                                   | 1.05                            | 30.70 and 42.48                                   | 0.95                            | 42.48   | 0.30                            |
| September 1 |  | 23.30   | 1.00                            | 23.30 and 30.86                                   | 0.95                            | 30.87 and 43.69                                   | 0.95                            | 43.69   | 0.30                            |

The Exhibit A Flow Compliance 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.

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 Revised Station B flow requirements for 2024 are highlighted in yellow.

**2024 Revised Flow Compliance Plan**  
**Table to Determine Minimum Flows at Station B**  
**Based Upon Year-to-Date Precipitation at Bear Valley Dam**  
**March 2, 2025**

| Date        | 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.  | 1.20                            | n.a.  | 1.20                            | n.a.  | 1.20                            |
| November 1  | 0.19   | 0.03  | 1.10                            | 0.03 and 0.56                                     | 1.00                            | 0.57 and 1.93                                     | 0.95                            | 1.93  | 0.90                            |
| December 1  | 1.08   | 1.59  | 0.90                            | 1.59 and 3.04                                     | 0.85                            | 3.05 and 5.60                                     | 0.85                            | 5.60  | 0.85                            |
| <b>2024</b> |  |   |                                 |   |                                 |   |                                 |   |                                 |
| January 1   | 1.92   | 3.73  | 0.90                            | 3.73 and 8.14                                     | 0.85                            | 8.15 and 12.84                                    | 0.85                            | 12.84   | 0.85                            |
| February 1  | 5.12   | 8.94  | 1.00                            | 8.94 and 13.84                                    | 0.85                            | 13.85 and 20.79                                   | 0.50                            | 20.79   | 0.30                            |
| March 1     | 23.21  | 14.42   | 0.95                            | 14.42 and 20.05                                   | 0.85                            | 20.06 and 31.47                                   | 0.40                            | 31.47   | 0.30                            |
| April 1     | 31.78  | 19.29   | 0.75                            | 19.29 and 25.84                                   | 0.50                            | 25.85 and 40.30                                   | 0.40                            | 40.30   | 0.30                            |
| May 1       | 34.24  | 21.61   | 0.95                            | 21.61 and 28.65                                   | 0.70                            | 28.66 and 41.16                                   | 0.55                            | 41.16   | 0.30                            |
| June 1      | 34.24  | 22.18   | 1.15                            | 22.18 and 30.01                                   | 1.00                            | 30.02 and 41.86                                   | 0.75                            | 41.86   | 0.30                            |
| July 1      | 34.24  | 22.42   | 1.50                            | 22.42 and 30.01                                   | 1.30                            | 30.02 and 41.86                                   | 0.95                            | 41.86   | 0.55                            |
| August 1    | 34.24  | 22.93   | 1.50                            | 22.93 and 30.69                                   | 1.50                            | 30.70 and 42.48                                   | 1.25                            | 42.48   | 0.55                            |
| September 1 | 34.24  | 23.30   | 1.35                            | 23.30 and 30.86                                   | 1.20                            | 30.87 and 43.69                                   | 1.20                            | 43.69   | 1.15                            |
| October 1   | 0.00   | n.a.  | 1.20                            | n.a.  | 1.20                            | n.a.  | 1.20                            | n.a.  | 1.20                            |
| November 1  | 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  | 1.03   | 1.59  | 0.90                            | 1.59 and 3.04                                     | 0.85                            | 3.05 and 5.60                                     | 0.85                            | 5.60  | 0.85                            |

**Note 1**  
**Note 2**

Yellow highlighted values are the Flow Compliance values for CY 2024  
Minimum flow values in blue are revised values used effective July 1, 2014

Based on the Revised Flow Compliance Plan and the actual water year-to-date precipitation at Bear Valley Dam, the plan for minimum daily average flows at Station B in 2024 was as follows:

| <b>Month<br/>2024</b> | <b>Hydrologic Condition<br/>WY To-Date</b> | <b>Minimum Daily<br/>Averages Flow (cfs)</b> | <b>Exhibit A<br/>Req.</b> |
|-----------------------|--|--|---------------------------|
| January               | Dry  | 0.90   | 0.90                      |
| February              | Dry  | 1.00   | 1.00                      |
| March                 | Above Normal                               | 0.40   | 0.40                      |
| April                 | Above Normal                               | 0.40   | 0.40                      |
| May                   | Above Normal                               | 0.55   | 0.55                      |
| June                  | Above Normal                               | 0.75   | 0.75                      |
| July                  | Above Normal                               | 0.95   | 0.95                      |
| August                | Above Normal                               | 1.25   | 0.95                      |
| September             | Above Normal                               | 1.20   | 0.95                      |
| October               | Start Water Year                           | 1.20   | 0.95                      |
| November              | Dry  | 1.10   | 0.90                      |
| December              | Dry  | 0.90   | 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 December 2018, the XiO cloud SCADA system was installed and began collecting data. There was a testing period between December 2018 and January 2019 to ensure data collection reliability and probe accuracy. In 2019, the XiO data was checked against the original transducer at Station B to ensure accuracy of measurement and system redundancy. With reliable data from Station B, the XiO system will automatically actuate the 6-inch bypass valve based on flow conditions at Station B. If side flows are excessive, the XiO system will slow the flow of the 6-inch bypass valve. On the contrary, if side flows are non-existent, the XiO system will adjust flows through the 6-inch bypass valve to meet the desired downstream flow rate as stated in the Revised Flow Compliance Plan based on cumulative water year rainfall.

2019 was a year of learning how to implement the XiO Cloud SCADA system. The system began operation in December 2018 and on February 17, 2019, a deep freeze damaged the control valve on the 6-inch Bypass Line, which put the XiO system out of service. The control valve was

replaced but there were other operational and equipment issues that required the Big Bear MWD staff to manually oversee the control system to keep Station B in compliance. On December 2, 2019 all problems with XiO SCADA system appeared to be resolved. In October of 2020 XiO was having trouble keeping flows steady at Station B. Big Bear MWD determined that manual setting of the flows in the 6-inch Bypass Line would create a more accurate flow at Station B.

During 2024, the Exhibit A Flow Compliance Plan requirements at Station B were met on all, except 8 days. The Revised Flow Compliance Plan flow requirements at Station B were higher in some months and the number of days of non-compliance in 2024 was also the same 8 days. On these days there were minor operational issues that resulted in flows that were just a little below the requirements. Meeting the Flow Compliance requirements at Station B appeared to keep the flows at Station A in compliance with the SWRCB requirements. However, access to Station A was limited to WY 2023-24 and Station A requirements were met during the January – September period of 2024. After September 2024, access to Station A was not possible so flow data was not available to determine compliance.

The next step for Big Bear MWD is to review the flow and release data collected over the past 17 years and recommend a final Flow Compliance Plan for Station B to the SWRCB that will require flows at Station B that will meet the flow needs at Station A and to eliminate the flow measurement facility at Station A. In 2025, Big Bear MWD will be in discussions with the SWRCB to close out this physical component of SWRCB Order No. 95-4.

### **Watermaster Accounting Procedures**

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 Water.

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 River Pick-up on the Santa Ana River below Seven Oaks Dam (SOD). 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 SCE Santa Ana River Diversions will be made using the Daily Flow Reports prepared by the San Bernardino Valley Water Conservation District.

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).

Beginning in 2018, the Watermaster Committee decided that Mutual's Deliveries of Santa Ana River Water should be determined as the sum of the following three deliveries:

- BVMWC Highline (B1)\* delivery,
- Northfork delivery: Northfork Canal Weir delivery (G2) plus Edwards Canal delivery (H2) plus Northfork Parshall Flume delivery to SBVWCD (K2), and
- Redlands delivery: Redlands Aqueduct Weir (W1) delivery less the Redlands Tunnel (I1) inflow plus the Redlands Sandbox Spills (YI).

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.

The following paragraph describes the 2020 accounting changes related to the Big Bear Lake outflows for fishery protection required by SWRCB Order 95-4 to reflect the operational change of SCE operations and the impact of related SOD operational procedures in 2020.

2020 was an abnormal operational year that required changes to the accounting procedures used to allocate the daily Outlet Works Flows and Dam Leakage for fishery protection required by SWRCB Order 95-4. Beginning March 3 and throughout the remainder of 2020, SCE was not generating power. The only diversions SCE made at their Bear Creek diversion facility were for delivery to Mutual at the Greenspot Forebay. The diversions during this period were between zero and 11 cfs. This SCE operation limited the amount of SAR water that could be delivered to Mutual. Because of the low diversion rates, the assumption was made that SCE did not divert the full flow of Bear Creek and the Outlet Works Flows and Dam Leakage would continue to flow downstream into Seven Oaks Reservoir. This operating condition continued in 2023.

The updated allocation for the condition when SCE was not operational is to determine if Mutual is “fully utilizing” the releases from Seven Oaks Dam. If they are “fully utilizing” the SOD releases the amount of the Outlet Works Flows and Dam Leakage (i.e. Fishery Releases) would be deducted from Mutual's Lake Account. “Fully utilizing” is defined as the condition when Mutual is diverting and using essentially all of the SOD releases and the amount of the SOD releases diverted by SBVWCD and/or flowing past Cuttle Weir is less than the amount of the Outlet Works Flows and Dam Leakage.

---

\* The term in parenthesis refers to the site location used in the Daily Flow Reports (DFR's) of the San Bernardino Valley Water Conservation District

When the SOD releases are high and the SBVWCD is diverting some of the SOD releases for recharge or there are un-diverted releases flowing past Cuttle Weir, the amount of the Outlet Works Flows and Dam Leakage is deducted from Mutual's and BBMWD's lake accounts in proportion to the amount of water in their accounts.

A second condition when Mutual is not "fully utilizing" the SOD releases and the SCE deliveries of SAR water is when Mutual delivers water to SBVWCD from the Tailrace Pipeline that is more than the Outlet Works Flows and Dam leakage used for fishery protection. The Tailrace Pipeline delivers SAR water from the afterbay of SCE Powerhouse #3. With SCE out of service, the water entering the afterbay comes from Mutual's River Pick-up, which consists of SOD releases and Greenspot spills from Mutual's Highline. When these flows exceed Mutual's needs, Mutual delivers the surplus water to SBVWCD for groundwater recharge. The committee assumes these flows include the Outlet Works Flows and Dam Leakage for fishery protection. The amounts would be deducted from Mutual's and BBMWD's lake accounts in proportion to the amount of water in their accounts.

In 2024, the SCE facilities were not operational all year. Under this condition, releases from the Lake were needed to meet the Fishery Requirements all year. The total releases from the Lake in 2024 to meet the Fishery Requirements was 674.6 acre-feet.

Under these conditions, the 2024 Fishery Releases from Bear Valley Dam into Bear Creek flowed down into the Santa Ana River and then into storage behind Seven Oaks Dam (SOD). Based on the SBVWCD Daily Flow Reports there were 14 days when there were no SOD releases, the total SOD release in 2024 was estimated to be 52,619 acre-feet.

The SOD releases were greater than the Fishery Releases on all other days. The flow in the SAR downstream from SOD was greater than the Fishery Releases on 300 days. This means the Fishery Releases that reached SOD would either be diverted by SBVWCD for groundwater recharge or flow past cuttle weir on these 300 days.

On the other 52 days, Mutual's River Pick-up was the entire SOD release. The River Pick-up would contain the Fishery Releases that reached SOD and would be delivered to the afterbay of

Powerhouse #3 and delivered to either the Redlands Aqueduct or the Tailrace Pipeline. On 19 days Mutual delivered SOD releases to SBVWCD for groundwater recharge. That left 43 days when Mutual delivered the SOD releases to their customers.

On these 43 days, the Fishery Releases were deducted from Mutual's Lake Account. The amount deducted for these 43 days was 88.4 acre-feet. On the other 323 days, the Fishery Releases were deducted from Mutual's and Big Bear MWD's lake accounts in proportion to how much was in their lake account. Of the remaining 586.2 acre-feet of Fishery Releases, the result was that 403.4 acre-feet were deducted from Mutual's Lake Account and 182.8 acre-feet was deducted from Big Bear MWD's Lake Account. Mutual's total deduction was 491.8 acre-feet.

The Watermaster Committee will continue to review these accounting methods in 2025 to make sure 1) the determinations of the allocation of the "Outlet Works Flows and Dam Leakage" for fishery protection in Bear Creek accurately reflect actual operations, and 2) Mutual's use of In Lieu Water and purchase of SWP water are not a sole criterion to determine if the Fishery Releases are deducted from Mutual's Lake Account.

The Watermaster Committee also found some conflicts between the data in the SBVWCD Daily Flow Reports and USGS gauge data. These conflicts could impact the number of days Mutual used the fishery releases that reached SOD. The Watermaster Committee will review this problem in 2025.

The input data and allocation of releases under SWRCB Order No. 95-4 in **Table 2.C** of **Appendix C** 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 when Mutual is “fully utilizing” the SAR diversions will be considered a “release actually made under District Operation ( $R_d$ )” and the fish releases when Mutual is not “fully utilizing” the SAR diversion will be treated as “spills which actually occurred under District Operation ( $S_d$ )”.
2. Under a Mutual operation, the fish releases used by Mutual when Mutual is “fully utilizing” the SAR diversion will be considered a “release which would have been made under a Mutual Operation ( $R_m$ )”, and the releases allocated to Mutual when Mutual is not “full utilizing” the SAR diversions will be considered a “spill which would have occurred under a Mutual Operation ( $S_m$ ).”

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

The Watermaster Committee will continue to work on these accounting procedures in 2025 to make sure they will be accurate for all possible river flow and diversion conditions that could occur in future years, including the condition when Mutual is using In Lieu water deliveries for groundwater recharge.

### **Dam and Spillway Gate Leakage**

Leakage through the spillway gates in Bays 1 and 10 can occur when the lake level is above the spillway crest elevation. In addition, minor leakage from pressure relief valves in Bays 1 and 10 can occur when the lake level is below the spillway crest and above the elevation of the relief valves. The structural reinforcement project completed in 2006 eliminated the dam leakage from cracks in the upper arches of Bays 5, 6 and 8.

In 2024, the lake level was above the spillway crest (Elevation 6,735.25 feet which is 8.00 feet below a full lake) starting around February but no spillway gate leakage was observed. The lake level was also above the relief valve elevation (6,731.05 feet above MSL) all year, but the Big Bear MWD did not observe any significant relief valve leakage during this period. The 2024 estimated monthly leakages are shown in **Table III-4**. The estimated relief valve leakage in 2024 was 7.54 AF.

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.

**TABLE III-4**  
**ESTIMATES OF**  
**MONTHLY DAM LEAKAGE**  
 (acre-feet)  
 Calendar Year 2024  
 Big Bear Watermaster

| <b>Month</b>        | <b>Spillway Gate Leakage (AF)</b> | <b>Bay 1 and Bay 10 Relief Valve Leakage (AF)</b> | <b>Additional Foundation Leakage (AF)</b> | <b>Total Estimated Leakage (AF)</b> |
|---------------------|-----------------------------------|---|---|-------------------------------------|
| January             | -0-                               | 0.27  | -0-                                       | 0.27                                |
| February            | -0-                               | 0.26  | -0-                                       | 0.26                                |
| March               | -0-                               | 0.27  | -0-                                       | 0.27                                |
| April               | -0-                               | 0.26  | -0-                                       | 0.26                                |
| May                 | -0-                               | 0.27  | -0-                                       | 0.27                                |
| June                | -0-                               | 4.61  | -0-                                       | 4.61                                |
| July                | -0-                               | 0.27  | -0-                                       | 0.27                                |
| August              | -0-                               | 0.27  | -0-                                       | 0.27                                |
| September           | -0-                               | 0.26  | -0-                                       | 0.26                                |
| October             | -0-                               | 0.27  | -0-                                       | 0.27                                |
| November            | -0-                               | 0.26  | -0-                                       | 0.26                                |
| December            | <u>-0-</u>                        | <u>0.27</u>                                       | <u>-0-</u>                                | <u>0.27</u>                         |
| <b>Annual Total</b> | <b>-0-</b>                        | <b>7.54</b>                                       | <b>-0-</b>                                | <b>7.54</b>                         |

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 2024 was 7.54 AF, so it did contribute to the outflows from the Lake to meet the requirements of SWRCB Order 95-4. This amount includes a release from Spillway Gate 5 in Bay 10 on June 24-26 to provide water for fishery protection while a new flow meter was installed in the 36-inch outlet works.

### **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  $\pm 0.5$  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 has been a small amount of leakage through the two sluice gates. In September 2022, the sluice gates were replaced and the leakage was eliminated. There was no sluice gate leakage in 2024.

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 (minimum of 30 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 releases through the 3-inch Relief Line were 132.7 acre-feet in 2024, and they flowed down Bear Creek and were measured as part of the flow at Station B. These releases are considered to be part of the releases to comply with SWRCB Order No. 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 a Krohne IFS 400 flow meter. Releases to comply with SWCRB Order No. 95-4 are normally made through the 6-inch Bypass Pipeline. The total amount released through the 6-inch Bypass Pipeline in 2024 was 534.3 acre-feet.

In 2024, 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 2024. The total from the Outlet Works in 2024 was estimated to be 667.0 acre-feet plus 7.6 acre-feet from Dam leakage for a total of 674.6 acre-feet.

**TABLE III-5**  
**MONTHLY DISCHARGES FROM LEAKAGE AND**  
**THE OUTLET WORKS OF BEAR VALLEY DAM**  
(acre-feet)  
Calendar Year 2024  
Big Bear Watermaster

| <b>Month</b> | <b>Flood Control<br/>Releases (AF)</b> | <b>Mutual<br/>Releases (AF)</b> | <b>SBVMWD<br/>Releases<br/>(AF)</b> | <b>SWRCB<br/>Discharges (AF)</b> | <b>Total<br/>Outlet Works<br/>Discharges (AF)</b> |
|--------------|--|---------------------------------|-------------------------------------|----------------------------------|---|
| January      | -0-                                    | -0-                             | -0-                                 | 58.0                             | 58.0  |
| February     | -0-                                    | -0-                             | -0-                                 | 59.8                             | 59.8  |
| March        | -0-                                    | -0-                             | -0-                                 | 27.1                             | 27.1  |
| April        | -0-                                    | -0-                             | -0-                                 | 26.4                             | 26.4  |
| May          | -0-                                    | -0-                             | -0-                                 | 36.2                             | 36.2  |
| June         | -0-                                    | -0-                             | -0-                                 | 45.9                             | 45.9  |
| July         | -0-                                    | -0-                             | -0-                                 | 57.8                             | 57.8  |
| August       | -0-                                    | -0-                             | -0-                                 | 78.6                             | 78.6  |
| September    | -0-                                    | -0-                             | -0-                                 | 76.9                             | 76.9  |
| October      | -0-                                    | -0-                             | -0-                                 | 80.4                             | 80.4  |
| November     | -0-                                    | -0-                             | -0-                                 | 69.9                             | 69.9  |
| December     | <u>-0-</u>                             | <u>-0-</u>                      | <u>-0-</u>                          | <u>57.6</u>                      | <u>57.6</u>                                       |
| <b>Total</b> | <b>-0-</b>                             | <b>-0-</b>                      | <b>-0-</b>                          | <b>674.6</b>                     | <b>674.6</b>                                      |

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

### Mutual Releases

There were no lake releases for Mutual in 2024.

## **San Bernardino Valley MWD Releases**

In 2024 San Bernardino Valley MWD did not request any lake releases from their storage account in Big Bear Lake for delivery of Lake water as an alternative to In Lieu Water to Mutual.

### **Flood Control Releases**

There were no flood control releases in 2024.

### **Spills**

Spills are flows that leave the lake over the spillway of the dam. They are calculated from lake gauge height readings and spillway gate settings at the dam during the time of the spill. In 2024, there were no spills from the lake.

### **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 can illustrate the impacts of rainfall/snowfall and plant evapotranspiration between the dam and Station B. **Table III-6** shows this comparison.

**TABLE III-6**  
**COMPARISON OF FLOWS AT STATION B WITH**  
**ESTIMATED LEAKAGE AND FLOWS FROM OUTLET WORKS**  
 Calendar Year 2024 - Big Bear Watermaster

| Month        | Flows from<br>Outlet Works<br>(AF) | Dam<br>Leakage<br>(AF) | Spillway<br>Gate Release<br>(AF) | Total Flows<br>From Lake<br>(AF) | Flow at<br>Station B<br>(AF) | Gains/<br>(Losses)<br>(AF) |
|--------------|------------------------------------|------------------------|----------------------------------|----------------------------------|------------------------------|----------------------------|
| January      | 57.78                              | 0.27                   | -                                | 58.05                            | 55.17                        | (2.88)                     |
| February     | 59.56                              | 0.26                   | -                                | 59.82                            | 76.11                        | 16.29                      |
| March        | 26.78                              | 0.27                   | -                                | 27.05                            | 44.04                        | 16.99                      |
| April        | 26.13                              | 0.27                   | -                                | 26.39                            | 55.86                        | 29.47                      |
| May          | 35.92                              | 0.27                   | -                                | 36.20                            | 39.18                        | 2.99                       |
| June         | 41.33                              | 4.63                   | -                                | 45.95                            | 48.54                        | 2.59                       |
| July         | 57.55                              | 0.27                   | -                                | 57.82                            | 61.69                        | 3.87                       |
| August       | 78.32                              | 0.27                   | -                                | 78.59                            | 78.35                        | (0.24)                     |
| September    | 76.60                              | 0.27                   | -                                | 76.87                            | 73.35                        | (3.52)                     |
| October      | 80.17                              | 0.27                   | -                                | 80.44                            | 75.73                        | (4.71)                     |
| November     | 69.60                              | 0.27                   | -                                | 69.86                            | 67.16                        | (2.70)                     |
| December     | 57.29                              | 0.27                   | -                                | 57.56                            | 57.59                        | 0.02                       |
| <b>Total</b> | <b>667.01</b>                      | <b>7.60</b>            | <b>-</b>                         | <b>674.61</b>                    | <b>732.78</b>                | <b>58.17</b>               |

In 2024, the measured flow at Station B was 58.2 acre-feet more than the estimated amount leaving Big Bear Lake from releases, leakage and spills. In 2024 these differences reflect the side flows that enter Bear Creek between the Dam and Station B during the winter months. In the summer and fall months, the differences were small and reflected in the improved measurements at Station B, and reflect the minor losses that can occur between the Dam and Station B. In October 2016, Big Bear MWD replaced the weir plate at Station B with a 12-inch v- notch weir to improve the accuracy of the measurements and replaced the communication line between the transducer and the SCADA system. These changes improved the accuracy of the Station B measurements. Big Bear MWD is continuing their efforts to improve the reliability and accuracy of the Station B measurements by installing an additional transducer probe and XiO cloud SCADA system. Big Bear MWD is taking physical measurements as well to ensure that Station B measurements are accurate. The Watermaster Committee will continue to monitor this condition in 2025.

### **Lake Withdrawals for Snowmaking**

Big Bear MWD sells water from Big Bear Lake for use in snowmaking and active fire fighting for ski areas within the watershed. In 2024, 807.8 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 other purposes 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. 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 2024, the withdrawal from the lake for snowmaking was 630.0 acre-feet and 315.0

acre-feet returned to the lake. In the summer and fall months, 177.8 acre-feet of water was used and none was returned to the lake. The “net withdrawal” for all purposes was 492.8 acre-feet (315.0 acre-feet for snowmaking and 177.8 acre-feet for use during the summer and fall months).

### **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 sewer 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 water service connections.

In 2024, the "net" wastewater exported from the Big Bear Lake Watershed was 1,277.2 acre-feet. **Table III-7** contains the 2024 monthly net exports. The “net” wastewater exported in 2024 was lower than normal due to the dry winter conditions, which contributed to lower inflow/ infiltration into the sewerage collection systems from rainfall and snowmelt.

**TABLE III-7**  
**NET WASTEWATER EXPORTS**  
 (acre-feet)  
 Calendar Year 2024  
 Big Bear Watermaster

| <b>Month</b> | <b>Net Wastewater Exports<br/>(acre-feet)</b> |
|--------------|---|
| January      | 94.3  |
| February     | 190.3   |
| March        | 207.3   |
| April        | 184.7   |
| May          | 102.1   |
| June         | 85.2  |
| July         | 87.6  |
| August       | 71.1  |
| September    | 52.6  |
| October      | 55.3  |
| November     | 64.9  |
| December     | <u>81.8</u>                                   |
| <b>Total</b> | <b>1,277.2</b>                                |

## **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 groundwater from the San Bernardino groundwater basin, buy State Water Project (SWP) water from San Bernardino Valley MWD, or reduce the delivery rate to its shareholders.

In 2024, Mutual reported they may not need much water from Big Bear MWD other than the portion of the SWRCB 95-4 Lake outflows they could beneficially use. 2024 was an average year but was a difficult year for Mutual because SCE was out of service for all of the year and was not able to deliver Santa Ana River water to Mutual to the Greenspot forebay. After June 24, 2024 SCE paid San Bernardino Valley MWD to deliver SWP water to meet Mutual's Highline needs. Prior to June 24, Mutual purchased State Water Project water to meet their Highline needs. Fortunately, Mutual was able to use the releases from Seven Oaks Dam to help meet their other water needs. Mutual met their overall 2024 water needs by releases from SOD, State Water Project water, 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 2024.

**TABLE III-8**  
**SUMMARY OF DIVERTED FLOW AT MOUTH OF**  
**SANTA ANA RIVER CANYON**  
**(ACRE-FEET)**  
 Calendar Year 2024  
 Big Bear Watermaster

| Flow Component   | Amount (AF)            |
|--|------------------------|
| <b>FLOW OF SANTA ANA RIVER AT MOUTH OF CANYON</b>                            |                        |
| Flow Reported for U.S.G.S. Gauge 11051501-provisional below SOD              | 52,141.0               |
| less BVMWC Canyon Well No. 1 Production                                      | <u>-0-</u>             |
| Estimated Santa Ana River Flow Below Seven Oaks Dam                          | <b>52,141</b>          |
| Annual Storage Change in Seven Oaks Reservoir                                | <u>+2,338</u>          |
| <b>Estimated Santa Ana River Flow at Mouth of Canyon before SOD per USGS</b> | <b>54,479</b>          |
| <b>DIVERSIONS BY BEAR VALLEY MUTUAL WATER COMPANY</b>                        |                        |
| Diversions:  |                        |
| Greenspot Pipeline Metering Station  | -0-                    |
| Edwards Line   | 225                    |
| North Fork Canal   | 2,253                  |
| North Fork Flume   | 3,804                  |
| Bear Valley Highline (includes Canyon Well No. 1)                            | -0-                    |
| Redlands Aqueduct (includes Redlands Tunnel)                                 | 8,830                  |
| SBVMWD Morton Canyon Connector Deliveries                                    | -0-                    |
| Redlands Sandbox Spreading (observed)  | <u>1,565</u>           |
|  | 16,677                 |
| Adjustments:   |                        |
| Water pumped from BVMWC Canyon Well No. 1                                    | -0-                    |
| Redlands Tunnel Diversion  | <u>-455</u>            |
| <b>Total MUTUAL SAR Diversions</b>   | <b>16,222</b>          |
| <b>DIVERSIONS BY SBVWCD</b>  |                        |
| Diversion by San Bernardino Valley Water Conservation District               | 24,176                 |
| SBVMWD Morton Canyon Connector Deliveries to SBVWCD                          | <u>0</u>               |
|  | 24,176                 |
| Adjustments:   |                        |
| North Fork Parshall Flume  | <u>3,804</u>           |
| <b>Total SBVWCD Diversions</b>   | <b>20,372</b>          |
| <b>TOTAL DIVERSIONS FROM THE SANTA ANA RIVER</b>                             |                        |
| <b>Total Diversions by Mutual and SBVWCD</b>                                 | <b>36,594</b>          |
| <b>AMOUNT NOT DIVERTED</b>   |                        |
| Santa Ana River Flow at Mouth of Canyon                                      | 54,479                 |
| Mutual and SBVWCD Diversions   | - 36,594               |
| Amount Released from Storage Behind Seven Oaks Dam                           | <u>-2,338</u>          |
| Estimated Not Diverted   | 15,547                 |
| Estimated Flow Downstream of Diversions*                                     | <u>15,328</u>          |
| <b>Estimated Losses and Measurement Errors **</b>                            | <b>+219      0.40%</b> |

\* This value equals the amount observed at the Cuttle Weir (14,942.3 AF) plus spills from PH #3 (385.4 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 gauges (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 as the Greenspot Spill. 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 gauge also includes the over-flow from the old SCE Powerhouse No. 3 forebay when the SCE system is operational. 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 2024, the total river flow reported by the USGS, currently provisional, was 52,141 acre-feet. However, measurements at Station No. 11049500 include the amount of groundwater pumped by Mutual and discharged into the flume above the gauge. Thus, to get the actual Santa Ana River Flow the Canyon Well production must be deducted from the reported flows. In 2024, the Canyon Well was not operational. Thus, the resulting estimated Santa Ana River flow was also 52,141 acre-feet in 2024. However, this value does not reflect the storage change in the reservoir behind Seven Oaks Dam. In 2024, an estimated 2,338 acre-feet of water was added to storage behind the Dam. Thus, the estimated flow of the Santa Ana River at the mouth of the canyon above Seven Oaks Dam was 54,479 acre-feet in 2024.

### **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 2024, Mutual's SAR diversions for their customers were estimated to be 16,222 acre-feet based on the Daily Flow Reports prepared by the San Bernardino Valley Water Conservation District

(SBVWCD). This amount was SAR water released from Seven Oaks Dam and diverted by Mutual at their River Pick Up. Beginning in 2020, Mutual's diversions include the water they deliver to North Fork Water Company and that North Fork delivers to SBVWCD via the North Fork Parshall Flume. In 2024, Mutual did not pump groundwater from their Canyon Well No.1 located in the Santa Ana Canyon above the major points of diversion, and they produced 455 acre-feet of water from the Redlands Tunnel.

### **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 2024, the diversions were estimated to be 20,372 acre-feet of Santa Ana River water for ground water recharge based on the Daily Flow Reports prepared by the SBVWCD. As mentioned above, the SAR water SBVWCD received from the North Fork Parshall Flume was not included in Table III-8 as a SBVWCD diversion.

### **Amount Not Diverted**

The sum of the diversions mentioned above are subtracted from the total river flow as reported by USGS Gauge 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 eight 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 which may have been partially remedied by the replacement of a portion of a steel pipe segment of the Aqueduct in 2021, and
3. Leakage around the Redlands Sandbox weir.

2. Unmeasured Diversions. The second explanation was that Mutual could 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 Gauge 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 the three gaging 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. For 2024, the flow over the Cuttle Weir was estimated to be 14,942 acre-feet.

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 was initially 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 their aqueduct above the forebay of Power House No. 3 and data from this flow meter is provided to the USGS. In addition, improved efforts were taken to monitor diverted water at the Redlands Sandbox 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 gauges 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 2023 was 3,450.0 acre-feet (water surface elevation of 2,204 feet). The amount stored behind SOD at the end of 2024 was 5,787.8 acre-feet (water surface elevation of 2,228 feet). In other words, water that was added to storage behind the dam was from inflow in 2024. This amount was 2,337.8 acre-feet and was not included in the USGS provisional value of 52,141 acre-feet. Adding the amount of SAR water stored behind SOD in 2024 and deducting the amount of groundwater pumped from BVMWC Canyon Well (-0- acre-feet) from the USGS provisional value increases the estimate of Santa Ana River flow to 54,478.8 acre-feet for 2024.

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 “Estimated Flow Downstream of Diversions” as reported in **Table III-8**. In 2024, there were 385.4 acre-feet of spills from SCE PH No. 3.

8. Differences in Measurements. The USGS estimates of the Santa Ana River flow are based on stream gauges that record data at 15-minute intervals throughout the day. The estimates of diversions are based on the Daily Flow Reports prepared by the SBVWCD and these reports contain only a single value (usually in the morning) for each working day for each diversion point. Thus, the diversion estimates are not as accurate as the USGS flow estimates and this could lead to significant errors in the “Estimated Not Diverted” value (15,547 acre-feet) as shown in Table III-8. The Watermaster Committee will review this item in 2025 to determine if Table III-8 should be revised to provide a better estimate of the amount of Santa Ana River water that is not diverted.

### **2024 Estimate of Amount Not Diverted**

In 2024, San Bernardino Valley Water Conservation District observed significant river flow past the Cuttle Weir at the Greenspot Road Bridge (14,942 acre-feet), and they reported 385 acre-feet of spills into 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 15,328 acre-feet.

In 2024, the estimated Santa Ana River flow at the mouth of the canyon was 54,479 acre-feet. The total estimated diversions of Santa Ana River flow by Mutual and San Bernardino Valley Water Conservation District was 36,594 acre-feet. Deducting the 2,338 acre-feet of water stored behind Seven Oaks Dam in 2024, this left an estimated 15,547 acre-feet of Santa Ana River water not diverted in 2024. Comparing this difference with the observed flows past the Cuttle Weir at Greenspot Road Bridge (14,942 acre-feet) and the spills from the afterbay of SCE PH No. 3 (386 acre-feet), results in unmeasured leakage losses and measurement errors of 219 acre-feet. These

losses and errors represent 0.96 percent of the estimated Santa Ana River flow (acre-feet), which is lower than normal.

### **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 MWD voted unanimously to approve the following policy for providing In Lieu Water 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 Big Bear MWD 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 2024, the lake level reached a high of 68.46 feet, (3.87 feet below full) and required Lake releases mid-March and mid-May. No Mutual Lake releases were made during this period. The lake ended the year 7.12 feet below full.

### **2012 In Lieu Lake Release Agreement**

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 Lake Release program began on July 1, 2012 and was scheduled to run through December 31, 2015. In 2015, the two agencies modified the existing In Lieu Agreement to extend the time Valley District could make In Lieu Lake Water deliveries to Mutual and provide Valley District with the opportunity to reduce their In Lieu SWP Water deliveries to Mutual during emergency years when their State Water Project (SWP) deliveries are significantly reduced.

At the end of 2023, Valley District had stored 438 acre-feet of water in Big Bear Lake. In 2024, Valley District did not request any In Lieu Lake Releases. The additional evaporation losses in 2024 were 49 acre-feet. Valley District ended the year with 389 acre-feet in their sub-account and the Lake was 0.20 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.

**TABLE III-9**  
**ALLOCATION OF BIG BEAR MWD LAKE ACCOUNT**  
 Calendar Year 2024  
 Big Bear Watermaster

| LAKE ACCOUNTS (acre-feet)            | Big Bear<br>WM Account | Valley District<br>Subaccount | Big Bear<br>Subaccount |
|--------------------------------------|------------------------|-------------------------------|------------------------|
| Initial Storage                      | 19,439.9               | 437.6                         | 19,002.3               |
| Lake Inflows                         | -                      | -                             | -                      |
| In Lieu Water Supplies to Mutual     | -                      | -                             | -                      |
| Lake Releases (Mutual & BBMWD)       | -                      | -                             | -                      |
| Releases & Leakage (SWRCB 95-4)      | (182.8)                | -                             | (182.8)                |
| Net Snowmaking Withdrawals           | (492.8)                | -                             | (492.8)                |
| Lake Spills & Flood Control Releases | -                      | -                             | -                      |
| Evaporation from Lake                | (1,795.0)              | (48.8)                        | (1,746.2)              |
| Net Wastewater Exports               | (1,277.2)              | -                             | (1,277.2)              |
| Advances and Repayment of Advances   | -                      | -                             | -                      |
| Ending Storage                       | 15,692.2               | 388.8                         | 15,303.4               |

**Water Deliveries to Mutual by Big Bear MWD**

Mutual received 88.4 acre-feet of water from Big Bear MWD in 2024. This year Mutual’s needs for water from BBMWD were met only by 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 2024.

**TABLE III-10**  
**WATER DELIVERIES TO MUTUAL BY**  
**BIG BEAR MUNICIPAL WATER DISTRICT**  
(Acre-feet)  
Calendar Year 2024  
Big Bear Watermaster

| <b>Month</b> | <b>Releases from Big Bear Lake for Mutual</b> | <b>Mutual's Use of Fish Releases*</b> | <b>"In-Lieu" State Water Project</b> | <b>"In-Lieu" Lake Releases</b> | <b>"In-Lieu" Groundwater</b> | <b>Total Deliveries to Mutual</b> |
|--------------|---|---------------------------------------|--------------------------------------|--------------------------------|------------------------------|-----------------------------------|
| January      | -0-   | 18.6                                  | -0-                                  | -0-                            | -0-                          | 18.6                              |
| February     | -0-   | -0-                                   | -0-                                  | -0-                            | -0-                          | -0-                               |
| March        | -0-   | -0-                                   | -0-                                  | -0-                            | -0-                          | -0-                               |
| April        | -0-   | -0-                                   | -0-                                  | -0-                            | -0-                          | -0-                               |
| May          | -0-   | -0-                                   | -0-                                  | -0-                            | -0-                          | -0-                               |
| June         | -0-   | -0-                                   | -0-                                  | -0-                            | -0-                          | -0-                               |
| July         | -0-   | 1.7                                   | -0-                                  | -0-                            | -0-                          | 1.7                               |
| August       | -0-   | 5.0                                   | -0-                                  | -0-                            | -0-                          | 5.0                               |
| September    | -0-   | -0-                                   | -0-                                  | -0-                            | -0-                          | -0-                               |
| October      | -0-   | -0-                                   | -0-                                  | -0-                            | -0-                          | -0-                               |
| November     | -0-   | 35.0                                  | -0-                                  | -0-                            | -0-                          | 35.0                              |
| December     | <u>-0-</u>                                    | <u>28.1</u>                           | <u>-0-</u>                           | <u>-0-</u>                     | <u>-0-</u>                   | <u>28.1</u>                       |
| <b>Total</b> | <b>-0-</b>                                    | <b>88.4</b>                           | <b>-0-</b>                           | <b>-0-</b>                     | <b>-0-</b>                   | <b>88.4</b>                       |

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

In 2019, Mutual used In Lieu Water for groundwater recharge for the second time. These deliveries could have an impact on the Basin Make-up Account. In 2022, Mutual delivered SAR water to SBVWCD at the Tailrace Pipeline Valve (J2) for groundwater recharge for 28 days when they were also taking In Lieu groundwater. The current formula for Basin Make-up Account does not include this operational condition. In 2025, the watermaster committee will address this issue.

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 2024, the amount of water delivered to Mutual by Big Bear MWD was 50,927 acre-feet. For the 48-year period the Judgment has been in effect, the average annual deliveries by Big Bear MWD to Mutual has been 4,518 acre-feet.

In 2025 Mutual can request up to 21,039 acre-feet of water from Big Bear MWD. This value is the amount that they are below the 65,000 acre-feet limitation at the end of 2024 (which is 14,073 acre-feet), plus the deliveries made in 2015 (which was 6,966 acre-feet), that will be dropped from the ten-year period ending in 2025. The 21,039 acre-feet total includes In Lieu deliveries, lake releases, and fishery outflows that Mutual is able to divert.

**TABLE III-11**  
**SUMMARY OF WATER DELIVERIES TO MUTUAL 1977 - 2024**

(acre-feet)

Calendar Year 2024 Big Bear Watermaster

| Calendar Year            | Mutual Lake Releases | SWRCB Outflows to Mutual | In Lieu Well Water | In Lieu SWP Water | In Lieu EVWD or VD Lake Rel | In- Lieu BV Stock Water | Total In Lieu & Releases | 10-year Total |
|--------------------------|----------------------|--------------------------|--------------------|-------------------|-----------------------------|-------------------------|--------------------------|---------------|
| 1977                     | 868.0                | -                        | 4,412.0            | -                 | -                           | -                       | 5,280.0                  | n.a.          |
| 1978                     | -                    | -                        | -                  | -                 | -                           | -                       | -                        | n.a.          |
| 1979                     | -                    | -                        | -                  | -                 | -                           | -                       | -                        | n.a.          |
| 1980                     | -                    | -                        | -                  | -                 | -                           | -                       | -                        | n.a.          |
| 1981                     | 2,250.0              | -                        | -                  | 672.0             | -                           | -                       | 2,922.0                  | n.a.          |
| 1982                     | 657.0                | -                        | -                  | 56.0              | -                           | -                       | 713.0                    | n.a.          |
| 1983                     | -                    | -                        | -                  | -                 | -                           | -                       | -                        | n.a.          |
| 1984                     | 1,700.0              | -                        | -                  | 993.0             | -                           | -                       | 2,693.0                  | n.a.          |
| 1985                     | 2,463.0              | -                        | 842.0              | 2,994.0           | -                           | -                       | 6,299.0                  | n.a.          |
| 1986                     | 1,358.0              | -                        | 1,139.0            | 190.0             | -                           | -                       | 2,687.0                  | 20,594.0      |
| 1987                     | -                    | -                        | 3,301.0            | 4,762.0           | -                           | 84.0                    | 8,147.0                  | 23,461.0      |
| 1988                     | -                    | -                        | 1,864.0            | 5,432.0           | -                           | 63.0                    | 7,359.0                  | 30,820.0      |
| 1989                     | -                    | -                        | 1,593.0            | 8,555.0           | -                           | -                       | 10,148.0                 | 40,968.0      |
| 1990                     | -                    | -                        | 562.0              | 7,722.0           | -                           | -                       | 8,284.0                  | 49,252.0      |
| 1991                     | 78.6                 | -                        | -                  | -                 | 151.0                       | -                       | 229.6                    | 46,559.6      |
| 1992                     | -                    | -                        | -                  | -                 | -                           | -                       | -                        | 45,846.6      |
| 1993                     | -                    | -                        | -                  | -                 | -                           | -                       | -                        | 45,846.6      |
| 1994                     | 1,140.8              | -                        | -                  | -                 | -                           | -                       | 1,140.8                  | 44,294.4      |
| 1995                     | 88.3                 | -                        | -                  | -                 | -                           | -                       | 88.3                     | 38,083.7      |
| 1996                     | 3,460.7              | -                        | -                  | 4,027.5           | -                           | -                       | 7,488.2                  | 42,884.9      |
| 1997                     | 364.0                | -                        | -                  | 6,780.1           | -                           | -                       | 7,144.1                  | 41,882.0      |
| 1998                     | -                    | -                        | -                  | -                 | -                           | -                       | -                        | 34,523.0      |
| 1999                     | 124.2                | 146.5                    | -                  | 10,435.8          | -                           | -                       | 10,706.5                 | 35,081.5      |
| 2000                     | -                    | 510.4                    | -                  | 12,877.5          | -                           | -                       | 13,387.9                 | 40,185.4      |
| 2001                     | 46.3                 | 492.7                    | 48.1               | 14,212.4          | -                           | -                       | 14,799.5                 | 54,755.3      |
| 2002                     | -                    | 614.1                    | -                  | 5,000.0           | -                           | -                       | 5,614.1                  | 60,369.4      |
| 2003                     | -                    | 484.3                    | -                  | -                 | -                           | -                       | 484.3                    | 60,853.7      |
| 2004                     | -                    | 512.3                    | -                  | 2,500.0           | -                           | -                       | 3,012.3                  | 62,725.2      |
| 2005                     | -                    | 146.3                    | -                  | 2,218.0           | -                           | -                       | 2,364.3                  | 65,001.2      |
| 2006                     | -                    | 467.2                    | -                  | 2,070.3           | -                           | -                       | 2,537.5                  | 60,050.5      |
| 2007                     | -                    | 486.0                    | -                  | 6,500.0           | -                           | -                       | 6,986.0                  | 59,892.4      |
| 2008                     | -                    | 474.6                    | -                  | 4,633.6           | -                           | -                       | 5,108.2                  | 65,000.7      |
| 2009                     | -                    | 509.8                    | -                  | 5,990.2           | -                           | -                       | 6,500.0                  | 60,794.2      |
| 2010                     | 123.1                | 276.2                    | -                  | 2,478.8           | -                           | -                       | 2,878.1                  | 50,284.3      |
| 2011                     | -                    | 384.5                    | -                  | 789.2             | -                           | -                       | 1,173.7                  | 36,658.5      |
| 2012                     | -                    | 640.8                    | -                  | 4,695.9           | -                           | -                       | 5,336.7                  | 36,381.1      |
| 2013                     | -                    | 653.1                    | -                  | 6,454.4           | -                           | -                       | 7,107.5                  | 43,004.3      |
| 2014                     | -                    | 892.9                    | 4,691.9            | 1,716.0           | -                           | -                       | 7,300.8                  | 47,292.8      |
| 2015                     | -                    | 661.9                    | 648.0              | 5,170.9           | 484.8                       | -                       | 6,965.6                  | 51,894.1      |
| 2016                     | -                    | 766.5                    | -                  | 8,500.0           | -                           | -                       | 9,266.5                  | 58,623.1      |
| 2017                     | -                    | 506.3                    | -                  | 4,146.8           | -                           | -                       | 4,653.1                  | 56,290.2      |
| 2018                     | -                    | 824.6                    | 447.9              | 6,618.4           | -                           | -                       | 7,890.9                  | 59,072.9      |
| 2019                     | -                    | 251.2                    | -                  | 299.7             | -                           | -                       | 550.9                    | 53,123.8      |
| 2020                     | -                    | 587.8                    | -                  | 3,079.7           | -                           | -                       | 3,667.5                  | 53,913.2      |
| 2021                     | -                    | 706.9                    | 6,084.0            | 2,190.4           | -                           | -                       | 8,981.3                  | 61,720.8      |
| 2022                     | -                    | 596.3                    | 6,226.0            | 1,746.0           | -                           | -                       | 8,568.3                  | 64,952.4      |
| 2023                     | -                    | 294.8                    | -                  | -                 | -                           | -                       | 294.8                    | 58,139.7      |
| 2024                     | -                    | 88.4                     | -                  | -                 | -                           | -                       | 88.4                     | 50,927.3      |
| <b>1977-2024 Average</b> | <b>306.7</b>         | <b>270.3</b>             | <b>663.7</b>       | <b>3,260.6</b>    | <b>13.2</b>                 | <b>3.2</b>              | <b>4,517.7</b>           |               |

2019 value for SWRCB Outflows to Mutual was corrected to 251.2 AF

Table III-11 was updated December 27, 2018 to correct minor rounding problems

## **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 State Water Project water and In Lieu groundwater deliveries as reported in **Table III-10** to the River diversions by Mutual and Mutual's groundwater production from their Canyon Well No. 1, as shown in **Table III-8**. Mutual's Canyon Well No. 2 was destroyed as part of the construction of the Seven Oaks Dam between 1994 and 1998. The value for Santa Ana River diversions in **Table III-8** includes the supply from the Redlands Tunnel. This Equivalent Water Diversion is the amount of Santa Ana River water Mutual would have to divert if their demands for water from Big Bear MWD had been met by lake releases rather than In Lieu Water deliveries. The 2024 Equivalent Water Diversions were 16,677 acre-feet.

**TABLE III-12**  
**EQUIVALENT WATER DIVERSIONS BY MUTUAL 1977-2024 (acre-feet)**  
 Calendar Year 2024, Big Bear Watermaster

| <b>Calendar Year</b> | <b>Net Santa Ana River Diversion by BVMWC*</b> | <b>Groundwater Production From Wells No. 1 &amp; 2</b> | <b>Big Bear MWD In Lieu Water Deliveries</b> | <b>Equivalent Total Water Diversions</b> |
|----------------------|--|--|--|--|
| 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  | 1,329  | 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                                   |
| 2015                 | 11,345   | -  | 5,819  | 17,164                                   |
| 2016                 | 9,453  | -  | 5,800  | 17,953                                   |
| 2017                 | 16,521   | -  | 4,147  | 20,668                                   |
| 2018                 | 11,608   | -  | 7,066  | 18,674                                   |
| 2019                 | 18,205   | 15   | 30   | 18,520                                   |
| 2020                 | 20,789   | 131  | 3,080  | 24,090                                   |
| 2021                 | 11,073   | -  | 8,274  | 19,347                                   |
| 2022                 | 12,371   | -  | 7,972  | 20,343                                   |
| 2023                 | 19,294   | 624  | -  | 19,918                                   |
| 2024                 | 16,677   | -  | -  | 16,677                                   |

\*Includes 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.

## **2024 ACCOUNT BALANCES**

**Appendix C** contains the 2024 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 C** 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 2024. **Table 1** of **Appendix C** provides additional detail. This information shows that:

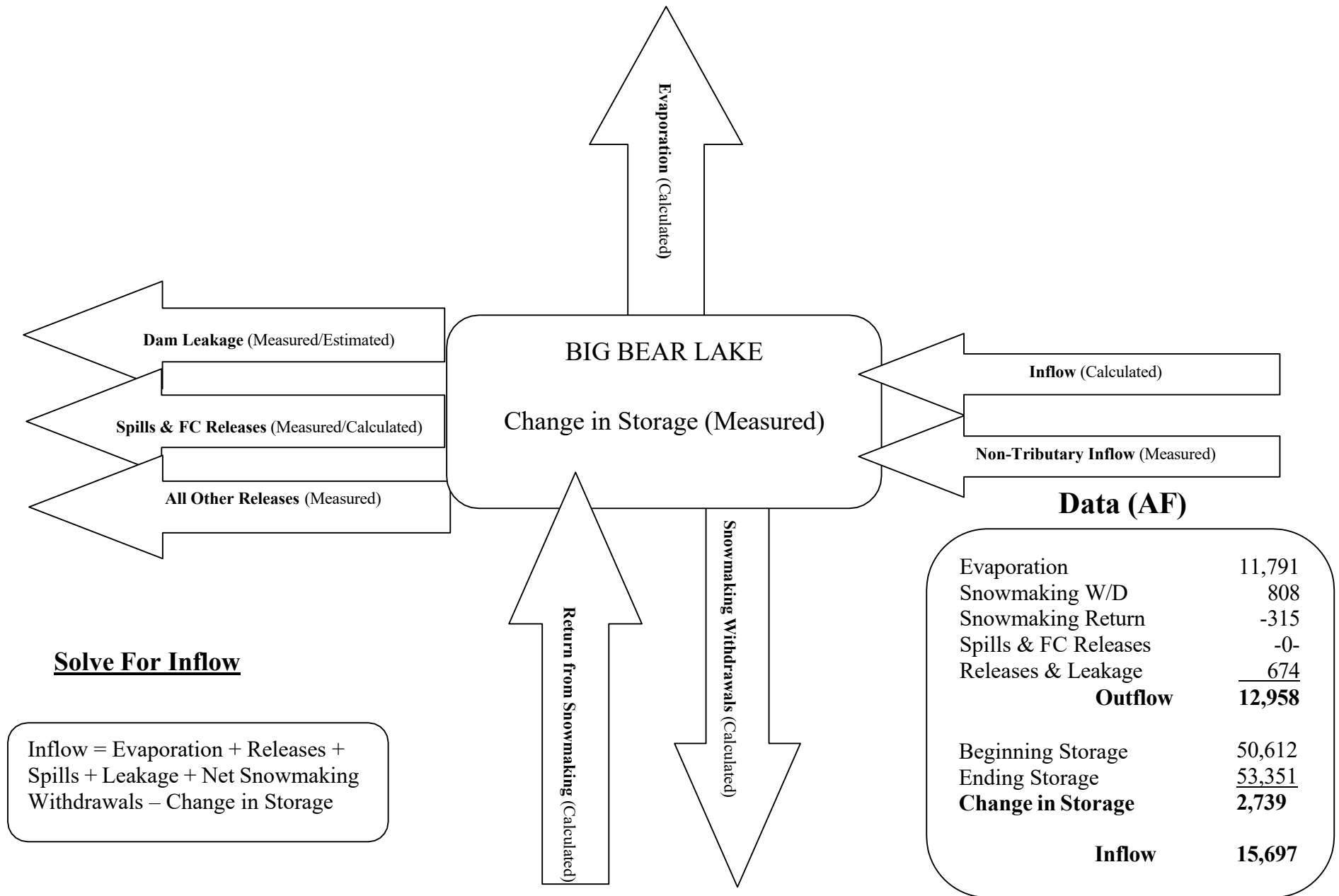
- 1) The lake level rose 1.08 feet, from a gauge height of 64.13 feet to 65.21 feet; 72.33 feet is full;
- 2) Lake storage increased by 2,739 acre-feet, it began the year with 50,612 acre-feet and ended the year with 53,351 acre-feet; when the lake is full, it contains 73,320 acre-feet of water;
- 3) Lake surface area varied between 2,582 and 2,783 acres;
- 4) Evaporation was 11,791 acre-feet;
- 5) Lake inflow was 15,697 acre-feet,
- 6) The total of spills, releases, leakage, and net lake withdrawals was 1,167 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 2024. Mutual's operation shows what would have happened if:

**Figure 2**  
**Water Balance for 2024 Actual Lake Operations**



- 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.

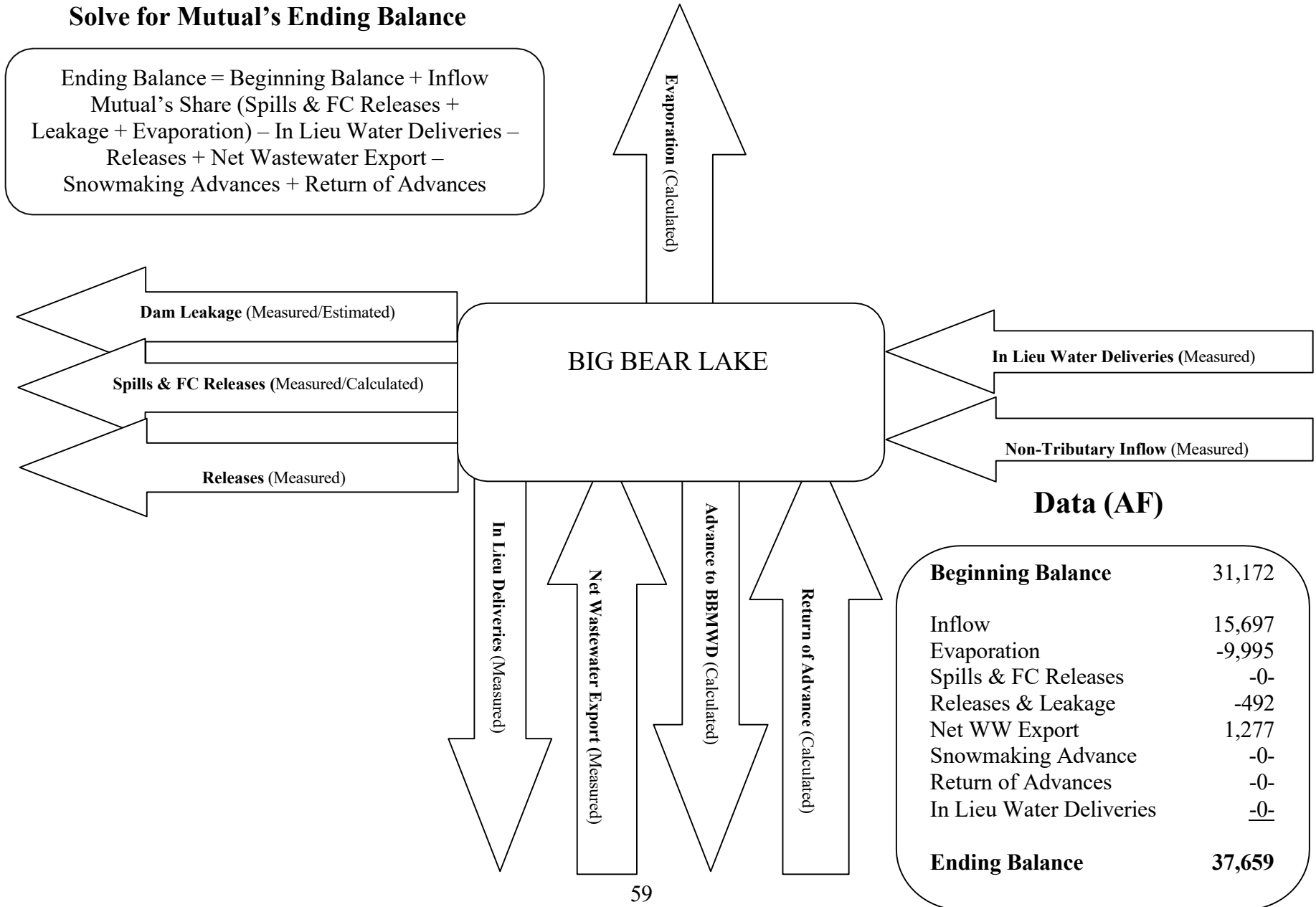
**Figure 3** and **Table 2** of **Appendix C** show that Mutual had 37,659 acre-feet in its lake account at the end of 2024. This account balance is 6,487 acre-feet more than was in their lake account at the end of 2023. **Table 2** also shows that in 2024 Mutual's lake account was credited with all the lake inflow (15,697 acre-feet), the total of their releases, spills, and leakage was 492 acre-feet. There were no In Lieu Water deliveries in 2024. In 2024, supplemental inflow of 1,277 acre-feet was added to Mutual's Lake Account for net wastewater exported from the basin. In 2024, there were no advances to Big Bear MWD for snowmaking within the watershed. Evaporation that would have taken place under a Mutual operation was 9,996 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 58.75 feet at the end of 2024 or 13.58 feet below the top of the dam. This synthesized lake level is 6.51 feet lower than it actually was (65.21 feet). This lower lake level reflects the impact of what Mutual's lake withdrawals would have been without the In Lieu Water program and with the credits they receive from the net wastewater exports. **Tables 2A** through **2C** of **Appendix C** 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 2024 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 43,828 acre-feet of net wastewater exports. After 35 years of getting these credits, Mutual's lake account has 5,177 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 2.45 feet. In other words, without the credits, Mutual's lake account would have been 32,481 acre-feet and their lake level would have ended the year at 56.30 or 16.03 feet down. In other words, it would have been 8.91 feet below the actual lake level of 65.21 feet and 2.45 feet lower than reported in Mutual's lake account tables (58.75 feet).

There are two primary reasons why the increase in their lake account (5,177 acre-feet) is less than the cumulative credits they have received (43,828 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 Wastewater export 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 2024 Mutual's lake account had 5,177 acre-feet more and Big Bear MWD's lake account had 5,177 acre-feet less as a consequence of the net wastewater export credits.

**TABLE IV-1**  
**EFFECT OF WASTEWATER EXPORT CREDITS**  
**ON MUTUAL'S LAKE ACCOUNT**  
 Calendar Year 2024  
 Big Bear Watermaster

| End of<br>Calendar<br>Year | Net<br>Wastewater<br>Export<br>Credit<br>(AF) | w/Wastewater Credits       |                         | w/o Wastewater Credits     |                         | Differences                |                         |
|----------------------------|---|----------------------------|-------------------------|----------------------------|-------------------------|----------------------------|-------------------------|
|                            |   | Storage<br>Account<br>(AF) | Lake<br>Level<br>(Feet) | Storage<br>Account<br>(AF) | Lake<br>Level<br>(Feet) | Storage<br>Account<br>(AF) | Lake<br>Level<br>(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                   | 49,683                     | 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                    |
| 2015                       | 846   | 16,437                     | 47.25                   | 8,968                      | 41.55                   | 7,469                      | 5.70                    |
| 2016                       | 848   | 8,977                      | 41.55                   | 3,021                      | 33.65                   | 5,956                      | 7.90                    |
| 2017                       | 1,279   | 12,122                     | 44.20                   | 6,290                      | 38.90                   | 5,832                      | 5.30                    |
| 2018                       | 727   | 4,935                      | 37.25                   | 799                        | 26.00                   | 4,136                      | 11.25                   |
| 2019                       | 1,264   | 23,611                     | 51.60                   | 18,920                     | 48.85                   | 4,691                      | 2.75                    |
| 2020                       | 1,038   | 20,788                     | 49.95                   | 15,775                     | 46.80                   | 5,013                      | 3.15                    |
| 2021                       | 881   | 12,537                     | 44.50                   | 7,818                      | 40.50                   | 4,719                      | 4.00                    |
| 2022                       | 838   | 5,778                      | 38.30                   | 2,006                      | 30.80                   | 3,772                      | 7.50                    |
| 2023                       | 1,553   | 31,172                     | 55.65                   | 26,490                     | 53.20                   | 4,682                      | 2.45                    |
| 2024                       | 1,277   | 37,659                     | 58.75                   | 32,482                     | 56.30                   | 5,177                      | 2.45                    |
| <b>TOTAL</b>               | <b>43,828</b>                                 |                            |                         |                            |                         |                            |                         |

\*The lake is empty at a gauge height of 23.0

\*\* The 2018 Storage Account and Lake Level Values were incorrectly reported in the 2018 Watermaster Report; the corrected values are shown above

## **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:

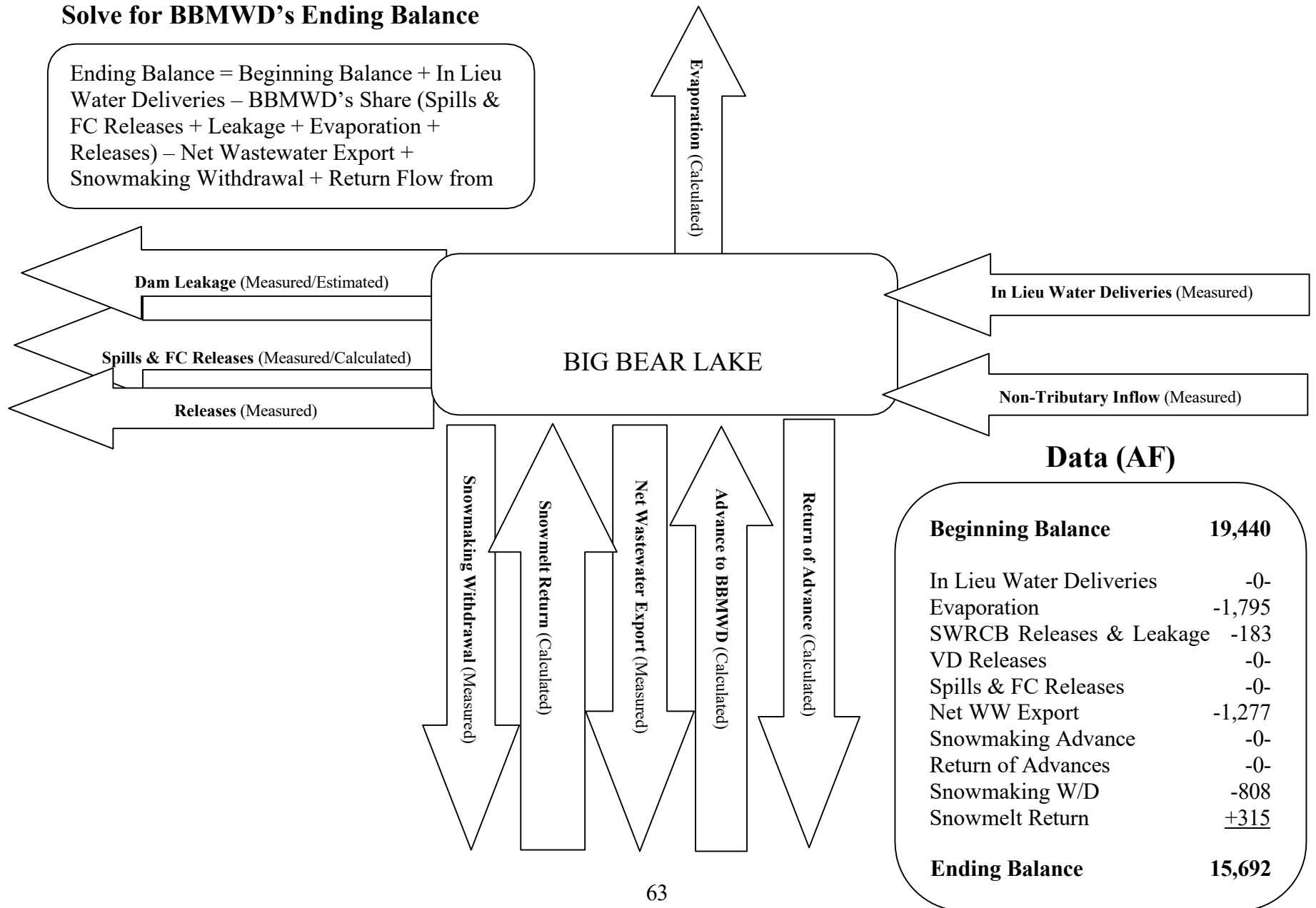
*“ Any water actually in storage in excess of Mutual's water in Storage, as calculated above, shall be for the account of District. So long as District has water in storage, all spills from the Lake shall be deemed District Water.”*

**Figure 4** illustrates the water balance for Big Bear MWD's lake account in 2024. Table 3 of **Appendix C** summarizes the results. This information shows the water actually in storage (from **Table 1** of **Appendix C**), Mutual's water in storage (from **Table 2** of **Appendix C**), and the difference between the two, which is the amount in Big Bear MWD's account. In 2024, Big Bear MWD's account balance began with 19,440 acre-feet and ended the year with 15,692 acre-feet. The decrease in their account was 3,748 acre-feet. This decrease was because there were no credits for In Lieu Water deliveries to Mutual during the year, and there were evaporation losses, SWRCB releases, net snowmaking withdrawals, and net wastewater exports.

**Table 3** of **Appendix C** 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 2024, Big Bear MWD's advance account was zero throughout the year.

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

**Figure 4**  
**Water Balance for 2024 BBMWD's Lake Operation**  
 (Synthesized Conditions)



## **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 C** 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 =

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

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 C** presents the status of the Basin Make-up Account for 2024. The account balance began the year with a balance of 21,069 acre-feet and ended the year with 21,162 acre-feet. There was a 93 acre-foot increase in the Basin Make-Up Account in 2024. The reason for the increase was the Fishery release that were not used, which increased the amount of groundwater recharge under the District operation.

In 2022, Mutual delivered In Lieu Water for groundwater recharge for the third time. Mutual did not deliver any In Lieu Water for groundwater recharge in 2024. The Watermaster Committee has agreed to review the impact of this new use of In Lieu Water on the Basin Make-up Account. The 1977 Judgment did not anticipate this use of In Lieu Water and the formulas used to determine the Basin Make-up Account balances may have to be revised to reflect this new use. The Watermaster Committee began to address this issue in 2023 and should complete their evaluation in 2025.

## **V. OTHER WATERMASTER ACTIVITIES**

### **IMPACTS OF SEVEN OAKS DAM**

#### **History and Background**

Construction of the 550-foot high Seven Oaks Dam (SOD) by the U.S. Army Corps of Engineers (Corps) began in 1990 and was completed in 1998. The plunge pool by-pass pipeline was completed in 2001, which routes low flows - for beneficial use by either Mutual (through its "River Pick-up") or by SBVWCD at its main river diversion - through the Dam, around the plunge pool, and back to the river channel.

Two features of SOD can affect Watermaster activities. First, the SOD prevents the natural subsurface flow of groundwater from leaving the Santa Ana River Canyon and causes all groundwater coming from upstream of the Dam to rise to the surface and pass through the dam outlet structure. The plunge pool by-pass line helps to overcome the loss of these subsurface flows. Second, when the SOD impounds storm flows behind the Dam for extended periods, it causes water quality degradation.

In 1993, San Bernardino Valley Municipal Water District (SBVMWD) and Western Municipal Water District (WMWD) of Riverside County provided funding to the Corps for a water conservation study to evaluate SOD as a dual-use structure for flood control and water conservation. The possible impoundment of waters of the Santa Ana River for uses other than flood control raised some water rights issues. Several diversion points for SBVWCD, North Fork Water Company, Mutual, and Redlands Water Company ("Below the Dam Diverters") are downstream of SOD, and the Dam altered the operation of these historical diversion points. It was the intent of the "below the dam diverters" to have releases from SOD approximately average annual natural flows, recognizing that flood control release flows were expected to have less silt at low release rates than previous flows and maybe more evenly distributed. Their request was to have the amount of water to be impounded behind SOD for uses 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.

## **Water Rights**

In 1995, SBVMWD and WMWD 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 (SWRCB). The petition and application were to give the two local agencies the right to impound water behind SOD, subject to the operational directions of the Dam for flood control. In 2000, the SWRCB adopted Order WR2000-12 to process the application filed by SBVMWD and WMWD and for the processing of a water right application filed by Orange County Water District (OCWD). In 2001 the water rights application (AO31165) was filed by SBVMWD and WMWD, and the water rights application (AO31174) filed by OCWD were accepted.

In 2001, SBVMWD filed a second application, and SBVWCD applied for the right to use Santa Ana River water that would initially be impounded behind SOD, then released for downstream use. In 2002, the SWRCB noticed the water rights applications filed by SBVMWD, WMWD, and OCWD, and a Pre-Hearing Conference and Public Hearing were noticed for the water rights applications filed by the Chino Basin Watermaster, SBVMWD/WMWD, SBVWCD, and the City of Riverside. During the Pre-Hearing Conference, 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. 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.

In 2008, the SBVWCD and SBVMWD conducted a study of the water spreading capacity of facilities downstream of SOD. Major conclusions of the study were that the area is ideal for recharge and not inhibited by clay or silt, faulting may interfere with the recharge in the eastern end, and very high flow years will saturate the spreading grounds. Additionally, structural capacities limit regular use to 300 cfs, and further to the west, the stable flows are limited to about 150 cfs. This study gave rise to the Enhanced Recharge Project, which would be permitted under SBVWCD Wash Plan HCP and SBVMWD River HCP. Construction of Phase 1A of the Enhanced

Recharge Project, which includes a sedimentation basin to improve the water quality of spreading flows, was completed in 2019. Phase 1B includes the construction of additional spreading basins and construction was completed in 2024. Allowing the water rights decisions to be perfected to a license.

## **Initial Operations and Water Quality**

The Corps and the Local Sponsors (San Bernardino and Orange County Flood Control Districts) initially operated the Dam under the Interim Water Control Plan, and in 2004 the Dam began operation under the Water Control Manual for the Seven Oaks Dam & Reservoir. The Manual required that during the storm season (October to May), a debris pool (water surface elevation of 2,200 feet) be formed to protect the intake tower from sediment intrusion. After the storm season, the Corp begins releasing water from the debris pool to start their maintenance activities.

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.

It was quickly observed that the raw water discharged from SOD was of poor quality and adversely impacted the ability of the two downstream water treatment plants, one owned by East Valley

Water District (EVWD) and the other owned by the City of Redlands (COR), ability to treat the water. If the upstream flow is diverted around the debris pool, such as when the Edison Facility is operational, there were significantly lower adverse impacts at their respective plants. A 2004 study showed turbidity increasing from 2 NTU to between 5 to 80 NTU when released from the debris pool with similar effects noted with increased color units, iron, manganese, and TOC. These readings indicate poorer quality water than historical Santa Ana River water quality conditions when water is passed through the debris pool.

In 2005, representatives from the Basin met with Congressman Jerry Lewis to describe the situation and seek Federal assistance to solve the problem, and Congress appropriated \$1,000,000 to study the issue. This report identified that water quality impacts included longer durations and elevated levels of turbidity, total organic carbon, color, iron, manganese, algae, and taste and odor-causing compounds, as well as water supply impacts, including less supply in dry hydrologic years, reduced stores in Fall through Winter as the debris pool behind the Dam, is filled, and extended periods the SCE facilities are out of service after flood events. During these extended periods, the SCE facilities cannot divert high-quality Santa Ana River (and Bear Creek) water around SOD. The report recommended long-term comprehensive alternatives, including pretreatment of the water delivered from SOD to achieve the water quality levels that existed before the Dam was constructed and hardening of the SCE facilities to be more reliable and remain in-service for longer periods. The recommended interim solution was to purchase imported SWP water from SBVMWD to replace the water that could not be used because of water quality problems, or that was not available due to dam operations and SCE facilities' unavailability.

The COE undertook a two-year \$3.5 million study of these issues and completed its draft study of the steps taken to address the water quality degradation in 2008. The report verified the original methodology used in calculating the effects of placing a dam that interrupted 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 report noted through modeling techniques based on field record data that there appeared to be no negative effect on the Santa Ana River water quality. The downstream users contend otherwise that the very nature of the water being retained behind the Dam for lengthy periods caused algae and bacterial growth, caused water to become stale and stagnant, and tended to plug up the pervious rock and soil layers of the downstream spreading basins.

At Congressman Lewis's urging, the Corps resumed bi-monthly talks with interested downstream prior rights and permitted water users. The Corps was willing to change the method of its operation if the downstream users agreed to accept responsibility for downstream water quality. The Corps and local sponsors began design efforts for a drained debris basin to reduce water held by the Dam in low water conditions. This change would improve water quality but slightly reduce the water conserved. The Corps and local sponsors of the SOD project were unable to complete the documentation and environmental clearance for water quality improvements to the reservoir.

### **Testing Operations and Edison Facilities**

The 2004-2005 water year began with higher rainfall. Late rains in 2004 had started to fill the debris pool behind the Dam. Heavy rains in 2004 and 2005 more than filled the debris pool, and there was approximately 40,000 acre-feet of water stored behind the Dam at an elevation of roughly 2,390. The Corps decided to test the operating valves for flood releases, and when high-velocity releases were taking place, a portion of the outlet tunnel failed, and the tests were terminated. The repairs to the tunnel were not completed until November 2005.

Operations in 2007 began with a release of approximately three (3) cfs from Seven Oaks Dam. The Corps slowly raised the reservoir elevation. During the last two weeks in April, the Corps 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.

In December 2010, heavy rains began, and the increased Santa Ana River flows were stored in the reservoir behind SOD. In mid-February 2011, the Corps 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 main gates at the outlet works. The flow was reduced shortly thereafter, and flows of 1,000 cfs were 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 the operation was transferred to the local sponsors.

## **Local Sponsor Operations**

In contrast to 2011, precipitation in 2012-2016 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 outflows were clean and useable by surface diverters. Most water entering the Dam flowed out at the same rate for use by surface diverters and conservation. State Project Water was available in limited quantities, and significant basin groundwater had to be used to make up water needed or guaranteed to local uses. Water levels behind SOD were at nearly historic lows due to drought.

2017 brought some decent rainfall with moderate and sustained outflows from the Seven Oaks dam between 50-250 cfs through April. Northern California had historic rainfall levels meaning State Project Water was widely available, and flows helped to relieve some pressure in the groundwater basin that has been caused by several years of drought. Operations in 2018 saw a return to less than average rainfall. There were only 16 days in April when flows greater than ten (10) cubic feet per second were released from the Dam for downstream users. Southern California Edison had to cease power generating operations in mid-August due to limited flow rates and was only able to begin generating again in December.

Operations in 2019 brought above-average rainfall, including one particularly warm storm on February 14, which caused debris that damaged the Edison intake. Edison was unable to generate for 186 days during 2019 due to damages at their intake and high-water levels behind SOD, which rose above 2,300 ft with releases of approximately 700 cubic feet per second occurring in May.

In 2019 the Exchange Plan members began to meet for the first time since 2003 to update the plan and address issues that were not included in the original plan. These issues were highlighted by the poor water quality supplies behind the SOD. A new possible exchange would be to swap Santa

Ana River water from behind SOD for imported water for direct use by Mutual, leaving the more turbid water for groundwater recharge.

Average to less than average rainfall characterized 2020-2022. Water quality was not an issue as no water was stored behind SOD for significant periods. Edison was unable to generate at Powerhouse #1 due to the damages sustained at the Bear Creek intake in 2019. Limited intermittent generation occurred at Powerhouse #3 over the period due to staffing limitations related to the COVID-19 pandemic and diversions limited to Powerhouse #1. Flows were still diverted at Powerhouse #1 to the Mutual Highline and the Greenspot spill.

Greater than average rainfall characterized 2023 including Tropical Storm Hillary bringing heavy flows on August 20, 2023. Which damaged the intake at Powerhouse #1, the conduit where it crosses the Santa Ana River between Powerhouse #1 and #3, and the access road between Seven Oaks Dam and Powerhouse #1. These damages have stopped all diversions to both Powerhouse #3 and to the Mutual Highline through and require Mutual to purchase SWP water to meet their Highline water supply needs. A consortium was formed to approach Edison about purchasing the powerhouses on both the Santa Ana River and its tributaries.

### **Current Period Operations**

Average rainfall, and an abundant supply of State Project Water, characterized 2024. SOD water elevation exceeded the debris pool level for approximately half the year, and water was released at higher flow rates between January and June. Construction of the Enhanced Recharge Phase 1B project was completed in 2024. The new recharge facilities began recharging water in the spring of 2024 capturing releases from SOD. Work on updates to the Exchange Plan continued in 2025.

The loss of the diversions from both Bear Creek and the Powerhouse #1 intake from Tropical Storm Hillary in 2023 continued to halt all flows of high-quality, high elevation water to Mutual through the Bear Valley Highline. Any water released from the Lake would reach the inlet pool of Seven Oaks Dam and would be subject to water quality issues and the release schedule controlled by the US Army Corps of Engineers. A consortium formed to approach Edison about purchasing the powerhouses on both the Santa Ana River and its tributaries continued to evaluate and analyze purchase alternatives in 2024.

## 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 ground-breaking 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 100<sup>th</sup> 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 and Lake Havasu. Boaters traveling to and from the lakes were transporting microscopic larvae in bilges and outdrives, 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 every solid object it encounters. This leads to clogged pipes, damage to vessels, and out-competition of the native species. Also, because each mature mussel can filter feed about one liter of water daily, huge mussel masses significantly reduce concentrations of plankton, which are an essential food supply for lake and reservoir fisheries.

The potential impact of a mussel infestation in Big Bear Lake is significant because Big Bear Lake is at the top of the Santa Ana River watershed. Every water body and stream below the Bear Valley Dam could become infected, and the resulting impacts to Bear Creek fisheries could suffer. The areas below Bear Valley Dam that could be impacted include the impoundment behind Seven Oaks Dam, the Edison power generating station, and the Santa Ana River all the way to the ocean.

In response to the mussel 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 2008 boating season. All boats entering in 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 wells, live wells, ballast tanks, etc. All vessels deemed suspicious by District inspectors were decontaminated at no charge to the boat owner with pressurized hot water (140°). 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 one-time funds at \$5,000 to help defray the costs associated with the 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 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 began as soon as the Lake warmed to 53°F, the minimum temperature at which the mussels can reproduce.

In 2009, a Quagga Prevention Program surcharge was added to boat permits to offset the costs associated with the program. The surcharge will remain in place as long as a threat exists or as grant money becomes available from the State. With the number of Quagga Mussel infested lakes in southern California increasing and the proximity of recreational boating opportunities such as the Colorado River, the threat of infestation becomes greater. New, more stringent protective measures were implemented at the start of the 2009 boating season. These 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 main office.

Starting in 2009, the BBMWD began offering Watercraft Inspection/Decontamination Training (WIT) certification to all of the private marina workers, allowing all participating marinas to inspect vessels before launching them. The BBMWD also adopted strict standards for the usage of private launch ramps (launch ramps on single family properties), requiring them to be able to be locked closed to prevent unauthorized access. Additionally, these private owners were required to meet personally with District personnel to receive Quagga Mussel education. In 2011, the BBMWD had a total of four WIT III certified staff, allowing them to teach the WIT I and II provided to the BBMWD seasonal staff and marina workers. By 2012, the BBMWD had three decontamination stations, one at the East Public Launch Ramp, one at the West Public Launch Ramp, and one at the BBMWD main office (used only for special events and full decontaminations). The station at the main office got usage in 2014, as inspectors found ten Quagga infested boats. Four of these vessels went to the main office for full decontamination and six were decontaminated at the East Public Launch Ramp.

In 2016, using Department of Boating and Waterways funding, an additional decontamination station and improved decontamination machines were installed at the East Public Launch Ramp. Following the decontamination upgrades, the BBMWD was able to purchase a Flow-Cam in 2017, using Department of Boating and Waterways funding, which allowed for in-house Quagga Mussel monitoring. In 2018, an enclosure for the decontamination units at the East Public Launch Ramp was constructed, protecting them from theft and the elements. The District continued to monitor for potential Quagga Mussel infestation through substrate monitoring at various points around the Lake and by sending plankton tow samples to the California Department of Fish and Wildlife Bodega Bay Shellfish Laboratory for cross-polarized light microscopy analysis and DNA testing. In 2019, the Watercraft Inspection and Decontamination data collection system (WID) was implemented at the Public Launch Ramps. Protocols for plankton tow sampling to be sent off to the California Department of Fish and Wildlife Bodega Bay Shellfish Laboratory were changed for more accurate results. Finally, after reports of New Zealand Mud Snails being found in Bear Creek (several miles below the Bear Valley Dam), the District performed an informal survey looking for New Zealand Mud Snails in Bear Creek, as well as formal surveys and setting traps in Big Bear Lake to search for a snail infestation. No New Zealand Mud Snails were found in either location.

The 2020 season was the busiest in BBMWD history. Despite a slow start caused by the onset of the COVID-19 pandemic, Big Bear Lake saw the highest number of visitors ever to Big Bear Lake. To help cope with the increased number of visitors and problems finding seasonal staff, the BBMWD implemented a fee for decontaminations. This helped to encourage boaters to take Clean, Drained, and Dry into their own hands. A quarantine banding program was implemented before the 2020 season, giving boaters another option to be ready for the boating season.

The 2021 season was a step back toward normal in spite of the ongoing COVID-19 pandemic. Visitors to the valley decreased relative to 2020 and boating saw a similar decline. The BBMWD adjusted with changing mandates and guidelines to keep staff and visitors safe.

The 2022 boating season turned out to be one of the slowest on record. The District almost hired a full staff of seasonal ramp attendants and launched just over 5,000 boats. Quagga mussel monitoring was performed and no indication of infestation was discovered.

The 2023 boating season was approximately average for the lake level. The District almost reached full staffing at the public launch ramps and launched almost 7,000 vessels. No indication of quagga mussel infestation was discovered through any means.

### **2024 Activities**

The 2024 boating season was the busiest since 2020 with excellent lake levels. The District hired ten seasonal ramp attendants to inspect and decontaminate vessels as they arrived at the Public Launch Ramps. In total, the District launched at least 10,994 vessels during the 2024 boating season. Of these, 3,451 were inspected at the Public Launch Ramps and of the inspected, 2,644 were clean, drained, and dry. A total of 680 vessels were decontaminated and the remainder left without being decontaminated or launched. 4,725 vessels arrived at the public launch ramps with BBMWD approved quagga mussel seals and were allowed to launch.

The District continued monitoring Big Bear Lake for the presence of quagga mussels. Quagga mussel veliger plankton tows, surface surveys, and artificial substrate monitoring are performed on a regular basis throughout the year to catch an infestation should it occur. All plankton tow samples analyzed came back negative for the presence of quagga mussel veligers (Tables V-1 to V10) and no indication of infestation has been discovered through artificial substrate monitoring (Table V-11) or surface surveys (Table V-12). Tables V-1 through V-12 are contained in Appendix A

# APPENDIX A

## PLANKTON TOW SHEETS AND SURFACE SURVEYS

TABLE V-1 Plankton Tow Sample Sheet May 23, 2024

| No | Sample descriptions<br>Big Bear Lake locations | CPLM<br>(veligers) | Preservation<br>QC Check | Lake-equivalent<br>volume examined |
|----|--|--------------------|--------------------------|------------------------------------|
| 1  | 5/23/24 Dam                                    | not detected       | pass                     | 1300 liters                        |
| 2  | 5/23/24 Gilner Point                           | not detected       | pass                     | 1300 liters                        |
| 3  | 5/23/24 Mid Lake Middle                        | not detected       | pass                     | 1300 liters                        |
| 4  | 5/23/24 Stanfield Middle                       | not detected       | pass                     | 1300 liters                        |

TABLE V-2 Plankton Tow Sample Sheet June 6, 2024

| No | Sample descriptions<br>Big Bear Lake locations | CPLM<br>(veligers) | Preservation<br>QC Check | Lake-equivalent<br>volume examined |
|----|--|--------------------|--------------------------|------------------------------------|
| 1  | 6/6/24 Dam                                     | not detected       | pass                     | 1300 liters                        |
| 2  | 6/6/24 Gilner Point                            | not detected       | pass                     | 1300 liters                        |
| 3  | 6/6/24 Mid Lake Middle                         | not detected       | pass                     | 1300 liters                        |
| 4  | 6/6/24 Stanfield Middle                        | not detected       | pass                     | 1300 liters                        |

TABLE V-3 Plankton Tow Sample Sheet June 27, 2024

| No | Sample descriptions<br>Big Bear Lake locations | CPLM<br>(veligers) | Preservation<br>QC Check | Lake-equivalent<br>volume examined |
|----|--|--------------------|--------------------------|------------------------------------|
| 1  | 6/27/24 Dam                                    | not detected       | pass                     | 1300 liters                        |
| 2  | 6/27/24 Gilner Point                           | not detected       | pass                     | 1300 liters                        |
| 3  | 6/27/24 Mid Lake Middle                        | not detected       | pass                     | 1300 liters                        |
| 4  | 6/27/24 Stanfield Middle                       | not detected       | pass                     | 1300 liters                        |

TABLE V-4 Plankton Tow Sample Sheet July 11, 2024

| No | Sample descriptions<br>Big Bear Lake locations | CPLM<br>(veligers) | Preservation<br>QC Check | Lake-equivalent<br>volume examined |
|----|--|--------------------|--------------------------|------------------------------------|
| 1  | 7/11/24 Dam                                    | not detected       | pass                     | 1300 liters                        |
| 2  | 7/11/24 Gilner Point                           | not detected       | pass                     | 1300 liters                        |
| 3  | 7/11/24 Mid Lake Middle                        | not detected       | pass                     | 1300 liters                        |
| 4  | 7/11/24 Stanfield Middle                       | not detected       | pass                     | 1300 liters                        |

TABLE V-5 Plankton Tow Sample Sheet July 25, 2024

| No | Sample descriptions<br>Big Bear Lake locations | CPLM<br>(veligers) | Preservation<br>QC Check | Lake-equivalent<br>volume examined |
|----|--|--------------------|--------------------------|------------------------------------|
| 1  | 7/25/24 Dam                                    | not detected       | pass                     | 1300 liters                        |
| 2  | 7/25/24 Gilner Point                           | not detected       | pass                     | 1300 liters                        |
| 3  | 7/25/24 Mid Lake Middle                        | not detected       | pass                     | 1300 liters                        |
| 4  | 7/25/24 Stanfield Middle                       | not detected       | pass                     | 1300 liters                        |

TABLE V-6 Plankton Tow Sample Sheet August 8, 2024

| No | Sample descriptions<br>Big Bear Lake locations | CPLM<br>(veligers) | Preservation<br>QC Check | Lake-equivalent<br>volume examined |
|----|--|--------------------|--------------------------|------------------------------------|
| 1  | 8/8/24 Dam                                     | not detected       | pass                     | 1300 liters                        |
| 2  | 8/8/24 Gilner Point                            | not detected       | pass                     | 1300 liters                        |
| 3  | 8/8/24 Mid Lake Middle                         | not detected       | pass                     | 1300 liters                        |
| 4  | 8/8/24 Stanfield Middle                        | not detected       | pass                     | 1300 liters                        |

TABLE V-7 Plankton Tow Sample Sheet August 21, 2024

| No | Sample descriptions<br>Big Bear Lake locations | CPLM<br>(veligers) | Preservation<br>QC Check | Lake-equivalent<br>volume examined |
|----|--|--------------------|--------------------------|------------------------------------|
| 1  | 8/21/24 Dam                                    | not detected       | pass                     | 1300 liters                        |
| 2  | 8/21/24 Gilner Point                           | not detected       | pass                     | 1300 liters                        |
| 3  | 8/21/24 Mid Lake Middle                        | not detected       | pass                     | 1300 liters                        |
| 4  | 8/21/24 Stanfield Middle                       | not detected       | pass                     | 1300 liters                        |

TABLE V-8 Plankton Tow Sample Sheet September 4, 2024

| No | Sample descriptions<br>Big Bear Lake locations | CPLM<br>(veligers) | Preservation<br>QC Check | Lake-equivalent<br>volume examined |
|----|--|--------------------|--------------------------|------------------------------------|
| 1  | 9/4/24 Dam                                     | not detected       | pass                     | 1300 liters                        |
| 2  | 9/4/24 Gilner Point                            | not detected       | pass                     | 1300 liters                        |
| 3  | 9/4/24 Mid Lake Middle                         | not detected       | pass                     | 1300 liters                        |
| 4  | 9/4/24 Stanfield Middle                        | not detected       | pass                     | 1300 liters                        |

TABLE V-9 Plankton Tow Sample Sheet September 18, 2024

| No | Sample descriptions<br>Big Bear Lake locations | CPLM<br>(veligers) | Preservation<br>QC Check | Lake-equivalent<br>volume examined |
|----|--|--------------------|--------------------------|------------------------------------|
| 1  | 9/18/24 Dam                                    | not detected       | pass                     | 1300 liters                        |
| 2  | 9/18/24 Gilner Point                           | not detected       | pass                     | 1300 liters                        |
| 3  | 9/18/24 Mid Lake Middle                        | not detected       | pass                     | 1300 liters                        |
| 4  | 9/18/24 Stanfield Middle                       | not detected       | pass                     | 1300 liters                        |

TABLE V-10 Plankton Tow Sample Sheet October 2, 2024

| No | Sample descriptions<br>Big Bear Lake locations | CPLM<br>(veligers) | Preservation<br>QC Check | Lake-equivalent<br>volume examined |
|----|--|--------------------|--------------------------|------------------------------------|
| 1  | 10/2/24 Dam                                    | not detected       | pass                     | 1300 liters                        |
| 2  | 10/2/24 Gilner Point                           | not detected       | pass                     | 1300 liters                        |
| 3  | 10/2/24 Mid Lake Middle                        | not detected       | pass                     | 1300 liters                        |
| 4  | 10/2/24 Stanfield Middle                       | not detected       | pass                     | 1300 liters                        |

TABLE V-11 Quagga Mussel Substrate Data 2024

| DATE      | SUBSTRATE LOCATION | SUBSTRATE DEPTH | EMPLOYEE # | SUBSTRATE | CONDITION | COMMENTS                                    | MUSSELS | SPECIES | PLATE SURFACE | PLATE EDGE | SPACERS | ROPE (DEPTH) | OTHER | OTHER ORGANISMS PRESENT                 | COMMENTS |
|-----------|--------------------|-----------------|------------|-----------|-----------|---|---------|---------|---------------|------------|---------|--------------|-------|---|----------|
| 4/22/2024 | EAST RAMP          | 7 FEET          | 351        | PRESENT   | INTACT    | NONE  | ABSENT  | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | ALGAE                                   | NONE     |
| 4/29/2024 | EAST RAMP          | NONE            | 351        | MISSING   | NONE      | SUBSTRATE LOST TO PROP STRIKE, WILL REPLACE | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | NONE                                    | NONE     |
| 5/13/2024 | PATROL DOCK        | 7 Feet          | 305        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | NONE                                    | NONE     |
|           | EAST RAMP          | 7 Feet          | 305        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | NONE                                    | NONE     |
| 5/20/2024 | EAST RAMP          | 7 FEET          | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | ALGAE                                   | NONE     |
|           | PATROL DOCK        | 7 FEET          | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | ALGAE, BLADDER SNAILS                   | NONE     |
|           | WEST RAMP          | 7 FEET          | 3351       | -         | -         | SET SUBSTRATE                               | -       | -       | -             | -          | -       | -            | -     | -                                       | -        |
| 5/28/2024 | EAST RAMP          | 7 FEET          | 305        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Carp Eggs                               | NONE     |
|           | PATROL DOCK        | 7 FEET          | 305        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | NONE                                    | NONE     |
|           | WEST RAMP          | 7 FEET          | 351        | MISSING   | -         | SUBSTRATE MISSING                           | -       | -       | -             | -          | -       | -            | -     | -                                       | -        |
| 6/3/2024  | EAST RAMP          | 7 FEET          | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae, dragonfly larvae, bladder snails | NONE     |
|           | PATROL DOCK        | 7 FEET          | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae, bladder Snails                   | NONE     |
|           | WEST RAMP          | -               | -          | -         | -         | WAITING ON NEW SUBSTRATE                    | -       | -       | -             | -          | -       | -            | -     | -                                       | -        |
| 6/11/2024 | TMDL 1             | 8'              | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | New                                     | NONE     |
|           | TMDL 2             | 8'              | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | New                                     | NONE     |
|           | TMDL 6             | 8'              | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | New                                     | NONE     |
|           | TMDL 9             | 6'              | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | New                                     | NONE     |
|           | WR                 | 6'              | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | New                                     | NONE     |
|           | ER                 | 7'              | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | New                                     | NONE     |
| 6/17/2024 | PATROL DOCK        | 7'              | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae, dragonfly larvae                 | NONE     |
|           | WR                 | 7'              | 305        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
|           | ER                 | 7'              | 305        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
|           | Patrol Dock        | 7'              | 305        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae, Bladder Snails                   | NONE     |
| 6/24/2024 | TMDL 1             | 8'              | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
|           | TMDL 2             | 8'              | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
|           | TMDL 6             | 7'              | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
|           | TMDL 9             | 7'              | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
|           | WR                 | 7'              | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
|           | ER                 | 7'              | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
| 7/1/2024  | PATROL DOCK        | 7'              | 351        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
|           | TMDL 1             | 8'              | 305        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
|           | TMDL 2             | 8'              | 305        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
|           | TMDL 6             | 7'              | 305        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
|           | TMDL 9             | 7'              | 305        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
|           | WR                 | 7'              | 305        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
|           | ER                 | 7'              | 305        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                                   | NONE     |
|           | PATROL DOCK        | 7'              | 305        | PRESENT   | INTACT    | NONE  | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae/Bladder snail                     | NONE     |

| DATE      | SUBSTRATE LOCATION | SUBSTRATE DEPTH | EMPLOYEE # | SUBSTRATE | CONDITION | COMMENTS | MUSSELS | SPECIES | PLATE SURFACE | PLATE EDGE | SPACERS | ROPE (DEPTH) | OTHER | OTHER ORGANISMS PRESENT | COMMENTS |
|-----------|--------------------|-----------------|------------|-----------|-----------|----------|---------|---------|---------------|------------|---------|--------------|-------|-------------------------|----------|
| 7/8/2024  | TMDL 1             | 8'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | TMDL 2             | 8'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | TMDL 6             | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae, Sculpin          | NONE     |
|           | TMDL 9             | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | WR                 | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | ER                 | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | PATROL DOCK        | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
| 7/15/2024 | TMDL 1             | 8'              | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | TMDL 2             | 8'              | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae, Sculpin          | NONE     |
|           | TMDL 6             | 7'              | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | TMDL 9             | 7'              | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | WR                 | 7'              | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | ER                 | 7'              | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | PATROL DOCK        | 7'              | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
| 7/22/2024 | TMDL 1             | 8'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | TMDL 2             | 8'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | TMDL 6             | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | TMDL 9             | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | WR                 | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | ER                 | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | PATROL DOCK        | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
| 7/30/2024 | TMDL 1             | 8'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae, Sculpin          | NONE     |
|           | TMDL 2             | 8'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae/Sculpin           | NONE     |
|           | TMDL 6             | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae/Sculpin           | NONE     |
|           | TMDL 9             | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae/Sculpin           | NONE     |
|           | WR                 | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | ER                 | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | PATROL DOCK        | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
| 8/5/2024  | TMDL 1             | 8'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | TMDL 2             | 8'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | TMDL 6             | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | TMDL 9             | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | WR                 | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | ER                 | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | PATROL DOCK        | 7'              | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
| 8/12/2024 | TMDL 1             | 8'              | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | TMDL 2             | 8'              | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | TMDL 6             | 7'              | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | TMDL 9             | 7'              | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | WR                 | 7'              | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | ER                 | 7'              | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |
|           | PATROL DOCK        | 7'              | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |

| DATE      | SUBSTRATE LOCATION | SUBSTRATE DEPTH | EMPLOYEE # | SUBSTRATE           | CONDITION | COMMENTS | MUSSELS | SPECIES | PLATE SURFACE | PLATE EDGE | SPACERS | ROPE (DEPTH) | OTHER | OTHER ORGANISMS PRESENT | COMMENTS |      |
|-----------|--------------------|-----------------|------------|---------------------|-----------|----------|---------|---------|---------------|------------|---------|--------------|-------|-------------------------|----------|------|
| 8/19/2024 | TMDL 1             | 8'              | 351        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 2             | 8'              | 351        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 6             | 7'              | 351        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae/Sculpin           | NONE     |      |
|           | TMDL 9             | NONE            | 351        | Cut off and missing |           |          |         |         |               |            |         |              |       |                         |          |      |
|           | WR                 | 7'              | 351        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | NONE                    | Algae    | NONE |
|           | ER                 | 7'              | 351        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | NONE                    | Algae    | NONE |
| 8/27/2024 | PATROL DOCK        | 7'              | 351        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 1             | 8'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 2             | 8'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 6             | 7'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 9             | NONE            | 305        | Cut off and missing |           |          |         |         |               |            |         |              |       |                         |          |      |
|           | WR                 | 7'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | NONE                    | Algae    | NONE |
| 9/3/2024  | ER                 | 7'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | PATROL DOCK        | 7'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 1             | 8'              | 351        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 2             | 8'              | 351        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 6             | 7'              | 351        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 9             | NONE            | 351        | Cut off and missing |           |          |         |         |               |            |         |              |       |                         |          |      |
| 9/9/2024  | WR                 | 7'              | 351        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | ER                 | 7'              | 351        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | PATROL DOCK        | 7'              | 351        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 1             | 8'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 2             | 8'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 6             | 7'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
| 9/16/2024 | TMDL 9             | NONE            | 305        | Cut off and missing |           |          |         |         |               |            |         |              |       |                         |          |      |
|           | WR                 | 7'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | ER                 | 7'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | PATROL DOCK        | 7'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 1             | 8'              | 351        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 2             | 8'              | 351        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
| 9/23/2024 | TMDL 6             | 7'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | TMDL 9             | NONE            | 305        | Cut off and missing |           |          |         |         |               |            |         |              |       |                         |          |      |
|           | WR                 | 7'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | ER                 | 7'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|           | PATROL DOCK        | 7'              | 305        | PRESENT             | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |

| DATE       | SUBSTRATE LOCATION | SUBSTRATE DEPTH            | EMPLOYEE # | SUBSTRATE | CONDITION | COMMENTS | MUSSELS | SPECIES | PLATE SURFACE | PLATE EDGE | SPACERS | ROPE (DEPTH) | OTHER | OTHER ORGANISMS PRESENT | COMMENTS |      |
|------------|--------------------|----------------------------|------------|-----------|-----------|----------|---------|---------|---------------|------------|---------|--------------|-------|-------------------------|----------|------|
| 9/30/2024  | TMDL 1             | 8'                         | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 2             | 8'                         | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 6             | 7'                         | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 9             | 7'                         | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | WR                 | REMOVED FROM LAKE FOR FALL |            |           |           |          |         |         |               |            |         |              |       |                         |          |      |
|            | ER                 | 7'                         | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | NONE                    | Algae    | NONE |
| 10/7/2024  | PATROL DOCK        | 7'                         | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 1             | 8'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 2             | 8'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 6             | 7'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 9             | 7'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | WR                 | REMOVED FROM LAKE FOR FALL |            |           |           |          |         |         |               |            |         |              |       |                         |          |      |
| 10/14/2024 | ER                 | 7'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | PATROL DOCK        | 7'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 1             | 8'                         | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 2             | 8'                         | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 6             | 7'                         | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 9             | 7'                         | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
| 10/21/2024 | WR                 | REMOVED FROM LAKE FOR FALL |            |           |           |          |         |         |               |            |         |              |       |                         |          |      |
|            | ER                 | 7'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | PATROL DOCK        | 7'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 1             | 8'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 2             | 8'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 6             | 7'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
| 10/28/2024 | TMDL 9             | 7'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | WR                 | REMOVED FROM LAKE FOR FALL |            |           |           |          |         |         |               |            |         |              |       |                         |          |      |
|            | ER                 | 7'                         | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | PATROL DOCK        | 7'                         | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 1             | 8'                         | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 2             | 8'                         | 351        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
| 11/5/2024  | TMDL 6             | 7'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 9             | 7'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | WR                 | REMOVED FROM LAKE FOR FALL |            |           |           |          |         |         |               |            |         |              |       |                         |          |      |
|            | ER                 | 7'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | PATROL DOCK        | 7'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |
|            | TMDL 1             | 8'                         | 305        | PRESENT   | INTACT    | NONE     | NONE    | NONE    | NONE          | NONE       | NONE    | NONE         | NONE  | Algae                   | NONE     |      |

TABLE V-12 Surface Survey Monitoring Data 2024

| Date      | Location           | Employee # | Approx. Distance Surveyed | Comments                       | Mussels | Species | Area Found | Other Organisms Present | Notes |
|-----------|--------------------|------------|---------------------------|--------------------------------|---------|---------|------------|-------------------------|-------|
| 1/3/2024  | ADVERSE CONDITIONS |            |                           |                                |         |         |            |                         |       |
| 1/10/2024 | EAST RAMP          | 351        | 60M                       | 34°F, SAND, COBBLE, CONCRETE   | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 36.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | MARSH              | 351        | 60M                       | FROZEN                         | ABSENT  | N/A     | N/A        | FROZEN                  | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | FROZEN                         | ABSENT  | N/A     | N/A        | FROZEN                  | NONE  |
| 1/17/2024 | EAST RAMP          | 351        | 60M                       | 34.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 36.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | MARSH              | 351        | 60M                       | 39.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 39.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 1/24/2024 | EAST RAMP          | 351        | 60M                       | 36.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 34.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | MARSH              | 351        | 60M                       | 35.5°F, SAND/MUD               | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 35.5°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
| 1/31/2024 | EAST RAMP          | 351        | 60M                       | 40.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 33.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | MARSH              | 351        | 60M                       | 35.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 33.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
| 2/7/2024  | ADVERSE CONDITIONS |            |                           |                                |         |         |            |                         |       |
| 2/14/2024 | ADVERSE CONDITIONS |            |                           |                                |         |         |            |                         |       |
| 2/21/2024 | ADVERSE CONDITIONS |            |                           |                                |         |         |            |                         |       |
| 2/28/2024 | EAST RAMP          | 351        | 60M                       | 40.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 38.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|           | MARSH              | 351        | 60M                       | 40.5°F, SAND/MUD               | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 36.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
| 3/6/2024  | EAST RAMP          | 351        | 60M                       | 37.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 39.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|           | MARSH              | 351        | 60M                       | 37.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 37.5°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
| 3/14/2024 | EAST RAMP          | 351        | 60M                       | 26.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 32.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|           | MARSH              | 351        | 60M                       | 34.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 28.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
| 3/20/2024 | EAST RAMP          | 351        | 60M                       | 41.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 44.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|           | MARSH              | 351        | 60M                       | 46.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 38.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | NONE                    | NONE  |

| Date      | Location    | Employee # | Approx. Distance Surveyed | Comments                       | Mussels | Species | Area Found | Other Organisms Present           | Notes |
|-----------|-------------|------------|---------------------------|--------------------------------|---------|---------|------------|-----------------------------------|-------|
| 3/29/2024 | EAST RAMP   | 351        | 60M                       | 38.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | WEST RAMP   | 351        | 60M                       | 38.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | MARSH       | 351        | 60M                       | 40.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | PLANTS                            | NONE  |
|           | MAIN OFFICE | 351        | 60M                       | 37.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
| 4/3/2024  | EAST RAMP   | 351        | 60M                       | 41.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | WEST RAMP   | 351        | INACCESSIBLE              |                                |         |         |            |                                   |       |
|           | MARSH       | 351        | 60M                       | 42.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | PLANTS                            | NONE  |
|           | MAIN OFFICE | 351        | 60M                       | 42.5°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
| 4/10/2024 | EAST RAMP   | 351        | 60M                       | 41.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | WEST RAMP   | 351        | 60M                       | 33°F, SAND, COBBLE, CONCRETE   | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | MARSH       | 351        | 60M                       | 45.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | PLANTS, ALGAE                     | NONE  |
|           | MAIN OFFICE | 351        | 60M                       | 41.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
| 4/17/2024 | EAST RAMP   | 351        | 60M                       | 47.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | WEST RAMP   | 351        | 60M                       | 48.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | MARSH       | 351        | 60M                       | 49.5°F, SAND/MUD               | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | MAIN OFFICE | 351        | 60M                       | 52.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
| 4/24/2024 | EAST RAMP   | 351        | 60M                       | 49.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | WEST RAMP   | 351        | 60M                       | 46.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | MARSH       | 351        | 60M                       | 51.5°F, SAND/MUD               | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | MAIN OFFICE | 351        | 60M                       | 48.5°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE, WATERBOATSMEN, FINGERLINGS | NONE  |
| 5/1/2024  | EAST RAMP   | 351        | 60M                       | 53.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | WEST RAMP   | 351        | 60M                       | 50.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | MARSH       | 351        | 60M                       | 54.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | MAIN OFFICE | 351        | 60M                       | 50.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
| 5/8/2024  | EAST RAMP   | 351        | 60M                       | 49°F, SAND, COBBLE, CONCRETE   | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | WEST RAMP   | 351        | 60M                       | 51.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | MARSH       | 351        | 60M                       | 51.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | MAIN OFFICE | 351        | 60M                       | 52.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
| 5/15/2024 | EAST RAMP   | 351        | 60M                       | 59°F, SAND, COBBLE, CONCRETE   | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | WEST RAMP   | 351        | 60M                       | 58.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |
|           | MARSH       | 351        | 60M                       | 60.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | MILFOIL, ALGAE                    | NONE  |
|           | MAIN OFFICE | 351        | 60M                       | 57.5°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE                             | NONE  |

| Date      | Location                               | Employee # | Approx. Distance Surveyed | Comments                       | Mussels | Species | Area Found | Other Organisms Present          | Notes |
|-----------|--|------------|---------------------------|--------------------------------|---------|---------|------------|----------------------------------|-------|
| 5/22/2024 | EAST RAMP                              | 351        | 60M                       | 58.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | WEST RAMP                              | 351        | 60M                       | 55.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE, SMARTWEED                 | NONE  |
|           | MARSH                                  | 351        | 60M                       | 57.5°F, SAND/MUD               | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | MAIN OFFICE                            | 351        | 60M                       | 59.5°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE, SMARTWEED                 | NONE  |
| 5/28/2024 | EAST RAMP                              | 351        | 60M                       | 62.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | WEST RAMP                              | 351        | 60M                       | 61.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE, SMARTWEED                 | NONE  |
|           | MARSH                                  | 351        | 60M                       | 65.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL, SMARTWEED        | NONE  |
|           | MAIN OFFICE                            | 351        | 60M                       | 66.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE, SMARTWEED                 | NONE  |
| 6/5/2024  | EAST RAMP                              | 351        | 60M                       | 64.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | WEST RAMP                              | 351        | 60M                       | 64.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | MARSH                                  | 351        | 60M                       | 70.5°F, SAND/MUD               | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | MAIN OFFICE                            | 351        | 60M                       | 65.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE, SMARTWEED                 | NONE  |
| 6/12/2024 | NO SURVEYS TAKEN DUE TO STAFFING ISSUE |            |                           |                                |         |         |            |                                  |       |
| 6/19/2024 | EAST RAMP                              | 351        | 60M                       | SAND, COBBLE, CONCRETE         | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | WEST RAMP                              | 351        | 60M                       | SAND, COBBLE, CONCRETE         | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | MARSH                                  | 351        | 60M                       | SAND/MUD                       | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | MAIN OFFICE                            | 351        | 60M                       | CONCRETE, BOULDERS             | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
| 6/28/2024 | EAST RAMP                              | 351        | 60M                       | 68.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | WEST RAMP                              | 351        | 60M                       | 65.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | MARSH                                  | 351        | 60M                       | 68.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL, SMARTWEED        | NONE  |
|           | MAIN OFFICE                            | 351        | 60M                       | 68.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
| 7/2/2024  | EAST RAMP                              | 351        | 60M                       | 64.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | WEST RAMP                              | 351        | 60M                       | 65.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | MARSH                                  | 351        | 60M                       | 66.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | MAIN OFFICE                            | 351        | 60M                       | 68.5°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
| 7/10/2024 | EAST RAMP                              | 351        | 60M                       | SAND, COBBLE, CONCRETE         | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | WEST RAMP                              | 351        | 60M                       | SAND, COBBLE, CONCRETE         | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | MARSH                                  | 351        | 60M                       | SAND/MUD                       | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL                   | NONE  |
|           | MAIN OFFICE                            | 351        | 60M                       | CONCRETE, BOULDERS             | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
| 7/17/2024 | EAST RAMP                              | 351        | 60M                       | SAND, COBBLE, CONCRETE         | ABSENT  | N/A     | N/A        | ALGAE, SMARTWEED, BLADDER SNAILS | NONE  |
|           | WEST RAMP                              | 351        | 60M                       | SAND, COBBLE, CONCRETE         | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | MARSH                                  | 351        | 60M                       | SAND/MUD                       | ABSENT  | N/A     | N/A        | ALGAE, SMARTWEED, MILFOIL        | NONE  |
|           | MAIN OFFICE                            | 351        | 60M                       | CONCRETE, BOULDERS             | ABSENT  | N/A     | N/A        | ALGAE, SMARTWEED                 | NONE  |
| 7/24/2024 | EAST RAMP                              | 351        | 60M                       | SAND, COBBLE, CONCRETE         | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | WEST RAMP                              | 351        | 60M                       | SAND, COBBLE, CONCRETE         | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |
|           | MARSH                                  | 351        | 60M                       | SAND/MUD                       | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL                   | NONE  |
|           | MAIN OFFICE                            | 351        | 60M                       | CONCRETE, BOULDERS             | ABSENT  | N/A     | N/A        | ALGAE                            | NONE  |

| Date      | Location           | Employee # | Approx. Distance Surveyed | Comments                        | Mussels | Species | Area Found | Other Organisms Present | Notes |
|-----------|--------------------|------------|---------------------------|---------------------------------|---------|---------|------------|-------------------------|-------|
| 7/31/2024 | EAST RAMP          | 351        | 60M                       | 70.0 °F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 68.0°F, SAND, COBBLE, CONCRETE  | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | MARSH              | 351        | 60M                       | 71.5°F, SAND/MUD                | ABSENT  | N/A     | N/A        | ALGAE, SMARTWEED        | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 69.5°F, CONCRETE, BOULDERS      | ABSENT  | N/A     | N/A        | ALGAE, SCULPIN          | NONE  |
| 8/7/2024  | EAST RAMP          | 351        | 60M                       | 78.0 °F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 72.0°F, SAND, COBBLE, CONCRETE  | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | MARSH              | 351        | 60M                       | 79.0°F, SAND/MUD                | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL          | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 74.0°F, CONCRETE, BOULDERS      | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 8/15/2024 | EAST RAMP          | 351        | 60M                       | 70.5 °F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 68.5°F, SAND, COBBLE, CONCRETE  | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | MARSH              | 351        | 60M                       | 70.0°F, SAND/MUD                | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL          | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 68.5°F, CONCRETE, BOULDERS      | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 8/22/2024 | EAST RAMP          | 351        | 60M                       | 69.0 °F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 67.5°F, SAND, COBBLE, CONCRETE  | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | MARSH              | 351        | 60M                       | 67.0°F, SAND/MUD                | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL, CARP    | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 69.0°F, CONCRETE, BOULDERS      | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 8/28/2024 | EAST RAMP          | 351        | 60M                       | 68.0 °F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 65.5°F, SAND, COBBLE, CONCRETE  | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | MARSH              | 351        | 60M                       | 74.5°F, SAND/MUD                | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL          | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 67.0°F, CONCRETE, BOULDERS      | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 9/5/2024  | EAST RAMP          | 351        | 60M                       | 65.0 °F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE, SCULPIN          | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 64.5°F, SAND, COBBLE, CONCRETE  | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | MARSH              | 351        | 60M                       | 66.0°F, SAND/MUD                | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL, CARP    | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 67.5°F, CONCRETE, BOULDERS      | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 9/11/2024 | ADVERSE CONDITIONS |            |                           |                                 |         |         |            |                         |       |
| 9/20/2024 | EAST RAMP          | 351        | 60M                       | 56.5°F, SAND, COBBLE, CONCRETE  | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 58.5°F, SAND, COBBLE, CONCRETE  | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | MARSH              | 351        | 60M                       | 52.5°F, SAND/MUD                | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL          | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 59.5°F, CONCRETE, BOULDERS      | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 9/26/2024 | EAST RAMP          | 351        | 60M                       | 59.5°F, SAND, COBBLE, CONCRETE  | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | WEST RAMP          | 351        | 60M                       | 60.5°F, SAND, COBBLE, CONCRETE  | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|           | MARSH              | 351        | 60M                       | 57.5°F, SAND/MUD                | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL          | NONE  |
|           | MAIN OFFICE        | 351        | 60M                       | 59.5°F, CONCRETE, BOULDERS      | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |

| Date       | Location                        | Employee # | Approx. Distance Surveyed | Comments                       | Mussels | Species | Area Found | Other Organisms Present | Notes |
|------------|---------------------------------|------------|---------------------------|--------------------------------|---------|---------|------------|-------------------------|-------|
| 10/4/2024  | EAST RAMP                       | 351        | 60M                       | 58.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE, SCULPIN          | NONE  |
|            | WEST RAMP                       | 351        | 60M                       | 59.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MARSH                           | 351        | 60M                       | 60.0°F, SAND/MUD               | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL          | NONE  |
|            | MAIN OFFICE                     | 351        | 60M                       | 61.5°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 10/11/2024 | EAST RAMP                       | 351        | 60M                       | 60.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | WEST RAMP                       | 351        | 60M                       | 60.5°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MARSH                           | 351        | 60M                       | 57.5°F, SAND/MUD               | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL          | NONE  |
|            | MAIN OFFICE                     | 351        | 60M                       | 59.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE, SCULPIN          | NONE  |
| 10/17/2024 | EAST RAMP                       | 351        | 60M                       | 59.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | WEST RAMP                       | 351        | 60M                       | 60.0°F, SAND, COBBLE, CONCRETE | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MARSH                           | 351        | 60M                       | 58.5°F, SAND/MUD               | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL          | NONE  |
|            | MAIN OFFICE                     | 351        | 60M                       | 58.0°F, CONCRETE, BOULDERS     | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 10/23/2024 | EAST RAMP                       | 351        | 60M                       | 54.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | WEST RAMP                       | 351        | 60M                       | 55.5°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MARSH                           | 351        | 60M                       | 50.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MAIN OFFICE                     | 351        | 60M                       | 54.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 10/30/2024 | EAST RAMP                       | 351        | 60M                       | 52.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | WEST RAMP                       | 351        | 60M                       | 50.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MARSH                           | 351        | 60M                       | 47.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MAIN OFFICE                     | 351        | 60M                       | 51.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 11/8/2024  | EAST RAMP                       | 351        | 60M                       | 42.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | WEST RAMP                       | 351        | 60M                       | 47.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MARSH                           | 351        | 60M                       | 38.5°F                         | ABSENT  | N/A     | N/A        | ALGAE, MILFOIL          | NONE  |
|            | MAIN OFFICE                     | 351        | 60M                       | 41.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 11/14/2024 | EAST RAMP                       | 351        | 60M                       | 45.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | WEST RAMP                       | 351        | 60M                       | 44.5°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MARSH                           | 351        | 60M                       | 41.5°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MAIN OFFICE                     | 351        | 60M                       | 51.5°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 11/21/2024 | EAST RAMP                       | 351        | 60M                       | 41.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | WEST RAMP                       | 351        | 60M                       | 44.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MARSH                           | 351        | 60M                       | 38.5°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MAIN OFFICE                     | 351        | 60M                       | 41.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 11/27/2024 | EAST RAMP                       | 351        | 60M                       | 44.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | WEST RAMP                       | 351        | 60M                       | 42.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MARSH                           | 351        | 60M                       | 42.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MAIN OFFICE                     | 351        | 60M                       | 41.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 12/4/2024  | EAST RAMP                       | 351        | 60M                       | 44.0°F                         | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|            | WEST RAMP                       | 351        | 60M                       | 42.0°F                         | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|            | MARSH                           | 351        | 60M                       | 41.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MAIN OFFICE                     | 351        | 60M                       | 38.5°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 12/12/2024 | EAST RAMP                       | 351        | 60M                       | 36.0°F                         | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|            | WEST RAMP                       | 351        | 60M                       | 35.0°F                         | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
|            | MARSH                           | FROZEN     |                           |                                |         |         |            |                         |       |
|            | MAIN OFFICE                     | 351        | 60M                       | 36.5°F                         | ABSENT  | N/A     | N/A        | NONE                    | NONE  |
| 12/18/2024 | EAST RAMP                       | 351        | 60M                       | 40.5°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | WEST RAMP                       | 351        | 60M                       | 39.5°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MARSH                           | 351        | 60M                       | 37.0°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
|            | MAIN OFFICE                     | 351        | 60M                       | 39.5°F                         | ABSENT  | N/A     | N/A        | ALGAE                   | NONE  |
| 12/25/2024 | NO SURVEYS TAKEN DUE TO HOLIDAY |            |                           |                                |         |         |            |                         |       |

APPENDIX B  
MINUTES OF WATERMASTER MEETINGS

Dates

January 16, 2024

March 19, 2024

August 13, 2024

October 22, 2024

**BIG BEAR WATERMASTER**  
**MINUTES OF THE MEETING OF JANUARY 16, 2024**

**PLACE:** San Bernardino Valley Water Conservation District  
and Zoom/Teleconference

|   |   |
|---|---|
| <b>PRESENT:</b> <u>Watermaster Committee</u><br>Don Evenson<br>Katelyn Scholte<br>Sam Fuller  | <u>Representing</u><br>Big Bear MWD, Chair<br>SBV Water Conservation District<br>Bear Valley Mutual Water Company   |
| <u>Others</u><br>Steve Ludecke<br>Brittany Lamson<br>Mike Stephenson<br>Mike Schermer<br>Mark Lee<br>Betsy Miller<br>Athena Laroche<br>Robert Stewart<br>George Hanson<br>Charlotte Van Eck | <br>Big Bear MWD<br>Big Bear MWD<br>Big Bear MWD<br>Big Bear MWD<br>Big Bear MWD<br>SBV Water Conservation District<br>SBV Water Conservation District<br>SBV Water Conservation District<br>Bear Valley Mutual Water Company<br>Bear Valley Mutual Water Company |

**1. WELCOME AND CALL TO ORDER**

The Big Bear Watermaster meeting was called to order by Don Evenson at 11:00 a.m.

**2. APPROVAL OF MINUTES**

It was moved by Mr. Fuller and seconded by Ms. Scholte to approve the minutes of the October 24, 2023 meeting as presented. The motion carried unanimously.

**3. LAKE AND BEAR CREEK STATUS**

Mike Stephenson reported that the current lake level is 64.01 feet, 8.32 feet below full. The release out of the six inch Bypass Line is 0.83 CFS, and the flow is 0.97 CFS at Station B. The SWRCB Requirement at Station B is 0.90 cfs for January. The new SCADA system will reduce the release to meet the Requirement. The thirty-six inch meter quit working, and BBMWD is working on replacing it.

Mr. Stephenson also provided an update on the Replenish Big Bear recycled water project. The Draft Environmental Impact Report has been released. Discussion on WIFIA loans ensued. BBMWD is working with the consultant to analyze brine to inform the operations and maintenance program. Ms. Lamson said the results of the analysis are expected in approximately two months. Mr. Fuller asked if better storage management in

the lake could allow BBMWD to deliver water instead of having to buy in-lieu water. Mr. Stephenson spoke in the affirmative and discussed increasing efficiency of releases.

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

Ms. Scholte stated that there is 23 CFS in Mill Creek and 9 CFS in SAR. The SCE facilities are offline. Ms. Scholte indicated that Exchange Plan efforts are pending SCE discussions related to the divestiture. Mr. Hanson discussed issues with SCE facilities being down, and said that Mutual has engaged SCE on these issues. Ms. Scholte discussed damage to the SCE pipeline. Mr. Stephenson asked about the quality of the water behind SOD. Mr. Hanson said that it is useable but is worse than previous years. Mr. Hanson said Mutual has been working with the SOD operators to request a minimum of 30 CFS releases. Mr. Evenson asked if there has been discussions on improved management of the SCE facilities. Mr. Hanson said that informal discussions were held with SCE.

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

Mr. Fuller stated that there was no in-lieu water in 2023. He said that in-lieu water is generally needed when there is no water to be recharged by the Conservation District at the Cuttle Weir. He said that during 2023, there was water at the Cuttle Weir available for spreading; therefore, there was no in-lieu water.

Mr. Fuller said that Mutual may need in-lieu for the coming year. Mutual ordered 2,000 AF of purchased water from Valley Municipal for 2024. There is an opportunity for Mutual to purchase water from Valley Municipal through the in-lieu agreement that Big Bear has had since 1996. Mr. Fuller said that due to damages to SCE's pipeline, water can no longer be diverted to Bear Creek or SAR #1 Powerhouse to meet Mutual's obligation. If it is not diverted at SAR #1, then Mutual cannot get water to higher elevation customers. The only alternative is to turn on wells or purchase water from Valley Municipal. Repair of the SCE facilities is critical to these water deliveries. Mr. Evenson asked if Mutual had access to the lake releases. Mr. Fuller said that if the pipeline and SCE facilities are not fixed, then Mutual will have to buy SWP water.

#### **6. ANNUAL WATERMASTER ACCOUNTING AND ANNUAL REPORTING**

Mr. Evenson reviewed the 2023 lake levels, which reached its high at 6.08 feet. The year ended at 8.20 feet down from full. He reviewed the preliminary lake account status for 2023. The year started at 30,071 AF, and at the end of June, it was 50,612 AF. Mutual's lake account started at 5,777.8 AF, and, at the end of June was 30,362.1 AF. BBMWD's account began at 24,293.2 AF, and at the end of June, was 20,249.9 AF. Mr. Evenson will finalize the accounts on February 16, and it will be sent to the Committee. A draft of the Watermaster Report will be brought to the Committee in March for review and approval.

**7. DATE FOR NEXT MEETING**

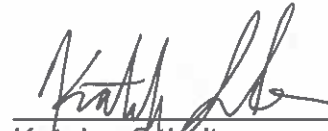
The next meeting will be on Tuesday, March 19, 2024, at 11:00 a.m. at the Water Conservation District.

**8. ADJOURN**

There being no further business, the meeting was adjourned by acclamation to lunch at 12:10 p.m.

  
Donald E. Evenson

  
Sam Fuller

  
Katelyn Scholte

**BIG BEAR WATERMASTER  
MINUTES OF THE MEETING OF MARCH 19, 2024**

PLACE: San Bernardino Valley Water Conservation District  
and Zoom/Teleconference

|                                       |                                  |
|---------------------------------------|----------------------------------|
| PRESENT: <u>Watermaster Committee</u> | <u>Representing</u>              |
| Don Evenson                           | Big Bear MWD, Chair              |
| Katelyn Scholte                       | SBV Water Conservation District  |
| Sam Fuller                            | Bear Valley Mutual Water Company |
| <br>                                  |                                  |
| <u>Others</u>                         |                                  |
| Mike Stephenson                       | Big Bear MWD                     |
| Steve Ludecke                         | Big Bear MWD                     |
| Mike Schermer                         | Big Bear MWD                     |
| Athena Laroche                        | SBV Water Conservation District  |
| Robert Stewart                        | SBV Water Conservation District  |

**1. WELCOME AND CALL TO ORDER**

The Big Bear Watermaster meeting was called to order by Don Evenson at 11:00 a.m.

**2. APPROVAL OF MINUTES**

The minutes of the January 16, 2024, meeting were approved.

**3. LAKE AND BEAR CREEK STATUS**

Mike Stephenson reported that the lake level is currently 66.53. Given that we are in a wet year, the release requirement is 0.4 CFS. Currently, we are seeing 0.57 CFS at Station B. The side flows were approximately 0.17 CFS. BBMWD is receiving 192 GPM out of the three-inch, and the six-inch is completely closed. This is the first time in nearly thirty years that it is dry in front of twenty-four, fourteen, and six-inch. Mr. Stephenson said that the thirty-six inch meter is not functioning. He said that the new meter will be installed once the weather clears up. Mr. Stephenson discussed alternatives until the meter can be installed. Mr. Evenson said that the Committee should discuss waiving the 12 CFS requirement until SCE is operational. Mr. Stephenson said that nothing is needed at this time.

Mr. Stephenson provided an update on the Replenish Big Bear recycled water project. There is a project meeting today. The Big Bear Community Services District (CSD) had approved a portion of the cost, and an amendment to the resolution is required to include WIFIA loan funding provisions. Namely, the WIFIA loan requires that anyone contributing

to the project is prohibited from building their own treatment plant in order to ensure that Big Bear Area Regional Wastewater Agency's (BBARWA) repayment funding is secure. In practice, this would require CSD to send 47% of its sewage to BBARWA and commit to not building its own treatment plant. CSD voted against the amendment to the resolution. Given that each entity must agree to the terms of the WIFIA loan, BBARWA may need to apply for a private loan. Mr. Ludecke said there will be a Q&A with the four-member agencies today. Discussion ensued on alternatives. Mr. Stephenson said the permit requirements have yet to be received from the Regional Board, which are needed prior to BBMWD committing to funding, etc.

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

Ms. Scholte said that there are 140 CFS in the Santa Ana River (SAR) as of this morning. SCE remains offline, with no date for planned repairs available. The Conservation District's recharge is currently limited to 50 CFS because our basins are full. Recharge has begun at five of the new Enhanced Recharge Project basins. There is a groundwater mound near our recharge facilities following the recent record recharge year. There are 70 CFS inflows in the river. Mr. Fuller discussed water quality issues caused by SOD. He indicated that when the 1996 In-Lieu Agreement was put into place, it was with the understanding that high quality water would be available through the SWP and/or SAR water would be available through the SCE system.

Ms. Scholte said the Exchange Plan Amendment is on hold pending the SCE divestiture efforts. Currently, no information is publicly available. Mr. Evenson discussed the potential for the BBWM to be included in this discussion. Ms. Scholte indicated that the consortium had not met recently but has been made aware of BBWM's interest in participating. BBWM will follow up with a letter and may set up meeting to discuss this item with SBVMWD.

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

Mr. Fuller is hopeful that there will be no need for in-lieu water. He indicated that the river is flowing well. Mutual will continue to work to obtain high-elevation water from SBVMWD and/or wells. If the river is not sufficient, they may call on in-lieu water. He indicated that Mutual has 2,000 AF of pre-purchased water from SBVMWD. Mr. Fuller said that, with the highline down, the only water that Mutual can currently obtain is through SOD. The local constituents are concerned with the quality of the water released through the dam. Mr. Fuller discussed alternate methods for water delivery. Mr. Evenson asked what the SWP allocation is. Mr. Fuller said that updated percentages will come out in April. Ms. Scholte noted that as of February, the SWP allocation is 15%.

#### **6. ANNUAL WATERMASTER ACCOUNTING, REPORT, TASKS, AND DEADLINES**

Mr. Evenson said that the report is nearing completion, with final comments pending.

He reviewed the lake accounts included on package page 5. The initial storage began at 24,293.2 AF for Big Bear, 5,777.8 AF for Mutual, and 30,071 AF for Actual. The ending storage to date is 19,439.9 AF for Big Bear, 31,172.1 AF for Mutual, and 50,612 AF for Actual. The Basin Make-Up Account's beginning balance was 20,971 AF, and the ending balance was 21,069 AF.

Mr. Evenson reviewed the precipitation data at the dam. The year began below average at 0.19 inches in October 2023. In January 2024, 3.20 inches of precipitation was received, and in February 2024, 18.09 inches were received, increasing the lake level.

Mr. Evenson reviewed the lake levels, indicating that the year began 8.2 feet down, and by the end of February, it was 6.3 feet down. As of March, it was less than six feet down. If Mutual needs water, BBMWD would have to release it rather than provide in-lieu water.

**7. DATE FOR NEXT MEETING**


The next quarterly meeting is July 18 to be held at the Big Bear Municipal Water District, at 11:00 a.m.

**8. ADJOURN**

There being no further business, the meeting was adjourned by acclamation at 12:28 p.m.

  
Donald E. Evenson

  
Sam Fuller

  
Katelyn Scholte

**BIG BEAR WATERMASTER**  
MINUTES OF THE MEETING OF August 13, 2024

PLACE: Big Bear Municipal Water District  
and Zoom/Teleconference

|          |                              |                                     |
|----------|------------------------------|-------------------------------------|
| PRESENT: | <u>Watermaster Committee</u> | <u>Representing</u>                 |
|          | Don Evenson                  | Big Bear MWD, Chair (zoom)          |
|          | Katelyn Scholte              | SBV Water Conservation District     |
|          | Sam Fuller                   | Bear Valley Mutual Water Company    |
|          | Others                       |                                     |
|          | Mike Stephenson              | Big Bear MWD                        |
|          | Steve Ludecke                | Big Bear MWD                        |
|          | Mark Lee                     | Big Bear MWD                        |
|          | Jared Cheek                  | Big Bear MWD                        |
|          | Brittany Lamson              | Big Bear MWD                        |
|          | Mike Schermer                | Big Bear MWD                        |
|          | Robert Stewart               | Water Conservation District(remote) |
|          | George Hanson                | Bear Valley Mutual Water Company    |
|          | Betsy Miller                 | Water Conservation District (zoom)  |
|          | Michael Plinski              | SBV Municipal Water District        |

**1. WELCOME AND CALL TO ORDER**

The Big Bear Watermaster meeting was called to order by Don Evenson at 11:03 a.m.

**2. APPROVAL OF MINUTES**

The minutes of the March 19, 2024, meeting were approved with a motion by Mr. Fuller with the following revisions: paragraph 1 section 3 “big bear MWD ‘receiving’ should be ‘releasing’ not ‘receiving’ 192 GPM. Page 2, third line would require CSD to send ‘47%’ is actually 100% of their contribution of sewer to BBARWA. The 47% represents the amount of wastewater CSD makes up of BBARWA’s three customers.

Mike Stephenson clarified that that number is CSD’s full amount of sewer that they deliver. Mrs. Scholte seconded the motion with corrections. Minutes approved.

**3. LAKE AND BEAR CREEK STATUS**

**A. Update on Recycled Water Project**

Mike Stephenson reported the lake is currently 5’4” down from full, we are currently releasing 1.26 CFS at Station B the requirement is 1.25 CFS. Releasing 578 GPM out of the 6”. The 3” is completely off, we are still seeing some side flows, small intrusions around the dam. We are as close as we have ever been to completing the SCADA upgrade. This will allow us to self-adjust to what flows are and will properly account for precipitation. No update to Replenish Big Bear except the environmental document was not approved last night.

Mr. Evenson wanted to confirm that the EIR was not approved, Mr. Stephenson confirmed that was true. Mr. Evenson asked if that meant the project stopped? Mr. Stephenson said that is what we think happened.

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

##### **A. Update on Exchange Plan Efforts**

Mrs. Scholte reported they are currently seeing 45 CFS out of SOD, 26 CFS out of Mill Creek, most water is being used by Redlands and East Valley, little available for recharge, Sam will update on state water.

##### **B. Update on Southern CA Edison Facilities**

Mrs. Scholte continued, Edison had another meeting of the exchange plan, however not everyone was there so there was no vote, Edison efforts are still underway, but nothing to share.

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

##### **A. In-Lieu Deliveries**

Mr. Fuller reported that it seems Seven Oaks Dam (SOD) is consistently releasing at the moment. Bear Valley is diverting Santa Ana flows to North Fork and Redlands Aqueduct, Conservation District ponds are still receiving water. We might need additional water this year. Current conditions, with the Edison siphon, at station 1 all water is taken below SOD, and is going to Redlands Aqueduct and North Fork. MWD has an obligation for Highline delivery, but Edison has left us with the problem. We have been buying State Water for the Highline delivery because it cannot be delivered.

This year up to June we have spent \$110,000 to purchase water to meet keep the Highline demand. Mutual has made agreements with Valley District which will allow Mutual to receive water at the Highline at no cost to Mutual with the current troubled conditions at the powerhouse. However, as flows decrease and we Mutual may need more water. With the recharge that Conservation District is doing and Mutual is purchasing more than that, it might be fair when extra is needed at Redlands Aqueduct and North Fork, Mutual will request the 1996 agreement be implemented, so any water received will become in-lieu water instead of exchange water.

The siphon under the SAR at powerhouse 1 will likely not be repaired anytime soon. Big Bear will need to work with Valley District to see how to get water into the Highline Green Valley pipeline. The Flow line to Powerhouse Number 1 is still in poor condition, and the run is in bad repair. We will need to come to an agreement on how to handle the water with the highline being out of service. Mutual is going to need in lieu water and all Mutual water should be treated as in lieu water at this point with these obstacles.

##### **B. Limitation of SAR Water Delivery Under Current Conditions**

Mr. Evenson asked if the lake levels rise, and water could be released, but it still does not do it any good. Mr. Fuller confirmed that was correct and explained it will all go down below SOD, there could be a problem and we (Mutual) still can't get the water. Once we get to the point where we need additional water, we would like to make additional arrangements to store water in a sub account, or we need to figure out a different solution. We do not have a great answer at the moment.

Mr. Evenson brought up the exchange program and that it worked great in the past, why not now. Mr. Fuller responded that we are working on it (the exchange program) now with some improvements. Mr. Stephenson requested clarification on whether the 2012 agreement or a new sub-account was recommended. Mr. Fuller confirmed that might be a vehicle for this approach, but we do need to put something together. Mr. Stephenson continued; we would need to produce something new to the 2012 agreement if anything.

Mike Plinski (Valley District) explained they are open and willing to put together an agreement to help with this issue. The group appreciated the gesture.

Mr. Fuller said at this time, we will need 6,500 acre feet for the remainder of the year. The original release seen in the 1996 agreement was a Big Bear Board decision, but we are reluctant to change any of that if our other options go through. Mr. Stephenson agreed with that approval process. Agreed among the committee, so Big Bear will need to take action because of the agreement, but they feel strongly about the interim solutions being discussed before any changes to the agreement were to occur.

Mr. Evenson inquired if Edison permits from "FERC" were being violated by allowing the powerhouses to be down for so long? Don't they have any obligation to ensure the water is being delivered to the water rights holders. Mr. Fuller explained that Bear Valley Mutual has not been aggressive on that permit as of yet, but FERC might be a future option.

## **6. ANNUAL WATERMASTER ACCOUNTING**

### **A. Preliminary June 2024 Lake Accounts**

Don reviewed water accounting handouts, these are the release requirements of minimum flows at station B, second slide shows the compliance for this, which Big Bear has done a good job managing to meet those requirements. Next slide is the lake level from the first 6 months of the year.

## **7. DATE FOR NEXT MEETING**

The next quarterly meeting is October 22, 2024, to be held at Mutual, at 11:00 a.m. All agreed that this date would still work for the group.

## **8. ADJOURN**

There being no further business, the meeting was adjourned by acclamation at 11:49 p.m.

  
Donald E. Evenson

  
Sam Fuller

  
Katelyn Scholte

**BIG BEAR WATERMASTER**  
MINUTES OF THE MEETING OF October 22, 2024

PLACE: Bear Valley Mutual Water Company  
101 E. Olive Ave., Redlands

|                                       |                                  |
|---------------------------------------|----------------------------------|
| PRESENT: <u>Watermaster Committee</u> | <u>Representing</u>              |
| Don Evenson                           | Big Bear MWD, Committee Chair    |
| Katelyn Scholte                       | SBV Water Conservation District  |
| Samuel Fuller                         | Bear Valley Mutual Water Company |
| <br>                                  |                                  |
| <u>Others</u>                         |                                  |
| Mike Stephenson                       | Big Bear MWD                     |
| Steve Ludecke                         | Big Bear MWD                     |
| Mike Schermer                         | Big Bear MWD                     |
| Jared Cheek                           | Big Bear MWD                     |
| <br>                                  |                                  |
| Betsy Miller                          | Water Conservation District      |
| Robert Stewart                        | Water Conservation District      |
| Michael Plinski                       | SBV Municipal Water District     |
| George Hanson                         | Bear Valley Mutual Water Company |
| Charlotte Van Eck                     | Bear Valley Mutual Water Company |

### 1. WELCOME AND CALL TO ORDER

The Big Bear Watermaster meeting was called to order by Don Evenson at 11:05 a.m.

### 2. APPROVAL OF MINUTES

The minutes of the August 13, 2024 meeting were discussed. Suggested revisions included correction to item 3 "Lake and Bear Creek Status". Sam Fuller suggested placing a period in the first sentence after 1.26 CFS and removing the word "at". In item 4, section B the portion that reads "Edison efforts are still underway, but nothing to share" should remain and the rest of the sentence should be placed in section A. Also, Mr. Fuller rewrote item 5 and submitted the revised edition to those present. Mr. Fuller asked the Committee to look over the revised edition, and bring comments to the next meeting. Mike Stephenson stated that he did not fully agree with the revisions he had the opportunity to review prior to the meeting but would bring comments regarding the revised edition to the next meeting. It was moved by Don Evenson and seconded by Katelyn Scholte to approve the revisions to the minutes, except Item 5 revisions, and discuss that item at the next meeting. Motion carried.

### 3. LAKE AND BEAR CREEK STATUS

#### A. Update on Recycled Water Project

Mike Stephenson reported the lake is currently 6.36 ft. down from full and the level is at 65.97 ft. BBMWD is currently releasing 1.22 CFS, meeting the 1.20 CFS requirement. The

SCADA is within 0.02 accuracy, which can fluctuate slightly with weather conditions. There is no update on Replenish Big Bear.

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

##### **A. Update on Exchange Plan Efforts**

Katelyn Scholte reported that the current flow in the Santa Ana River is 40 CFS and there is 20 CFS in Mill Creek. The Santa Ana River water is flowing to the Seven Oaks Dam and the Bear Valley Highline is still down. We are waiting to see the impact on the river water quality because of the recent fires. George Hanson stated that the City of Redlands is not currently taking water at the Horace Hinckley Water Treatment Plant likely due to water quality.

##### **B. Update on Southern California Edison Facilities**

Bear Valley Mutual Water Company employees were able to inspect damage in Upper Santa Ana River and took many pictures. The Santa Ana Hydro Plant #1 is still intact, and the fires did not burn the building. However, there is a broken cable that suspended the Alder Creek pipeline and the fire melted the line completely. San Bernardino Valley had been informed of the condition of the pipelines after the fires. Mr. Plinski stated that discussions regarding the fire damage with Southern California Edison will happen soon. Mrs. Scholte stated that currently, SCE facilities on Mill Creek are in operation, but Santa Ana hydroelectric plants 1 and 3 are not in operation.

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

##### **A. In-Lieu Deliveries**

Sam Fuller stated that in-lieu deliveries are not expected for the remainder of 2024.

##### **B. Limitations of Santa Ana River Water Delivery Under Current Conditions**

There are limitations on deliveries to Bear Valley Mutual Water Company from Santa Ana River because of the current conditions. Currently, water diversions are being made into the Water Conservation District spreading basins. Santa Ana River water is not able to get to the Bear Valley Highline because of the damage from Hurricane Hilary that occurred in August 2023 at SAR 1. Until that damage is repaired and placed back into operation thereby restoring flows in the Highline, the San Bernardino Valley Municipal Water District will continue delivering State Project Water to Bear Valley Mutual Water Company, as provided in the Asset Purchase Agreement entered into between San Bernardino Valley Municipal Water District and SCE.

Don Evenson supplied Table III-12 from the Annual Report which shows the quantities of diversions by Mutual. As a result of the damage in the Santa Ana Canyon from Hurricane Hillary, the flow of Santa Ana River (and any Big Bear Lake releases) now ends up behind Seven Oaks Dam. The table shows the historic diversions from Santa Ana River, groundwater production from wells and the Big Bear Municipal Water District in-lieu deliveries. The table shows that the maximum

amount of diversions is 32,256 Acre Feet and the minimum amount is 13,065 Acre Feet since 1977.

The water needed for the Highline cannot be diverted at SAR 1 due to the damage, therefore that water remains in the river and flows behind the Seven Oaks Dam. Releases of water from behind the dam are of poor quality, so the bulk of the water released is being recharged by the Water Conservation District. Currently, as a result of water quality concerns, the Water Conservation District and the SBV Municipal Water District are receiving water that would otherwise belong to Bear Valley Mutual Water Company. How Bear Valley Mutual Water Company should receive in-lieu water is not clear and a workable solution is needed to figure out how to get Bear Valley water.

Sam Fuller stated that the Seven Oaks Accord anticipated that the Edison plants would always be in operation and deliver water. Until SBV Municipal Water District takes over the operation of the Edison plants, the 1977 Judgement will not function properly. Mike Plinski stated that discussions are being made between Bear Valley Mutual Water Company and SBV Municipal Water District regarding an exchange agreement.

## **6. ANNUAL WATERMASTER ACCOUNTING**

### **A. Preliminary September Lake Account Status**

Mr. Evenson reported that as of September 30, 2024 Big Bear Lake level was at 6.10 feet, up 2.10 feet. In the Preliminary Lake Account Status, the actual lake accounts ending storage is 56,145 Acre Feet. Bear Valley Mutual's lake account is 39,970 Acre Feet and the Big Bear Municipal Water District's lake account is 16,175 Acre Feet.

At Station B, although there were some days that were just below the dam fishery release requirements, the release requirements have been met.

## **7. DATE FOR NEXT MEETING**

The 2025 quarterly meeting dates are set for January 21, March 18, July 15 and October 21.

## **8. OTHER BUSINESS**

### **A. Board Secretary**

Jared Cheek offered to inform the Watermaster Board in the near future whether Brittany Lamson will be able to take on the duties of Board secretary. Betsy Miller stated that the Water Conservation District will also be able to provide an employee if necessary.

### **B. Chairman**

Don Evenson will be retiring from the position of Watermaster and Chairman at the end of 2024. It was moved by Sam Fuller to nominate Mike Stephenson as Committee Chairman beginning January 1, 2025. Katelyn Scholte seconded the motion. Mike Stephenson accepted, and motion carried. Appreciation was

expressed for Don Evenson and his willingness to continue to help and give advice in the future.

**9. ADJOURNMENT**

There being no further business, the meeting was adjourned by acclamation at 11:45 a.m.

  
Donald E. Evenson

  
Sam Fuller

  
Katelyn Scholte

# APPENDIX C

## TABLE OF ACCOUNTS OF OPERATION OF BIG BEAR LAKE ACCOUNTS FOR CALENDAR YEAR 2024

|  |              |
|--|--------------|
| INPUT DATA SUMMARY OF RESULTS                      | B-1 THRU B-4 |
| SUMMARY OF RESULTS                                 | B-5          |
| 1. ACTUAL OPERATION OF BIG BEAR LAKE               | B-6          |
| 1.A Summary Details                                | B-7          |
| 1.B Release Details                                | B-8          |
| 1.C Lake Withdrawal Details                        | B-9          |
| 1.D Evaporation Details                            | B-10         |
| 2. SYNTHESIZED MUTUAL OPERATION OF BIG BEAR LAKE   | B-11         |
| 2.A Lake Outflow Details                           | B-12         |
| 2.B Synthesized Evaporation Calculation            | B-13         |
| 2.C Mutual's Leakage and Adjusted Spills           | B-14         |
| 3. DETERMINATION OF BIG BEAR'S LAKE ACCOUNT STATUS | B-15         |
| 3.A Lake Inflow Details                            | B-16         |
| 3.B Lake Outflow Details                           | B-17         |
| 4. BASIN MAKE-UP ACCOUNT                           | B-18         |
| 4.A Big Bear's Basin Additions                     | B-19         |
| 4.B Mutual's Basin Additions                       | B-20         |
| 4.C Basin Replenishments                           | B-21         |

**INPUT DATA  
BIG BEAR WATERMASTER REPORT  
CALENDAR YEAR  
2024**

Sheet 1 Of 4

|   |   |  |                                   |            |
|---|---|--|-----------------------------------|------------|
| Calendar Year   | = | <b>2024</b>                            |                                   |            |
| Mutual's Lake Account Balance on Jan.1                  | = | <b>31,172.1</b>                        | acre-feet                         |            |
| Basin Make-Up Account Balance on Jan. 1                 | = | <b>21,069</b>                          | acre-feet                         | See Note 1 |
| Account Balance for Mutual's Advances to BBMWD          | = | -                                      | acre-feet                         |            |
| Repayment Premium for Mutual's Advances to BBMWD        | = | <b>0%</b>                              |                                   |            |
| 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        |            |
| <b>Monthly Evaporation Rate Calculation Factors</b>     |   | <u>C1</u>                              | <u>C2</u>                         | <u>C3</u>  |
| 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**  
**2024**  
**(continued)**

| Month     | Gage*<br>Height<br>1st of<br>Month<br>(feet) | Actual<br>Mutual<br>Shareholder<br>Releases<br>(acre-feet) | Mutual<br>Other<br>Releases<br>(acre-feet) | Actual<br>Spillway<br>Flood Control<br>Releases<br>(acre-feet) | Actual<br>Outlet Works<br>& Flood Control<br>Releases<br>(acre-feet) | Big Bear's<br>Spreading<br>Releases<br>(acre-feet) | Big Bear's<br>Other<br>Releases<br>(acre-feet) | Leakage<br>(Not used,<br>included in<br>Fish Releases)<br>(acre-feet) |
|-----------|--|--|--|--|--|--|--|---|
|           | <b>64.13</b>                                 |  |  |  |  |  |  |   |
| January   | 64.16  | -  | -  | -  | -  | -  | -  | -   |
| February  | 65.88  | -  | -  | -  | -  | -  | -  | -   |
| March     | 67.01  | -  | -  | -  | -  | -  | -  | -   |
| April     | 68.28  | -  | -  | -  | -  | -  | -  | -   |
| May       | 68.28  | -  | -  | -  | -  | -  | -  | -   |
| June      | 67.75  | -  | -  | -  | -  | -  | -  | -   |
| July      | 67.05  | -  | -  | -  | -  | -  | -  | -   |
| August    | 66.42  | -  | -  | -  | -  | -  | -  | -   |
| September | 66.07  | -  | -  | -  | -  | -  | -  | -   |
| October   | 65.68  | -  | -  | -  | -  | -  | -  | -   |
| November  | 65.40  | -  | -  | -  | -  | -  | -  | -   |
| December  | 65.21  | -  | -  | -  | -  | -  | -  | -   |

Change 1.08  
 \* Gage at Bear Valley Dam

**BIG BEAR WATERMASTER REPORT  
CALENDAR YEAR  
2024  
(continued)**

| Month         | Big Bear's<br>Withdrawals<br>for<br>Snowmaking<br>(acre-feet) | Big Bear's<br>Releases<br>for<br>SBVMWD<br>(acre-feet) | Mutual<br>Spills of<br>Wastewater<br>Exports<br>(acre-feet) | In-Lieu<br>Imported<br>Supplies<br>(SBVMWD)<br>(acre-feet) | In Lieu<br>Supplies<br>from SBVMWD's<br>Contract Wells<br>(acre-feet) | In Lieu<br>Supplies<br>from Mutual's<br>Wells<br>(acre-feet) | VD<br>In Lieu<br>Supplies<br>from BB Lake<br>acre-feet |
|---------------|---|--|---|--|---|--|--|
| January       | 276.22  | -  | -   | -  | -   | -  | -  |
| February      | 85.70   | -  | -   | -  | -   | -  | -  |
| March         | 7.05  | -  | -   | -  | -   | -  | -  |
| April         | 7.85  | -  | -   | -  | -   | -  | -  |
| May           | 39.02   | -  | -   | -  | -   | -  | -  |
| June          | 44.57   | -  | -   | -  | -   | -  | -  |
| July          | 32.51   | -  | -   | -  | -   | -  | -  |
| August        | 27.25   | -  | -   | -  | -   | -  | -  |
| September     | 34.49   | -  | -   | -  | -   | -  | -  |
| October       | 1.73  | -  | -   | -  | -   | -  | -  |
| November      | 150.19  | -  | -   | -  | -   | -  | -  |
| December      | 101.27  | -  | -   | -  | -   | -  | -  |
| <b>Totals</b> | <b>807.85</b>   | -  | -   | -  | -   | -  | -  |

**INPUT DATA**  
**BIG BEAR WATERMASTER REPORT**  
**CALENDAR YEAR**  
**2024**  
 (continued)

| Month     | SWRCB<br>Order 95-4<br>Releases &<br>Leakage<br>(acre-feet) | Mutual's<br>Direct Use of<br>Order 95-4<br>Lake Outflows<br>(acre-feet) | Basin<br>Replenishment<br>from<br>SBVMWD<br>(acre-feet) | Basin<br>Replenishment<br>from<br>Others<br>(acre-feet) | 2024<br>Net<br>Wastewater<br>Exports<br>(acre-feet) | Average<br>Air<br>Temperature<br>(degrees F) |
|-----------|---|---|---|---|---|--|
| January   | 58.05   | 18.56   | -   | -   | 94.29   | 37.2   |
| February  | 59.82   | -   | -   | -   | 190.31  | 35.6   |
| March     | 27.05   | -   | -   | -   | 207.28  | 37.5   |
| April     | 26.39   | -   | -   | -   | 184.66  | 44.2   |
| May       | 36.20   | -   | -   | -   | 102.12  | 52.3   |
| June      | 45.95   | -   | -   | -   | 85.15   | 64.1   |
| July      | 57.82   | 1.75  | -   | -   | 87.63   | 70.4   |
| August    | 78.59   | 5.01  | -   | -   | 71.14   | 66.3   |
| September | 76.87   | -   | -   | -   | 52.61   | 59.7   |
| October   | 80.44   | -   | -   | -   | 55.28   | 54.5   |
| November  | 69.86   | 34.98   | -   | -   | 64.85   | 40.9   |
| December  | 57.57   | 28.10   | -   | -   | 81.84   | 43.5   |
| Totals    | 674.61  | 88.40   |   |   | 1,277.16  |  |

**SUMMARY RESULTS - Preliminary**  
**CALENDAR YEAR**  
**2024**

| LAKE ACCOUNTS (acre-feet)                       | Big Bear         | Mutual          | Actual          |
|---|------------------|-----------------|-----------------|
| <b>Initial Storage</b>                          | <b>19,439.9</b>  | <b>31,172.1</b> | <b>50,612.0</b> |
| Lake Inflows                                    | 0.0              | 15,697.3        | 15,697.3        |
| In-Lieu Supplies to Mutual                      | 0.0              | 0.0             | 0.0             |
| Lake Releases (Mutual & BBMWD)                  | 0.0              | 0.0             | 0.0             |
| Releases & Leakage (SWRCB 95-4)                 | (182.8)          | (491.8)         | (674.6)         |
| Net Snowmaking Withdrawals from Lake            | (492.8)          | 0.0             | (492.8)         |
| Lake Spills & Flood Control Releases            | 0.0              | 0.0             | 0.0             |
| Leakage from Dam                                | 0.0              | 0.0             | 0.0             |
| Evaporation from Lake                           | (1,795.0)        | (9,995.9)       | (11,790.9)      |
| Net Wastewater Exports                          | (1,277.2)        | 1,277.2         | 0.0             |
| Advances & Repayment of Advances                | 0.0              | 0.0             | 0.0             |
| <b>Ending Storage</b>                           | <b>15,692.2</b>  | <b>37,658.8</b> | <b>53,351.0</b> |
| <b>Storage Change</b>                           | <b>(3,747.7)</b> | <b>6,486.7</b>  | <b>2,739.0</b>  |
| <b>BASIN MAKE UP ACCOUNT (acre-feet)</b>        |                  |                 |                 |
| <b>Beginning Balance</b>                        | n.a.             | n.a.            | <b>21,069</b>   |
| Recharge From Releases of Lake Water Used by I  | 44               | 44              | 0               |
| Recharge From In-lieu SWP Water Delivered to Mi | 0                | n.a.            | 0               |
| Recharge from Spills & Other Lake Releases      | 299              | 206             | 93              |
| <b>Account Credit (Debit)</b>                   | <b>343</b>       | <b>250</b>      | <b>93</b>       |
| Amount Replenished                              | 0                | n.a.            | 0               |
| <b>Ending Balance</b>                           |                  |                 | <b>21,162</b>   |

**CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER**

**TABLE 1  
ACTUAL OPERATION OF BIG BEAR LAKE**

| Month         | 1<br>Gage<br>Height<br>1st of<br>Month<br>(Input Data)<br>(feet) | 2<br>Volume<br>in<br>Storage<br>(ac-ft) | 3<br>Change<br>in<br>Storage<br>(ac-ft) | 4<br>Lake<br>Surface<br>Area<br>(acres) | 5<br>Spills<br>Releases<br>Leakage<br>Withdrawals<br>(see Table 1.A)<br>(feet) | 6<br>Estimated<br>Lake<br>Evaporation<br>(see Table 1.D)<br>(ac-ft) | 7<br>Calc.<br>Total<br>Inflow<br>(ac-ft) | 8<br>Adjusted<br>Lake<br>Inflow *<br>(ac-ft) | 9<br>Adjusted<br>Lake<br>Evap *<br>(ac-ft) | 10<br>Adjusted<br>Evap<br>Rate *<br>(feet/month) |
|---------------|--|---|---|---|--|---|--|--|--|--|
| January       | 64.13  | <b>50,612</b>                           | 0                                       | 2,582                                   | 196  | 238   | 435                                      | 434.5  | 238  | 0.092  |
| February      | 64.16  | 50,612                                  | 4,594                                   | 2,582                                   | 103  | 269   | 4,965                                    | 4,965.4                                      | 269  | 0.102  |
| March         | 65.88  | 55,206                                  | 2,963                                   | 2,669                                   | 31   | 521   | 3,515                                    | 3,514.7                                      | 521  | 0.193  |
| April         | 67.01  | 58,169                                  | 3,584                                   | 2,722                                   | 30   | 778   | 4,392                                    | 4,392.3                                      | 778  | 0.283  |
| May           | 68.28  | 61,753                                  | 0                                       | 2,783                                   | 75   | 1,204   | 1,279                                    | 1,279.0                                      | 1,204                                      | 0.433  |
| June          | 68.28  | 61,753                                  | (1,525)                                 | 2,783                                   | 91   | 1,582   | 148                                      | 147.8  | 1,582                                      | 0.571  |
| July          | 67.75  | 60,228                                  | (1,922)                                 | 2,758                                   | 90   | 1,799   | (33)                                     | 0.0  | 1,832                                      | 0.668  |
| August        | 67.05  | 58,306                                  | (1,756)                                 | 2,724                                   | 106  | 1,705   | 55                                       | 55.0   | 1,705                                      | 0.630  |
| September     | 66.42  | 56,550                                  | (945)                                   | 2,693                                   | 111  | 1,396   | 562                                      | 562.0  | 1,396                                      | 0.520  |
| October       | 66.07  | <b>55,605</b>                           | (930)                                   | 2,676                                   | 81   | 1,166   | 318                                      | 317.7  | 1,166                                      | 0.437  |
| November      | 65.68  | 54,675                                  | (794)                                   | 2,660                                   | 145  | 678   | 29                                       | 28.9   | 678  | 0.256  |
| December      | 65.40  | 53,881                                  | (530)                                   | 2,644                                   | 108  | 331   | (91)                                     | 0.0  | 422  | 0.160  |
| December      | 65.21  | <b>53,351</b>                           |   | 2,635                                   |  |   |  |  |  |  |
| <b>TOTALS</b> |  |   | <b>2,739.0</b>                          |   | <b>1,167.4</b>   | <b>11,667</b>   | <b>15,573</b>                            | <b>15,697.3</b>                              | <b>11,790.9</b>                            | <b>4.345</b>                                     |

\* NOTE: Evaporation adjusted to eliminate negative inflow  
9 month totals

15,350.7      9,524.7

CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER

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

| Month         | 1 | 2  | 3  | 4  | 5   | 6  | 7 | 8 | 9  |
|---------------|---|--|--|--|---|--|---|---|--|
|               |   | Actual<br>Spillway<br>Flood Control<br>Releases<br>(Input Data)<br>(ac-ft) | Actual<br>Outlet Works<br>Flood Control<br>Releases<br>(Input Data)<br>(ac-ft) | Actual<br>Lake<br>Releases<br>(Non-FC)<br>(see Table 1.B)<br>(ac-ft) | Actual<br>Estimated<br>Leakage<br>(not used)<br>(Input Data)<br>(ac-ft) | Estimated<br>Net<br>Lake<br>Withdrawal<br>(see Table 1.C)<br>(ac-ft) |   |   | Total<br>Spills<br>Releases<br>Leakage<br>Withdrawals<br>(ac-ft) |
| January       |   | -  | -  | 58.1   | -   | 138.1  |   |   | 196.2  |
| February      |   | -  | -  | 59.8   | -   | 42.9   |   |   | 102.7  |
| March         |   | -  | -  | 27.1   | -   | 3.5  |   |   | 30.6   |
| April         |   | -  | -  | 26.4   | -   | 3.9  |   |   | 30.3   |
| May           |   | -  | -  | 36.2   | -   | 39.0   |   |   | 75.2   |
| June          |   | -  | -  | 46.0   | -   | 44.6   |   |   | 90.5   |
| July          |   | -  | -  | 57.8   | -   | 32.5   |   |   | 90.3   |
| August        |   | -  | -  | 78.6   | -   | 27.3   |   |   | 105.8  |
| September     |   | -  | -  | 76.9   | -   | 34.5   |   |   | 111.4  |
| October       |   | -  | -  | 80.4   | -   | 0.9  |   |   | 81.3   |
| November      |   | -  | -  | 69.9   | -   | 75.1   |   |   | 145.0  |
| December      |   | -  | -  | 57.6   | -   | 50.6   |   |   | 108.2  |
| <b>TOTALS</b> |   | -  | -  | <b>674.6</b>   | -   | <b>492.8</b>   |   |   | <b>1,167.4</b>   |

CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER

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

| Month         | 1<br>Mutual's<br>Shareholder<br>Releases<br><br>(Input Data)<br>(ac-ft) | 2<br>Mutual's<br>Other<br>Releases<br><br>(Input Data)<br>(ac-ft) | 3<br>Mutual's<br>Total<br>Releases<br><br>(Col.1 + Col.2)<br>(ac-ft) | 4<br>Big Bear's<br>Releases for<br>SBVMWD<br><br>(Input Data)<br>(ac-ft) | 5<br>Big Bear's<br>Spreading<br>Releases<br><br>(Input Data)<br>(ac-ft) | 6<br>Big Bear's<br>Other<br>Releases<br><br>(Input Data)<br>(ac-ft) | 7<br>Big Bear's<br>Total<br>Releases<br><br>Col.4+Col.5+Col.6<br>(ac-ft) | 8<br>SWRCB<br>Order NO. 95-4<br>Lake Outflows<br><br>(Input Data)<br>(ac-ft) | 9<br>Total<br>Actual<br>Releases<br><br>(Cols.3+ 7+ 8)<br>(ac-ft) |
|---------------|---|---|--|--|---|---|--|--|---|
| January       | -   | -   | -  | -  | -   | -   | -  | 58.05  | 58.1  |
| February      | -   | -   | -  | -  | -   | -   | -  | 59.82  | 59.8  |
| March         | -   | -   | -  | -  | -   | -   | -  | 27.05  | 27.1  |
| April         | -   | -   | -  | -  | -   | -   | -  | 26.39  | 26.4  |
| May           | -   | -   | -  | -  | -   | -   | -  | 36.20  | 36.2  |
| June          | -   | -   | -  | -  | -   | -   | -  | 45.95  | 46.0  |
| July          | -   | -   | -  | -  | -   | -   | -  | 57.82  | 57.8  |
| August        | -   | -   | -  | -  | -   | -   | -  | 78.59  | 78.6  |
| September     | -   | -   | -  | -  | -   | -   | -  | 76.87  | 76.9  |
| October       | -   | -   | -  | -  | -   | -   | -  | 80.44  | 80.4  |
| November      | -   | -   | -  | -  | -   | -   | -  | 69.86  | 69.9  |
| December      | -   | -   | -  | -  | -   | -   | -  | 57.57  | 57.6  |
| <b>TOTALS</b> | -   | -   | -  | -  | -   | -   | -  | <b>674.61</b>  | <b>674.6</b>  |

**CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER**

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

| Month         | 1 | 2  | 3 | 4 | 5   | 6 | 7  | 8 | 9   |
|---------------|---|--|---|---|---|---|--|---|---|
|               |   | Snowmaking<br>Withdrawals<br><br>(Input Data)<br>(ac-ft) |   |   | Total<br>Lake<br>Withdrawals<br><br>(ac-ft) |   | Return from<br>Snow melt @<br>50.0%<br><br>(ac-ft) |   | Estimated<br>Net Lake<br>Withdrawals<br><br>(ac-ft) |
| January       |   | 276.22   |   |   | 276.22                                      |   | 138.11   |   | 138.11  |
| February      |   | 85.70  |   |   | 85.70                                       |   | 42.85  |   | 42.85   |
| March         |   | 7.05   |   |   | 7.05  |   | 3.53   |   | 3.52  |
| April         |   | 7.85   |   |   | 7.85  |   | 3.93   |   | 3.92  |
| May           |   | 39.02  |   |   | 39.02                                       |   | -  |   | 39.02   |
| June          |   | 44.57  |   |   | 44.57                                       |   | -  |   | 44.57   |
| July          |   | 32.51  |   |   | 32.51                                       |   | -  |   | 32.51   |
| August        |   | 27.25  |   |   | 27.25                                       |   | -  |   | 27.25   |
| September     |   | 34.49  |   |   | 34.49                                       |   | -  |   | 34.49   |
| October       |   | 1.73   |   |   | 1.73  |   | 0.87   |   | 0.86  |
| November      |   | 150.19   |   |   | 150.19                                      |   | 75.10  |   | 75.09   |
| December      |   | 101.27   |   |   | 101.27                                      |   | 50.64  |   | 50.63   |
| <b>TOTALS</b> |   | <b>807.85</b>  |   |   | <b>807.85</b>                               |   | <b>315.03</b>                                      |   | <b>492.82</b>                                       |

**CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER**

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

| 1             | 2 | 3                                      | 4                                      | 5  | 6   | 7 | 8 | 9   |
|---------------|---|--|--|--|---|---|---|---|
| Month         |   | Lake<br>Surface<br>Area<br><br>(acres) | Average<br>Lake<br>Area<br><br>(acres) | Average<br>Air<br>Temperature<br>(Input Data)<br>(deg F) | Calculated<br>Evaporation<br>Rate<br><br>(feet/month) |   |   | Estimated<br>Lake<br>Evaporation<br><br>(ac-ft) |
| January       |   | 2,582                                  | 2,582                                  | 37.20  | 0.092   |   |   | 238.3   |
| February      |   | 2,582                                  | 2,626                                  | 35.60  | 0.102   |   |   | 268.7   |
| March         |   | 2,669                                  | 2,696                                  | 37.50  | 0.193   |   |   | 521.1   |
| April         |   | 2,722                                  | 2,753                                  | 44.20  | 0.283   |   |   | 778.0   |
| May           |   | 2,783                                  | 2,783                                  | 52.30  | 0.433   |   |   | 1,203.8   |
| June          |   | 2,783                                  | 2,771                                  | 64.10  | 0.571   |   |   | 1,582.3   |
| July          |   | 2,758                                  | 2,741                                  | 70.40  | 0.656   |   |   | 1,798.9   |
| August        |   | 2,724                                  | 2,709                                  | 66.30  | 0.630   |   |   | 1,705.2   |
| September     |   | 2,693                                  | 2,685                                  | 59.70  | 0.520   |   |   | 1,395.6   |
| October       |   | 2,676                                  | 2,668                                  | 54.50  | 0.437   |   |   | 1,166.4   |
| November      |   | 2,660                                  | 2,652                                  | 40.90  | 0.256   |   |   | 678.0   |
| December      |   | 2,644                                  | 2,640                                  | 43.50  | 0.125   |   |   | 330.6   |
| <b>TOTALS</b> |   |  |  |  | <b>4.298</b>  |   |   | <b>11,666.9</b>                                 |

**CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER**

**TABLE 2  
SYNTHESIZED MUTUAL OPERATION OF BIG BEAR LAKE**

| Month         | 1<br>Gauge<br>Height<br>1st of<br>Month<br><br>(feet) | 2<br>Mutual's<br>Lake<br>Account<br><br>(ac-ft) | 3<br>Change<br>in<br>Storage<br>(*)<br><br>(ac-ft) | 4<br>Lake<br>Surface<br>Area<br><br>(acres) | 5<br>Mutual's<br>Lake<br>Inflow<br><br>(see Table 1)<br><br>(feet) | 6<br>Mutual's Net<br>Wastewater<br>Export<br>Credit<br><br>(see Table 2.A)<br><br>(ac-ft) | 7<br>Mutual's<br>Lake<br>Evap.<br><br>(see Table 2.B)<br><br>(ac-ft) | 8<br>Mutual's<br>Snowmaking<br>Advances to<br>Big Bear<br><br>(see Table 3)<br><br>(ac-ft) | 9<br>Mutual's<br>Credit for<br>Return of<br>Advances<br><br>(see Table 3)<br><br>(ac-ft) | 10<br>Mutual's<br>Releases<br>Leakage<br>Spills &<br>In-lieu Del.<br><br>(see Table 2.A)<br><br>(ac-ft) |
|---------------|---|---|--|---|--|---|--|--|--|---|
| January       | 55.65   | 31,172  | 303  | 1,981                                       | 434.5  | 94.3  | 183.2  | -  | -  | 42.9  |
| February      | 55.80   | 31,475  | 4,905  | 1,989                                       | 4,965.4  | 190.3   | 213.0  | -  | -  | 37.2  |
| March         | 58.15   | 36,380  | 3,273  | 2,174                                       | 3,514.7  | 207.3   | 430.7  | -  | -  | 17.8  |
| April         | 59.60   | 39,654  | 3,899  | 2,282                                       | 4,392.3  | 184.7   | 659.7  | -  | -  | 18.0  |
| May           | 61.30   | 43,553  | 322  | 2,386                                       | 1,279.0  | 102.1   | 1,033.4  | -  | -  | 25.5  |
| June          | 61.40   | 43,875  | (1,158)  | 2,392                                       | 147.8  | 85.2  | 1,358.7  | -  | -  | 32.6  |
| July          | 60.95   | 42,717  | (1,522)  | 2,366                                       | -  | 87.6  | 1,567.7  | -  | -  | 41.5  |
| August        | 60.30   | 41,195  | (1,384)  | 2,329                                       | 55.0   | 71.1  | 1,452.7  | -  | -  | 57.0  |
| September     | 59.70   | 39,812  | (624)  | 2,289                                       | 562.0  | 52.6  | 1,184.3  | -  | -  | 54.1  |
| October       | 59.40   | 39,187.9  | (670)  | 2,267                                       | 317.7  | 55.3  | 986.0  | -  | -  | 56.7  |
| November      | 59.10   | 38,518  | (537)  | 2,244                                       | 28.9   | 64.9  | 571.4  | -  | -  | 59.6  |
| December      | 58.85   | 37,981  | (322)  | 2,226                                       | -  | 81.8  | 355.1  | -  | -  | 48.9  |
| December      | 58.75   | 37,658.8  |  | 2,218                                       |  |   |  |  |  |   |
| <b>TOTALS</b> |   |   | <b>6,487</b>                                       |   | <b>15,697.3</b>  | <b>1,277.2</b>  | <b>9,995.9</b>   | <b>-</b>   | <b>-</b>   | <b>491.8</b>  |

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

8,083.4

**CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER**

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

| Month         | 1<br>Mutual's<br>Spills &<br>FC Releases<br>from<br>Table 2.C<br>(ac-ft) | 2<br>Mutual's<br>Lake<br>Releases<br>from<br>Table 1.B<br>(ac-ft) | 3<br>Mutual's<br>Leakage<br>from<br>Table 2.C<br>(ac-ft) | 4<br>Mutual's<br>Order No. 95-4<br>Releases<br>from<br>Table 2.C<br>(ac-ft) | 5<br>Big Bear's<br>In-lieu<br>Supply<br>Deliveries<br>(see Table 3.B)<br>(ac-ft) | 6<br>Mutual's<br>Releases<br>Leakage<br>Spills &<br>In-lieu Del.<br>(to Table 2)<br>(ac-ft) | 7 | 8<br>Net Credit<br>for<br>Wastewater<br>Exports<br>(Input Data)<br>(ac-ft) | 9<br>Spilled<br>from<br>Mutual's<br>Lake Acct.<br>(Input Data)<br>(ac-ft) | 10<br>Net<br>Wastewater<br>Export<br>Credit<br>(to Table 2)<br>(ac-ft) |
|---------------|--|---|--|---|--|---|---|--|---|--|
| January       | -  | -   | -  | 42.9  | -  | 42.9  |   | 94.3   | -   | 94.3   |
| February      | -  | -   | -  | 37.2  | -  | 37.2  |   | 190.3  | -   | 190.3  |
| March         | -  | -   | -  | 17.8  | -  | 17.8  |   | 207.3  | -   | 207.3  |
| April         | -  | -   | -  | 18.0  | -  | 18.0  |   | 184.7  | -   | 184.7  |
| May           | -  | -   | -  | 25.5  | -  | 25.5  |   | 102.1  | -   | 102.1  |
| June          | -  | -   | -  | 32.6  | -  | 32.6  |   | 85.2   | -   | 85.2   |
| July          | -  | -   | -  | 41.5  | -  | 41.5  |   | 87.6   | -   | 87.6   |
| August        | -  | -   | -  | 57.0  | -  | 57.0  |   | 71.1   | -   | 71.1   |
| September     | -  | -   | -  | 54.1  | -  | 54.1  |   | 52.6   | -   | 52.6   |
| October       | -  | -   | -  | 56.7  | -  | 56.7  |   | 55.3   | -   | 55.3   |
| November      | -  | -   | -  | 59.6  | -  | 59.6  |   | 64.9   | -   | 64.9   |
| December      | -  | -   | -  | 48.9  | -  | 48.9  |   | 81.8   | -   | 81.8   |
| <b>TOTALS</b> | -  | -   | -  | <b>491.8</b>  | -  | <b>491.8</b>  |   | <b>1,277.2</b>   | -   | <b>1,277.2</b>   |

174.08

Sept. YTD Valu

1,075.2

**CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER**

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

| Month         | 1<br>Starting<br>Volume<br><br>(ac-ft) | 2<br>Starting<br>Area<br><br>(acres) | 3<br>Assumed<br>Evap<br><br>(ac-ft) | 4<br>Estimated<br>Ending<br>Volume<br><br>(ac-ft) | 5<br>Estimated<br>Ending<br>Area<br><br>(acres) | 6<br>Average<br>Area<br><br>(acres) | 7<br>Mutuals<br>Lake<br>Evap.<br>(to Table 2)<br>(ac-ft) | 8<br>Big Bear's<br>Lake<br>Evap.<br>(to Table 3.A)<br>(ac-ft) | 9<br>Revised<br>Ending<br>Volume<br>Estimate<br>(ac-ft) | 10 |
|---------------|--|--------------------------------------|-------------------------------------|---|---|-------------------------------------|--|---|---|----|
| January       | 31,172.1                               | 1,981.0                              | 182.9                               | 31,475.1  | 1,989.0   | 1,985.0                             | 183.2  | 55.1  | 31,474.8  |    |
| February      | 31,474.8                               | 1,989.0                              | 203.6                               | 36,389.7  | 2,174.0   | 2,081.5                             | 213.0  | 55.7  | 36,380.3  |    |
| March         | 36,380.3                               | 2,174.0                              | 420.3                               | 39,664.2  | 2,282.0   | 2,228.0                             | 430.7  | 90.4  | 39,653.7  |    |
| April         | 39,653.7                               | 2,282.0                              | 645.0                               | 43,567.7  | 2,386.0   | 2,334.0                             | 659.7  | 118.3   | 43,553.0  |    |
| May           | 43,553.0                               | 2,386.0                              | 1,032.1                             | 43,876.5  | 2,392.0   | 2,389.0                             | 1,033.4  | 170.4   | 43,875.2  |    |
| June          | 43,875.2                               | 2,392.0                              | 1,366.1                             | 42,709.4  | 2,366.0   | 2,379.0                             | 1,358.7  | 223.6   | 42,716.8  |    |
| July          | 42,716.8                               | 2,366.0                              | 1,581.1                             | 41,181.9  | 2,326.0   | 2,346.0                             | 1,567.7  | 264.0   | 41,195.2  |    |
| August        | 41,195.2                               | 2,329.0                              | 1,466.3                             | 39,798.1  | 2,286.0   | 2,307.5                             | 1,452.7  | 252.5   | 39,811.7  |    |
| September     | 39,811.7                               | 2,289.0                              | 1,190.0                             | 39,182.1  | 2,267.0   | 2,278.0                             | 1,184.3  | 211.3   | 39,187.9  |    |
| October       | 39,187.9                               | 2,267.0                              | 991.1                               | 38,513.1  | 2,244.0   | 2,255.5                             | 986.0  | 180.4   | 38,518.1  |    |
| November      | 38,518.1                               | 2,244.0                              | 573.7                               | 37,978.7  | 2,226.0   | 2,235.0                             | 571.4  | 106.6   | 37,981.0  |    |
| December      | 37,981.0                               | 2,226.0                              | 355.7                               | 37,658.2  | 2,218.0   | 2,222.0                             | 355.1  | 66.7  | 37,658.8  |    |
| <b>TOTALS</b> |  |                                      |                                     |   |   |                                     | <b>9,995.9</b>   | <b>1,795.0</b>  |   |    |

**CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER**

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

| Month         | 1<br>Total<br>Leakage<br><br>from<br>Input Data<br>(ac-ft) | 2<br>Mutual's<br>Leakage<br><br>to<br>Table 2.A<br>(ac-ft) | 3<br>Big Bear's<br>Leakage<br><br>to<br>Table 3.B<br>(ac-ft) | 4<br>Actual<br>Spills &<br>FC Releases<br>from<br>Input Data<br>(ac-ft) | 5<br>Big Bear's<br>Spills &<br>FC Releases<br>to<br>Table 3.B<br>(ac-ft) | 6<br>Mutual's<br>Spills &<br>FC Releases<br>to<br>Table 2.A<br>(ac-ft) | 7<br>SWRCB<br>Order 95-4<br>Releases<br>from<br>Input Data<br>(ac-ft) | 8<br>Mutual's<br>Order 95-4<br>Direct Use<br>from<br>Input Data<br>(ac-ft) | 9<br>Mutual's<br>Order 95-4<br>Releases<br>to<br>Table 2.A<br>(ac-ft) | 10<br>Big Bear's<br>Order 95-4<br>Releases<br>to<br>Table 3.B<br>(ac-ft) |
|---------------|--|--|--|---|--|--|---|--|---|--|
| January       | -  | -  | -  | -   | -  | -  | 58.05   | 18.56  | 42.88   | 15.17  |
| February      | -  | -  | -  | -   | -  | -  | 59.82   | 0.00   | 37.20   | 22.62  |
| March         | -  | -  | -  | -   | -  | -  | 27.05   | 0.00   | 17.83   | 9.22   |
| April         | -  | -  | -  | -   | -  | -  | 26.39   | 0.00   | 17.99   | 8.40   |
| May           | -  | -  | -  | -   | -  | -  | 36.20   | 0.00   | 25.53   | 10.67  |
| June          | -  | -  | -  | -   | -  | -  | 45.95   | 0.00   | 32.65   | 13.30  |
| July          | -  | -  | -  | -   | -  | -  | 57.82   | 1.75   | 41.52   | 16.30  |
| August        | -  | -  | -  | -   | -  | -  | 78.59   | 5.01   | 57.00   | 21.59  |
| September     | -  | -  | -  | -   | -  | -  | 76.87   | 0.00   | 54.12   | 22.75  |
| October       | -  | -  | -  | -   | -  | -  | 80.44   | 0.00   | 56.69   | 23.75  |
| November      | -  | -  | -  | -   | -  | -  | 69.86   | 34.98  | 59.55   | 10.31  |
| December      | -  | -  | -  | -   | -  | -  | 57.57   | 28.10  | 48.87   | 8.70   |
| <b>TOTALS</b> | -  | -  | -  | -   | -  | -  | <b>674.61</b>   | <b>88.40</b>   | <b>491.83</b>   | <b>182.78</b>  |
|               |  |  |  |   |  |  | 466.74  |  | 326.7   | 140.0  |

CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER

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

| Month         | 1<br>Actual<br>Lake<br>Account<br><br>(see Table 1)<br>(ac-ft) | 2<br>Mutual's<br>Lake<br>Account<br><br>(see Table 2)<br>(ac-ft) | 3<br>Big Bear's<br>Lake<br>Account<br><br>(calc.)<br>(ac-ft) | 4<br>Change in<br>Big Bear's<br>Lake<br>Account<br><br>(calc.)<br>(ac-ft) | 5 | 6<br>Big Bear's<br>Advances<br>From<br>Mutual<br>(calc.)<br>(ac-ft) | 7<br>Big Bear's<br>Payments<br>Against<br>Advances<br><br>(calc.)<br>(ac-ft) | 8<br>Big Bear's<br>Advance<br>Account<br>Balance<br><br>(calc.)<br>(ac-ft) | 9<br>Big Bear's<br>0%<br>Repayment<br>Premium<br><br>(calc.)<br>(ac-ft) | 10<br>Mutual's<br>Credit for<br>Return of<br>Advances<br><br>(to Table 2)<br>(ac-ft) |
|---------------|--|--|--|---|---|---|--|--|---|--|
| January       | 50,612   | 31,172   | 19,439.9   | (302.7)   |   | -   | -  | -  | -   | -  |
| February      | 50,612   | 31,475   | 19,137   | (311.5)   |   | -   | -  | -  | -   | -  |
| March         | 55,206   | 36,380   | 18,826   | (310.4)   |   | -   | -  | -  | -   | -  |
| April         | 58,169   | 39,654   | 18,515   | (315.2)   |   | -   | -  | -  | -   | -  |
| May           | 61,753   | 43,553   | 18,200   | (322.2)   |   | -   | -  | -  | -   | -  |
| June          | 61,753   | 43,875   | 17,878   | (366.6)   |   | -   | -  | -  | -   | -  |
| July          | 60,228   | 42,717   | 17,511   | (400.4)   |   | -   | -  | -  | -   | -  |
| August        | 58,306   | 41,195   | 17,111   | (372.5)   |   | -   | -  | -  | -   | -  |
| September     | 56,550   | 39,812   | 16,738   | (321.2)   |   | -   | -  | -  | -   | -  |
| October       | 55,605   | 39,188   | 16,417.1   | (260.3)   |   | -   | -  | -  | -   | -  |
| November      | 54,675   | 38,518   | 16,157   | (256.8)   |   | -   | -  | -  | -   | -  |
| December      | 53,881   | 37,981   | 15,900   | (207.9)   |   | -   | -  | -  | -   | -  |
|               | 53,351   | 37,659   | 15,692.2   |   |   |   |  | -  |   |  |
| <b>TOTALS</b> |  |  |  | <b>(3,747.7)</b>  |   | -   | -  | -  | -   | -  |

**CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER**

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

| Month         | 1<br>In-lieu<br>SWP Water<br>from<br>SBVMWD<br>(Input Data)<br>(ac-ft) | 2<br>In-lieu<br>Water<br>from Other's<br>Wells<br>(Input Data)<br>(ac-ft) | 3<br>In-lieu<br>Supplies<br>from Mutual's<br>Wells<br>(Input Data)<br>(ac-ft) | 4 | 5<br>Valley District<br>In Lieu<br>Lake<br>Supplies<br>(Input Data)<br>(ac-ft) | 6<br>Big Bear's<br>In-lieu<br>Deliveries<br>to Mutual<br>(calc.)<br>(ac-ft) | 7 | 8<br>Big Bear's<br>Advances<br>From<br>Mutual<br>(from Table 3)<br>(ac-ft) | 9 | 10<br>Big Bear's<br>Total<br>Lake<br>Inflows<br>(calc.)<br>(ac-ft) |
|---------------|--|---|---|---|--|---|---|--|---|--|
| January       | -  | -   | -   |   | -  | -   |   | -  |   | -  |
| February      | -  | -   | -   |   | -  | -   |   | -  |   | -  |
| March         | -  | -   | -   |   | -  | -   |   | -  |   | -  |
| April         | -  | -   | -   |   | -  | -   |   | -  |   | -  |
| May           | -  | -   | -   |   | -  | -   |   | -  |   | -  |
| June          | -  | -   | -   |   | -  | -   |   | -  |   | -  |
| July          | -  | -   | -   |   | -  | -   |   | -  |   | -  |
| August        | -  | -   | -   |   | -  | -   |   | -  |   | -  |
| September     | -  | -   | -   |   | -  | -   |   | -  |   | -  |
| October       | -  | -   | -   |   | -  | -   |   | -  |   | -  |
| November      | -  | -   | -   |   | -  | -   |   | -  |   | -  |
| December      | -  | -   | -   |   | -  | -   |   | -  |   | -  |
| <b>TOTALS</b> | -  | -   | -   |   | -  | -   |   | -  |   | -  |
| 6 month total |  |   |   |   |  | 0   |   |  |   |  |

**CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER**

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

| Month         | 1<br>Big Bear's<br>Snowmaking<br>Withdrawals<br><br>(Input Data)<br>(ac-ft) | 2<br>Big Bear's<br>Total<br>Releases<br><br>Table 1.B<br>(ac-ft) | 3<br>Return<br>Flow from<br>Snowmelt<br>50.0%<br>(Table 1.C)<br>(ac-ft) | 4<br>Big Bear's<br>Net<br>Lake<br>Withdrawal<br>(calc.)<br>(ac-ft) | 5<br>Big Bear's<br>Payments<br>Against<br>Advances<br>(see Table 3)<br>(ac-ft) | 6<br>Big Bear's<br>Spills &<br>FC Releases<br>from<br>Table 2.C<br>(ac-ft) | 7<br>Big Bear's<br>Leakage +<br>SWRCB Rel.<br>from<br>Table 2.C<br>(ac-ft) | 8<br>Big Bear's<br>Lake<br>Evaporation<br>from<br>Table 2.B<br>(ac-ft) | 9<br>Net<br>Wastewater<br>Export<br>Credit<br>(from Table 2.A)<br>(ac-ft) | 10<br>Big Bear's<br>Total<br>Lake<br>Outflows<br>(calc.)<br>(ac-ft) |
|---------------|---|--|---|--|--|--|--|--|---|---|
| January       | 276.2   | -  | 138.1   | 138.1  | -  | -  | 15.2   | 55.1   | 94.3  | <b>302.7</b>  |
| February      | 85.7  | -  | 42.9  | 42.9   | -  | -  | 22.6   | 55.7   | 190.3   | <b>311.5</b>  |
| March         | 7.1   | -  | 3.5   | 3.5  | -  | -  | 9.2  | 90.4   | 207.3   | <b>310.4</b>  |
| April         | 7.9   | -  | 3.9   | 3.9  | -  | -  | 8.4  | 118.3  | 184.7   | <b>315.2</b>  |
| May           | 39.0  | -  | -   | 39.0   | -  | -  | 10.7   | 170.4  | 102.1   | <b>322.2</b>  |
| June          | 44.6  | -  | -   | 44.6   | -  | -  | 13.3   | 223.6  | 85.2  | <b>366.6</b>  |
| July          | 32.5  | -  | -   | 32.5   | -  | -  | 16.3   | 264.0  | 87.6  | <b>400.4</b>  |
| August        | 27.3  | -  | -   | 27.3   | -  | -  | 21.6   | 252.5  | 71.1  | <b>372.5</b>  |
| September     | 34.5  | -  | -   | 34.5   | -  | -  | 22.8   | 211.3  | 52.6  | <b>321.2</b>  |
| October       | 1.7   | -  | 0.9   | 0.9  | -  | -  | 23.7   | 180.4  | 55.3  | <b>260.3</b>  |
| November      | 150.2   | -  | 75.1  | 75.1   | -  | -  | 10.3   | 106.6  | 64.9  | <b>256.8</b>  |
| December      | 101.3   | -  | 50.6  | 50.6   | -  | -  | 8.7  | 66.7   | 81.8  | <b>207.9</b>  |
| <b>TOTALS</b> | <b>807.9</b>  | <b>-</b>   | <b>315.0</b>  | <b>492.8</b>   | <b>-</b>   | <b>-</b>   | <b>182.8</b>   | <b>1,795.0</b>   | <b>1,277.2</b>  | <b>3,747.7</b>  |

1,441.3

**CALENDAR YEAR**  
**2024**  
**BIG BEAR WATERMASTER**  
**TABLE 4**  
**BASIN MAKE-UP ACCOUNT**

| Month         | 1<br>Big Bear's<br>Basin<br>Additions<br>(see Table 4.A)<br>(ac-ft) | 2 | 3<br>Mutual's<br>Basin<br>Additions<br>(see Table 4.B)<br>(ac-ft) | 4 | 5<br>Net<br>Credit<br>(Debit)<br><br>(ac-ft) | 6 | 7<br>Total<br>Basin<br>Replenishment<br>(see Table 4.C)<br>(ac-ft) | 8 | 9<br>Basin<br>Comp.<br>Account<br>Balance<br>(ac-ft) |
|---------------|---|---|---|---|--|---|--|---|--|
| January       | 29.4  |   | 21.7  |   | 7.7  |   | -  |   | 21,069   |
| February      | 30.5  |   | 19.0  |   | 11.5   |   | -  |   | 21,077   |
| March         | 13.8  |   | 9.1   |   | 4.7  |   | -  |   | 21,088   |
| April         | 13.5  |   | 9.2   |   | 4.3  |   | -  |   | 21,093   |
| May           | 18.5  |   | 13.0  |   | 5.4  |   | -  |   | 21,097   |
| June          | 23.4  |   | 16.7  |   | 6.8  |   | -  |   | 21,103   |
| July          | 29.5  |   | 21.2  |   | 8.3  |   | -  |   | 21,109   |
| August        | 40.0  |   | 29.0  |   | 11.0   |   | -  |   | 21,118   |
| September     | 39.2  |   | 27.6  |   | 11.6   |   | -  |   | 21,129   |
| October       | 41.0  |   | 28.9  |   | 12.1   |   | -  |   | 21,140   |
| November      | 35.3  |   | 30.0  |   | 5.3  |   | -  |   | 21,153   |
| December      | 29.1  |   | 24.6  |   | 4.4  |   | -  |   | 21,158   |
| <b>TOTALS</b> | <b>343.2</b>  |   | <b>249.9</b>  |   | <b>93.2</b>                                  |   | <b>0.0</b>   |   | <b>21,162</b>  |

**CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER**

**TABLE 4.A  
BIG BEAR'S BASIN ADDITIONS**

| Month         | SPILLS  |  |  | LAKE RELEASES                                 |  |   |  | IN LIEU SUPPLIES                                  |  | 10<br>Big Bear's<br>Basin<br>Additions<br>(ac-ft) |
|---------------|---|--|--|---|--|---|--|---|--|---|
|               | 1<br>Actual<br>Spills & FC<br>Releases<br>(ac-ft) | 2<br>Actual<br>SWRCB 95-4<br>Releases<br>(ac-ft) | 3<br>Basin<br>Addition @<br>51.0%<br>(ac-ft) | 4<br>Lake<br>Release<br>for Mutual<br>(ac-ft) | 5<br>SWRCB 95-4<br>Releases<br>for Mutual<br>(ac-ft) | 6<br>Big Bear's<br>Total Releases<br>Table 1.B<br>(ac-ft) | 7<br>Basin<br>Addition @<br>50.0%<br>(ac-ft) | 8<br>Imported<br>In Lieu<br>Deliveries<br>(ac-ft) | 9<br>Basin<br>Addition @<br>50.0%<br>(ac-ft) |   |
| January       | -   | 39.5   | 20.1   | -   | 18.6   | -   | 9.3  | -   | -  | 29.4  |
| February      | -   | 59.8   | 30.5   | -   | -  | -   | 0.0  | -   | -  | 30.5  |
| March         | -   | 27.1   | 13.8   | -   | -  | -   | 0.0  | -   | -  | 13.8  |
| April         | -   | 26.4   | 13.5   | -   | -  | -   | 0.0  | -   | -  | 13.5  |
| May           | -   | 36.2   | 18.5   | -   | -  | -   | 0.0  | -   | -  | 18.5  |
| June          | -   | 46.0   | 23.4   | -   | -  | -   | 0.0  | -   | -  | 23.4  |
| July          | -   | 56.1   | 28.6   | -   | 1.8  | -   | 0.9  | -   | -  | 29.5  |
| August        | -   | 73.6   | 37.5   | -   | 5.0  | -   | 2.5  | -   | -  | 40.0  |
| September     | -   | 76.9   | 39.2   | -   | -  | -   | 0.0  | -   | -  | 39.2  |
| October       | -   | 80.4   | 41.0   | -   | -  | -   | 0.0  | -   | -  | 41.0  |
| November      | -   | 34.9   | 17.8   | -   | 35.0   | -   | 17.5   | -   | -  | 35.3  |
| December      | -   | 29.5   | 15.0   | -   | 28.1   | -   | 14.1   | -   | -  | 29.1  |
| <b>TOTALS</b> | <b>0.0</b>  | <b>586.2</b>                                     | <b>299.0</b>                                 | <b>0.0</b>                                    | <b>88.4</b>  | <b>0.0</b>  | <b>44.2</b>                                  | <b>0.0</b>  | <b>0.0</b>                                   | <b>343.2</b>                                      |

CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER

TABLE 4.B  
MUTUAL'S BASIN ADDITIONS

| Month         | SPILLS & FISH RELEASES             |   |  | LAKE RELEASES                               |   |  | 7<br>Total<br>Basin<br>Additions<br>(ac-ft) |
|---------------|------------------------------------|---|--|---|---|--|---|
|               | 1<br>Mutual's<br>Spills<br>(ac-ft) | 2<br>Mutual's<br>SWRCB 95-4<br>Shared Releases<br>(ac-ft) | 3<br>Basin<br>Addition @<br>51.0%<br>(ac-ft) | 4<br>Mutual's<br>Lake<br>Demands<br>(ac-ft) | 5<br>SWRCB 95-4<br>Lake Outflows<br>Used by Mutual<br>(ac-ft) | 6<br>Basin<br>Addition @<br>50.0%<br>(ac-ft) |   |
| January       | -                                  | 24.3  | 12.4   | -   | 18.6  | 9.3  | 21.7  |
| February      | -                                  | 37.2  | 19.0   | -   | 0.0   | -  | 19.0  |
| March         | -                                  | 17.8  | 9.1  | -   | 0.0   | -  | 9.1   |
| April         | -                                  | 18.0  | 9.2  | -   | 0.0   | -  | 9.2   |
| May           | -                                  | 25.5  | 13.0   | -   | 0.0   | -  | 13.0  |
| June          | -                                  | 32.6  | 16.7   | -   | 0.0   | -  | 16.7  |
| July          | -                                  | 39.8  | 20.3   | -   | 1.8   | 0.9  | 21.2  |
| August        | -                                  | 52.0  | 26.5   | -   | 5.0   | 2.5  | 29.0  |
| September     | -                                  | 54.1  | 27.6   | -   | 0.0   | -  | 27.6  |
| October       | -                                  | 56.7  | 28.9   | -   | 0.0   | -  | 28.9  |
| November      | -                                  | 24.6  | 12.5   | -   | 35.0  | 17.5   | 30.0  |
| December      | -                                  | 20.8  | 10.6   | -   | 28.1  | 14.1   | 24.6  |
| <b>TOTALS</b> | <b>0.0</b>                         | <b>403.4</b>  | <b>205.7</b>                                 | <b>0.0</b>                                  | <b>88.4</b>   | <b>44.2</b>                                  | <b>249.9</b>                                |

CALENDAR YEAR  
2024  
BIG BEAR WATERMASTER

TABLE 4.C  
BASIN REPLENISHMENTS

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