

TESTIMONY OF ROBERT C. WAGNER

I. Qualifications

1. I am a Professional Engineer licensed in the State of California and president of the water resource engineering firm of Wagner & Bonsignore, Consulting Civil Engineers in Sacramento, California. I have provided expert testimony to the State Water Board on several occasions including matters related to the hydrology and water rights of South Fork American River in a hearing leading to Decision 1635; surface and subsurface flow interactions and Fully Appropriated Streams listing of the American River; hydrology and water rights of the Mojave River system and Lake Arrowhead. I have appeared before this Board on other matters related to water right administration. I have provided testimony in Court on matters related to riparian water rights, pre-1914 and post 1914 appropriative rights, groundwater surface water interactions, hydrology, water use and disposal. I serve as Engineer for the Court appointed Mojave Basin Area Watermaster, and represent various private clients and public agencies on water right matters throughout California.
2. I am providing this testimony on the issues pertaining to the County of Alpine and Lake Alpine Water Company (the "Applicants") Petition for Partial Assignment of State-Filed Application 5648, Petitions to Change State-Filed Application, and Application 31523 (the "Project"), that will be discussed during the July 14, 2008, State Water Resources Control Board (SWRCB) hearing to consider the Applicants' petitions and application.
3. A true and correct copy of my professional resume is attached as County & LAWC Exhibit G. All exhibits, tables, figures, plates and data attached hereto were prepared by me or under my direct supervision and are attached hereto as Attachment A. The appendices are included as Attachment B.

II. Background

4. Lake Alpine Water Company (LAWC) currently holds water right Licenses 11007 and 10840. License 11007 authorizes LAWC to store 240 acre-feet of water in Bear Lake, and divert 0.05 cfs by direct diversion. The "as-built" capacity of Bear Lake is 360 acre-feet. The annual withdrawal from storage under License 11007 is limited to 140 acre-feet per year. Thus, 220 acre-feet of water stored in Bear Lake is not authorized for use. License 10840 authorizes the direct diversion of 0.075 cfs, which is limited to 42 acre-feet per year. The combined annual authorized use under these two licenses is 182 acre-feet per year.

5. Applicants seek to appropriate 395 acre-feet of water under SFA 5648. The water can be categorized in the following manner: (1) 220 acre-feet of the 395 is being sought to authorize the full amount of water that can be stored in Bear Lake, which amounts to 120 acre-feet of unpermitted storage capacity plus 100 acre-feet of licensed but unused capacity, to be collected from October 1 to July 30; and (2) the right to directly divert at a rate of 0.78 cfs an additional 175 acre-feet per year from Bear Creek, to be diverted from October 1 to July 30. The purposes of use are municipal and recreation.

III. General Description of Watershed Area and Project Area

6. The source of water for the project is Bear Creek, in Alpine County tributary to Bloods Creek thence North Fork Stanislaus River. The North Fork Stanislaus River (NFSR), the Middle Fork Stanislaus River, and the South Fork Stanislaus River are impounded by New Melones Reservoir. Bear Lake is located approximately 58 miles upstream from New Melones Dam (approximately 68 miles to Goodwin Dam) According to Division of Safety of Dams (DSOD) Bear Lake has a drainage are of 0.8 square miles (520 acres impounded at the point of diversion). The watershed of Bear Creek ranges in elevation from about 7,200 feet above msl to about 8,400 feet above msl. The area is generally tree covered, steep and rocky. Seasonal runoff occurs during October to July, but is most abundant during the snowmelt period of May and June. Runoff due to rainfall or snowmelt is rapid with limited watershed retention.
7. Precipitation at Bear Valley normally occurs between October and May with the heaviest amounts falling during January, February and March. Snowfall is abundant due to the elevation (above 7,200 feet). According to Mr. Bruce Orvis Jr., manager of the Lake Alpine Water Company, Bear Creek is normally dry after the snowmelt in June or early July, and remains dry until late October (normally after the start of the precipitation season). I personally inspected the site on July 5, 2005, which followed an unusually wet winter. There was still a small amount of snow pack above Bear Lake and a small amount of flow into the lake. According to Mr. Orvis, the inflow ceased within a few weeks.
8. While precipitation records for Bear Valley are not readily available, precipitation as recorded at Calaveras Big Trees (elevation 4,700 feet) is indicative of the pattern of expected precipitation in the area. The average annual precipitation reported at Big Trees is about 54 inches. We expect that substantially greater precipitation falls at Bear Valley due to the elevation change of almost 3,000 feet. Almost 85% of the rainfall at Big Trees occurs in the November to May period. Average precipitation in July (2.2 inches), August (0.8 inches), September (0.7 inches) and October (2.8 inches) produces limited runoff and supports the reported lack of flow in Bear Creek during the months of July through October (see Appendix B for precipitation record).

9. The project location, drainage areas at specific points in the watershed and estimated seasonal annual discharge at each point is shown on Plate I. Plate II is an expanded section of the project location.
10. As shown on Plates I and II, other than Bear Lake, the Bloods Creek watershed is unimpaired. The NFSR upstream from its confluence with Bloods Creek is impaired by Utica Reservoir (2,400 acre-feet) and Union Reservoir (2,000 acre-feet) on the NFSR and Spicer Meadows Reservoir (189,000 acre-feet) on Highland Creek. Water rights associated with these reservoirs are unaffected by Applicants' diversions.
11. Goodwin Dam is a point downstream of New Melones and regulates water diverted under prior claims of right by senior right holders Oakdale Irrigation District (OID) and South San Joaquin Irrigation District (SSJID). The Bear Creek drainage area above Bear Lake is 0.08% of the drainage area at Goodwin Dam (Plate I).

IV. Watershed of Origin

12. The water covered by the portion of SFA 5648 applicable to the NFSR (30,000 acre-feet of storage and 975 cfs of direct diversion) originates in Alpine, Calaveras and Tuolumne counties. (Plate I). Plate I shows that the watershed of Bear Creek in Alpine County, as well as the point of diversion and the place of use, lie wholly within the watershed of the NFSR. Alpine County comprises approximately 15.6% of the New Melones watershed. We estimate that the water tributary to New Melones Reservoir originating in Alpine County is at least 184,000 acre-feet annually. Thus, Alpine County is a county of origin for water tributary to NFSR.

V. Place of Use of SFA 5648

13. The Applicants' place of use is outside of the place of use boundary designated by SFA 5648. However, the proposed place of use falls within the NFSR watershed. Thus, the use of the water applied for will be in the Stanislaus River watershed (see Plate I).

VI. Physical Water Availability at Point of Diversion

14. The State Water Board records for SFA 5648 show water available under SFA 5648 for the NFSR of 30,000 acre feet by diversion to storage and 975 cfs by direct diversion. Water Board records indicate that there has been no assignment of SFA 5648 for the NFSR and the entire amount remains available.

15. We evaluated the hydrology of Bear Creek and Bloods Creek to determine the frequency that water is physically available on a seasonal basis to satisfy the Applicants' requested appropriation of 395 acre feet.
16. There are no discharge records for Bear Creek, thus in order to estimate the amount and frequency of water availability it was necessary to estimate the daily discharge of Bear Creek at the point of diversion. Bear Valley Water District (BVWD), which operates a wastewater treatment plant near the confluence of Bloods Creek and Bear Creek for the Bear Valley community, measured the flow of Bloods Creek during the spring of 2003 and 2005. The year 2005 was a heavy snowfall year and measurements were limited.
17. The Bloods Creek measured discharge for 2003 was compared to the discharge reported by the USGS gage station on the Merced River at Pohono Bridge for the period during which measurements were made on Bloods Creek, March 22 to June 18, 2003. The Merced River watershed is relatively unimpaired above Pohono Bridge. While the Merced River is much larger than Bloods Creek, Blood Creek exhibited a remarkably similar seasonal runoff pattern. A statistical relationship was developed to estimate flow in Bloods Creek. The relationship between the discharge of Bloods Creek measured by the BVWD and the discharge for Merced River at Pohono Bridge are shown on Figure 1.
18. Figure 2 shows the relationship between the estimated discharge of Bloods Creek based on the Merced River, and the measured discharge of Bloods Creek. The data show a good correlation. The total volume of water measured and estimated is within 10%; considered to be within the expected error of uncertainty for these types of measurements.
19. There is a USGS gage on the NFSR near Avery (Avery) downstream from Bloods Creek about 20 miles. However, the record is impaired by the reservoirs in the upper watershed of NFSR. In order to evaluate the applicability of the Merced River at Pohono Bridge record to the NFSR watershed (and Bloods Creek) we compared the flow at Avery to Pohono Bridge. The results are shown on Figures 3A and 3B. Based on the relationship shown on Figures 3A and 3B we concluded that the Merced River at Pohono was a reasonably representative record for estimating unimpaired flow in NFSR watershed where necessary.
20. We also estimated the flow in the NFSR at McKays' point, based on a ratio of watershed area with the Merced River. Figure 4 shows a comparison of the estimated flow at McKay's to a nearby USGS gage at Avery. The timing and distribution of discharge is similar, but the volume measured at Avery is about 30% higher. Consequently, we conclude that our estimation of flow using the Merced River probably understates the actual amount of water available at this point.

21. The watershed of Bloods Creek (about 2,000 acres) is geographically similar to Bear Creek (520 acres) and about at the same elevation (7,000 to 8,000 feet msl). The estimated flow in Bloods Creek was assumed to be a reasonable basis for determining the discharge of Bear Creek, See Figure 5.
22. Figures 6 through 10 show the estimated frequency of water availability at the Applicants point of diversion based on the flow record in the Merced River, from 1917 through 2007 and adjusted from Bloods Creek measurements. We included an evaluation of the three driest years in the record (Figures 8, 9 and 10). As shown on Figure 6, the full amount of the Applicants requested appropriation is available in 99.8% of the years. Notably, LAWC's report of licensee for Bear Lake under license 11007 shows that Bear Lake has spilled in every year dating back to at least 1980 (see appendix C). Based on the foregoing analysis, there is water physically available more than 99% of the time at the point of diversion.

VII. Water Availability Relative to Instream Flows Requirements

23. An analysis of the hydrology of the Bear Creek - Bloods Creek drainage system under unimpaired conditions, and impaired conditions proposed by Applicants, showed very little expected change in the timing and distribution of runoff to Bear Creek below Bear Lake. The analysis was provided to the California Department of Fish and Game (CDFG) in a letter report to Mr. Gary Hobgood dated August 10, 2005 (see appendix).
24. We also investigated and tabulated the water right filings (statements of water diversion and use and applications to appropriate water) on the Bear Creek - Bloods creek system. These filings and the face value amount are shown on Table 1.
25. Compared to the estimated average annual discharge of Bloods Creek (23,949 acre feet) at its confluence with the NFSR (Plate I) these filings represent only 2.8% of the annual discharge of Bloods Creek. The confluence is downstream of significant barriers to up migration for fish in Bloods Creek. CDFG withdrew its protest to the project on the basis of this analysis.

VIII. Water Availability – Protest Resolution – Impact to Prior Rights

26. The SWRCB publicly noticed the subject petitions and application on December 10, 2004. The SWRCB received eight protests from interested parties and legal users of water. After consultation with these parties, the Applicants have resolved all eight of the protests. A summary of the protests, and their dismissal letters are attached as Exhibit O. The protestants recognize that the potential impact of the requested appropriations to the hydrology of the NFSR and downstream water rights on the Stanislaus system is de minimus, minimal or insignificant.

IX. Assignment of SFA 5648 will not Impair Prior Rights

27. Table 2 shows the water right filings on the Stanislaus River System represented by the protestants as well as the water right filings in the NFSR as indicated on the SWRCB eWRIMS system. The filings prior to SFA 5648 and downstream of the Applicants' point of diversion are highlighted.
28. The amount of the proposed appropriation (395 acre-feet) relative to the amount of water normally available in the NFSR (see Plate I) is such a minimal amount that the diversion will have a de minimus effect on the downstream hydrology. It is believed that there is a lack of hydraulic connection between Applicants' point of diversion and downstream prior right holders during July, August, September and October. Lacking such connection, diversions by Applicants would have no impact at all on downstream diversions during those months. During the remaining months, it is possible that Applicants' diversions could impact downstream right holders; however the potential interference is so small as to be immeasurable. This limited ability to cause impact, and the insignificance of the impact, was recognized by all of the protestants including CDFG.
29. The State Water Board has taken notice of de minimus or insignificant impacts in previous water right decisions. For example in Water Right Decision 1587 (page 53) the State Water Board writes: "The Bureau's own testimony indicated that inflow to Folsom Reservoir would be reduced by about 33,000 afa from the project's proposed operations, an amount that is insignificant when examining the 1,050,000 acre feet that can be assigned to El Dorado under Applications 7938 and 7939."
30. For perspective, in this instance we evaluated the possible impairment of the prior water rights of OID-SSJID at Goodwin Dam below New Melones and on CCWD-NCPA at McKay's point. OID-SSJID claim a pre-1914 water right of 1,816.6 cfs and post-1914 storage rights of about 144,000 acre feet. CCWD-NCPA claim a pre-1914 water rights of 88 cfs. Each of these rights enjoy a higher priority than SFA 5648 sought by Petitioners. SFA 5648 is believed to have a higher priority than all of the other diverters upstream of Goodwin Dam.
31. We assumed that 1,816.6 cfs was a maximum diversion rate to satisfy a beneficial use based on an irrigation demand, seasonally adjusted to the potential evapotranspiration rate in the general area of OID-SSJID. The results of this analysis are shown on Table 3. The maximum impairment of diversion opportunity at Goodwin based on the past 105 years of record would be 23.2 acre feet. The potential average diversion at Goodwin Dam during the irrigation season, March through October, is 408,513 acre feet per year. The potential impairment is less than 0.006%. A review of the full natural flow at Goodwin indicates there has

always been sufficient seasonal runoff to satisfy the OID-SSJID storage rights as well.

32. Table 4 shows the average flow estimated at McKay's Point to represent inflow to the Utica Ditch for diversion of 88 cfs for power. During the Applicants' diversion season there is on average 88 cfs or more, in all months, or there is a lack of hydraulic connection, with the exception of November where the average flow is 64 cfs. Again, due to the possibility of only a very limited infringement of right, the protests were settled.
33. The foregoing is not intended to be a representation of how the water rights of prior right holders been exercised in the past or, or to suggest that the full amount of the rights is not fully valid during months of the right holders season if that amount of water existed and was needed for beneficial uses. The analysis is intended to show the de minimus impact of the Bear Lake diversions. The lack of measureable impact was the basis for settlement of the protests.

X. Assignment of SFA 5648

34. One of the Petitioner's purposes of use is recreation. The Stanislaus River has been declared to be fully appropriated from April 1 to November 30 (see State Water Board Order WR 98-08, Staff Exhibit G). The period of highest runoff (snowmelt) occurs after April 1st. Since water is available under 5648, and there are no outstanding protests, approval would provide Petitioners with the flexibility to directly divert during the spring and early summer from April 1 to the end of the requested diversion season of July 30, when water is normally abundant, to preserve the recreational uses of the lake by allowing the lake to remain full longer through the dry season. If the season was curtailed to only December 1 to March 31, Applicants would need to withdraw water from storage during April, May, June and July, impairing recreation in some years due to lower lake levels than would occur if the SFA 5648 assignment is approved.

XI. SFA 5648 – Conflict with a General or Coordinated Plan

35. I have reviewed Bulletin 160-05, the California Water Plan, and did not see any projects or plans to use the water available under SFA 5648. (County & LAWC Exhibit P) Specifically, Chapters 17 and 18 of Volume 2, dealing with water storage projects, did not disclose any plan to use water from SFA 5648.

XII. Water Availability for Application 31523 (if petition for partial assignment is denied).

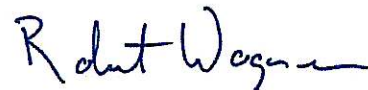
36. Table 5 shows the estimated and measured monthly flow at various points in the watershed. Table 5 indicates that water is available at the point of diversion (Bear Creek) during all months of the year on average. However during the months of August and September it is rare that there is any flow in Bear Creek. Occasionally there is flow in October if the precipitation season begins early. More frequently there is flow in July due to snowmelt following heavy winter storms. Flow in Bear Creek is mostly a function of runoff from precipitation. It is reasonable to conclude that during months of limited precipitation there would be a lack of flow sufficient to sustain hydraulic connection downstream. The record at Calaveras Big Trees supports this conclusion. We do not believe that the Applicants' diversions will impact downstream water rights.
37. The protestants within the NFSR system that could be affected by an assignment of SFA5648 are also holders post-1914 water rights (Table 2). The impact analysis showing de minimus impact on downstream diversion opportunities of pre-1927 and pre-1914 water rights, applies to the post-1914 water rights as well. While the impact is not quantified here, it would be larger (although the actual impairment would still be small). It is noteworthy that the post-1914 water right holder protestants dismissed their protests, and have chosen not to appear in this proceeding.
38. I also compared the amount of water sought by Application 31523 to the Stanislaus River watershed losses that occurred due to the New Melones Project. Prior to construction of New Melones Dam, the reservoir impounded by Old Melones resulted in an annual evaporation rate. The annual rate of evaporation increased significantly with the construction of New Melones. As shown on Table 6 and Figure 11 the estimated change in evaporation between New Melones and the amount that would have occurred during the 28 year period between 1980 and 2007, is 28,458 acre-feet per year. This represents an increase in losses from the watershed due to the construction and operation of New Melones more than 70 times greater than the total face value of Application 31523.
39. Due to the Fully Appropriated Stream Index, WRO 98-08 (FAS), the Stanislaus River system is fully appropriated from April 1 to November 30. (See Staff Exhibit G.) Application 31523 seeks a diversion season from October 1 to July 31. If Application 31523 is limited to comply with FAS, then the requested diversion season would be reduced by five months and would extend only from December 1 to March 31. Based upon Table 5, this would mean that the full amount of water sought by Applicants (395 afa) would not appear to be available during an average year. Based upon monthly averages, only approximately 252 acre-feet would be theoretically available at the Applicants' point of diversion during this reduced diversion season. However, this assumes that water would actually be liquid during these months, which would not be expected. During these months, the water is typically still frozen (snow), and would not be available to divert. The water only becomes actually available during and after March (see Figures 1 and 2). Thus, if the FAS finding was strictly interpreted and applied to

Application 31523, then during most years adequate water would not be available to fulfill the full amount of water sought by Applicants.

40. It is my understanding that since Alpine County is a County of Origin and is seeking those protections, the FAS finding should not be applied to Application 31523. This issue is more fully addressed in the Applicants' closing brief.

XIII. Conclusion

41. Based on the foregoing I conclude that with respect to the petition for partial assignment and petitions to change SFA 5648:
- a. There is water available for the requested appropriation in 99% of the years;
 - b. The diversions will have a de minimus, or no impact, on prior water rights;
 - c. The diversions will have a de minimus impact on the total water resources of the Stanislaus River system and in particular the NFSR;
 - d. The partial assignment will not interfere with any General or Coordinated County Plans;
 - e. The partial assignment is consistent with the California State Water Plan;
 - f. There is currently no opposition to the approval of the petition for partial assignment SFA 5648 and the petitions to change place of use and purpose of use.
42. Based on the foregoing, I conclude that with respect to Application 31523:
- g. FAS could greatly limit the Applicants' ability to fully divert the amount of water sought by the Applicants.
 - h. The full amount of diversions exercised during the requested season will have a de minimus, or no impact, on prior water rights;
 - i. The diversions will have a de minimus impact on the total water resources of the Stanislaus River system and in particular the NFSR;
 - j. There is currently no opposition to the approval of the application as filed for the amount or season.



Robert C. Wagner, P.E.

Bibliography

California Department of Water Resources (DWR), California Data Exchange Center (CDEC) website: http://cdec.water.ca.gov/cgi-progs/stationInfo?station_id=SNS, Stanislaus River – Goodwin (SNS), Full Natural Flow, accessed June 2008.

United States Bureau of Reclamation (USBR) Central Valley Operations Office, Water Operations Division, New Melones Lake Full Natural Inflow, obtained June 2008.

United States Geological Survey (USGS) National Water Information System (NWIS) website:

http://waterdata.usgs.gov/ca/nwis/nwisman/?site_no=11294500&agency_cd=USGS, USGS 11294500 North Fork Stanislaus River Near Avery, CA, accessed June 2008.

USGS NWIS website:

http://waterdata.usgs.gov/ca/nwis/nwisman/?site_no=11266500&agency_cd=USGS, USGS 11266500 Merced River at Pohono Bridge Near Yosemite, CA, accessed June 2008.

Western Regional Climate Center (WRCC) website:

<http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca1277>, Calaveras Big Trees, CA, accessed June 2008.

Bear Valley Water District Records

Mr. Bruce Orvis, Manager, Lake Alpine Water Company Personal Communication

State Water Resources Control Board, Division of Water Rights, Water Rights Information Management System (eWRIMS)

ATTACHMENT A

Figures

1. Relationship Between Merced River and Bloods Creek Discharge
2. Comparison of Estimated and Measured Discharge of Bloods Creek Above Bear Creek
- 3A. Double Mass Curve of North Fork Stanislaus River Near Avery and Merced River at Pohono Bridge
- 3B. North Fork Stanislaus River Near Avery and Merced River at Pohono Bridge
4. Comparison of Estimated Unimpaired Flow of North Fork Stanislaus River at the S000998 POD and Reported Flow at USGS 11294500 Fork Stanislaus River Near Avery, CA
5. Estimated Bloods Creek Above Bear Creek and Estimated Bear Creek at Bear Lake Dam
6. Estimated Bear Lake Seasonal Inflow Volume October Through July Exceedance
7. Estimated Bear Lake Daily Inflow October Through July Daily Seasonal Exceedance
8. Dry Year Water Availability Estimated Daily Bear Lake Inflow October 1, 1976 Through July 31, 1977
9. Dry Year Water Availability Estimated Daily Bear Lake Inflow October 1, 1930 Through July 31, 1931
10. Dry Year Water Availability Estimated Daily Bear Lake Inflow October 1, 1975 Through July 31, 1976
11. Annual Evaporation from Old Melones and New Melones Compared to Requested Bear Creek Diversions

Tables

1. Water Rights Located Within the Bloods Creek Watershed as Shown on State Water Resources Control Board Spot Maps
2. North Fork Stanislaus River Water Right Filings As Indicated By SWRCB eWRIMS
3. Estimated Impairment of Stanislaus River – Goodwin (SNS), Full Natural Flow
4. Estimated Flow of North Fork Stanislaus River at S000998 Based on Flow in Merced River at Pohono Bridge Near Yosemite, CA
5. Monthly Average Discharge at Selected Points of Interest
6. Change in Evaporation Between New Melones and Old Melones Reservoirs

Plates

1. Watershed Areas within New Melones Watershed, Average Seasonal Discharge, Place of Use for State Filed Application 5648, and Proposed Addition to Place of Use
2. Watershed Areas of Bear Creek, Bloods Creek above North Fork Stanislaus River, and Proposed Addition to Place of Use for State Filed Application 5648

6/30/2008

FIGURE 1
Alpine County - Lake Alpine Water Company
Relationship Between Merced River and Bloods Creek Discharge
Average Daily Flow for 2003

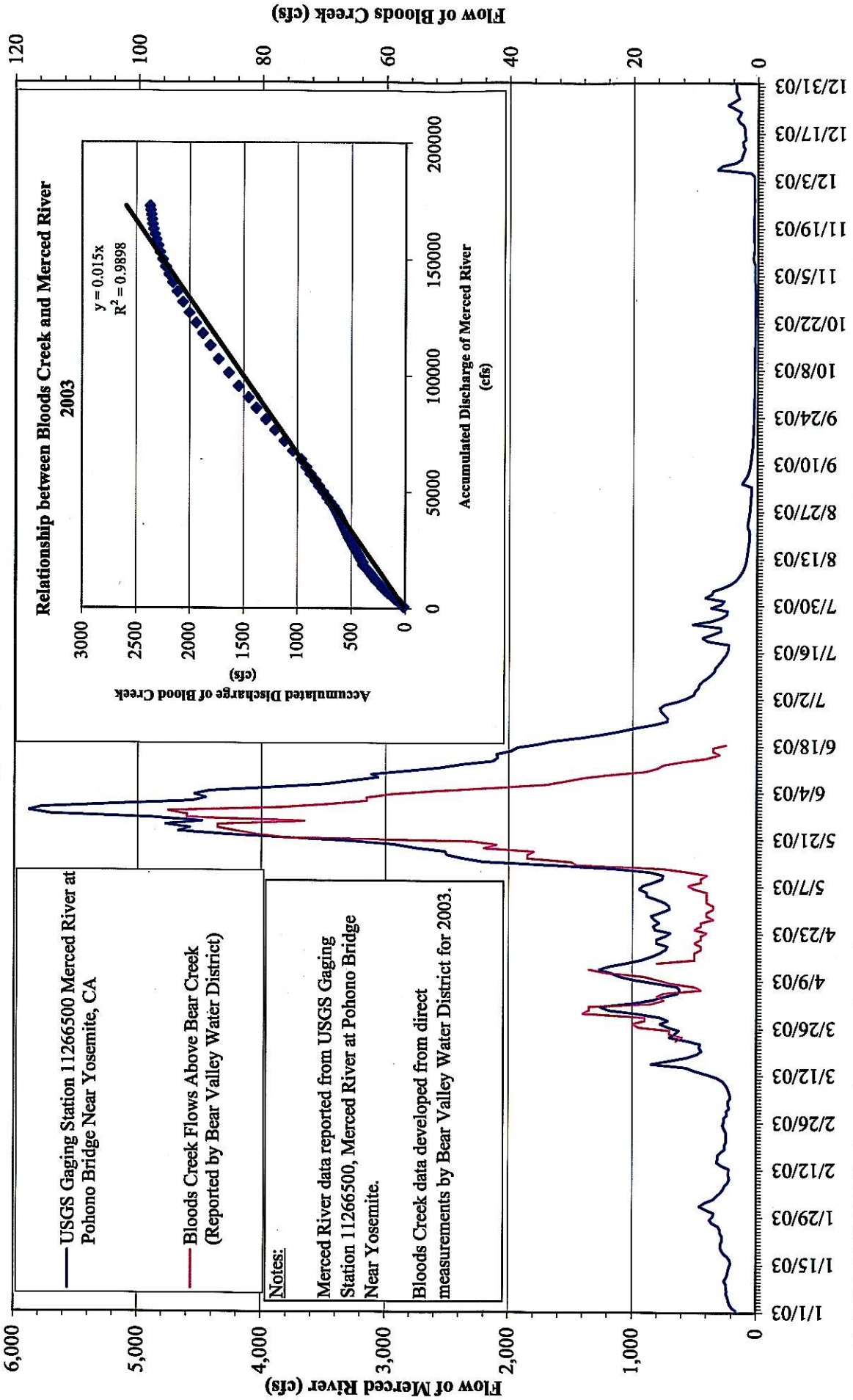


FIGURE 2
Alpine County - Lake Alpine Water Company
Comparison of Estimated and Measured Discharge of Bloods Creek Above Bear Creek

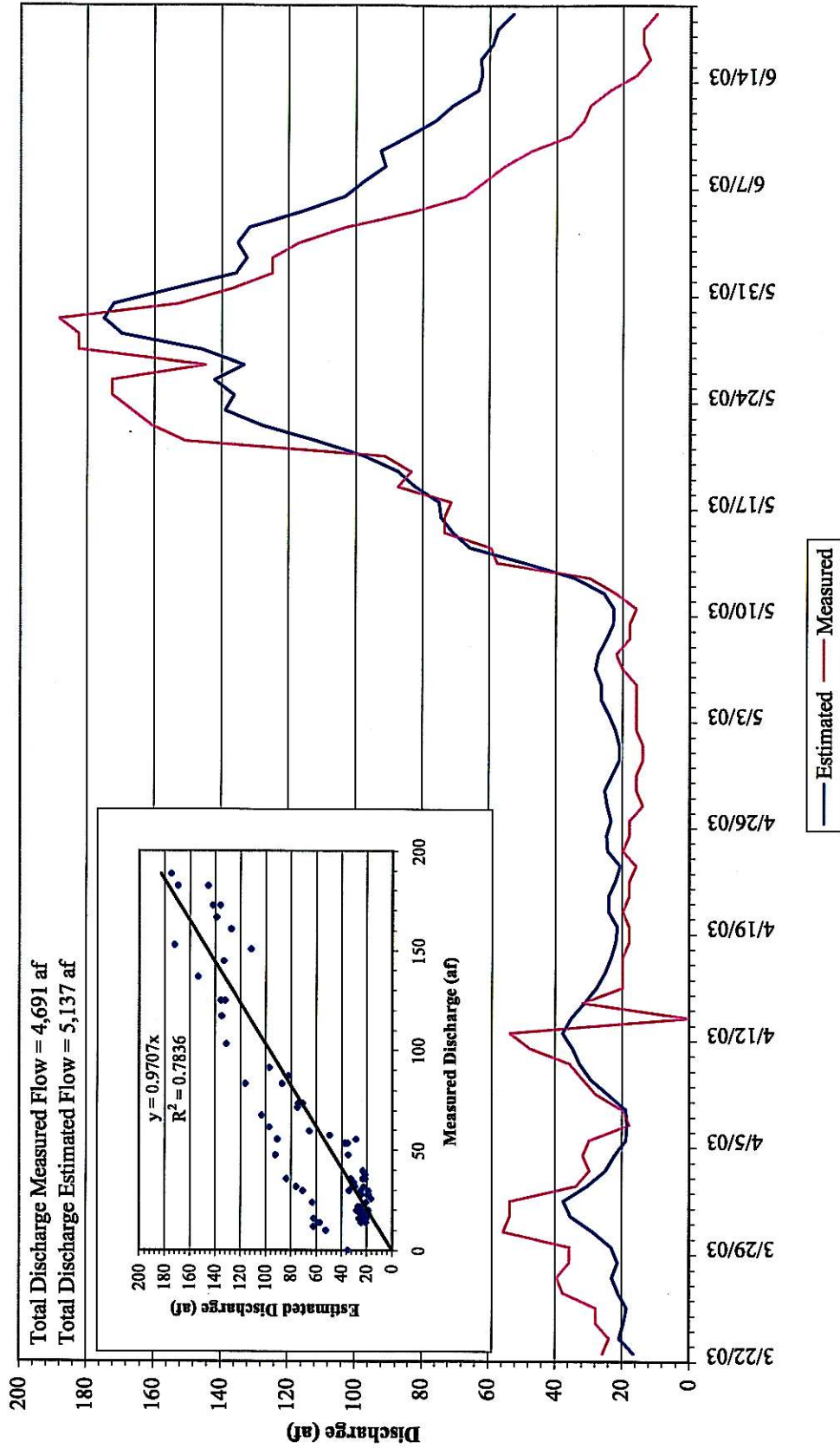
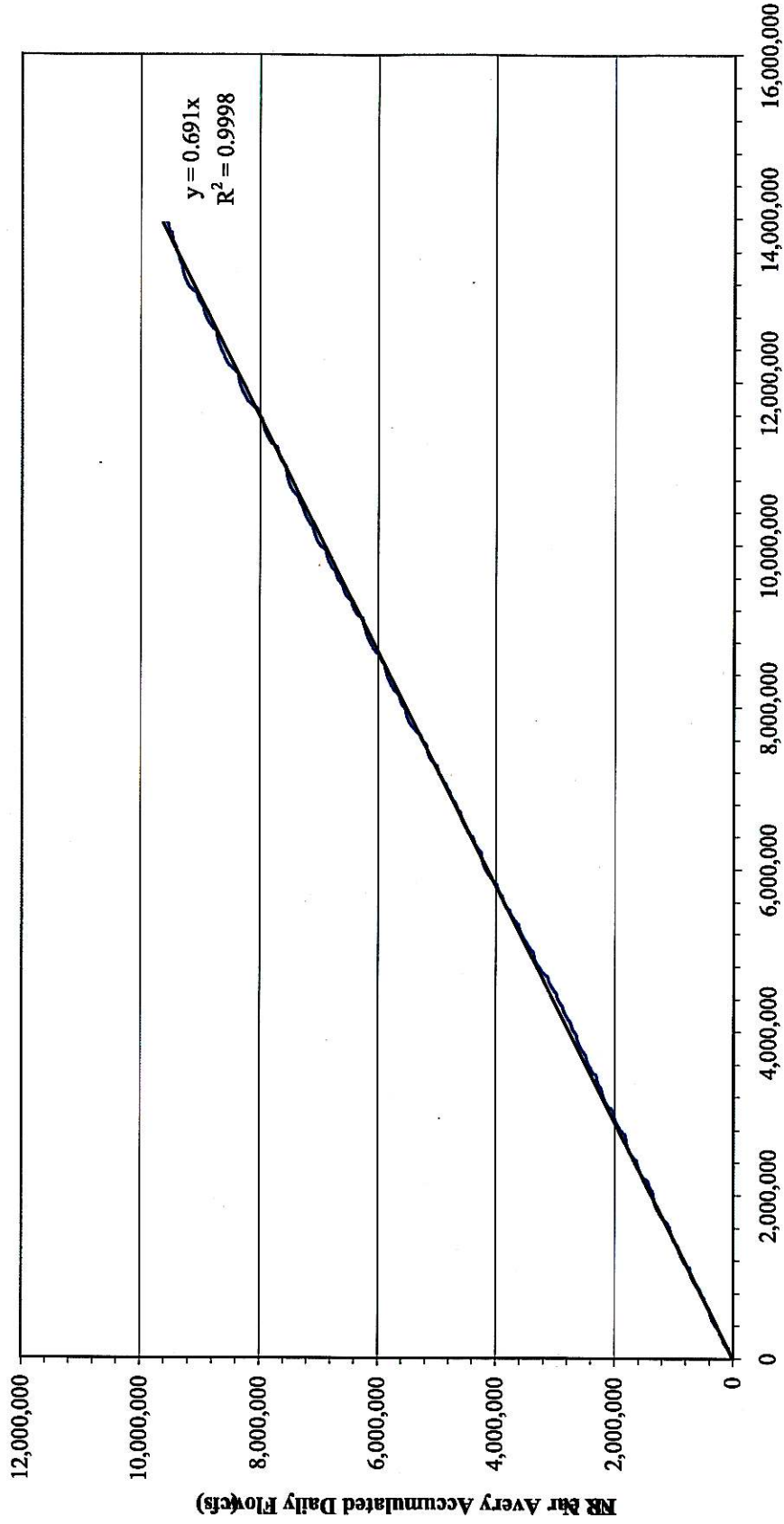


FIGURE 2A
Alpine County - Lake Alpine Water Company
Double Mass Curve of North Fork Sanislaus River Near Avery and Merced River at Rhono Bridge
Water Years 1999 Through 2000



Merced River at Rhono Bridge Accumulated Daily Flow (cfs)

Note: Indicates a relationship between flow conditions on the Merced River and NFSR are stable over time.

FIGURE 3B
Alpine County - Lake Alpine Water Company
North Fork Stanislaus River Near Avery and Merced River at Pohono Bridge
Water Years 1917 Through 2007

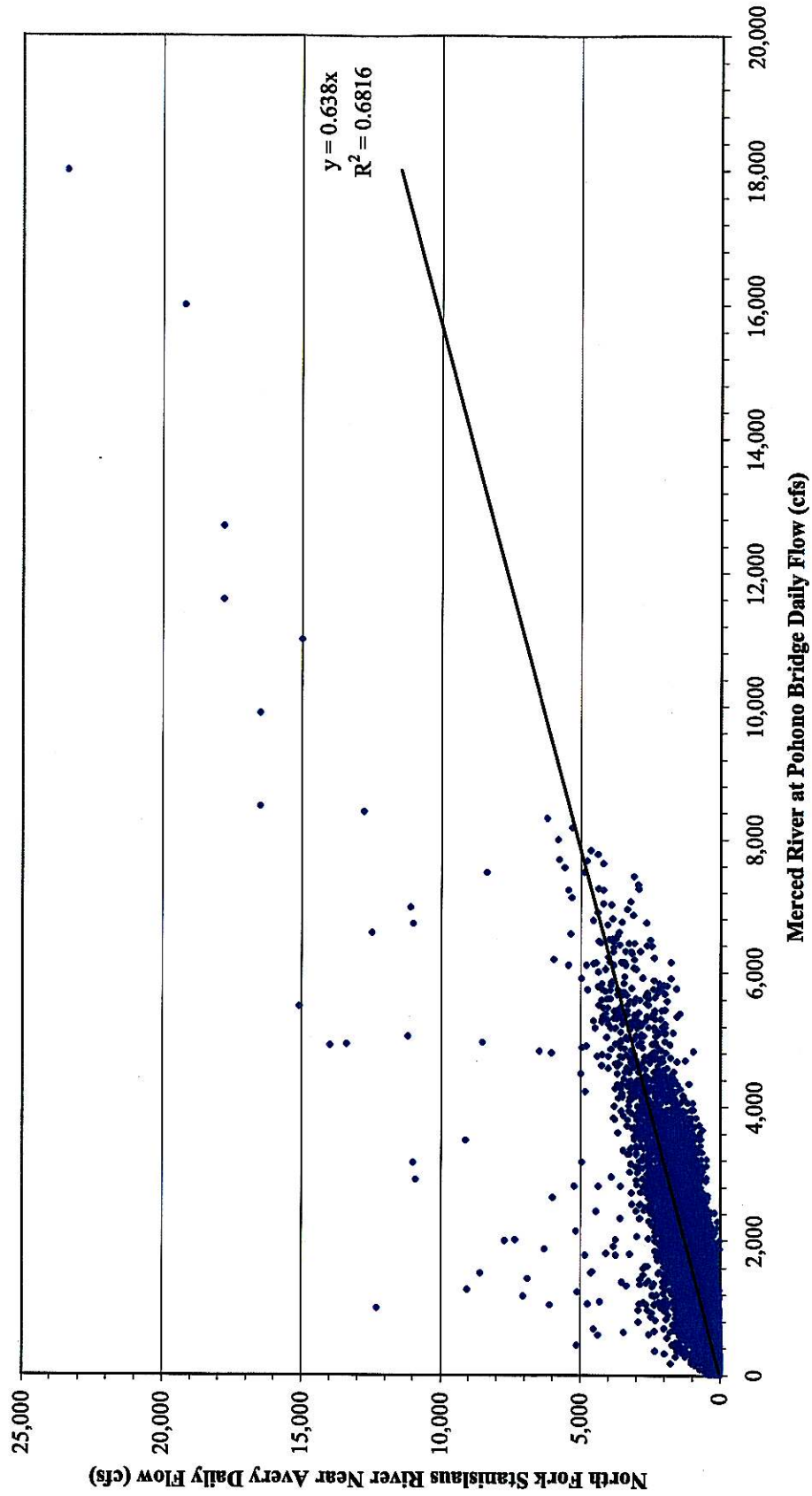
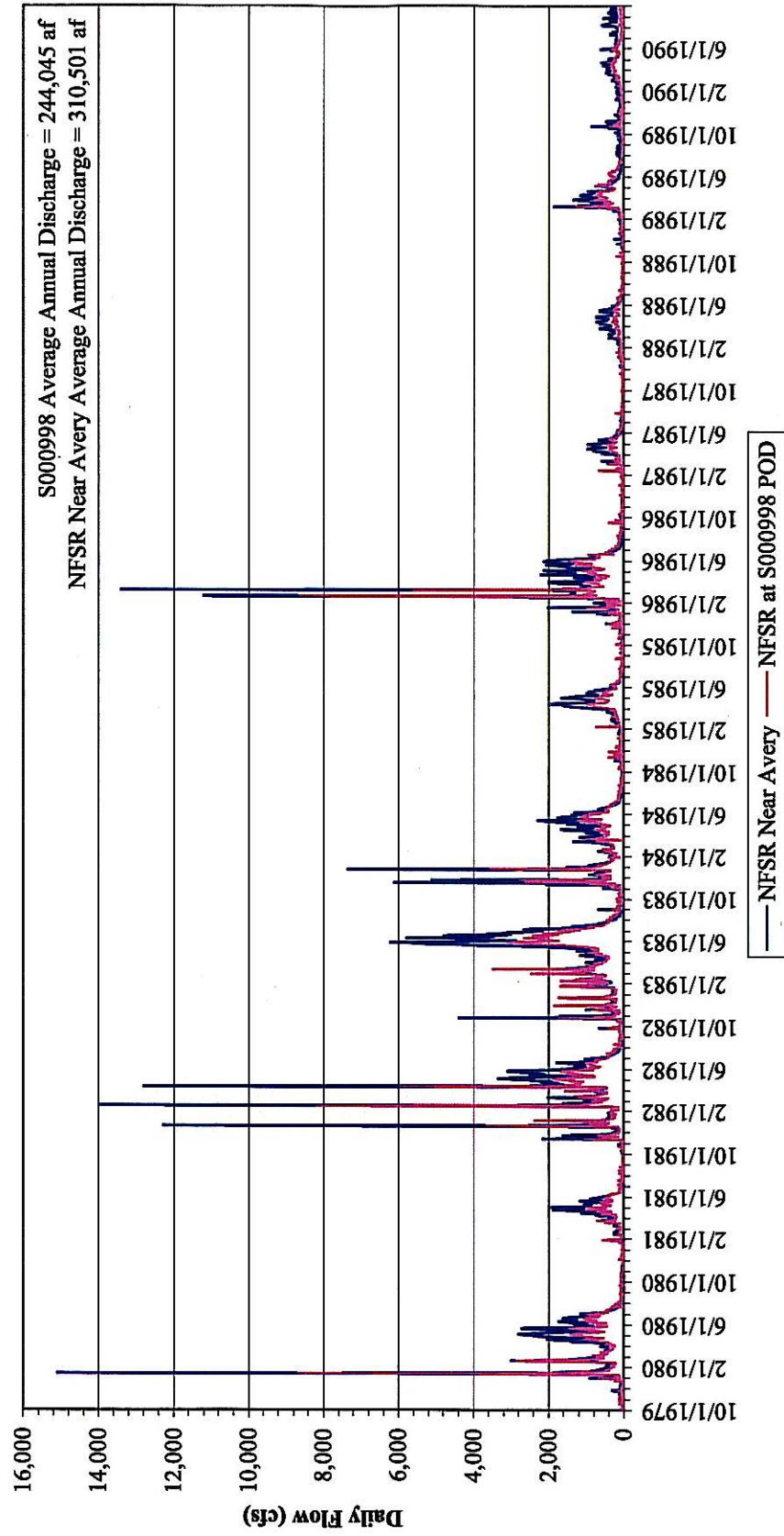
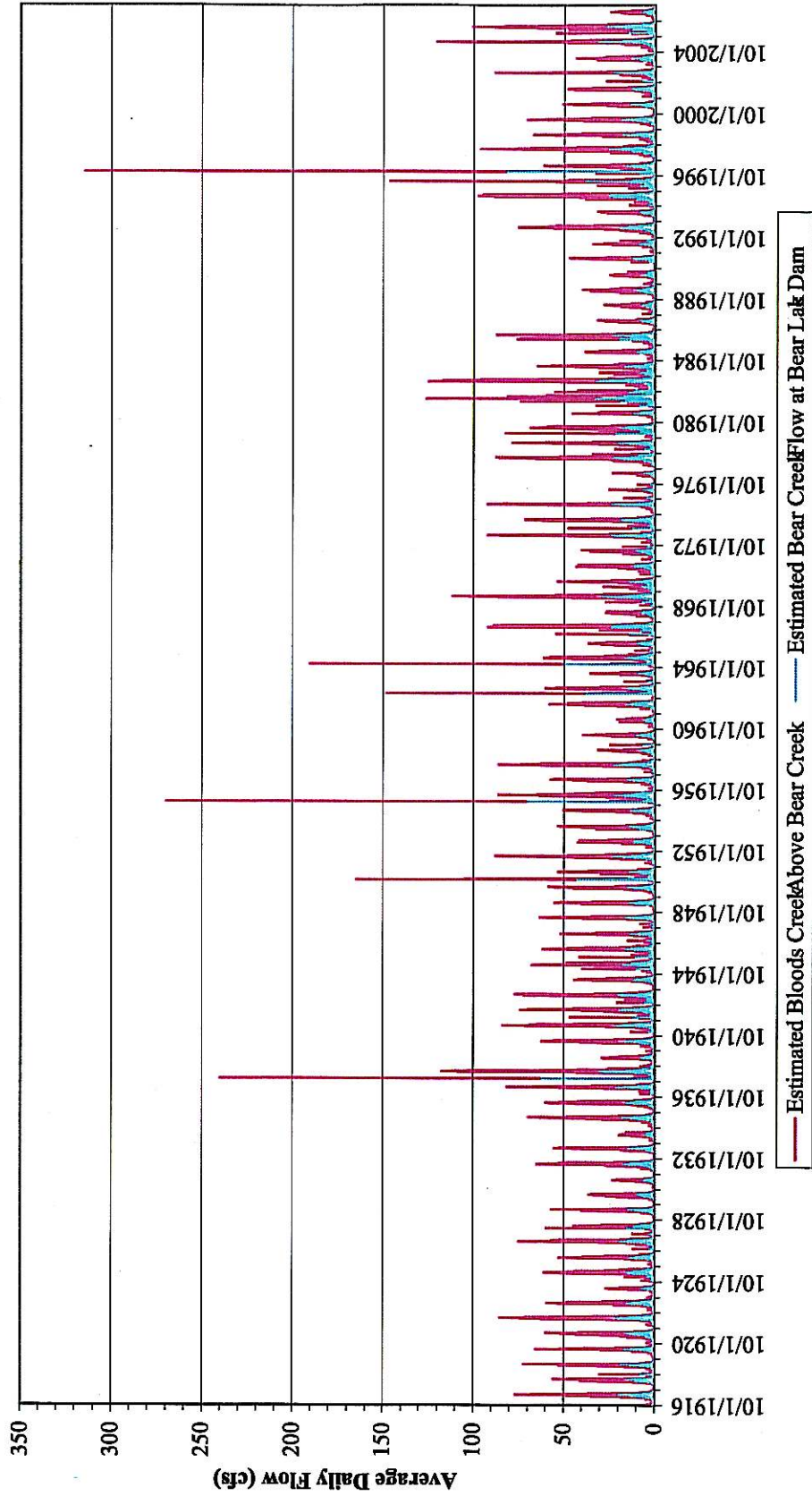


FIGURE 4
Alpine County - Lake Alpine Water Company
Comparison of Estimated Unimpaired Flow of North Fork Stanislaus River at the S000998 POD
and Reported Flow at USGS 11294500 North Fork Stanislaus River Near Avery, CA
Water Years 1980 Through 1990



Note: Flow at S000998 (McKay's Point) estimated from Merced River watershed area ratio(0.54).

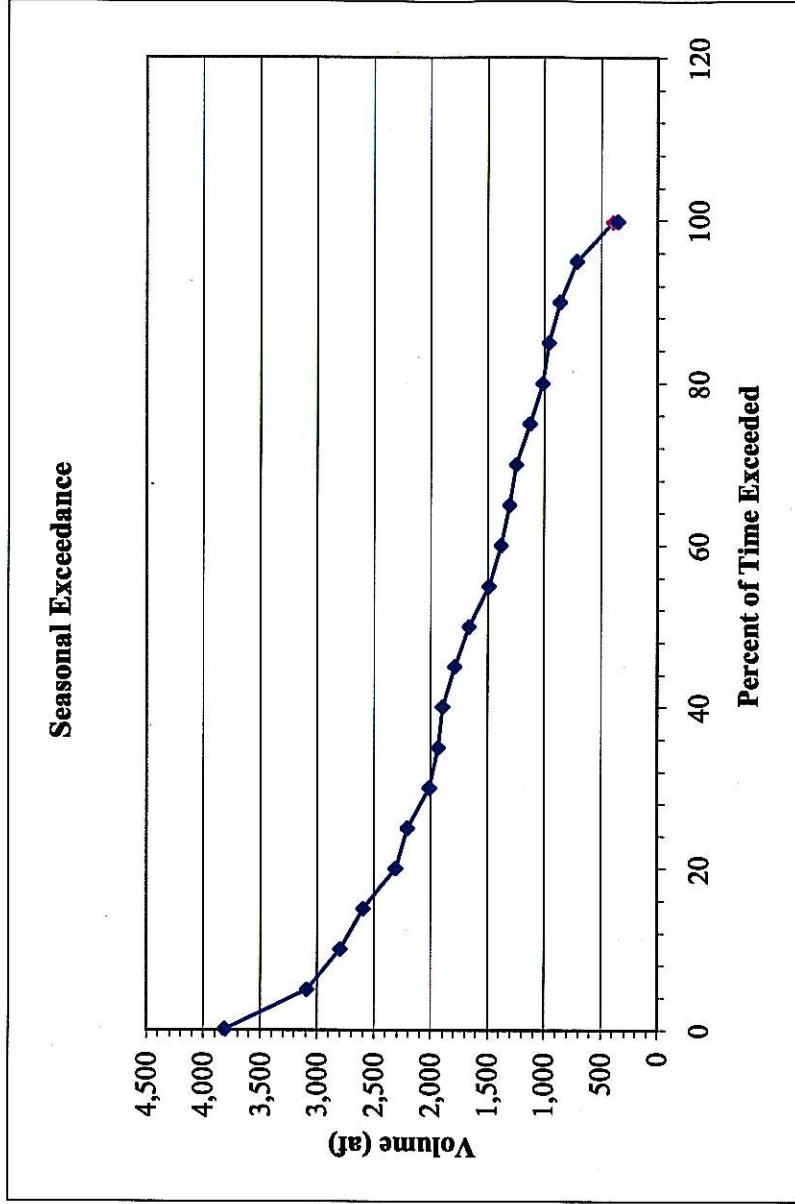
FIGURE 5
Alpine County - Lake Alpine Water Company
Estimated Bloods Creek Above Bear Creek and Estimated Bear Creek at Bear Lake Dam
October 1916 Through September 1990



Note: Flows at Bloods Creekestimated from Merced River (Fig. 1). Bear Creek(520 ac) estimated from Bloods Creek(2001 ac) watershed area ratio of 0.26.

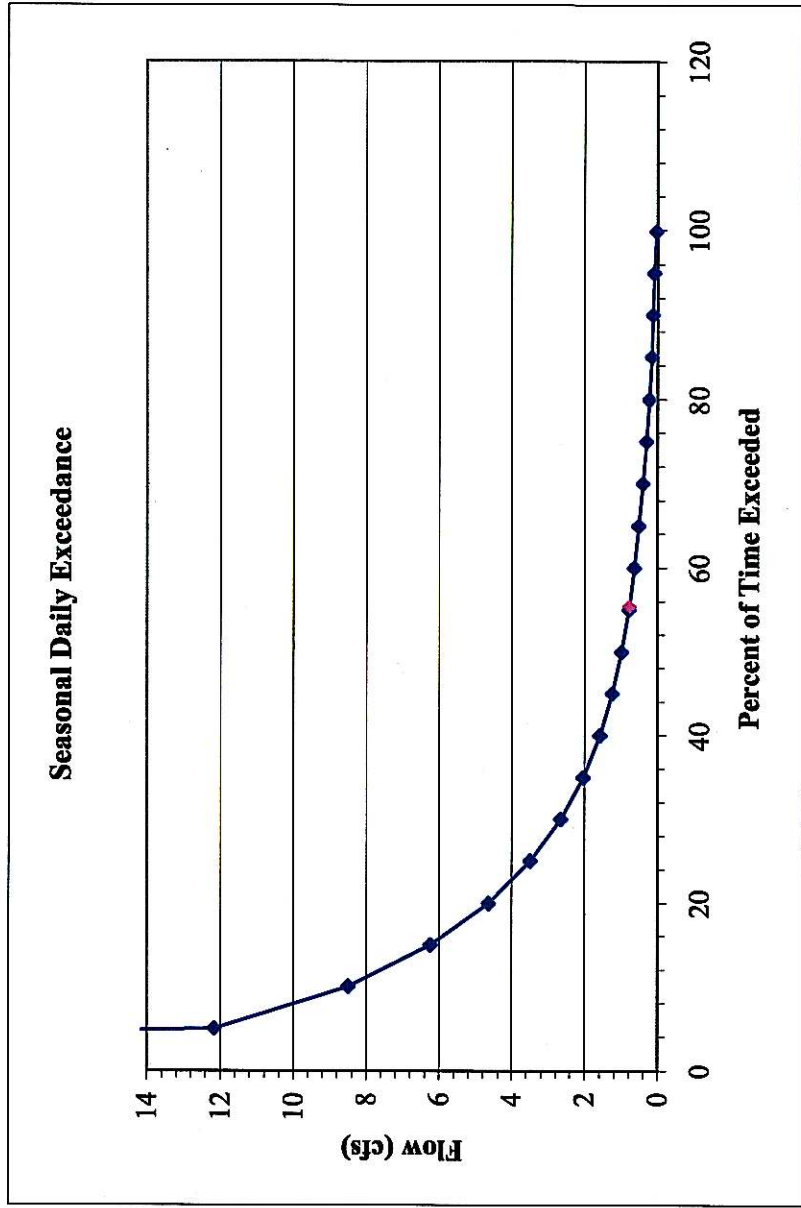
FIGURE 6
Alpine County - Lake Alpine Water Company
Estimated Bear Lake Seasonal Inflow Volume
October Through July Exceedance Water Years 1917 Through 2007

Percent of Time Exceeded	Volume (af)
0.1	3,813
5	3,088
10	2,797
15	2,595
20	2,309
25	2,206
30	2,014
35	1,935
40	1,897
45	1,790
50	1,659
55	1,486
60	1,381
65	1,305
70	1,246
75	1,126
80	1,013
85	957
90	861
95	708
99.8	395
99.9	352



Notes:
 Indicates total discharge equals or exceeds 395 af 99.8% of the time.
 Bear Creek (20 ac) estimated from Bloods Creek (2001 ac) watershed area ratio of 0.26.

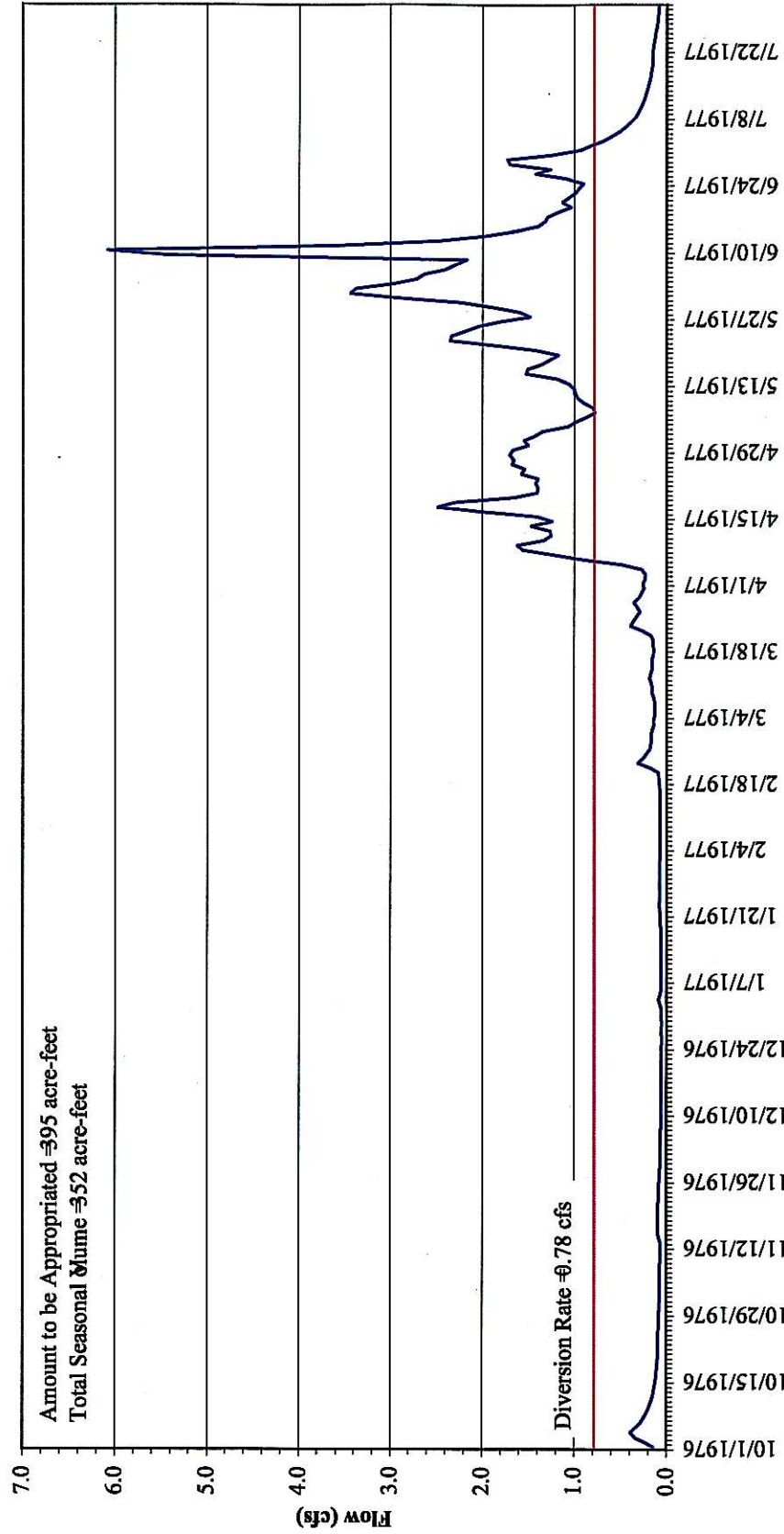
FIGURE 7
Alpine County - Lake Alpine Water Company
Estimated Bear Lake Daily Inflow
October Through July Daily Seasonal Exceedance Water Years 1917 Through 2007



Percent of Time Exceeded	Flow (cfs)
0.1	81.859
5	12.162
10	8.498
15	6.237
20	4.639
25	3.504
30	2.664
35	2.031
40	1.583
45	1.247
50	0.990
55	0.795
55.4	0.780
60	0.639
65	0.522
70	0.405
75	0.305
80	0.218
85	0.152
90	0.113
95	0.078
99.9	0.021

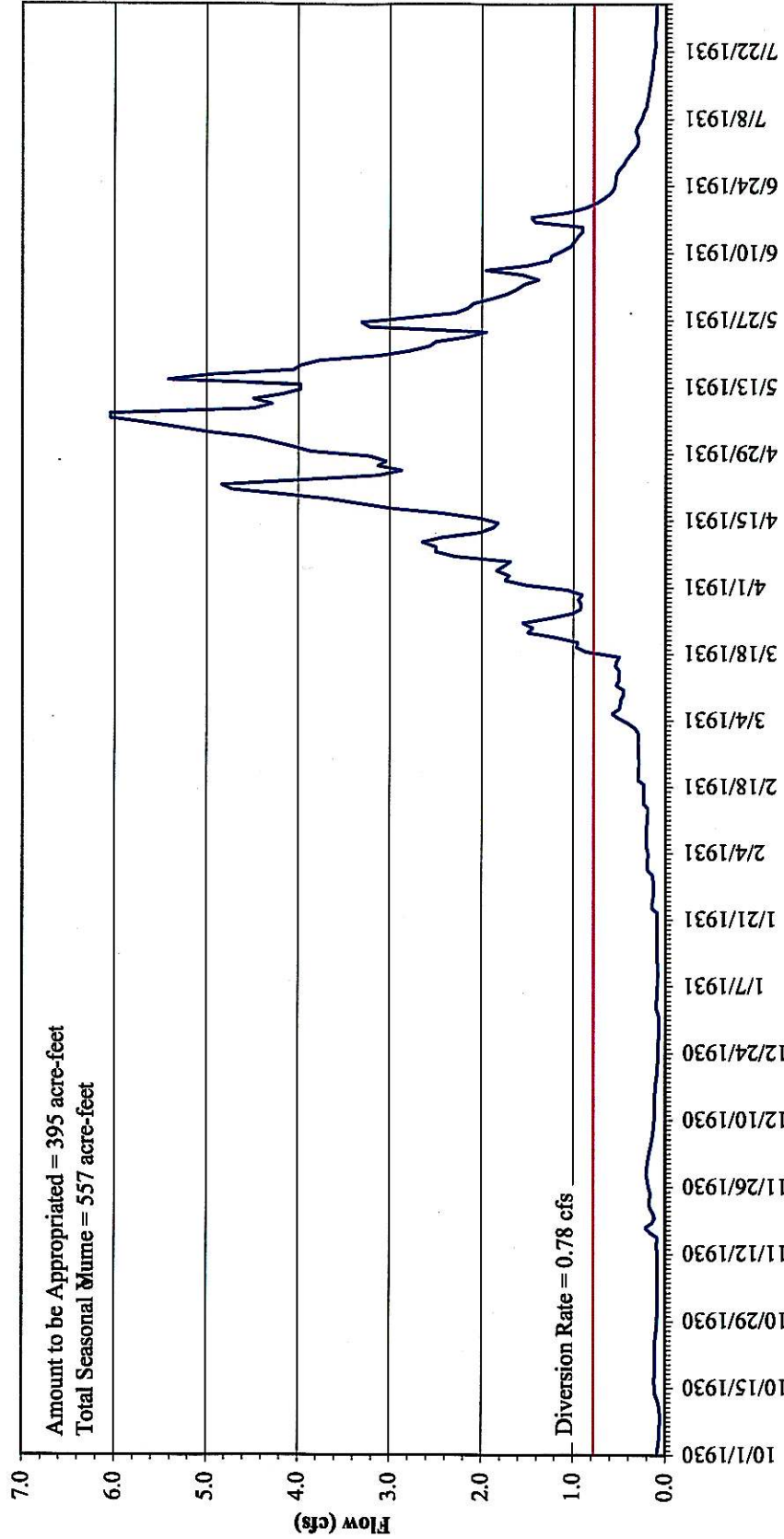
Notes:
 Indicates daily discharge exceeds 0.78 cfs 55.4% of the time.
 Bear Creek @20 ac)estimated from Bloods Creek @001 ac)watershed area ratio of 0.26.

FIGURE 8
Alpine County - Lake Alpine Water Company
Dry Year Water Availability Estimated Daily Bear Lake Inflow
October 1, 1976 Through July 31, 1977
(Driest Year on Record)



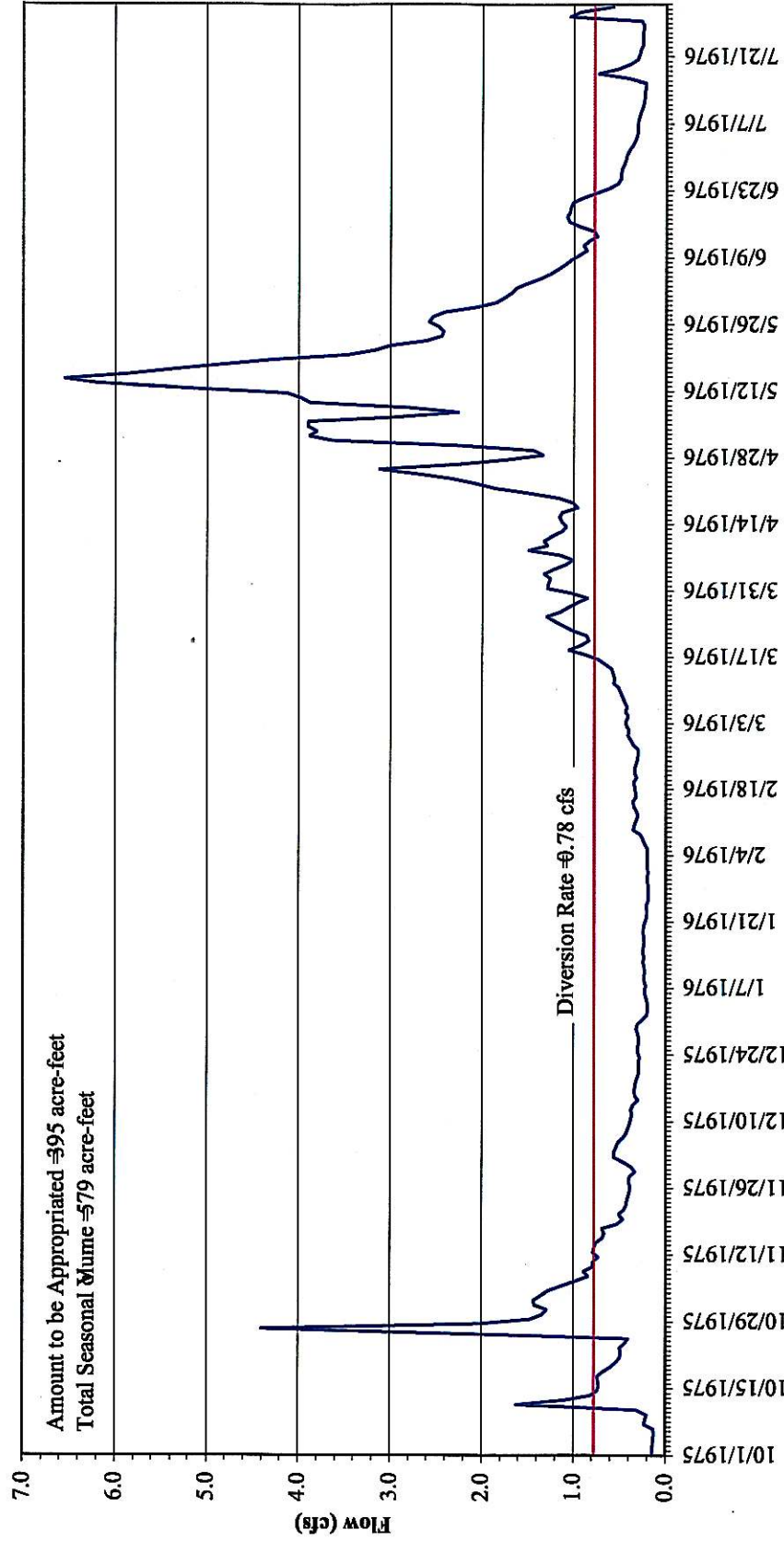
Note: Bear Creek (20 ac) estimated from Bloods Creek (2001 ac) watershed area ratio of 0.26.

FIGURE 9
Alpine County - Lake Alpine Water Company
Dry Year Water Availability Estimated Daily Bear Lake Inflow
October 1, 1930 Through July 31, 1931
(Second Driest Year on Record)



Note: Bear Creek (520 ac) estimated from Bods Creek (2001 ac) watershed area ratio of 0.26.

FIGURE 10
Alpine County - Lake Alpine Water Company
Dry Year Water Availability Estimated Daily Bear Lake Inflow
October 1, 1975 Through July 31, 1976
(Third Driest Year on Record)



Note: Bear Creek (20 ac) estimated from Bloods Creek (2001 ac) watershed area ratio of 0.26.

TABLE 1
Alpine County - Lake Alpine Water Company
Water Rights Located Within the Bloods Creek Watershed as Shown on State Water Resources Control Board Spot Maps

Right	Owner	Source	Diversion Season	Use	Maximum Annual Use (af)
A13353	Sherman Acres Mutual Water Association	Unnamed tributary to Bloods Creek	6/1 to 9/1	4000 gallons/day	1.4
A20312	Lake Alpine Water Company	Bear Creek tributary to Bloods Creek	1/1 to 12/31	.075 cfs	54.3
A21485	Lake Alpine Water Company	Bear Creek tributary to Bloods Creek	10/1 to 6/1	Storage 240 af	140.0
A22291	Bear Alley Homeowners Association	Bear Creek tributary to Bloods Creek	1/1 to 12/31	DD of .05 cfs	3.2
A29813	Bear Alley Homeowners Association	Unnamed tributary to Corral Gulch thence Bloods Creek	1/1 to 12/32	7000 gallons/day	8.0
A31523	Lake Alpine Water Company	Bear Creek tributary to Bloods Creek	10/1 to 7/1	Storage 220 af DD of .78 cfs	395.0
S13730	James L Orvis & Bruce Orvis	Unnamed tributary to Bloods Creek	1/1 to 12/31	.067 cfs	48.5
S14798	Scott C. Parker	Unnamed tributary to Bloods Creek	3/1 to 10/1	150 gallons/day	0.1
				Total	650.5

TABLE 2
Alpine County - Lake Alpine Water Company
North Fork Stanislaus River
Water Right Filings As Indicated By SWRCB eWRIMS

Diverter	Application	License/ Permit	Direct Diversion Rate	Direct Diversion Season	Storage Season	Face Value Storage Amount (\$)	Source
Calaveras County Water District	S000249	-	1.08 cfs	Jan 1 - Nov 30	-	-	Big Trees Creek
Utica Power Authority	S000998	-	90 cfs	Jan 1 - Dec 31	-	-	North Fork Stanislaus River
Utica Power Authority	S000999	-	40 cfs	Jan 1 - Dec 31	-	-	Angels Creek
Utica Power Authority	S001000	-	5 cfs	Jan 1 - Dec 31	-	-	Angels Creek
Utica Power Authority	S001001	-	7 cfs	Mar 1 - Dec 31	-	-	Angels Creek
Calaveras County Water District	S001002	-	-	Jan 1 - Dec 31	-	4,117	Silver Creek
Calaveras County Water District	S001003	-	-	Jan 1 - Oct 31	-	3,130	North Fork Stanislaus River
Calaveras County Water District	S001004	-	-	Feb 1 - Oct 31	-	2,334	North Fork Stanislaus River
Oakdale Irrigation District	S004683	-	1816 cfs	Feb 1 - Dec 31	-	500	Stanislaus River
Utica Power Authority	S010401	-	88 cfs	Jan 1 - Dec 31	-	-	Mill Creek
Utica Power Authority	S011479	-	45 cfs	Jan 1 - Dec 31	-	-	French Gulch
Pacific Gas and Electric Company	A000077A	L9966	-	-	Nov 1 - Aug 1	4,062	Highland Creek
Oakdale Irrigation District & South San Joaquin Irrigation District	A001081	L2012	-	-	Oct 1 - July 1	96,195	Stanislaus River
South San Joaquin Irrigation District	A002524	L604	-	-	Sept 1 - May 1	36,000	Stanislaus River
Oakdale Irrigation District	A003091	-	-	-	Oct 1 - Jul 1	10,754	Stanislaus River
Oakdale Irrigation District	A005648A	-	-	-	Oct 1 - Jul 2	60,000	Middle Fork Stanislaus River
Lake Alpine Water Company	SFA 5648X - A031523	-	0.78 cfs	Oct 1 - July 31	Oct 1 - July 31	395	Bear Creek
Oakdale Irrigation District	A010872	L7856	-	-	Jan 1 - Dec 31	80,000	Stanislaus River
Oakdale Irrigation District	A010978	L3986	-	-	Dec 1 - May 1	25,000	Stanislaus River
Oakdale Irrigation District	A011105	L7857	-	-	Oct 1 - July 1	98,000	Middle Fork Stanislaus River
Calaveras County Water District	A011792B	P15013	-	-	Nov 1 - July 1	2,200	North Fork Stanislaus River
Oakdale Irrigation District	A012490	L10166	-	-	Oct 1 - July 1	76,300	Highland Creek
Oakdale Irrigation District	A012614	L7858	550 cfs	Jan 1 - Dec 31	Oct 1 - July 1	64,500	Stanislaus River
Oakdale Irrigation District	A012873	L10167	400 cfs	Jan 1 - Dec 31	Jan 1 - July 15	98,000	Middle Fork Stanislaus River
Calaveras County Water District	A012910	P15015	65 cfs	Mar 1 - July 1	-	64,500	Middle Fork Stanislaus River
Calaveras County Water District	A012911	P15016	400 cfs	Jan 1 - Dec 31	Nov 1 - July 1	2,200	North Fork Stanislaus River
Calaveras County Water District	A012912	P15017	7 cfs	Nov 1 - July 1	-	76,300	Highland Creek
Calaveras County Water District	A012912A	P14769	3 cfs	Nov 1 - July 1	-	-	North Fork Stanislaus River
Calaveras County Water District	A013091	P15018	-	-	Nov 1 - July 1	63,000	Highland Creek
Calaveras County Water District	A013092	P15019	-	-	Nov 1 - July 1	63,000	Highland Creek
Calaveras County Water District	A013093	P15020	-	-	Nov 1 - July 1	350	North Fork Stanislaus River
Oakdale Irrigation District	A013309	L7859	200 cfs	Jan 1 - Dec 31	-	49,700	Highland Creek
Oakdale Irrigation District & South San Joaquin Irrigation District	A013310	L7860	1500 cfs	Jan 1 - Dec 31	Jan 1 - Dec 31	80,000	Stanislaus River
U.S. Department of the Interior of Reclamation, Region 2 Bureau	A14858B	P20245	2250 cfs	Nov 1 - June 30	-	1,000,000	Stanislaus River
U.S. Department of the Interior of Reclamation, Region 2 Bureau	A14859	P16598	6000 cfs	Jan 1 - Dec 31	Nov 1 - June 30	980,000	Stanislaus River
Calaveras County Water District	A018727	P15021	640 cfs	Jan 1 - Dec 31	Nov 1 - July 1	-	North Fork Stanislaus River
Calaveras County Water District	A019148	P15023	60 cfs	Jan 1 - Dec 31	Nov 1 - June 30	25	Beaver Creek
Calaveras County Water District	A019148	P15023	600 cfs	Jan 1 - Dec 31	Nov 1 - June 30	52,000	North Fork Stanislaus River
Calaveras County Water District	A019148	P15023	340 cfs	Jan 1 - Dec 31	Nov 1 - June 30	-	Highland Creek
Calaveras County Water District	A019149	P15024	-	-	Nov 1 - June 30	37,000	North Fork Stanislaus River
Calaveras County Water District	A019149	P15024	-	-	Nov 1 - June 30	12,700	Highland Creek
Calaveras County Water District	A019149	P15024	-	-	Nov 1 - June 30	350	North Fork Stanislaus River
U.S. Department of the Interior of Reclamation, Region 2 Bureau	A19303	P16599	-	-	Nov 1 - June 30	1,420,000	Stanislaus River
U.S. Department of the Interior of Reclamation, Region 2 Bureau	A19304	P16600	-	-	Nov 1 - June 30	1,420,000	Stanislaus River
Lake Alpine Water Company	A020312	L010840	0.75 cfs	Jan 1 - Dec 31	-	-	Unnamed Springs
Lake Alpine Water Company	A021485	L011007	0.05 cfs	Jan 1 - Dec 31	Oct 1 - June 1	240	Bear Creek
Oakdale Irrigation District & South San Joaquin Irrigation District	A026791	P19046	1800 cfs	Jan 1 - Dec 31	-	-	Stanislaus River
U.S. Department of the Interior of Reclamation, Region 2 Bureau	A27319	P20246	4000 cfs	Jan 1 - Dec 31	-	-	Stanislaus River
Stockton East Water District	A030603	-	750 cfs	Nov 1 - June 30	Nov 1 - June 30	155,000	Stanislaus River
Oakdale Irrigation District	A031502	P21188	170 cfs	Jan 1 - Dec 31	-	50,000	Middle Fork Stanislaus River

Note:

Highlighted records indicate water right claims Senior to State Filed Application 5648 and downstream of LAWC/County of Alpine Point of Diversion.

TABLE 3
Alpine County - Lake Alpine Water Company
Stanislaus River - Goodwin (SNS), Full Natural Flow
October 1901 Through June 2008⁽¹⁾

Month	OID/SSJID Pre-1914 Claim 1,816.6 cfs ⁽²⁾ (cfs)	Monthly Average ET _o , Oakdale, CA Station ⁽³⁾ (in)	Estimated Potential Irrigation Demand ⁽⁴⁾ (cfs)	Maximum Potential Impairment Caused by LAWC ⁽⁵⁾ (af)	Average Flow at SNS (cfs)	Potential Average Diversion (cfs)	Potential Average Volume Diverted (af)
October	1,816.6	3.37	779.9	NHC	168	168	10,350
November	ND	ND	ND	ND	424	424	25,246
December	ND	ND	ND	ND	807	807	49,605
January	ND	ND	ND	ND	1,376	1,376	84,629
February	ND	ND	ND	ND	1,777	1,777	98,710
March	1,816.6	3.43	793.8	4.4	2,286	794	48,806
April	1,816.6	5.24	1,212.6	1.3	3,419	1,213	72,155
May	1,816.6	6.70	1,550.5	3.6	4,746	1,550	95,335
June	1,816.6	7.40	1,712.5	13.9	3,189	1,712	101,899
July	1,816.6	7.85	1,816.6	NHC	965	965	59,314
August	1,816.6	6.75	1,562.0	ND	223	223	13,708
September	1,816.6	4.93	1,140.9	ND	117	117	6,946
Total				23.2			666,703
Mar-Oct				23.2			408,513

Maximum LAWC Impairment at Goodwin: 23.2/408,513 = 0.006%

Notes:

- ⁽¹⁾ As reported by DWR on CDEC website (http://cdec.water.ca.gov/cgi-progs/stationInfo?station_id=SNS), accessed June 2008.
- ⁽²⁾ Direct diversion right claimed by OID/SSJID and confirmed by 1929 Decree.
- ⁽³⁾ As reported by California Irrigation Management Information System (CIMIS) June 2008.
- ⁽⁴⁾ Monthly Irrigation Demand based on ratio of potential ET_o for a specific month, and July, multiplied by the maximum diversion of 1,816.6 cfs.
- ⁽⁵⁾ Potential impairment assumed to be maximum direct diversion rate 0.78 cfs; NHC: No Hydraulic Connection between P.O.D. and Goodwin; ND: Outside Diversion Season.

TABLE 4
Alpine County - Lake Alpine Water Company
Estimated Flow of North Fork Stanislaus River at S000998⁽¹⁾ Based on Flow in
Merced River at Pohono Bridge Near Yosemite, CA
Water Years 1917 Through 2007

Month	Average Flow at S998 (cfs)	Potential Average S998 Diversion (cfs)	S998 Diversion Potential Average Volume (acre-feet)
October	33	33	2,015
November	64	64	3,829
December	98	88	5,411
January	110	88	5,411
February	134	88	4,887
March	233	88	5,411
April	598	88	5,236
May	1,272	88	5,411
June	1,034	88	5,236
July	347	88	5,411
August	80	80	4,897
September	34	34	2,038
Total			55,194
Nov-Jul			46,244

Notes:

⁽¹⁾ Statement 998 filed by Utica Power Authority for claim of pre-1914 right at Utica Ditch (88 cfs by 1929 decree).

TABLE 5
Alpine County - Lake Alpine Water Company
Monthly Average Discharge at Selected Points of Interest
 (all values in acre-feet)

Point of Interest	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct-Jul Total	Annual Total
Reported - Goodwin Dam Watershed														
Stanislaus River - Goodwin (SNS), Full Natural Flow ⁽¹⁾	10,350	25,246	49,605	84,629	99,550	140,589	203,459	291,800	189,734	59,314	13,708	6,946	1,154,276	1,174,931
USGS 11294500 North Fork Stanislaus River Near Avery, CA	5,976	8,622	14,757	16,868	19,639	31,792	56,718	86,222	45,264	11,869	6,777	5,996	297,727	310,501
Synthesized														
S000998 Utica Power Authority POD at McKay's Point ⁽²⁾	2,015	3,829	6,015	6,786	7,513	14,336	35,605	78,184	61,507	21,317	4,897	2,038	237,109	244,045
S000998 Utica Power Authority POD at McKay's Point ⁽³⁾	2,591	4,925	7,736	8,727	9,662	18,437	45,790	100,549	79,102	27,415	6,298	2,621	304,937	313,856
Bloods Creek Above Confluence with Bear Creek ⁽⁴⁾	56	107	168	189	210	400	994	2,183	1,717	595	137	57	6,619	6,813
Bear Creek at Bear Lake Dam ⁽⁵⁾	15	28	44	49	55	104	258	567	446	155	36	15	1,720	1,771
Reported - Merced River														
USGS 11266500 Merced River at Pohono Bridge Near Yosemite, CA	3,750	7,127	11,196	12,630	13,983	26,682	66,267	145,513	114,475	39,674	9,114	3,793	441,298	454,205

Notes:

- ⁽¹⁾ As reported by DWR on CDEC website (http://cdec.water.ca.gov/cgi-progs/stationInfo?station_id=SNS), accessed June 2008.
- ⁽²⁾ Estimated based on a watershed area ratio with USGS 11266500 Merced River at Pohono Bridge Near Yosemite, CA.
- ⁽³⁾ Calculated based on a double mass relationship between NFSR Near Avery and Merced River (Figure 2).
- ⁽⁴⁾ Calculated based on a double mass relationship with USGS 11266500 Merced River at Pohono Bridge Near Yosemite, CA.
- ⁽⁵⁾ Estimated based on a watershed area ratio with calculated Bloods Creek flow above Bear Creek.

TABLE 6
Lake Alpine Water Company
Change in Evaporation between
New Melones and Old Melones Reservoirs

Water Year	Annual Evaporation (acre-feet)		
	New Melones	Old Melones	Difference
1980	14,626	11,155	3,471
1981	17,530	13,298	4,232
1982	38,352	12,054	26,299
1983	52,264	11,693	40,571
1984	59,429	13,636	45,793
1985	50,053	12,233	37,820
1986	55,576	12,480	43,095
1987	53,011	13,474	39,537
1988	44,509	13,610	30,899
1989	33,331	12,849	20,482
1990	25,936	12,789	13,147
1991	19,601	12,692	6,909
1992	13,921	11,735	2,186
1993	22,315	11,218	11,097
1994	25,514	12,264	13,250
1995	36,366	10,822	25,544
1996	54,909	12,369	42,540
1997	53,740	12,390	41,350
1998	44,708	9,785	34,923
1999	47,954	11,026	36,928
2000	50,479	11,810	38,669
2001	48,288	12,038	36,250
2002	43,813	12,062	31,751
2003	40,417	11,537	28,881
2004	44,176	13,088	31,088
2005	44,364	10,809	33,555
2006	52,506	11,325	41,181
2007	47,024	11,653	35,371
2008*	21,380	5,971	15,409
1980-2007 Total	1,134,714	337,894	796,820
1980-2007 Average	40,526	12,068	28,458
Requested Lake Alpine Diversions	395	395	395
Percent of Evaporative Losses	0.97%	3.27%	1.39%

Notes:

Record runs through June 15, 2008.

FIGURE 11
Alpine County - Lake Alpine Water Company
Annual Evaporation from Old Melones & New Melones Compared to Requested Bear Creek Diversions
Water Years 1980 Through 2007

