

**DEPARTMENT OF WATER RESOURCES**

1416 NINTH STREET, P.O. BOX 942836  
SACRAMENTO, CA 94236-0001  
(916) 653-5791



March 26, 2003

Dr. Peter H. Gleick  
Pacific Institute  
654 13<sup>th</sup> Street, Suite 104  
Oakland, California 94612

Dear Dr. Gleick:

This is in response to your comments of August 29, 2002 to Mr. Steve Macaulay, Chief Deputy Director of the Department of Water Resources, on the Draft State Water Project Delivery Reliability Report.

Time has been taken to develop additional technical information to respond to your, and other's, concern that the level of delivery reliability projected by the draft report is questionable because it is much greater than the historical deliveries of the State Water Project. You state this situation calls into question the validity of the results and, because no comparison of the model results with historical values is presented in the draft report, it is impossible for the reader to determine the credibility of the results.

In the draft report, DWR committed to an evaluation of the adequacy of using CALSIM II for estimating SWP delivery ability. This effort is underway and consists of a simulation of a recent drought period, a simulation of a longer historic period, a sensitivity analysis of the key parameters of CALSIM II and a peer review conducted by the CALFED Science Program. Attachment 1 contains the analysis comparing CALSIM II results with actual SWP deliveries for the most recent drought period (1987-1992). The entire evaluation is expected to be completed within a year.

The 1987-1992 comparison illustrates two things. First, the CALSIM II study contained in the report estimates average deliveries during this period to be significantly lower than the corresponding historic average. This difference is primarily due to stricter Delta water quality standards. Delta protection standards currently in place, per the State Water Resources Control Board's Decision 1641, are more restrictive to operations and reduce the allowable amount of SWP export when compared to those in place during the drought. Secondly, the study shows, once the previous standards (SWRCB Decision 1485) are used by CALSIM II to simulate the system and the results are adjusted for differences between the actual and modeled values for storage at the beginning and end of the period, the average water deliveries estimated by CALSIM II are very close to the actual historic amounts (50 taf/yr lower).

Dr. Peter H. Gleick  
March 26, 2003  
Page 2

This is an important conclusion that should help improve general confidence in using CALSIM II as an analytical tool. It does not, however, address the accuracy of the results for other hydrologic periods. This task is being done under the simulation of the longer historic period.

DWR plans to finalize the SWP Delivery Reliability Report in the near future. We recognize that this is an ongoing process and plan to revise the report frequently. We commit to involving the public in the discussions and analyses regarding the sufficiency of CALSIM II. Your letter, as well as all others, commenting on the draft report and the corresponding responses will be included in an appendix to the final report. In addition, they are posted on the State Water Project Delivery Reliability Report website (<http://swpdelivery.water.ca.gov>).

Thank you for your comments. If you wish to discuss this further, please call me at (916) 653-1099. For technical information, please contact Francis Chung, Chief of DWR's Modeling Support Branch, at (916) 653-5924.

Sincerely,

*Katherine F. Kelly*

Katherine F. Kelly, Chief  
Bay-Delta Office

Attachments

## Comparison of Historical and CALSIM II Deliveries for 1987-1992

As explained on page 6 of the draft report, past deliveries cannot accurately predict future deliveries. There have been continual, significant changes in the factors that determine State Water Project water delivery, including water demand. SWP Water contractors' requests for water have increased in recent years and 2001 is the first year that requests exceeded 4.0 million acre-feet per year (as shown in the attached Figure 1).

The 2001 model study used for the draft report assumes that current water-use conditions, including water demands, exist for each year analyzed in the 73-year model study. Since the 2001 model study includes water demands that are significantly higher than historical levels, modeled water deliveries often exceed historical deliveries. One exception to this would be during dry periods because supply, not demand, determines the amount of water delivery.

Historical values for SWP Table A deliveries from the Delta have been compared to the Table A delivery values of the 2001 model study for the dry period of 1987 through 1992 to assess how well CALSIM II simulates supply-limited conditions for a recent period. This comparison requires three adjustments to be made for the results to be comparable. One adjustment is made to the historical delivery data and two are made to the conditions assumed for CALSIM II.

The historical delivery data are adjusted to be comparable to the model results as follows. Historically, a portion of the annual water allocation is carried over in SWP storage facilities and delivered in the following year. The CALSIM II model does not currently have criteria and procedures to allow carryover of allocated water from one year to the next. To make the historical data comparable to model data, the historical Table A delivery data was adjusted to show all the "carryover water" being delivered in the year of allocation rather than the following year. The adjusted historical and 2001 model study deliveries for the 1987 through 1992 dry period are compared in Figure 2.

The modeled average delivery for this period is 1,670 taf/yr compared to the historical average of 2,030 taf/yr in CALSIM II format.

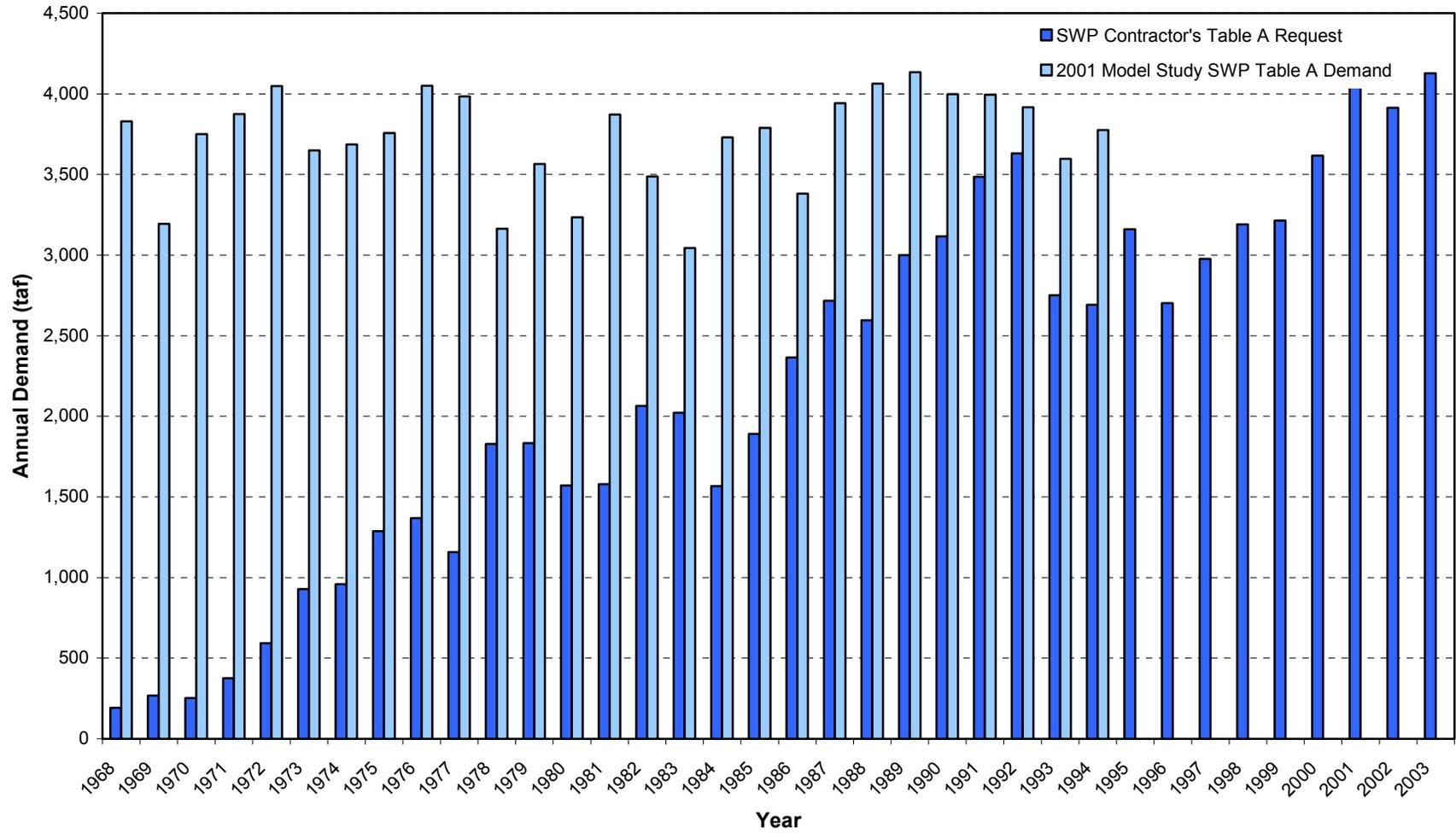
The two adjustments made to CALSIM II are 1) changing the regulatory requirements for Delta operation to match the ones in place during 1987-92, and 2) adjusting the reservoir storages at the beginning of the period to match those that actually existed at that time.

The 2001 model study in the draft report includes regulatory constraints that were not applicable to the 1987-1992 period (State Water Resources Control Board Decision 1641). For comparison purposes, a special 2001 model study was completed with the regulations that were in effect at that time (Decision 1485). As shown in Figure 3, this study produces higher SWP deliveries than the original study with the D-1641

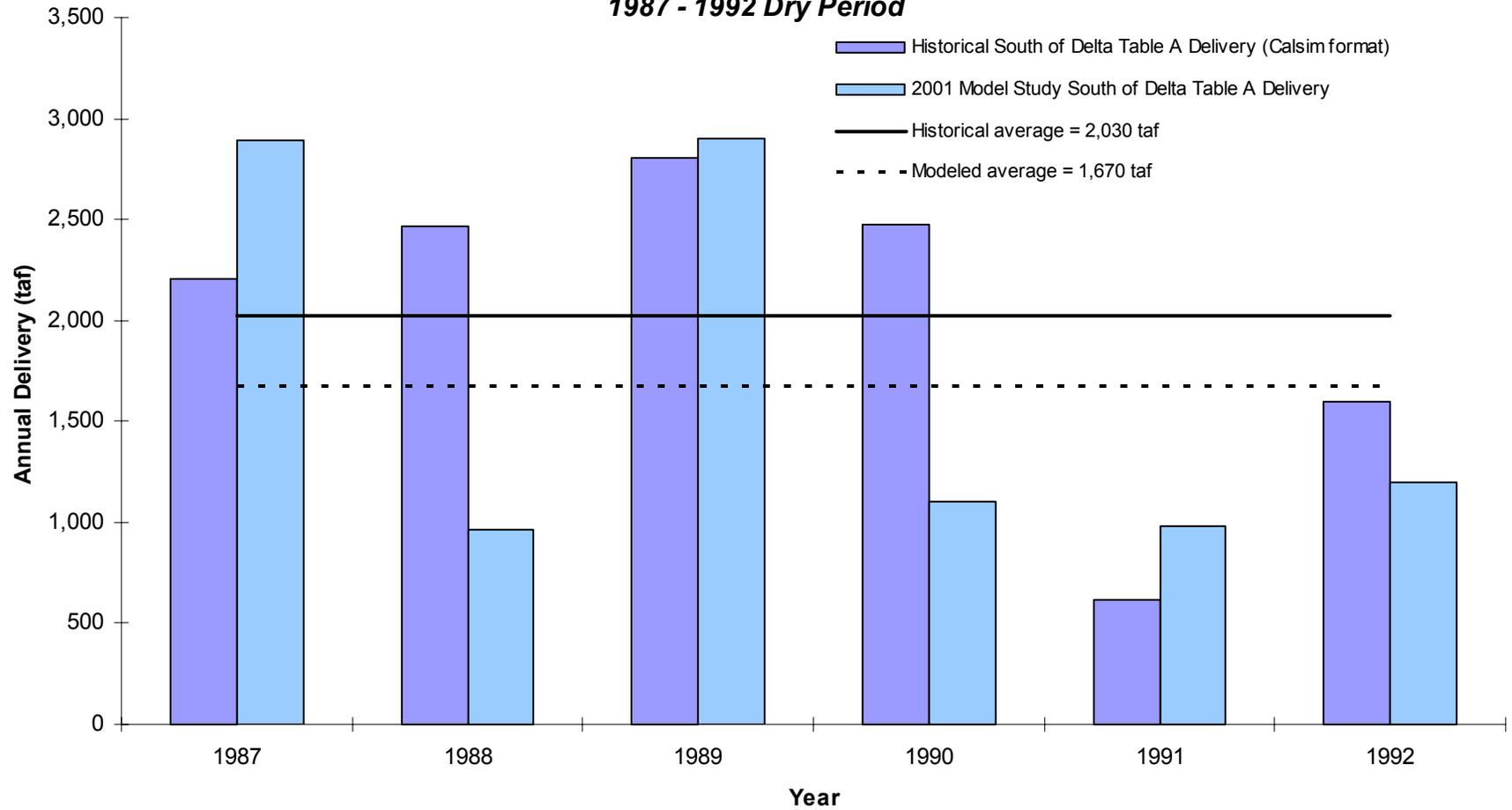
constraints. The study's modeled average delivery for this period is 1,910 taf/yr, compared to the average of 1,670 taf/yr for the original study. A comparison of the revised study results with the historical deliveries is shown as Figure 3.

Modeled SWP demand for 1986, a wet year just before the dry period, is 3,345 taf compared to the historical request of 2,364 taf. As a result of this higher model demand, modeled SWP storage at the beginning of the dry period is approximately 420 taf lower than the historical SWP storage. The modeled storage at the end of the dry period is essentially the same as the historical value. There is, therefore, an additional 420 taf of supply that would have been delivered in the model and the CALSIM delivery amounts during the dry period should be adjusted accordingly. To adjust for the 420 taf difference in storage, 70 taf was added to the modeled delivery for each of the six years in the dry period. This adjustment raises the average model delivery for the dry period to 1,980 taf/yr, 50 taf/yr lower than the historical average of 2030 taf/yr (Figure 4).

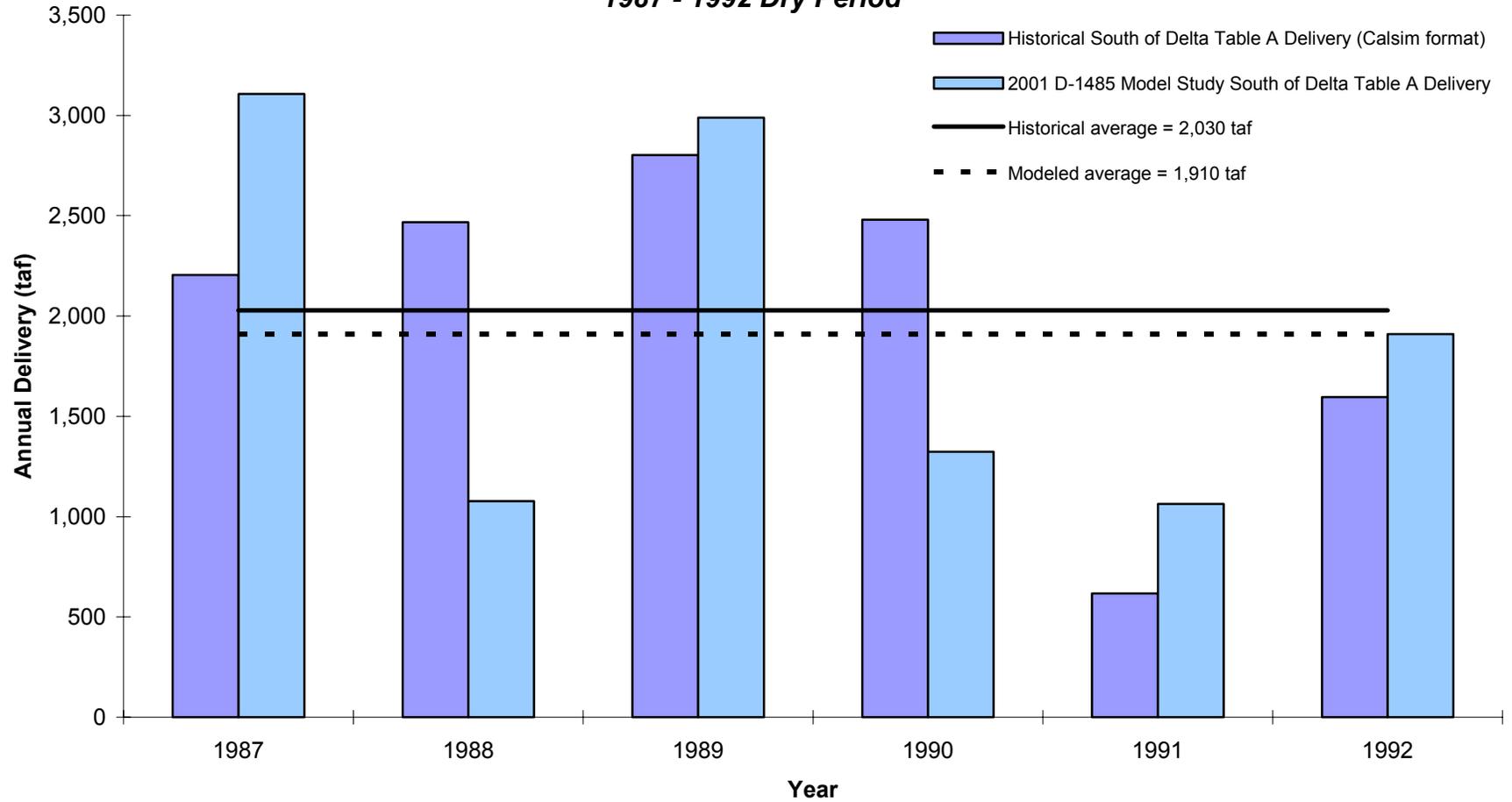
**Figure 1**  
**SWP Contractor's Table A Request versus 2001 Model Study SWP Table A Demand**



**Figure 2**  
**Historical SWP Table A Delivery versus 2001 Model Study SWP Table A Delivery**  
**1987 - 1992 Dry Period**



**Figure 3**  
**Historical SWP Table A Delivery versus 2001 D-1485 Model Study SWP Table A Delivery**  
**1987 - 1992 Dry Period**



**Figure 4**  
**Historical SWP Table A Delivery v. Adjusted 2001 D-1485 Model Study SWP Table A Delivery**  
**1987 - 1992 Dry Period**

