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EVALUATION OF AVAILABLE CAPACITY IN THE CALIFORNIA AQUEDUCT FROM REACH 10A TO REACH 30

Prepared for:

NEWHALL LAND

NEWHALL LAND AND FARMING COMPANY

NOVEMBER 23, 2002

Prepared by:

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PROVOST & PRITCHARD INC
ENGINEERING GROUP

FRESNO • BAKERSFIELD

EVALUATION OF AVAILABLE CAPACITY IN THE CALIFORNIA AQUEDUCT FROM REACH 10A TO REACH 30

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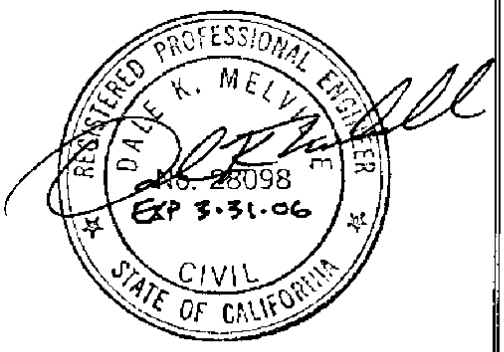
NEWHALL LAND

NEWHALL LAND AND FARMING COMPANY
23823 Valencia Boulevard
Valencia, California 91355-2194

NOVEMBER 23, 2002

Prepared by:



PROVOST & PRITCHARD ENGINEERING GROUP, INC.
286 W. Cromwell Avenue
Fresno, California 93711-6162

Table of Contents

Introduction

Background

The Newhall Land and Farming Company ("NLF") has proposed development of the Newhall Ranch Specific Plan in the Santa Clarita Valley. Water requirements for the development at build-out have been projected at 17,680 acre-feet per year ("af/y") in an average year. The demand will be met with 9,035 af/y of non-potable (recycled) water and 8,645 af/y of potable supplies. The 8,645 af/y potable supply will be derived in part from 7,038 af/y in agricultural water use on NLF lands being converted to urban use for the Newhall Ranch development. The remaining 1,607 af/y is firm SWP water secured by NLF through a contract with the Nickel Family LLC in Kern County; this water is 100% reliable and is not subject to reduction in dry-year conditions[1]. The Nickel Family water is delivered through the Kern County Water Agency's ("KCWA") water supply contract with the California Department of Water Resources ("DWR"). In addition to the supplies mentioned above, NLF is acquiring 7,648 af/y of SWP entitlement water from Berrenda Mesa Water District ("BMWD"), a member unit of KCWA.

As noted above, water for the development has been acquired by NLF, either directly or through the regional water wholesaler, Castaic Lake Water Agency ("CLWA")) from State Water Project ("SWP") contractor supplies, and other sources. Conveyance of all but 1,607 af/y of this demand will be accomplished via existing capacity paid for by, and otherwise available to CLWA. Questions have been raised as to whether sufficient capacity is available within the main stem and West branch of the California Aqueduct and associated facilities ("Aqueduct") to convey the remaining 1,607 af/y from Kern County to CLWA.

Purpose

The purpose of this report is to evaluate the ability of existing SWP facilities to convey the remaining 1,607 af/y from areas in Kern County (Aqueduct Reach 10A) to Castaic Lake (Aqueduct Reach 30 on West Branch) through the year 2035. In perspective, 1,607 af/y equates to 8.8 cfs flowing for 3 months per year (or 2.2 cfs flowing throughout the year) in an Aqueduct conveyance system with an operational capacity of 1,680-6,350 cfs and a storage capacity of 540,520 af[2] between these two reaches.

Executive Summary

Sufficient capacity in the California Aqueduct is available through 2035 to convey an additional 1,607 af/y of water from Kern County (Reach 10A) to Castaic Lake (Reach 30). Although a theoretical situation exists in which that capacity could be temporarily unavailable, that situation is very unlikely to occur. Further, that situation would occur only in an extremely wet year in which all SWP contractors received and requested delivery of

[1] Newhall Ranch Specific Plan and Water Reclamation Plant, Additional Analysis.
[2] Combined storage of Quail Lake, Pyramid Lake, Elderberry Forebay, Castaic Lake, and Castaic Lake Lagoon (Ref: DWR Data Handbook).

100% of their SWP water allocations to locations south of the Tehachapi Mountains. In such a year, CLWA would have an abundance of water from CLWA's existing SWP supplies (including the 41,000 af/y SWP entitlement recently acquired by CLWA and 7,648 af/y being acquired by NLF from BMWD) and the water needs of the NLF development could be met using CLWA and/or BMWD water, eliminating the need for the 1,607 af/y that could theoretically be temporarily displaced from the California Aqueduct.

Furthermore, approximately 53,000 af/y in supplemental SWP conveyance capacity is conservatively estimated to be available in the California Aqueduct and the West Branch from unused from other SWP West Branch contractors and Aqueduct design features that provide operational flexibility and other unscheduled contingencies. Additional conveyance capacity is likely, as in years with 100% SWP entitlement allocations, significant quantities of SWP water from SWP contractors south of the Tehachapi Mountains would be expected to be delivered to areas north of the Tehachapi Mountains to groundwater banking programs and/or sales through the SWP Turnback Pool Program.

Report Organization

This report is comprised of text discussion and corresponding tables and figures. All tables and figures are grouped together following the text sections; an exception is the summary (Table 11) presented in the Conclusions section.

Approach to Evaluating the Availability of Future Aqueduct Capacity

Background

The California Aqueduct was designed and built to accommodate full deliveries to SWP contractors; 100% SWP entitlement allocations is 4,125,031 af/y. When less than 100% of SWP deliveries are available, additional capacity exists in the Aqueduct to deliver water south to SWP contractors. Conveyance of 1,607 af/y requires only 0.04% of the SWP total annual entitlement, or 0.06% of the 2,580,200 af/y SWP entitlement to contractors south of the Tehachapi Mountains.

In August 2002, DWR released the draft report titled "The State Water Project Delivery Reliability Report". The DWR reliability report relies on recent operations modeling by DWR and the US Bureau of Reclamation ("USBR") using the CALSIM II program developed for diversions from the San Francisco-Bay Delta to the SWP and Central Valley Project ("CVP"). Operational scenarios were modeled for the SWP for conditions for the years 2001 and 2021. Two scenarios for 2021 were developed; 2021A assumed contractor demands would vary with weather conditions and 2021B assumed contractor fixed demands of 4.13 million af/y ("maf/y"). Based on various repetitive wet years (single wet year to the wettest

10-year historical period), SWP deliveries are projected to vary from 82-87% under scenario 2021A and from 87-100% under scenario 2021B.[3]

The CALSIM II model utilized the 1922-1994 hydrologic conditions, and found that SWP allocations of less than 100%[4] occurred in 60 of the 73 years studied under scenario 2021A (variable demands) and 54 of the 73 years studied under scenario 2021B (fixed demands). Should the environmental restrictions on SWP deliveries experienced in the past decade continue to increase, the number of years with full SWP allocations will decrease even further through and beyond 2021.

The above results reported by DWR have been confirmed by other studies by respected SWP modeling consultants, Surface Water Resources, Inc. ("SWRI"), which indicate lower SWP delivery allocations.[5] For ultimate SWP demands, allocations would be less than 100% in 63 of the 72 years (1922-1993) with variable demands, and 46 of the 72 years with fixed SWP demands.

Thus, considering the results of the CALSIM II and SWRI studies, and assuming that SWP deliveries in 2035 would be lower than current or project 2021 deliveries, the number of years in which more than 99.94% of SWP allocations would be available to contractors will be small.

In years when SWP water supplies approach 100%, several urban SWP contractors south of the Tehachapi Mountains have, historically not requested delivery of all their SWP allocation to their service areas, making additional capacity available in the Aqueduct south of Kern County. That trend can be expected to continue. Reasons for the decreased service area demand in these years include the following:

- Delivery of SWP supply to groundwater banking programs in the San Joaquin Valley. The Metropolitan Water District of Southern California ("MWDSC") is a participant in established groundwater banking programs in the Semitropic Water Storage District ("WSD") and the Arvin-Edison WSD, and is developing a groundwater banking program with the Kern-Delta Water District ("WD"). In addition, MWDSC (and other SWP contractors south of the Tehachapi Mountains) have indicated that they intend to explore other banking programs in the San Joaquin Valley. In years in which SWP allocations approach 100%, SWP water is diverted to these banking programs for recovery in drier years. That water therefore does not consume Aqueduct capacity.
- Prior sale of portions of their SWP supply into DWR's "Turnback Pool Program". The Turnback Pool Program offers SWP contractors an opportunity to market their SWP allocation rather than take delivery of it. This option has been particularly attractive

[3] Refer to Appendix Table A (excerpt from Table 5, The State Water Project Delivery Reliability Report).
[4] As modeling produces allocations to the nearest percent, and historically DWR has generally rounded delivery allocations to the closest 5%, 97% or greater has been considered a 100% allocation for the data presented in this section.
[5] Refer to Appendix Table B.

to SWP contractors south of the Tehachapi Mountains in years of higher SWP allocations. The majority of the water sold into the Turnback Pool Program has been historically delivered to agricultural SWP contractors north of the Tehachapi Mountains; southern California SWP contractors that have sold water into the Turnback Pool Program the past three years (2000-2002) include Antelope Valley-East Kern Water Agency ("WA"), Castaic Lake WA, Crestline-Lake Arrowhead WA, Mojave WA, San Bernardino Valley Municipal Water District ("MWD"), San Gabriel Valley MWD, San Gorgonio Pass WA, and Ventura County Flood Control District ("FCD"). (See Appendix Table C, Turn-back Water Pool Program Results for 2000, 2001 & 2002). It should be noted that Ventura County FCD[6], which uses the same Aqueduct reaches as CLWA, has sold 3,000 to 9,002 af into the Turnback Pool Program in each of the last three years; SWP allocations for those three years ranged from 39 to 90% of entitlement.

- Of the three entities that contract for SWP water through Ventura County FCD, the City of Ventura and Casitas MWD have never taken delivery of any of their combined 15,000 af SWP entitlement; their plans to construct a pipeline from Castaic Lake to the City of Ventura were defeated by the voters, and the pipeline was never constructed. United Water Conservation District has delivered a portion of its SWP water via Pyramid Lake and Piru Creek or exchanges[7] between MWDSC and its member units.
- Requested needs are less than 100% entitlement. Some southern California urban contractors have historically delivered less than their SWP entitlement and have not participated in sales to the Turnback Pool Program (e.g., MWDSC and Littlerock Creek Irrigation District ("ID")).

Therefore, in those years when the SWP makes 100% allocations available to its contractors, a portion of those allocations will almost certainly be refused, sold to the Turnback Pool Program, or delivered to San Joaquin Valley groundwater banking programs, creating capacity to wheel at least 1,607 af from Kern County to Castaic Lake.

Study Approach

Because not all SWP contractors have available monthly water demand projections through the year 2035, we have evaluated four separate components to quantify future available capacity in the California Aqueduct. The findings for each of these components are additive, and are based on information available from published documents. A conservative approach has been taken, meaning that the demand assumptions are generally at the higher end of the range, yielding a lower excess capacity in the Aqueduct than could

[6] Ventura County FCD has contracted for 20,000 af/y SWP entitlement on behalf of Casitas MWD (5,000 af/y), City of Ventura (10,000 af/y), and United Water Conservation District (5,000 af/y).

[7] In 1990 and 1991, United WCD delivered SWP entitlement via Pyramid Lake and Piru Creek; these were the only Ventura SWP deliveries until 1997. Beginning in 1997 an exchange of 1,850 af/y has occurred on behalf of United WCD with MWDSC taking Port Hueneme WA's (a United WCD sub-entity) entitlement via the West Branch and Calleguas MWD releasing a like quantity of water to Port Hueneme WA through local facilities. (Communications with Dana Wisehart, United WCD).

otherwise be the case. The four components used to quantify future available capacity in the California Aqueduct are:

Component #1: The projected available capacity within CLWA's existing contractual capacity.

Component #2: The projected available capacity within MWDSC's existing contractual capacity.

Component #3: The projected or historical use of southern California (south of the Tehachapi Mountains) SWP contractors other than CLWA and MWDSC compared to their existing contractual capacity.

Component #4: The supplemental capacity of the California Aqueduct designed to provide a degree of operational flexibility and safety from operational losses and other unscheduled contingencies.

A discussion of existing Aqueduct capacity, historical and projected deliveries, and available future Aqueduct capacity, relative to each of the four components, is presented below.

Existing Aqueduct Capacity

Background

Figures 1, 2, and 3, respectively, illustrate:

- The locations of the SWP contractors, including the Kern County Water Agency and the CLWA (Figure 1),
- The locations of the primary SWP facilities (Figure 2); specific reference in this report will be made to the facilities downstream (south) of the Coastal Branch through the terminus of the West Branch at Castaic Lake, and
- A detailed drawing of the facilities and reaches (e.g., R17F) in the California Aqueduct downstream from the southern portion of Kern County (Figure 3).

Table 1 provides a listing of the capacities of the pertinent features of the California Aqueduct (Aqueduct) from the upper section of Reach 10A (in Kern County) on the main stem of the Aqueduct to Reach 30 (at Castaic Lake) on the West Branch.

Component #1: Castaic Lake Water Agency

In March 1999, CLWA and DWR executed Amendment No. 18 to their Water Supply Contract for an additional 41,000 af of SWP entitlement, purchased from the Kern County

Water Agency ("KCWA")[8]. Exhibit A of said amendment provides the capacity in the California Aqueduct available to CLWA from the Delta to Castaic Lake. The value varies, due to capacity acquired by CLWA through entitlement purchases from Devil's Den Water District (20 cfs through Reach 8D associated with 12,700 af of entitlement) and KCWA (25-122 cfs through Reach 16A associated with 41,000 af of entitlement). As shown, the minimum flow rate available to CLWA is 132 cfs; 150 cfs is available to CLWA for instantaneous peaking from Castaic Lake.

Component #2: The Metropolitan Water District of Southern California

In addition to the Aqueduct capacity allocated to MWDSC to convey its entire 2,011,500 af of entitlement water (3,143 cfs of Aqueduct capacity), MWDSC purchased an additional 188 cfs of capacity from Kettleman City (Reach 8D) through the bifurcation of the East and West Branches (Reach 17F). MWDSC's intent in acquiring the additional capacity was to provide additional peaking capacity for emergency situations; currently, MWDSC has no plans to utilize this additional capacity in on-going operations. For all practical purposes, this alone eliminates any perceived capacity limitations from Kern County to the bifurcation, thus focusing the capacity issue for delivery of the 1,607 af/y (equivalent to 2.2 cfs throughout the year) for NLF within the West Branch.

Within the West Branch, two portions of the West Branch either operate or were constructed at less than the planned full capacity (refer to Table 1). The Quail Lake Canal has a capacity of 1,962 cfs. The Peace Valley Pipeline and Warne Power Plant are limited to 1,680 cfs, although an additional 900 cfs can be delivered (subject to repairs scheduled to be completed in 2003) through an emergency bypass (Gorman Creek Improvement Channel) to increase the capacity through this later reach.[9]

Even with these restrictions in the West Branch (refer to "Comments" column in Table 1) and ignoring use of the emergency bypass channel, additional conveyance capacity is available in the West Branch. The most restrictive capacity of 1,680 cfs exceeds the combined capacities for MWDSC (1,400 cfs)[10], CLWA (132 cfs)[11], and Ventura County FCD (37 cfs)[12], which total 1,569 cfs.

Component #3: Other Southern California SWP Contractors

In addition to CLWA and MWDSC, Ventura County FCD (Ventura) is the only other West Branch SWP contractor. As presented in the "Background" portion of the previous section, the two water entities representing 15,000 af/y of Ventura's 20,000 af/y SWP entitlement have never taken delivery of SWP water, nor are there any pending plans to do so.

[8] Refer to Table D (Amendment No. 18 to the DWR/CLWA Water Supply Contract).
[9] DWR, Operations Records and Reports Section (Guy Maiser).
[10] Demands on the West Branch (ref: MWDSC's Integrated Water Resources Plan).
[11] Refer to Appendix Table D.
[12] Ventura County FCD's peak delivery capacity (ref: DWR, State Water Project Analysis Office (Dave Knock)).

Excepting Ventura's entitlement contracted for United WCD (5,000 af/y), the balance of Ventura's water has historically not been requested or has been offered to other SWP contractors through the Turnback Pool Program.

Component #4: Design Criteria for the California Aqueduct

As noted above, Table 1 provides a listing of the capacities of the pertinent features of the California Aqueduct (Aqueduct) from the upper section of Reach 10A (in Kern County) to Reach 30 (at Castaic Lake). Specific design criteria and operational contingencies originally planned in the Aqueduct delivery system are addressed in the following section.

Historical and Projected Demands

Component #1: Castaic Lake Water Agency

Projections for CLWA's future water demand and available capacities were based on the following assumptions and procedures:

To estimate the monthly demand curve for CLWA, the monthly distribution of SWP supplies for 2000 was used. In 2000, 90% of contract entitlement was available, thus representing the most recent year when nearly full SWP supplies were available to SWP urban contractors (i.e., water delivery patterns in 2000 reflect demand similar to a 100% SWP delivery allocation). CLWA Year 2000 SWP demand distribution is depicted in Figure 4.

CLWA's Urban Water Management Plan (December 2000) provided data regarding total water usage for 1999, and estimated total projected water usage for the years 2005, 2010, 2015, and 2020. For this evaluation, the intermediate years were interpolated linearly; future total water usage between 2020 and 2035 was estimated by extending the annual increase for the years 2015 through 2020 to the years between 2020 and 2035. The projected annual water usage was then distributed on a monthly demand distribution in accordance with Figure 4. The resulting projected water usage and monthly distribution are depicted in Table 2, CLWA Demand Projections.

To evaluate the highest possible demand on the SWP system by CLWA, it was assumed that CLWA would use its SWP entitlement first (before any local supplies) and that the full contract entitlement of 95,200 af/y was available via the DWR allocation process.

A monthly cap, equivalent to CLWA's SWP contractual Aqueduct delivery capacity, as identified in Amendment No. 18 to CLWA's contract with DWR (Appendix Table D), was used to "trim" the monthly demands produced in Table 2. CLWA's contractual capacity of 132 cfs equates to a monthly capacity of 7,853 af/month in SWP demand to be delivered to CLWA. The totals of the adjusted monthly quantities were then compared to the total contract entitlement. The adjusted monthly quantities and the demand quantities in excess of the SWP contract quantities are depicted in Table 3.

Table 4 depicts the difference between CLWA's total demand projections and the monthly quantities capped by the 7,853 af per month constraint. This total is then added to the annual demand quantity in excess of the SWP contract entitlement quantity. By examining the unmet demand, it can be seen that the largest deficit is approximately 44,000 af/y by the year 2035. This deficit is projected to be met in part by up to 17,000 af/y in recycled water[13] , and in part by groundwater pumping or exchanges from future groundwater banking programs south of the Tehachapi Mountains[14]. The remaining demand in 2035 is about 27,000 af/y. This is less than the range of 37,500 af/y to 55,000 af/y anticipated to be supplied by local groundwater in average/normal years[15]. This would appear to be a reasonable projected quantity available through groundwater pumping in a 100% SWP year, based on a 13,900-19,400 af/y difference in CLWA's SWP supply between a 100% SWP delivery (92,500 af/y) and an average/normal SWP supply of 73,100-78,600 af/y[16].

Component #2: The Metropolitan Water District of Southern California

With the construction of Diamond Valley Reservoir, the middle reach of MWDSC's Foothill Feeder (MWDSC outlet from Castaic Lake) and the SWP's Peace Valley pipeline expansion are not currently planned to be constructed to convey West Branch deliveries to MWDSC's service area[17]. Thus, greater demands have been placed on the East Branch and the need to enlarge the East Branch. Accordingly, with less use of the West Branch by MWDSC, a greater portion of MWDSC's 1,400 cfs capacity in the West Branch is projected to be available.

As part of its 1996 Integrated Water Resources Plan, MWDSC developed water demand projections for the years 2002 though 2020. These projections provided the basis for estimating the availability of conveyance capacity within MWDSC's West Branch capacity. MWDSC estimated projected demands on the West Branch of the SWP system under two scenarios. The first scenario assumed that the East Branch of the SWP system was not enlarged. By assuming that the East Branch is not enlarged, greater demands are exerted on the West Branch. The second scenario assumed that enlargement projects on the East Branch take place in the years 2015 and 2017. Demand projections were based on average monthly flowrates calculated over a 77-year hydrologic period. In essence, 77 schedules were developed for each month between 2002 and 2020. Currently, the DWR is preparing a pre-feasibility study for the East Branch Enlargement; upon completion, the study will be reviewed by affected SWP contractors and a decision to proceed with the enlargement and/or other alternatives will be considered by MWDSC and others.

MWDSC's West Branch flow profile study evaluated the projections by comparing the flow capacity in the West Branch available to MWDSC with the median flow and 95th percentile for the 77 years of data for each month. The median flow depicts the flow quantity whereby

[13] CLWA's Urban Water Management Plan.
[14] Discussion with CLWA (Mary Lou Cotton).
[15] CLWA's Urban Water Management Plan.
[16] Refer to Appendix Tables A and B; average SWP supply of 79-85% equates to a 73,100-78,600 af/y SWP supply for CLWA.
[17] Discussion with MWDSC (Dirk Marks)

50 percent of the data runs are less than this quantity and 50 percent are greater than this quantity. The 95th percentile flow depicts the flow quantity where 95 percent of the 77 years of flow estimates are less than this value. These projected flow profiles (without and with the East Branch Enlargement) are depicted in Figure 5 and Figure 6, respectively. The median and 95th percentile flows were then used to estimate how much capacity would be available within MWDSC's 1,400 cfs capacity limit. As shown in Figures 5 and 6, more capacity is needed by MWDSC in the West Branch when the East Branch is not enlarged. Thus, for purposes of this report, the No East Branch Enlargement is considered the worst case for the availability of excess capacity in the West Branch. Table 5 depicts the summary of the numerical projections made by MWDSC (and graphically displayed in Figure 5) for the No East Branch Enlargement scenario. Assumptions used by MWDSC in the West Branch flow profile study were[18]:

- Full use of the Monterey Amendment deliveries from DWR terminal reservoirs
- Transfers on the SWP available to MWDSC on the East Branch
- Colorado River Aqueduct deliveries based on Seven States Proposal augmented with yield from Colorado-based storage and banking programs
- SWP entitlement based on maintenance of the Bay-Delta Accord with current facilities
- MWDSC blend objective of 35% SWP at blended treatment facilities on year-round basis
- Inland Feeder online in 2007 (current projection is completion in 2005)
- San Diego Pipe 6 online in 2008
- Implementation of treatment protocols that satisfy impending disinfection by-product rules and allow for unrestricted use of SWP
- Demand projections from MWDSC September 2001 long-range sales forecast.

MWDSC's demand projections were then extrapolated from 2020 to 2035. The extrapolation was based on the average percent increase over the ten years from 2011 through 2020 and applied to 2020 and subsequent years. The worst-case scenario (No East Branch Enlargement) assumed an average 3.80 percent per year increase in MWDSC's demand. The extrapolated increase in demand used for the West Branch is greater than the 2.30 percent per year total water demand increase anticipated in MWDSC noted in the "Report on Metropolitan's Water Supplies" (February 2002). Table 6 summarizes the projections made for 2021 through 2035 for the No East Branch Enlargement scenario. This table also includes the analysis of how much capacity would be available in the West Branch on a monthly basis.

Component #3: Other Southern California SWP Contractors

Data representing the historical demands on the California Aqueduct by other southern California SWP contractors (in addition to MWDSC and CLWA) is available from DWR Bulletin 132-01, Appendix B. These contractors consist of the Antelope Valley - East Kern WA, Coachella Valley WD, Crestline - Lake Arrowhead WA, Desert WA, Littlerock Creek

[18] Information provided by MWDSC (Ray Urbach)

ID, Mojave WA, Palmdale WA, San Bernardino Valley MWD, San Gabriel Valley MWD, San Gorgonio Pass WA, and Ventura County FCD. Table 7 presents a summary of the entitlement and historical maximum demands from each of these SWP contractors.

Each of these southern California SWP contractors were contacted and asked to provide their entitlement demands for the year 2035. Five contractors responded, each indicating a projected need for all of their contracted entitlement. The contractors that did not respond were those that have historically not delivered their full SWP entitlement. Several items should be noted from Table 7:

- Only two contractors (Coachella Valley WD and Desert WA, which are typically buyers from the Turnback Pool Program) have ever delivered their maximum entitlement,
- Even with Coachella Valley WD and Desert WA delivering a combined 127,131 af above their entitlement, total deliveries to these eleven contractors is approximately 108,000 af, (23%) less than their combined entitlement of 473,500 af, and
- The maximum historical deliveries shown do not occur in the same year; in fact, only one year (1990) is in common for two relatively smaller contractors.

Table 8 presents the deliveries to these eleven SWP contractors for the most recent 10-year period. Antelope Valley - East Kern WA, Coachella Valley WD, Desert WA, Palmdale WA, San Bernardino Valley MWD, and Ventura County FCD have shown trends of increasing SWP deliveries; San Gorgonio Pass WA completed construction of facilities this month to allow them to initiate SWP deliveries. The remaining four contractors have not shown a trend of increasing SWP deliveries, and a fifth contractor (Ventura County FCD) appears unlikely to be taking delivery of any of the 15,000 af/y portion of the entitlement contracted on behalf of Casitas MWD and the City of Ventura.

Component #4: Design Criteria for the California Aqueduct

As with most capital facilities, a level of contingency was designed into the capacity of the California Aqueduct. Bulletin 200, Volume II, refers to three specific areas where capacity of the Aqueduct was oversized to provide additional operational flexibility and contingency. Specifically:

- An additional three percent (3%) capacity for operational losses was designed within the project system,
- South of the San Joaquin Valley, additional capacity was designed into the system in an amount equivalent to "the larger of (1) the maximum reach capacity required to permit downstream deliveries on demand in conjunction with regulatory storage, or (2) the capacity required to convey downstream water on a continuous basis plus 7½%. This allowed reserve capacity during years of maximum demand to replace a month's outage within about four weeks", and
- All conveyance facilities were sized with a contingency factor of 5% to account for actual changes in roughness coefficients due to aquatic growth, sediment, or surface deterioration.

With respect to the additional capacity provided for operational losses, DWR continues to use 3% to reflect overall losses in the SWP system; specific losses by reach and reservoir vary both in location and time.

With respect to the additional reserve capacity, item (1) would provide most SWP contractors south of the Tehachapi Mountains a peak monthly flowrate equivalent to 11% of their entitlement. Item (2) would provide a peak monthly flowrate equivalent to 8.33% (continuous flow) plus 7½%, or 8.95%. DWR's criteria provides for 11% monthly peaking at the contractors' turnouts, with 8.95% of entitlement being available throughout the upstream Aqueduct reaches.

With respect to the 5% contingency capacity, although discussed with DWR operational staff[19], no analysis has been undertaken to quantify the contingency factor related to the current roughness coefficients in the Aqueduct. This value is expected to vary, based on time, sediment conditions in the Aqueduct, and construction modifications that result in raising, repairing, and replacing portions of the Aqueduct lining.

Additionally, as noted for Component #2 in the previous section (Existing Aqueduct Capacity), prior to construction of the Aqueduct, MWDSC purchased an additional 188 cfs of capacity from Kettleman City (Reach 8D) through the bifurcation of the East and West Branches (Reach 17F). MWDSC's intent in acquiring the additional capacity was to provide additional peaking capacity for emergency situations; currently, MWDSC has no plans to utilize this additional capacity in on-going operations[20]. For all practical purposes, this alone eliminates any perceived capacity limitations from Kern County to the bifurcation, thus focusing the capacity issue within the West Branch.

Available Future Aqueduct Capacity

Component #1: Castaic Lake Water Agency

To evaluate the available future capacity in the SWP system, it was assumed that the lesser of the following CLWA conveyance constraints would prevail: a 9.77% peaking factor (9,040 af/month) [21], a 150 cfs instantaneous flowrate from Castaic Lake (8,924 af/month)[22], or 132 cfs (7,853 af/month)[23] . By using the least of these three constraints, the available capacity is reduced to the most conservative estimate. The available capacity within

[19] DWR, Water and Plant Engineering Office (Gary Gravier).
[20] Discussion with MWDSC (Dirk Marks).
[21] Monthly peaking factor for CLWA is based on 11% of original 41,500 af entitlement (4,565 af/month), plus continuous flow plus allowance (0.0895%) of the 12,700 af acquired from Devils Den WD (1,137 af/month), plus continuous flow plus allowance (0.0895%) of the 41,000 af acquired from Kern County WA (3,669 af/month); weighted monthly peaking factor is then 9,371 af/month / 95,200 af entitlement = 9.84% (ref: information from DWR, State Water Project Analysis Office (Dave Paulson)).
[22] Article 2 of CLWA Amendment No. 18 (ref: Appendix Table D).
[23] Exhibit A of CLWA Amendment No. 18 (ref: Appendix Table D).

CLWA's 132 cfs (7,853 af/month) contractual conveyance capacity constraint is depicted in Table 3.

The demand projection in SWP usage in Table 3 was then used to determine available capacity within the CLWA demand schedule. The available capacity each month is the difference between the monthly capacity noted above (7,853 af/month) and the projected monthly demands from Table 3. The available capacity is shown in Table 9; available capacity decreases from about 23,000 af/y currently to approximately 3,400 af/y in 2035.

Component #2: The Metropolitan Water District of Southern California

Table 10 summarizes the available capacities on an annual basis for the No East Branch Enlargement scenarios, depicted monthly in Table 6. Table 10 indicates that by 2035, at the 95th percentile, 39,737 af/y of MWDSC's existing capacity would be available for delivery through the West Branch of the California Aqueduct.

Although the Cadiz groundwater banking program was terminated last month by MWDSC's board of directors, MWDSC staff[24] has indicated that it is likely more groundwater storage programs will be developed in the desert areas with access to Colorado River supplies, thus increasing the need to MWDSC's SWP deliveries to shift further to the East Branch in wetter years to offset Colorado River deliveries to such future groundwater programs.

Furthermore, the 1984 Advance Delivery Agreement among MWDSC, Desert WA, and Coachella Valley WD is contemplated to be expanded under the pending Colorado River Quantification Settlement Agreement (QSA). Under the QSA, MWDSC would transfer an additional 35,000 af/y of its SWP water to Coachella Valley WD and Coachella Valley WD would exchange the SWP water for an equal quantity of Colorado River supply. MWDSC is also considering transfer of 100,000 af/y of its SWP entitlement to Desert WA and Coachella Valley WD , whereby these two agencies would provide additional water supplies to MWDSC when SWP water deliveries are reduced in a given year.[25] Again, these programs act to further further reduce MWDSC deliveries in the West Branch.

Component #3: Other Southern California SWP Contractors

As previously noted and documented in Appendix Table C, seven SWP southern California contractors (Antelope Valley-East Kern WA, Crestline-Lake Arrowhead WA, Mojave WA, San Bernardino Valley MWD, San Gabriel Valley MWD, San Gorgonio Pass WA, and Ventura County FCD) have a history of being sellers into the SWP Turnback Pool Program in years with high SWP delivery allocations. With the exception of San Bernardino Valley MWD (which contractually has other options to the Turnback Pool Program) and perhaps Antelope Valley-East Kern WA (which may need to increase deliveries to avoid groundwater overdraft), sales to the Turnback Pool Program remain the likely water management approach for the remaining contractors in years of high SWP deliveries.

[24] MWDSC, Imported Supply Unit Manager (Dirk Marks).
[25] Information provided by MWDSC (Dirk Marks)

Information developed by MWDSC[26], based on discussions with most other southern California SWP contractors (Bulletin 132, and 5-year delivery schedules submitted annually to DWR), indicates that by 2020, three East Branch contractors (Crestline-Lake Arrowhead WA, San Bernardino Valley MWD, and San Gabriel Valley MWD) combined, would be requesting 36,100 af/y less than their full entitlement.
Based on the information presented in Tables 7 and 8 and discussed in the previous section and above, it is assumed for this analysis that in 2035, a minimum of 10% of the combined entitlement from Littlerock Creek ID, Mojave WA, San Gabriel Valley MWD, San Gorgonio Pass WA, and Ventura County FCD would not be delivered to southern California in a 100% SWP delivery year. This calculates as 10% of 144,200 af/y, or about 14,400 af/y; this quantity of water, at a minimum, is likely to be delivered to the Turnback Pool Program, exchanges with other contractors, or groundwater banking programs north of the Tehachapi Mountains.

It is highly probable, therefore, that significantly greater than 1,607 af/y would be delivered north of the Tehachapi Mountains, either into the SWP Turnback Pool Program, to groundwater banking programs, or exchanges with other water contractors. To the extent that such water is delivered north of the Tehachapi Mountains, pumping capacity at Edmonston Pumping Plant (in addition to MWDSC's 188 cfs excess peaking capacity) is available for delivery of the 1,607 af/y to CLWA.

Relating specifically to the West Branch, 10% of Ventura County FCD's entitlement is 2,000 af/y. Although the 2,000 af/y is used in this analysis, in practice, none of Ventura County FCD's 15,000 af/y of entitlement associated with the City of Ventura and Casitas MWD has ever been delivered to their service area, or are there plans to do so.

Component #4: Design Criteria for the California Aqueduct

As presented in the previous section (Historical and Projected Demands), unused Aqueduct reserve capacity related to the design would provide CLWA a peak monthly flowrate equivalent to 8.95% (minimum) or 11% (maximum) of entitlement. Based on the lesser of these rates and limiting this contingency only to CLWA's portion of SWP capacity contracted for in the Aqueduct, equates to an available conveyance capacity of 666 af/month[27].

[26] Information provided by MWDSC (Ray Urbach)
[27] 7,853 af/month (from Component #1 of this section) divided by CLWA's 95,200 af of entitlement equates to 8.25% monthly peaking for CLWA; the difference between 8.95% and 8.25% is 0.70%, or an equivalent flowrate of 666 af/month in minimum Aqueduct contingency capacity related to CLWA's enitlement.

Conclusions

A summary of the findings presented in the previous section is provided in Table 11. From Table 11, it is concluded that capacity in SWP facilities to wheel 1,607 af/y from Kern County to the Newhall Ranch Specific Plan area within CLWA will exist in essentially all years. Even with the conservative assumptions noted, it is unlikely that restrictions would arise to prohibit the delivery of an additional 1,607 af/y in the California Aqueduct from Kern County (Reach 10A or south) to Castaic Lake (Reach 30). That capacity would only be temporarily unavailable in an extremely wet year in which CLWA would have more than adequate water to serve the needs of the Newhall Ranch Specific Plan area. In such a year, CLWA would have an abundance of water from CLWA's existing SWP supplies (including the 41,000 af/y SWP entitlement recently acquired by CLWA and 7,648 af/y being acquired by NLF from BMWD) and the water needs of the NLF development could be met using CLWA water, eliminating the need for the 1,607 af that could theoretically be temporarily displaced from the California Aqueduct.

The following is a summary of the assumptions used in this analysis, which result in a more conservative conclusion (i.e., assumptions that reduce the available Aqueduct capacity for the 1,607 af/y).

Assumptions conservatively impacting Component #1:

- CLWA's maximum monthly deliveries were based on 132 cfs (7,853 af/month) contractual conveyance capacity.

Assumptions conservatively impacting Component #2:

- MWDSC and other southern California SWP contractors do not deliver any of their SWP water for recharge to San Joaquin Valley groundwater banking programs in years of 100% SWP supply allocations. Given the continued development of groundwater banking programs in the San Joaquin Valley and the increasing need for urban water agencies to firm up dry year supplies, this assumption is highly unlikely; higher delivery SWP years provide the most desirable conditions for groundwater banking in these facilities, and MWDSC in particular, has invested more than $82 million to date in order to do so.
- MWDSC does not deliver additional SWP water to Desert WA and Coachella Valley WD as currently contemplated under the QSA on the Colorado River.
- The East Branch of the California Aqueduct is not enlarged. Currently, DWR is preparing a pre-feasibility study for the East Branch Enlargement. Upon completion, the study will be reviewed by affected SWP contractors and a decision to proceed with the enlargement and/or other alternatives will be considered by MWDSC and others. A greater annual increase in MWDSC demand (3.80%/y) was utilized for the years 2021 through 2035 than currently used by MWDSC for their projections through 2020 (2.30%/y).

Assumptions conservatively impacting Component #3:

- Only 10% of Ventura County FCD's entitlement of was assumed not be to delivered to Ventura County in 100% SWP years.
- In a year with a 100% SWP allocation, other southern California SWP contractors do not sell any Turnback Pool Program water to SWP contractors located north of the Tehachapi Mountains. (Based on historical practices, this scenario is unlikely. Therefore, available capacity from Kern County to Castaic Lake would probably increase on the order of at least 50,000 af (author's opinion; refer to Appendix Table C for Turnback sales offered from southern California contractors in a 90% year)).

Assumptions conservatively impacting Component #4:

- Only the increased capacity available from design criteria related to CLWA's portion of its contractual capacity in the Aqueduct was quantified, and not the capacity available throughout Reaches 10A to 17F for all southern California SWP contractors and throughout Reaches 29A to30 for all West Branch contractors.

Table 11. Summary of Minimum Projected Available Aqueduct and West Branch Capacity (af) in Year 2035

Month	Component #1 CLWA[a]	Component #2 Met – West Branch[b]	Component #3 Other Contractors[c]	Component #4 Aqueduct Design[d]	Total Available Capacity
January	958	-0-	166	666	1,790
February	2,174	18,929	167	666	21,936
March	282	12,501	167	666	13,616
April	-0-	-0-	166	666	832
May	-0-	-0-	167	666	833
June	-0-	-0-	167	666	833
July	-0-	-0-	166	666	832
August	-0-	-0-	167	666	833
September	-0-	-0-	167	666	833
October	-0-	-0-	166	666	832
November	-0-	5,908	167	666	6,741
December	-0-	2,399	167	666	3,232
Totals	**3,414**	**39,737**	**2,000**	**7,992**	**53,143**

[a] Refer to Table 9.
[b] Refer to Tables 6 & 10.
[c] Limited to 10% of Ventura County FCD's entitlement.
[d] Refer to footnote 27 and prior discussions for Component #4.

The above table demonstrates that sufficient capacity in the California Aqueduct and West Branch is available through 2035 to convey an additional 1,607 af/y of water from Kern County (Reach 10A) to Castaic Lake (Reach 30). Again, putting the 1,607 af/y into perspective, the 1,607 af/y equates to 8.8 cfs (533 af/mo) for 3 months or 2.2 cfs (133 af/month) throughout the year.

Furthermore, given the worst case scenario that other southern California SWP contractors, including MWDSC, would need to deliver additional non-project water into their respective service areas and use a portion of the identified available capacity, CLWA would have an equal priority to convey a quantity of water proportional to its contracted SWP delivery capacity through any available Aqueduct capacity.

Of the SWP contractors south of Edmonston Pumping Plant, CLWA represents 3.69% of the entitlement (95,200 af of 2,580,200 af in 2035). Accordingly, for CLWA to be able to convey the additional 1,607 af/y, other southern California SWP contractors would only need to request 0.06% less of their combined capacity to be delivered south of the Tehachapi Mountains. Given the historical use and conservative projections provided herein, it is extremely likely that sufficient conveyance capacity would be available through 2035 to deliver an additional 1,607 af/y south of the Delta (in Kern County) to Castaic Lake.

Furthermore, as previously discussed for the West Branch:

- Ventura County FCD has no plans to use 15,000 af/y (75%) of its SWP entitlement, which represents 28 cfs capacity from the Delta to Castaic Lake (note: only 2.2 cfs is necessary to convey 1,607 af/y to NLF, which requires only 6% of Ventura County FCD's 37 cfs capacity), and
- The combined capacities of MWDSC (1,400 cfs), CLWA (132 cfs), and Ventura County FCD (37 cfs, if ever used) total 1,569 cfs, which is 111 cfs less than the 1,680 cfs capacity at the most restrictive location in the West Branch (the Peace Valley pipeline).

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Personal communications with:

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- Guy Masier, Mike Nolasco, Tuan Bui (DWR, Operations Records and Reports Section - Sacramento)

- Joel Quintero (DWR, State Water Project Operations – Castaic)
- Gary Gravier (DWR, Water and Plant Engineering Office)
- Dan Masnada, Bob Sagehorn, Mary Lou Cotton (Castaic Lake Water Agency)
- Dirk Marks, Deven Upadhyay, Ray Urbach (The Metropolitan Water District of Southern California)
- Steve Zimmer (Newhall Land and Farming Company)
- Tom Worthington (Impact Sciences, Inc.)
- Russ Fuller (Antelope Valley-East Kern WA)
- Norm Caouette (Mojave WA)
- Tom Levy (Coachella Valley WD)
- Dan Ainsworth (Desert WA)
- Dana Wisehart (United WCD)

Table 1. Capacity of Aqueduct Features

Listing of Beginning of Reach, Pumping Plants and Capacity Changes

Feature	Reach	U/S Mile Post	Capacity (CFS)	Max. Capacity Acre-Feet per Day	Max. Capacity Acre-Feet per 30 days	Comments
Check 21	7	172.4	8100	16,062	481,869	
Canal	11B	210.31	6,350	12,592	377,762	
Check 25	11B	217.79	5,950	11,799	353,966	
Canal	12D	217.81	5,950	11,799	353,966	
Check 27	12D, 12E	231.73	5,950	11,799	353,966	
Check 28	12E	238.11	5,350	10,609	318,272	
Canal	13B	238.13	5,350	10,609	318,272	
Transition	13B	249.45	5,050	10,014	300,425	
Canal	14A	249.46	5,050	10,014	300,425	
Buena Vista PP	14A	250.99	5,050	10,014	300,425	
Check 32	14A	261.72	4,900	9,717	291,501	
Canal	14B	261.77	4,900	9,717	291,501	
Canal	14C	271.33	4,700	9,320	279,603	
Forebay	15A	278.05	4,600	9,122	273,654	
Teerink PP	15A	278.13	4,600	9,122	273,654	
Canal	15A, 16A	278.43	4,600	9,122	273,654	
Forebay	16A	280.29	4,400	8,725	261,756	
Chrisman PP	16A	280.36	4,400	8,725	261,756	
Forebay	17E	293.38	4,400	8,725	261,756	
Edmonston PP	17E	293.45	4,400	8,725	261,756	
Tehachapi Tunnels	17E	294.93	5,360	10,629	318,866	
Porter Tunnel	17F	298.66	5,360	10,629	318,866	
Tehachapi Afterbay	17F	303.45	5,360	10,629	318,866	
Bifurcation	29A	304.04		-	-	
Oso Canal	29A	0.00	3,129	6,205	186,144	
Oso PP	29A	1.49	3,129	6,205	186,144	
Quail Canal	29F	1.90	3,129	6,205	186,144	1962 cfs capacity per MWDSC
Peace Valley Pipeline	29G	8.25	1,564	3,101	93,042	1680 cfs capacity per DWR*
Warne PwrP	29G	14.07	1,564	3,101	93,042	1680 cfs capacity per DWR*
Pyramid Lake	29H	14.10			-	
Angeles Tunnel	29J	18.19	18,000	35,694	1,070,820	
Castaic PwrP	29J	25.82	18,000	35,694	1,070,820	
Elderberry Outlet	30	28.12	17,000	33,711	1,011,330	
Castaic Lake	30	28.12			-	

PP = Pumping Plant
PwrP = Power plant
Source: Department of Water Resources, Data Handbook - State Water Project, 1997
Comments: Conversations with Ray Urbach (MWDSC) and both Joel Quintero (DWR Southern Field Division) and Guy Maiser (DWR Operations Records and Reports Section)
* Excludes 900 cfs additional bypass capacity via Gorman Creek Improvement Channel

Table 2. CLWA Demand Projections (af)

			Percent Monthly Distribution												
			5.1	4.2	5.6	7.4	8.4	11.7	12.6	12.7	11.8	7.8	7.4	5.4	100
Year	CLWA Estimate	Demand Projection	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
1999	74400	74400	3,794.4	3,124.8	4,166.4	5,505.6	6,993.6	7,960.8	8,779.2	9,448.8	8,556.0	5,803.2	5,505.6	4,761.6	74,400.0
2000		74517	3,800.4	3,129.7	4,172.9	5,514.2	7,004.6	7,973.3	8,793.0	9,463.6	8,569.4	5,812.3	5,514.2	4,769.1	74,516.7
2001		74633	3,806.3	3,134.6	4,179.5	5,522.9	7,015.5	7,985.8	8,806.7	9,478.4	8,582.8	5,821.4	5,522.9	4,776.5	74,633.3
2002		74750	3,812.3	3,139.5	4,186.0	5,531.5	7,026.5	7,998.3	8,820.5	9,493.3	8,596.3	5,830.5	5,531.5	4,784.0	74,750.0
2003		74867	3,818.2	3,144.4	4,192.5	5,540.1	7,037.5	8,010.7	8,834.3	9,508.1	8,609.7	5,839.6	5,540.1	4,791.5	74,866.7
2004		74983	3,824.2	3,149.3	4,199.1	5,548.8	7,048.4	8,023.2	8,848.0	9,522.9	8,623.1	5,848.7	5,548.8	4,798.9	74,983.3
2005	75100	75100	3,830.1	3,154.2	4,205.6	5,557.4	7,059.4	8,035.7	8,861.8	9,537.7	8,636.5	5,857.8	5,557.4	4,806.4	75,100.0
2006		76560	3,904.6	3,215.5	4,287.4	5,665.4	7,196.6	8,191.9	9,034.1	9,723.1	8,804.4	5,971.7	5,665.4	4,899.8	76,560.0
2007		78020	3,979.0	3,276.8	4,369.1	5,773.5	7,333.9	8,348.1	9,206.4	9,908.5	8,972.3	6,085.6	5,773.5	4,993.3	78,020.0
2008		79480	4,053.5	3,338.2	4,450.9	5,881.5	7,471.1	8,504.4	9,378.6	10,094.0	9,140.2	6,199.4	5,881.5	5,086.7	79,480.0
2009		80940	4,127.9	3,399.5	4,532.6	5,989.6	7,608.4	8,660.6	9,550.9	10,279.4	9,308.1	6,313.3	5,989.6	5,180.2	80,940.0
2010	82400	82400	4,202.4	3,460.8	4,614.4	6,097.6	7,745.6	8,816.8	9,723.2	10,464.8	9,476.0	6,427.2	6,097.6	5,273.6	82,400.0
2011		84240	4,296.2	3,536.1	4,717.4	6,233.8	7,918.6	9,013.7	9,940.3	10,698.5	9,687.6	6,570.7	6,233.8	5,391.4	84,240.0
2012		86080	4,390.1	3,615.4	4,820.5	6,369.9	8,091.5	9,210.6	10,157.4	10,932.2	9,899.2	6,714.2	6,369.9	5,509.1	86,080.0
2013		87920	4,483.9	3,692.6	4,923.5	6,506.1	8,264.5	9,407.4	10,374.6	11,165.8	10,110.8	6,857.8	6,506.1	5,626.9	87,920.0
2014		89760	4,577.8	3,769.9	5,026.6	6,642.2	8,437.4	9,604.3	10,591.7	11,399.5	10,322.4	7,001.3	6,642.2	5,744.6	89,760.0
2015	91600	91600	4,671.6	3,847.2	5,129.6	6,778.4	8,610.4	9,801.2	10,808.8	11,633.2	10,534.0	7,144.8	6,778.4	5,862.4	91,600.0
2016		93780	4,782.8	3,938.6	5,251.7	6,939.7	8,815.3	10,034.5	11,066.0	11,910.1	10,784.7	7,314.8	6,939.7	6,001.9	93,780.0
2017		95960	4,894.0	4,030.3	5,373.8	7,101.0	9,020.2	10,267.7	11,323.3	12,186.9	11,035.4	7,484.9	7,101.0	6,141.4	95,960.0
2018		98140	5,005.1	4,121.9	5,495.8	7,262.4	9,225.2	10,501.0	11,580.5	12,463.8	11,286.1	7,654.9	7,262.4	6,281.0	98,140.0
2019		100320	5,116.3	4,213.4	5,617.9	7,423.7	9,430.1	10,734.2	11,837.8	12,740.6	11,536.8	7,825.0	7,423.7	6,420.5	100,320.0
2020	102500	102500	5,227.5	4,305.0	5,740.0	7,585.0	9,635.0	10,967.5	12,095.0	13,017.5	11,787.5	7,995.0	7,585.0	6,560.0	102,500.0
2021		104680	5,338.7	4,396.6	5,862.1	7,746.3	9,839.9	11,200.8	12,352.2	13,294.4	12,038.2	8,165.0	7,746.3	6,699.5	104,680.0
2022		106860	5,449.9	4,488.1	5,984.2	7,907.6	10,044.8	11,434.0	12,609.5	13,571.2	12,288.9	8,335.1	7,907.6	6,839.0	106,860.0
2023		109040	5,561.0	4,579.7	6,106.2	8,069.0	10,249.8	11,667.3	12,866.7	13,848.1	12,539.6	8,506.1	8,069.0	6,978.6	109,040.0
2024		111220	5,672.2	4,671.2	6,228.3	8,230.3	10,454.7	11,900.5	13,124.0	14,124.9	12,790.3	8,675.2	8,230.3	7,118.1	111,220.0
2025		113400	5,783.4	4,762.8	6,350.4	8,391.6	10,659.6	12,133.8	13,381.2	14,401.8	13,041.0	8,845.2	8,391.6	7,257.6	113,400.0
2026		115580	5,894.6	4,854.4	6,472.5	8,552.9	10,864.5	12,367.1	13,638.4	14,678.7	13,291.7	9,015.2	8,552.9	7,397.1	115,580.0
2027		117760	6,005.8	4,945.9	6,594.6	8,714.2	11,069.4	12,600.3	13,895.7	14,955.5	13,542.4	9,185.3	8,714.2	7,536.6	117,760.0
2028		119940	6,116.9	5,037.5	6,716.6	8,875.6	11,274.4	12,833.6	14,152.9	15,232.4	13,793.1	9,355.3	8,875.6	7,676.2	119,940.0
2029		122120	6,228.1	5,129.0	6,838.7	9,036.9	11,479.3	13,066.8	14,410.2	15,509.2	14,043.8	9,525.4	9,036.9	7,815.7	122,120.0
2030		124300	6,339.3	5,220.6	6,960.8	9,198.2	11,684.2	13,300.1	14,667.4	15,786.1	14,294.5	9,695.4	9,198.2	7,955.2	124,300.0
2031		126480	6,450.5	5,312.2	7,082.9	9,359.5	11,889.1	13,533.4	14,924.6	16,063.0	14,545.2	9,865.4	9,359.5	8,094.7	126,480.0
2032		128660	6,561.7	5,403.7	7,205.0	9,520.8	12,094.0	13,766.6	15,181.9	16,339.8	14,795.9	10,035.5	9,520.8	8,234.2	128,660.0
2033		130840	6,672.8	5,495.3	7,327.0	9,682.2	12,299.0	13,999.9	15,439.1	16,616.7	15,046.6	10,205.5	9,682.2	8,373.8	130,840.0
2034		133020	6,784.0	5,586.8	7,449.1	9,843.5	12,503.9	14,233.1	15,696.4	16,893.5	15,297.3	10,375.6	9,843.5	8,513.3	133,020.0
2035		135200	6,895.2	5,678.4	7,571.2	10,004.8	12,708.8	14,466.4	15,953.6	17,170.4	15,548.0	10,545.6	10,004.8	8,652.8	135,200.0

Table 3. CLWA Demand Projections in af with 7,853 af/month Cap

(132 cfs over 30 days / month)

			Percent Monthly Distribution													
			5.1	4.2	5.6	7.4	9.4	10.7	11.8	12.7	11.5	7.8	7.4	6.4	100	Excess over SWP Entitlement
Year	CLWA Estimate	Demand Projection	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL	95,200
1999	74400	74400	3,794.4	3,124.8	4,166.4	5,505.6	6,993.6	7,853.0	7,853.0	7,853.0	7,853.0	5,803.2	5,505.6	4,761.6	71,067.2	-
2000		74517	3,800.4	3,129.7	4,172.9	5,514.2	7,004.6	7,853.0	7,853.0	7,853.0	7,853.0	5,812.3	5,514.2	4,769.1	71,129.4	-
2001		74633	3,806.3	3,134.6	4,179.5	5,522.9	7,015.5	7,853.0	7,853.0	7,853.0	7,853.0	5,821.4	5,522.9	4,778.5	71,191.6	-
2002		74750	3,812.3	3,139.5	4,186.0	5,531.5	7,026.5	7,853.0	7,853.0	7,853.0	7,853.0	5,830.5	5,531.5	4,784.0	71,253.6	-
2003		74867	3,818.2	3,144.4	4,192.5	5,540.1	7,037.5	7,853.0	7,853.0	7,853.0	7,853.0	5,839.6	5,540.1	4,791.5	71,315.9	-
2004		74983	3,824.2	3,149.3	4,199.1	5,548.8	7,048.4	7,853.0	7,853.0	7,853.0	7,853.0	5,848.7	5,548.8	4,798.9	71,378.1	-
2005	75100	75100	3,830.1	3,154.2	4,205.6	5,557.4	7,059.4	7,853.0	7,853.0	7,853.0	7,853.0	5,857.8	5,557.4	4,806.4	71,440.3	-
2006		76560	3,904.6	3,215.5	4,287.4	5,665.4	7,196.6	7,853.0	7,853.0	7,853.0	7,853.0	5,971.7	5,665.4	4,899.8	72,218.5	-
2007		78020	3,979.0	3,276.8	4,369.1	5,773.5	7,333.9	7,853.0	7,853.0	7,853.0	7,853.0	6,085.6	5,773.5	4,993.3	72,996.7	-
2008		79480	4,053.5	3,338.2	4,450.9	5,881.5	7,471.1	7,853.0	7,853.0	7,853.0	7,853.0	6,199.4	5,881.5	5,086.7	73,774.6	-
2009		80940	4,127.9	3,399.5	4,532.6	5,989.6	7,608.4	7,853.0	7,853.0	7,853.0	7,853.0	6,313.3	5,989.6	5,180.2	74,553.0	-
2010	82400	82400	4,202.4	3,460.8	4,614.4	6,097.6	7,745.6	7,853.0	7,853.0	7,853.0	7,853.0	6,427.2	6,097.6	5,273.8	75,331.2	-
2011		84240	4,296.2	3,538.1	4,717.4	6,233.8	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	6,570.7	6,233.8	5,391.4	76,246.4	-
2012		86080	4,390.1	3,615.4	4,820.5	6,369.9	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	6,714.2	6,369.9	5,509.1	77,054.1	-
2013		87920	4,483.9	3,692.6	4,923.5	6,506.1	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	6,857.8	6,506.1	5,626.9	77,861.9	-
2014		89760	4,577.8	3,769.9	5,026.6	6,642.2	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,001.3	6,642.2	5,744.6	78,669.6	-
2015	91600	91600	4,671.6	3,847.2	5,129.6	6,778.4	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,144.8	6,778.4	5,862.4	79,477.4	-
2016		93780	4,782.8	3,936.8	5,251.7	6,939.7	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,314.8	6,939.7	6,001.9	80,434.4	-
2017		95960	4,894.0	4,030.3	5,373.8	7,101.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,484.9	7,101.0	6,141.4	81,391.4	-
2018		98140	5,005.1	4,121.9	5,495.8	7,262.4	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,654.9	7,262.4	6,281.0	82,348.5	-
2019		100320	5,116.3	4,213.4	5,617.9	7,423.7	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,825.0	7,423.7	6,420.5	83,305.5	-
2020	102500	102500	5,227.5	4,305.0	5,740.0	7,585.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,585.0	6,560.0	84,120.5	-
2021		104680	5,338.7	4,396.6	5,862.1	7,746.3	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,746.3	6,699.5	84,907.5	-
2022		106860	5,449.9	4,488.1	5,984.2	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	6,839.0	85,585.2	-
2023		109040	5,561.0	4,579.7	6,106.2	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	6,978.6	86,049.5	-
2024		111220	5,672.2	4,671.2	6,228.3	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,118.1	86,513.9	-
2025		113400	5,783.4	4,762.8	6,350.4	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,257.6	86,978.2	-
2026		115580	5,894.6	4,854.4	6,472.5	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,397.1	87,442.5	-
2027		117760	6,005.8	4,945.9	6,594.6	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,536.6	87,906.9	-
2028		119940	6,116.9	5,037.5	6,716.6	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,676.2	88,371.2	-
2029		122120	6,228.1	5,129.0	6,838.7	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,815.7	88,835.6	-
2030		124300	6,339.3	5,220.6	6,960.8	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	89,197.7	-
2031		126480	6,450.5	5,312.2	7,082.9	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	89,522.5	-
2032		128660	6,561.7	5,403.7	7,205.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	89,847.3	-
2033		130840	6,672.8	5,495.3	7,327.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	90,172.2	-
2034		133020	6,784.0	5,586.8	7,449.1	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	90,497.0	-
2035		135200	6,895.2	5,678.4	7,571.2	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	7,853.0	90,821.8	-

Table 4. Difference in af between CLWA Demand Projections and 7,853 af/month Cap

(132 CFS over 30 days/month) [Demand not met by SWP supplies due to contract constraints]

Year	CLWA Estimate	Demand Projection	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL	Demand met by SWP Supply	Total Needed from other supplies
1999	74400	74400	-	-	-	-	-	107.8	926.2	1,595.8	709.0	-	-	-	3,332.8	-	3,332.8
2000		74517	-	-	-	-	-	120.3	940.0	1,610.6	716.4	-	-	-	3,387.3	-	3,387.3
2001		74633	-	-	-	-	-	132.8	953.7	1,625.4	729.8	-	-	-	3,441.8	-	3,441.8
2002		74750	-	-	-	-	-	145.3	967.5	1,640.3	743.3	-	-	-	3,496.3	-	3,496.3
2003		74867	-	-	-	-	-	157.7	981.3	1,655.1	756.7	-	-	-	3,550.7	-	3,550.7
2004		74983	-	-	-	-	-	170.2	995.0	1,669.9	770.1	-	-	-	3,605.2	-	3,605.2
2005	75100	75100	-	-	-	-	-	182.7	1,008.8	1,684.7	783.5	-	-	-	3,659.7	-	3,659.7
2006		76560	-	-	-	-	-	338.9	1,161.1	1,870.1	951.4	-	-	-	4,341.5	-	4,341.5
2007		78020	-	-	-	-	-	495.1	1,353.4	2,055.5	1,119.3	-	-	-	5,023.3	-	5,023.3
2008		79480	-	-	-	-	-	651.4	1,526.6	2,241.0	1,287.2	-	-	-	5,705.2	-	5,705.2
2009		80940	-	-	-	-	-	807.6	1,697.9	2,426.4	1,456.1	-	-	-	6,387.0	-	6,387.0
2010	82400	82400	-	-	-	-	-	963.8	1,870.2	2,611.8	1,623.0	-	-	-	7,068.8	-	7,068.8
2011		84240	-	-	-	-	65.6	1,160.7	2,087.3	2,846.5	1,834.6	-	-	-	7,993.6	-	7,993.6
2012		86080	-	-	-	-	238.5	1,357.6	2,304.4	3,079.2	2,046.2	-	-	-	9,025.9	-	9,025.9
2013		87920	-	-	-	-	411.5	1,554.4	2,521.6	3,312.8	2,257.8	-	-	-	10,058.1	-	10,058.1
2014		89760	-	-	-	-	584.4	1,751.3	2,738.7	3,546.5	2,469.4	-	-	-	11,090.4	-	11,090.4
2015	91600	91600	-	-	-	-	757.4	1,948.2	2,955.8	3,780.2	2,681.0	-	-	-	12,122.6	-	12,122.6
2016		93780	-	-	-	-	962.9	2,161.5	3,213.0	4,057.1	2,961.7	-	-	-	13,345.6	-	13,345.6
2017		95960	-	-	-	-	1,167.2	2,414.7	3,470.3	4,333.9	3,162.4	-	-	-	14,568.6	-	14,568.6
2018		98140	-	-	-	-	1,372.2	2,648.0	3,727.5	4,610.8	3,439.1	-	-	-	15,791.5	-	15,791.5
2019		100320	-	-	-	-	1,577.1	2,881.2	3,984.8	4,887.6	3,683.8	-	-	-	17,014.5	-	17,014.5
2020	102500	102500	-	-	-	-	1,782.0	3,114.5	4,242.0	5,164.5	3,934.5	142.0	-	-	18,379.5	-	18,379.5
2021		104680	-	-	-	-	1,986.9	3,347.8	4,499.2	5,441.4	4,185.2	312.0	-	-	19,772.5	-	19,772.5
2022		106860	-	-	-	54.6	2,191.8	3,581.0	4,756.5	5,718.2	4,435.9	482.1	54.6	-	21,274.6	-	21,274.6
2023		109040	-	-	-	216.0	2,396.8	3,814.3	5,013.7	5,995.1	4,686.6	652.1	216.0	-	22,990.5	-	22,990.5
2024		111220	-	-	-	377.3	2,601.7	4,047.5	5,271.0	6,271.9	4,937.3	822.2	377.3	-	24,706.1	-	24,706.1
2025		113400	-	-	-	538.6	2,806.6	4,280.8	5,528.2	6,548.8	5,188.0	992.2	538.6	-	26,421.8	-	26,421.8
2026		115580	-	-	-	699.9	3,011.5	4,514.1	5,785.4	6,825.7	5,438.7	1,162.2	699.9	-	28,137.5	-	28,137.5
2027		117760	-	-	-	861.2	3,216.4	4,747.3	6,042.7	7,102.5	5,689.4	1,332.3	861.2	-	29,853.1	-	29,853.1
2028		119940	-	-	-	1,022.6	3,421.4	4,980.6	6,299.9	7,379.4	5,940.1	1,502.3	1,022.6	-	31,568.8	-	31,568.8
2029		122120	-	-	-	1,183.9	3,626.3	5,213.8	6,557.2	7,656.2	6,190.8	1,672.4	1,183.9	-	33,284.4	-	33,284.4
2030		124300	-	-	-	1,345.2	3,831.2	5,447.1	6,814.4	7,933.1	6,441.5	1,842.4	1,345.2	102.2	35,102.3	-	35,102.3
2031		126480	-	-	-	1,506.5	4,036.1	5,680.4	7,071.6	8,210.0	6,692.2	2,012.4	1,506.5	241.7	36,957.5	-	36,957.5
2032		128660	-	-	-	1,667.8	4,241.0	5,913.6	7,328.9	8,486.8	6,942.9	2,182.5	1,667.8	381.2	38,812.7	-	38,812.7
2033		130840	-	-	-	1,829.2	4,445.9	6,146.9	7,586.1	8,763.7	7,193.6	2,352.5	1,829.2	520.8	40,667.8	-	40,667.8
2034		133020	-	-	-	1,990.5	4,650.9	6,380.1	7,843.4	9,040.5	7,444.3	2,522.6	1,990.5	660.3	42,525.0	-	42,525.0
2035		135200	-	-	-	2,151.8	4,855.8	6,613.4	8,100.6	9,317.4	7,695.0	2,692.6	2,151.8	799.8	44,378.2	-	44,378.2

Table 5. Projected Monthly MWDSC West Branch Flows

Assumes No East Branch Enlargement Implementation
Underlying Metropolitan Demands From The 2000 Sales Forecast
Flowrates in cubic-feet per second

DATE	MIN	MAX	AVG	MEDIAN	95th %	MWDSC Capacity (cfs)	Capacity available over 95th % (cfs)	Availability af/month	Capacity avail. over Median (cfs)	Availability af/month
Jan-02	187.6	639.2	397.7	403.2	584.2	1400	815.8	50,147	996.8	61,276
Feb-02	139.4	501.0	303.7	310.7	458.3	1400	941.7	52,286	1,089.3	60,482
Mar-02	167.0	567.2	353.4	355.6	519.2	1400	880.8	54,148	1,044.4	64,202
Apr-02	280.3	1,053.8	564.0	561.0	827.6	1400	572.4	34,052	839.0	49,912
May-02	201.3	732.3	340.3	332.4	493.9	1400	906.1	55,702	1,067.6	65,629
Jun-02	265.1	867.1	450.0	424.2	724.9	1400	675.1	40,163	975.8	58,050
Jul-02	277.4	1,131.3	721.8	721.0	1,077.9	1400	322.1	19,803	679.0	41,740
Aug-02	185.3	638.7	326.7	318.4	498.0	1400	902.0	55,449	1,081.6	66,489
Sep-02	163.3	510.1	310.2	309.9	466.3	1400	933.7	55,543	1,090.1	64,850
Oct-02	239.7	763.7	478.5	485.5	683.2	1400	716.8	44,065	914.4	56,211
Nov-02	193.7	663.6	407.9	416.2	607.5	1400	792.5	47,146	983.8	58,526
Dec-02	199.1	667.1	406.7	413.2	610.1	1400	789.9	48,560	986.8	60,662
Jan-03	197.5	816.7	518.6	552.8	684.1	1400	715.9	44,011	847.2	52,080
Feb-03	145.7	679.0	356.6	352.8	505.6	1400	894.4	49,660	1,047.2	58,145
Mar-03	174.5	612.2	415.8	423.4	614.1	1400	785.9	48,314	976.6	60,035
Apr-03	281.3	1,101.7	610.1	603.6	975.2	1400	424.8	25,274	796.4	47,378
May-03	202.2	613.4	358.5	345.7	562.2	1400	837.8	51,505	1,054.3	64,811
Jun-03	266.5	1,044.7	524.0	487.2	814.5	1400	585.5	34,834	912.8	54,302
Jul-03	279.1	1,129.7	690.6	684.4	1,038.7	1400	361.3	22,208	715.6	43,990
Aug-03	186.2	760.4	335.0	310.0	536.5	1400	863.5	53,083	1,090.0	67,006
Sep-03	164.0	589.6	329.8	325.7	525.7	1400	874.3	52,012	1,074.3	63,910
Oct-03	240.7	771.1	502.0	504.8	727.3	1400	672.7	41,353	895.2	55,031
Nov-03	194.5	686.1	430.8	436.1	628.3	1400	771.7	45,911	963.9	57,342
Dec-03	199.9	690.3	428.1	427.1	632.6	1400	767.4	47,176	972.9	59,807
Jan-04	198.2	927.0	469.6	498.7	642.4	1400	757.6	46,569	901.3	55,406
Feb-04	140.6	692.9	380.9	391.3	641.8	1400	758.2	42,101	1,008.7	56,007
Mar-04	176.5	731.4	407.0	422.3	577.2	1400	822.8	50,579	977.7	60,102
Apr-04	282.3	951.2	609.3	604.8	907.9	1400	492.1	29,274	795.2	47,306
May-04	203.2	706.4	357.7	342.9	544.8	1400	855.2	52,572	1,057.1	64,983
Jun-04	267.9	948.2	513.0	501.1	843.5	1400	556.5	33,105	898.9	53,476
Jul-04	280.8	1,131.4	692.6	691.1	1,002.8	1400	397.2	24,420	708.9	43,578
Aug-04	187.1	706.3	336.6	334.3	557.4	1400	842.6	51,796	1,065.7	65,512
Sep-04	164.7	578.6	335.6	328.6	546.2	1400	853.8	50,791	1,071.4	63,738
Oct-04	241.6	803.3	504.9	508.4	726.7	1400	673.3	41,391	891.6	54,809
Nov-04	195.3	692.2	435.9	439.1	637.5	1400	762.5	45,364	960.9	57,164
Dec-04	200.7	697.0	433.1	431.3	640.1	1400	759.9	46,715	968.7	59,549
Jan-05	198.8	884.5	491.7	503.0	700.3	1400	699.7	43,013	897.0	55,141
Feb-05	148.0	706.9	381.1	396.6	605.4	1400	794.6	44,122	1,003.4	55,713
Mar-05	177.3	645.6	411.7	436.2	586.1	1400	813.9	50,032	963.8	59,248
Apr-05	283.3	1,003.2	604.2	606.8	877.1	1400	522.9	31,110	793.2	47,187
May-05	204.2	704.3	362.1	355.6	554.7	1400	845.3	51,963	1,044.4	64,202
Jun-05	269.3	939.1	528.2	530.8	752.9	1400	647.1	38,496	869.2	51,709
Jul-05	282.5	1,157.0	715.4	720.1	1,088.8	1400	311.2	19,129	679.9	41,795
Aug-05	188.0	746.1	342.7	325.4	575.2	1400	824.8	50,703	1,074.6	66,059
Sep-05	165.5	602.2	335.6	330.0	514.6	1400	885.4	52,672	1,070.0	63,654
Oct-05	242.6	814.2	511.0	520.1	751.1	1400	648.9	39,892	879.9	54,090
Nov-05	196.1	690.5	437.4	441.0	639.2	1400	760.8	45,258	959.0	57,051
Dec-05	201.5	695.7	434.7	432.4	642.1	1400	757.9	46,593	967.6	59,481
Jan-06	199.8	862.4	476.5	484.3	686.2	1400	713.8	43,877	915.7	56,291
Feb-06	148.9	795.4	379.4	375.0	596.1	1400	803.9	44,635	1,025.0	56,912
Mar-06	178.4	604.5	405.7	428.1	572.2	1400	827.8	50,887	971.9	59,746

Table 5. Continued:

Apr-06	284.8	1,130.5	640.3	630.9	1,001.7	1400	398.3	23,695	769.1	45,754
May-06	205.7	772.5	373.7	361.9	554.2	1400	845.8	51,994	1,038.1	63,815
Jun-06	271.5	970.6	534.5	505.3	849.7	1400	550.3	32,735	894.7	53,226
Jul-06	284.8	1,154.5	728.4	726.2	1,047.6	1400	352.4	21,662	673.8	41,421
Aug-06	189.5	771.2	349.5	334.2	575.0	1400	824.0	50,653	1,065.8	65,518
Sep-06	166.7	643.1	337.1	332.2	518.1	1400	861.9	52,464	1,067.8	63,523
Oct-06	244.2	812.8	511.3	513.4	724.1	1400	575.9	41,547	886.6	54,502
Nov-06	197.4	692.5	440.1	443.7	641.6	1400	758.4	45,117	956.3	56,890
Dec-06	202.7	698.5	437.9	435.0	649.6	1400	750.4	46,129	965.0	59,321
Jan-07	191.7	783.5	470.7	473.8	676.0	1400	724.0	44,504	926.2	56,936
Feb-07	148.5	585.3	355.1	361.5	507.1	1400	892.9	49,577	1,038.5	57,662
Mar-07	179.5	623.5	400.3	406.4	558.6	1400	841.4	51,721	993.6	61,080
Apr-07	286.2	1,057.5	627.8	643.7	951.4	1400	448.6	28,688	756.3	44,992
May-07	207.3	636.3	367.9	362.3	551.8	1400	848.2	52,143	1,037.7	63,791
Jun-07	273.7	1,090.3	515.0	516.4	728.0	1400	672.0	39,976	883.6	52,565
Jul-07	287.2	1,158.3	703.2	712.0	1,074.2	1400	325.8	20,030	688.0	42,293
Aug-07	191.0	595.9	342.7	351.5	497.4	1400	902.6	55,487	1,048.5	64,454
Sep-07	168.0	557.0	338.3	334.5	519.5	1400	880.4	52,374	1,065.5	63,387
Oct-07	245.7	764.2	513.6	526.1	711.9	1400	688.1	42,298	873.9	53,721
Nov-07	198.7	694.6	443.2	446.6	646.6	1400	753.4	44,819	953.4	56,718
Dec-07	204.0	701.4	440.5	437.8	648.0	1400	752.0	46,226	962.2	59,149
Jan-08	202.0	679.1	450.8	460.9	640.4	1400	759.6	46,695	939.1	57,729
Feb-08	150.7	528.6	360.5	378.5	490.7	1400	909.3	50,490	1,021.5	56,718
Mar-08	172.3	596.4	395.5	414.6	553.9	1400	846.1	52,014	985.4	60,575
Apr-08	287.7	1,011.3	632.5	638.3	910.6	1400	489.4	29,113	761.7	45,314
May-08	208.9	627.8	375.3	366.9	535.4	1400	864.6	53,148	1,033.1	63,508
Jun-08	275.9	868.1	519.8	524.6	799.0	1400	601.0	35,752	875.4	52,078
Jul-08	289.5	1,172.2	750.3	758.9	1,088.3	1400	311.7	19,160	641.1	39,410
Aug-08	192.5	717.8	347.9	347.9	515.2	1400	884.8	54,393	1,052.1	64,676
Sep-08	169.2	566.0	341.0	336.8	499.1	1400	900.9	53,597	1,063.2	63,250
Oct-08	247.3	782.2	521.3	535.3	722.3	1400	677.7	41,660	864.7	53,156
Nov-08	200.0	696.7	445.3	449.5	645.9	1400	754.1	44,863	950.5	56,545
Dec-08	205.3	704.3	443.2	440.5	649.0	1400	751.0	46,164	959.5	58,983
Jan-09	193.9	729.7	450.1	463.6	632.5	1400	767.5	47,181	936.4	57,563
Feb-09	144.4	566.7	352.8	368.6	495.9	1400	904.1	50,198	1,031.4	57,267
Mar-09	173.3	600.7	396.2	417.2	562.0	1400	838.0	51,517	982.8	60,416
Apr-09	289.1	1,150.2	653.7	656.6	937.8	1400	462.2	27,495	743.4	44,225
May-09	210.4	623.3	371.7	372.9	526.1	1400	873.9	53,720	1,027.1	63,139
Jun-09	278.1	999.2	551.8	550.2	828.0	1400	572.0	34,027	849.8	50,555
Jul-09	291.9	1,177.7	769.2	773.0	1,145.6	1400	254.4	15,641	627.0	38,544
Aug-09	193.9	659.8	369.2	375.5	560.5	1400	839.5	51,609	1,024.5	62,979
Sep-09	170.5	684.9	353.5	352.2	541.4	1400	858.6	51,077	1,047.8	62,334
Oct-09	248.9	808.4	530.7	546.9	740.0	1400	660.0	40,573	853.1	52,443
Nov-09	201.3	698.6	448.2	452.4	648.3	1400	751.7	44,716	947.6	56,373
Dec-09	206.6	707.1	445.6	443.2	651.5	1400	748.5	46,010	956.8	58,817
Jan-10	204.4	718.1	463.7	481.7	663.7	1400	736.3	45,264	918.3	56,451
Feb-10	152.5	532.6	349.7	361.3	512.1	1400	887.9	49,300	1,038.7	57,673
Mar-10	174.4	704.5	396.4	402.5	564.3	1400	835.7	51,372	997.5	61,319
Apr-10	290.5	1,129.1	564.5	650.5	1,019.3	1400	380.7	22,647	749.5	44,528
May-10	212.0	743.2	398.1	396.3	609.2	1400	790.8	48,614	1,003.7	61,700
Jun-10	280.3	987.3	547.1	530.4	871.6	1400	528.4	31,433	869.6	51,733
Jul-10	294.2	1,183.3	803.3	825.8	1,152.2	1400	247.8	15,235	574.2	35,298
Aug-10	195.4	801.7	378.7	366.4	648.2	1400	751.8	46,214	1,033.6	63,538
Sep-10	171.8	642.5	359.1	361.6	571.1	1400	828.9	49,312	1,038.4	61,774
Oct-10	250.5	814.9	530.6	535.1	750.7	1400	649.3	38,913	864.9	53,168
Nov-10	202.6	702.7	455.4	465.3	658.2	1400	741.8	44,128	934.7	55,605
Dec-10	207.9	709.9	449.1	445.9	654.1	1400	745.9	45,855	954.1	58,651
Jan-11	196.4	851.2	478.3	495.9	700.8	1400	699.2	42,981	904.1	55,578
Feb-11	152.0	677.0	359.1	376.9	504.4	1400	895.6	49,726	1,023.1	56,807
Mar-11	175.7	609.3	406.4	419.1	571.2	1400	828.8	50,948	980.9	60,299
Apr-11	292.4	1,062.0	687.9	683.5	1,031.1	1400	368.9	21,947	716.5	42,525

Table 5. Continued:

May-11	214.0	842.9	406.8	404.7	595.4	1400	804.6	49,464	995.3	61,184
Jun-11	283.0	1,052.8	578.5	556.0	898.7	1400	501.3	29,621	844.0	50,210
Jul-11	306.5	1,199.0	839.8	849.2	1,168.2	1400	231.8	14,247	550.8	33,859
Aug-11	197.3	793.7	382.5	355.1	601.2	1400	798.8	49,106	1,044.9	64,233
Sep-11	173.4	735.1	359.2	356.0	546.1	1400	853.9	50,800	1,044.0	62,108
Oct-11	252.5	910.1	539.0	549.4	735.3	1400	664.7	40,864	850.6	52,289
Nov-11	204.2	809.2	459.2	463.1	655.8	1400	744.2	44,271	936.9	55,736
Dec-11	209.5	717.8	455.6	453.1	661.5	1400	738.5	45,400	946.9	58,209
Jan-12	207.4	758.0	467.4	474.5	685.5	1400	714.5	43,925	925.5	56,893
Feb-12	153.2	571.8	362.8	374.5	512.0	1400	888.0	49,308	1,025.5	58,940
Mar-12	183.9	740.7	412.8	427.3	578.1	1400	821.9	50,522	972.7	59,795
Apr-12	294.2	1,241.6	698.6	691.0	1,036.1	1400	363.9	21,647	709.0	42,178
May-12	216.0	785.2	414.2	406.6	684.5	1400	735.5	45,216	993.4	61,067
Jun-12	285.6	1,065.5	608.5	597.0	937.6	1400	462.4	27,506	803.0	47,770
Jul-12	314.8	1,254.6	870.0	894.4	1,181.7	1400	218.3	13,417	505.6	31,081
Aug-12	199.1	833.0	401.2	380.5	659.3	1400	740.7	45,531	1,019.5	62,672
Sep-12	174.9	742.0	369.8	362.6	559.2	1400	840.8	50,020	1,037.4	61,715
Oct-12	254.4	919.8	553.1	566.2	788.9	1400	611.1	37,569	831.8	51,133
Nov-12	205.9	744.0	466.9	480.9	673.4	1400	726.6	43,228	919.1	54,677
Dec-12	211.1	725.7	463.9	460.4	666.4	1400	733.6	45,099	939.6	57,760
Jan-13	199.3	743.1	472.4	490.3	679.4	1400	720.6	44,295	909.7	55,922
Feb-13	162.9	550.0	364.1	361.4	509.4	1400	890.6	49,447	1,038.6	57,667
Mar-13	178.5	666.5	419.1	426.8	585.1	1400	814.9	50,092	973.2	59,826
Apr-13	296.1	1,181.7	717.2	747.5	1,036.6	1400	363.4	21,621	652.5	38,817
May-13	218.0	802.4	426.3	423.0	707.4	1400	692.6	42,574	977.0	60,059
Jun-13	288.3	1,079.7	626.3	616.6	918.3	1400	481.7	28,659	783.4	46,604
Jul-13	302.7	1,230.5	893.2	933.5	1,207.7	1400	192.3	11,822	466.5	28,677
Aug-13	201.0	799.8	431.8	407.2	669.3	1400	730.7	44,921	992.8	61,030
Sep-13	176.6	680.9	379.0	369.2	591.5	1400	808.5	48,100	1,030.8	61,322
Oct-13	256.5	877.8	555.5	572.2	794.7	1400	605.3	37,208	827.8	50,887
Nov-13	207.6	715.9	470.1	474.8	681.0	1400	719.0	42,772	925.2	55,040
Dec-13	212.7	733.7	471.3	467.6	681.7	1400	718.3	44,157	932.4	57,317
Jan-14	212.7	766.6	485.6	499.8	692.2	1400	707.8	43,513	900.2	55,338
Feb-14	149.8	708.7	377.1	392.8	533.2	1400	866.8	48,128	1,007.2	55,924
Mar-14	197.4	661.7	418.2	424.2	592.4	1400	807.6	49,643	975.8	59,985
Apr-14	298.0	1,238.8	743.0	731.8	1,116.0	1400	284.0	16,898	668.2	39,751
May-14	228.6	882.2	445.2	431.5	698.8	1400	701.2	43,104	968.5	59,537
Jun-14	290.9	1,133.9	647.6	639.6	998.1	1400	401.9	23,908	760.4	45,236
Jul-14	318.3	1,284.0	939.3	978.2	1,234.0	1400	166.0	10,202	421.8	25,929
Aug-14	202.8	849.9	440.5	420.9	706.1	1400	693.9	42,657	979.1	60,188
Sep-14	178.2	758.4	394.3	401.8	591.9	1400	808.1	48,071	998.2	59,383
Oct-14	258.5	973.8	566.2	574.7	791.4	1400	608.6	37,411	825.3	50,734
Nov-14	209.2	720.9	473.9	479.4	674.9	1400	725.1	43,135	920.6	54,766
Dec-14	214.4	895.5	481.0	474.8	695.8	1400	704.2	43,287	925.2	56,875
Jan-15	217.4	975.9	507.3	515.0	785.6	1400	614.4	37,768	885.0	54,404
Feb-15	172.0	561.5	379.5	392.2	528.2	1400	871.8	48,406	1,007.8	55,957
Mar-15	181.3	707.5	426.6	430.0	617.3	1400	782.7	48,115	970.0	59,629
Apr-15	299.9	1,369.4	752.1	758.6	1,166.9	1400	233.1	13,867	641.4	38,157
May-15	222.0	911.5	445.5	434.1	697.3	1400	702.7	43,195	965.9	59,377
Jun-15	293.6	1,157.7	693.4	665.2	1,104.8	1400	295.2	17,559	734.8	43,713
Jul-15	310.2	1,400.0	960.0	1,011.0	1,272.0	1400	128.0	7,871	389.0	23,913
Aug-15	204.7	894.9	459.5	435.6	796.2	1400	603.8	37,115	964.4	59,285
Sep-15	179.8	672.2	389.9	394.6	582.4	1400	817.6	48,641	1,005.4	59,811
Oct-15	260.5	934.0	577.1	571.0	888.2	1400	511.8	31,462	829.0	50,961
Nov-15	210.9	810.9	483.9	484.2	704.1	1400	695.9	41,400	915.8	54,481
Dec-15	216.0	749.5	484.0	482.1	689.0	1400	711.0	43,710	917.9	56,426
Jan-16	205.4	1,138.9	520.4	539.4	763.6	1400	636.4	39,123	860.6	52,904
Feb-16	152.1	592.6	383.9	384.9	545.1	1400	854.9	47,469	1,015.1	56,362
Mar-16	182.9	711.9	431.9	428.8	618.0	1400	782.0	48,071	971.2	59,703
Apr-16	301.3	1,400.0	775.6	760.8	1,186.3	1400	213.7	12,715	639.2	38,026
May-16	225.7	1,059.8	485.1	468.7	779.2	1400	620.8	38,165	931.3	57,250

Table 5. Continued:

Jun-16	298.7	1,252.7	712.5	680.1	1,171.7	1400	228.3	13,584	719.9	42,827
Jul-16	317.2	1,400.0	996.4	1,052.3	1,314.2	1400	85.8	5,277	347.7	21,374
Aug-16	208.1	951.4	487.6	442.4	864.4	1400	515.6	31,698	957.6	58,867
Sep-16	181.9	845.0	418.1	419.0	663.3	1400	736.7	43,829	981.0	58,360
Oct-16	260.3	950.5	586.7	586.1	819.3	1400	580.7	35,700	813.9	50,033
Nov-16	211.3	733.6	489.2	501.7	687.2	1400	712.8	42,406	898.3	53,440
Dec-16	218.1	761.7	496.6	493.6	704.8	1400	695.2	42,737	906.4	55,719
Jan-17	235.4	1,092.0	563.4	552.0	835.5	1400	564.5	34,700	848.0	52,129
Feb-17	195.1	585.9	397.6	406.4	552.7	1400	847.3	47,048	993.6	55,169
Mar-17	187.4	747.0	454.3	462.1	627.1	1400	772.9	47,515	937.9	57,656
Apr-17	381.9	1,400.0	847.3	881.1	1,315.5	1400	84.5	5,025	518.9	30,869
May-17	235.3	963.5	572.1	553.2	918.3	1400	481.7	29,609	846.8	52,055
Jun-17	311.3	1,270.4	862.5	921.5	1,180.1	1400	219.9	13,061	478.5	28,466
Jul-17	398.4	1,400.0	1,088.9	1,113.2	1,360.6	1400	39.4	2,420	286.8	17,630
Aug-17	217.2	1,018.2	581.1	596.4	925.8	1400	474.2	29,152	803.6	49,400
Sep-17	183.9	809.0	473.1	507.9	712.1	1400	687.9	40,924	892.1	53,071
Oct-17	321.2	1,060.7	636.2	646.0	966.7	1400	433.3	26,639	754.0	46,351
Nov-17	213.5	741.1	505.1	509.5	706.1	1400	693.9	41,278	890.5	52,976
Dec-17	223.7	774.0	507.9	513.1	713.3	1400	686.7	42,211	886.9	54,520
Jan-18	221.4	1,030.4	616.9	599.7	927.1	1400	472.9	29,072	800.3	49,197
Feb-18	168.3	741.0	404.6	406.0	607.0	1400	793.0	44,032	994.0	55,191
Mar-18	202.8	765.6	459.7	471.2	651.0	1400	739.0	45,430	928.8	57,096
Apr-18	336.3	1,376.8	882.2	884.5	1,274.9	1400	125.1	7,440	515.5	30,667
May-18	232.9	1,058.6	589.3	568.0	933.5	1400	466.5	28,678	832.0	51,146
Jun-18	324.2	1,246.4	905.1	961.5	1,199.6	1400	200.4	11,924	438.5	26,086
Jul-18	427.0	1,400.0	1,120.8	1,135.8	1,400.0	1400	-	-	264.2	16,241
Aug-18	214.7	1,036.7	618.2	636.9	946.7	1400	453.3	27,866	763.1	46,910
Sep-18	186.1	1,051.5	492.5	473.8	813.5	1400	586.5	34,691	926.2	55,100
Oct-18	277.6	1,104.3	642.6	667.7	954.8	1400	445.4	27,378	732.3	45,017
Nov-18	228.5	989.4	520.7	524.4	726.2	1400	673.8	40,084	875.6	52,089
Dec-18	240.0	838.7	531.6	526.8	739.9	1400	660.1	40,581	873.2	53,678
Jan-19	279.0	1,115.4	630.8	626.4	1,003.0	1400	397.0	24,406	773.6	47,556
Feb-19	211.6	690.4	419.5	423.1	603.9	1400	796.1	44,203	976.9	54,241
Mar-19	218.1	1,109.5	495.4	485.3	726.8	1400	673.2	41,381	914.7	56,229
Apr-19	425.3	1,400.0	905.5	944.2	1,316.5	1400	83.5	4,970	455.8	27,116
May-19	235.6	1,114.6	625.1	604.2	927.8	1400	472.2	29,025	795.8	48,920
Jun-19	337.2	1,306.0	952.4	984.8	1,238.7	1400	161.3	9,597	415.2	24,700
Jul-19	482.7	1,400.0	1,159.3	1,166.0	1,400.0	1400	-	-	234.0	14,385
Aug-19	236.4	1,054.6	661.2	684.5	978.8	1400	421.2	25,894	715.5	43,984
Sep-19	188.3	940.5	504.9	507.8	787.6	1400	612.4	36,429	892.2	53,077
Oct-19	349.4	1,182.5	642.8	667.8	862.3	1400	537.7	33,056	732.2	45,011
Nov-19	243.6	865.9	521.1	510.8	758.0	1400	642.0	38,190	889.2	52,899
Dec-19	256.4	798.7	537.9	536.2	784.9	1400	635.1	39,043	863.8	53,100
Jan-20	241.2	1,132.2	642.1	645.4	952.2	1400	447.8	27,529	754.6	46,388
Feb-20	193.6	772.8	432.0	441.4	605.3	1400	794.7	44,125	958.6	53,225
Mar-20	233.6	811.6	484.3	483.6	683.9	1400	716.1	44,020	916.4	56,334
Apr-20	437.0	1,400.0	942.1	944.7	1,348.7	1400	51.3	3,049	455.3	27,086
May-20	269.5	1,145.3	670.0	619.1	1,042.2	1400	357.8	21,997	780.9	48,004
Jun-20	361.3	1,324.3	983.5	1,039.1	1,226.5	1400	173.5	10,320	360.9	21,470
Jul-20	671.9	1,400.0	1,191.1	1,190.4	1,400.0	1400	-	-	209.6	12,885
Aug-20	230.0	1,073.9	718.4	717.6	1,025.0	1400	375.0	23,055	682.4	41,949
Sep-20	190.6	1,086.1	555.5	548.9	889.2	1400	510.8	30,387	851.1	50,632
Oct-20	310.6	1,135.3	688.3	705.0	1,033.9	1400	366.1	22,505	695.0	42,724
Nov-20	258.8	834.5	533.3	538.6	743.4	1400	656.6	39,062	861.4	51,245
Dec-20	272.9	828.9	553.8	565.2	777.8	1400	622.2	38,246	834.8	51,318

Table 6. MWDSC Demand Projections with No East Branch Enlargement

Projections based on 3.80% increase per year (2011-2020 average) in W. Branch Use with No East Branch Enlargement	MEDIAN	95th %	MWDSC Capacity (cfs)	Capacity available over 95th % (cfs)	Availability af/month	Capacity avail. over Median (cfs)	Availability af/month
Jan-21	669.9	988.4	1400	411.6	25,305	730.1	44,880
Feb-21	458.2	628.3	1400	771.7	42,848	941.8	52,294
Mar-21	502.0	709.9	1400	690.1	42,422	898.0	55,204
Apr-21	980.6	1,400.0	1400	0.0	0	419.4	24,950
May-21	642.6	1,081.8	1400	318.2	19,563	757.4	46,558
Jun-21	1,078.6	1,273.1	1400	126.9	7,548	321.4	19,121
Jul-21	1,235.6	1,453.2	1400	-	-	164.4	10,104
Aug-21	744.9	1,063.9	1400	336.1	20,661	655.1	40,273
Sep-21	569.8	923.0	1400	477.0	28,377	830.2	49,391
Oct-21	731.8	1,073.2	1400	326.8	20,090	668.2	41,077
Nov-21	559.1	771.6	1400	628.4	37,382	840.9	50,027
Dec-21	586.7	807.4	1400	592.6	36,429	813.3	49,997
Jan-22	695.38	1,025.92	1400	374.1	22,996	704.6	43,315
Feb-22	475.58	652.18	1400	747.8	41,522	924.4	51,327
Mar-22	521.05	736.89	1400	663.1	40,764	878.9	54,032
Apr-22	1,017.86	1,453.19	1400	-	-	382.1	22,733
May-22	667.05	1,122.87	1400	277.1	17,036	733.0	45,057
Jun-22	1,119.57	1,321.51	1400	78.5	4,670	280.4	16,683
Jul-22	1,282.59	1,508.42	1400	-	-	117.4	7,218
Aug-22	773.17	1,104.34	1400	295.7	18,175	626.8	38,533
Sep-22	591.41	958.06	1400	441.9	26,291	808.6	48,103
Oct-22	759.60	1,113.97	1400	286.0	17,583	640.4	39,367
Nov-22	580.31	800.95	1400	599.0	35,637	819.7	48,783
Dec-22	608.97	838.08	1400	561.9	34,543	791.0	48,627
Jan-23	721.81	1,064.91	1400	335.1	20,599	678.2	41,691
Feb-23	493.66	676.96	1400	723.0	40,146	906.3	50,324
Mar-23	540.85	764.89	1400	635.1	39,042	859.1	52,814
Apr-23	1,056.54	1,508.41	1400	-	-	343.5	20,432
May-23	692.39	1,165.54	1400	234.5	14,413	707.6	43,499
Jun-23	1,162.12	1,371.72	1400	28.3	1,682	237.9	14,152
Jul-23	1,331.33	1,565.74	1400	-	-	68.7	4,221
Aug-23	802.55	1,146.30	1400	253.7	15,596	597.4	36,727
Sep-23	613.88	994.47	1400	405.5	24,125	786.1	46,766
Oct-23	788.46	1,156.30	1400	243.7	14,981	611.5	37,593
Nov-23	602.36	831.39	1400	568.6	33,827	797.6	47,451
Dec-23	632.11	869.93	1400	530.1	32,585	767.9	47,204
Jan-24	749.24	1,105.37	1400	294.6	18,112	650.8	40,004
Feb-24	512.41	702.68	1400	697.3	38,718	887.6	49,282
Mar-24	561.40	793.95	1400	606.0	37,256	838.6	51,551
Apr-24	1,096.69	1,565.73	1400	-	-	303.3	18,044
May-24	718.70	1,209.83	1400	190.2	11,690	681.3	41,881
Jun-24	1,206.28	1,423.85	1400	-	-	193.7	11,525
Jul-24	1,381.92	1,625.24	1400	-	-	18.1	1,112
Aug-24	833.05	1,189.66	1400	210.1	12,918	566.9	34,852
Sep-24	637.21	1,032.26	1400	367.7	21,877	762.8	45,378
Oct-24	818.42	1,200.24	1400	199.8	12,280	581.6	35,751
Nov-24	625.25	862.98	1400	537.0	31,947	774.7	46,090
Dec-24	656.13	902.98	1400	497.0	30,553	743.9	45,728
Jan-25	777.71	1,147.38	1400	252.6	15,530	622.3	38,254
Feb-25	531.89	729.39	1400	670.6	37,235	868.1	48,201
Mar-25	582.74	824.12	1400	575.9	35,401	817.3	50,240
Apr-25	1,138.36	1,625.23	1400	-	-	261.8	15,565
May-25	746.02	1,255.80	1400	144.2	8,864	654.0	40,202

Table 6. Continued:

Jun-25	1,252.11	1,477.96	1400	-	-	147.9	8,798
Jul-25	1,434.43	1,687.00	1400	-	-	-	-
Aug-25	864.71	1,235.08	1400	164.9	10,138	535.3	32,906
Sep-25	861.42	1,071.49	1400	328.5	19,543	738.6	43,938
Oct-25	849.52	1,245.85	1400	154.2	9,476	550.5	33,839
Nov-25	649.01	895.77	1400	504.2	29,997	751.0	44,676
Dec-25	681.07	937.30	1400	462.7	28,444	718.9	44,195
Jan-26	807.26	1,190.98	1400	209.0	12,849	592.7	36,438
Feb-26	552.10	767.10	1400	642.9	35,696	847.9	47,079
Mar-26	604.88	855.44	1400	544.6	33,476	795.1	48,878
Apr-26	1,181.62	1,686.99	1400	-	-	218.4	12,991
May-26	774.36	1,303.52	1400	96.5	5,931	625.6	38,460
Jun-26	1,299.70	1,534.12	1400	-	-	100.3	5,967
Jul-26	1,488.94	1,751.10	1400	-	-	-	-
Aug-26	897.57	1,282.01	1400	118.0	7,253	502.4	30,886
Sep-26	686.56	1,112.20	1400	287.8	17,121	713.4	42,443
Oct-26	881.81	1,293.19	1400	106.8	6,566	518.2	31,855
Nov-26	673.68	929.81	1400	470.2	27,972	726.3	43,209
Dec-26	706.95	972.91	1400	427.1	26,254	693.1	42,604
Jan-27	837.94	1,236.23	1400	163.8	10,067	562.1	34,552
Feb-27	573.08	795.87	1400	614.1	34,099	826.9	45,914
Mar-27	627.87	887.95	1400	512.1	31,477	772.1	47,465
Apr-27	1,226.52	1,751.10	1400	-	-	173.5	10,320
May-27	803.79	1,353.06	1400	46.9	2,886	596.2	36,651
Jun-27	1,349.08	1,592.41	1400	-	-	50.9	3,023
Jul-27	1,545.52	1,817.65	1400	-	-	-	-
Aug-27	931.67	1,330.73	1400	69.3	4,259	468.3	28,789
Sep-27	712.65	1,154.47	1400	245.5	14,607	687.4	40,891
Oct-27	915.32	1,342.33	1400	57.7	3,545	484.7	29,795
Nov-27	699.27	965.14	1400	434.9	25,870	700.7	41,686
Dec-27	733.81	1,009.88	1400	390.1	23,982	666.2	40,953
Jan-28	869.78	1,283.21	1400	116.8	7,179	530.2	32,594
Feb-28	594.86	816.74	1400	584.3	32,441	805.1	44,705
Mar-28	651.73	921.69	1400	478.3	29,403	748.3	45,999
Apr-28	1,273.13	1,817.64	1400	-	-	126.9	7,547
May-28	834.33	1,404.47	1400	-	-	565.7	34,773
Jun-28	1,400.35	1,652.93	1400	-	-	-	-
Jul-28	1,604.25	1,886.72	1400	-	-	-	-
Aug-28	967.06	1,381.29	1400	18.7	1,150	432.9	26,613
Sep-28	739.73	1,198.34	1400	201.7	11,997	660.3	39,280
Oct-28	950.10	1,393.34	1400	6.7	409	449.9	27,657
Nov-28	725.85	1,001.82	1400	398.2	23,688	674.2	40,105
Dec-28	761.69	1,048.26	1400	351.7	21,623	638.3	39,239
Jan-29	902.83	1,331.97	1400	68.0	4,182	497.2	30,563
Feb-29	617.46	846.73	1400	553.3	30,720	782.5	43,450
Mar-29	676.49	956.71	1400	443.3	27,260	723.5	44,476
Apr-29	1,321.51	1,886.71	1400	-	-	78.5	4,689
May-29	866.04	1,457.84	1400	-	-	534.0	32,824
Jun-29	1,453.56	1,715.74	1400	-	-	-	-
Jul-29	1,665.21	1,958.41	1400	-	-	-	-
Aug-29	1,003.83	1,433.78	1400	-	-	396.2	24,354
Sep-29	767.84	1,243.87	1400	156.1	9,288	632.2	37,607
Oct-29	986.20	1,446.29	1400	-	-	413.8	25,437
Nov-29	753.43	1,039.89	1400	360.1	21,423	646.6	38,464
Dec-29	790.64	1,088.09	1400	311.9	19,174	609.4	37,459
Jan-30	937.14	1,382.59	1400	17.4	1,070	462.9	28,454
Feb-30	640.92	878.91	1400	521.1	28,933	759.1	42,147
Mar-30	702.20	993.07	1400	406.9	25,015	697.8	42,896
Apr-30	1,371.73	1,958.40	1400	-	-	28.3	1,682
May-30	898.95	1,513.24	1400	-	-	501.1	30,801
Jun-30	1,508.60	1,780.94	1400	-	-	-	-

Table 6. Continued:

Jul-30	1,728.5	2,032.8	1400	0.0	0	0.0	0
Aug-30	1,042.0	1,486.3	1400	0.0	0	358.0	22,009
Sep-30	797.0	1,291.1	1400	106.9	6,476	603.0	35,872
Oct-30	1,023.7	1,501.2	1400	0.0	0	376.3	23,134
Nov-30	782.1	1,079.4	1400	320.6	19,072	617.9	36,761
Dec-30	820.7	1,129.4	1400	270.6	16,632	579.3	35,612
Jan-31	972.7	1,435.1	1400	0.0	0	427.3	26,266
Feb-31	665.3	912.3	1400	487.7	27,079	734.7	40,795
Mar-31	728.9	1,030.8	1400	369.2	22,696	671.1	41,256
Apr-31	1,423.9	2,032.8	1400	0.0	0	0.0	0
May-31	933.1	1,570.7	1400	0.0	0	466.9	28,701
Jun-31	1,566.1	1,848.6	1400	0.0	0	0.0	0
Jul-31	1,794.2	2,110.1	1400	0.0	0	0.0	0
Aug-31	1,081.6	1,544.8	1400	0.0	0	318.4	19,575
Sep-31	827.3	1,340.2	1400	59.8	3,557	572.7	34,079
Oct-31	1,062.6	1,556.3	1400	0.0	0	337.4	20,742
Nov-31	811.8	1,120.4	1400	279.6	16,632	588.2	34,993
Dec-31	851.9	1,172.4	1400	227.6	13,994	548.1	33,695
Jan-32	1,009.7	1,489.7	1400	0.0	0	390.3	23,992
Feb-32	690.6	947.0	1400	453.0	25,154	709.4	39,391
Mar-32	756.6	1,070.0	1400	330.0	20,268	643.4	39,553
Apr-32	1,478.0	2,110.1	1400	0.0	0	0.0	0
May-32	968.6	1,690.4	1400	0.0	0	431.4	26,522
Jun-32	1,625.6	1,918.9	1400	0.0	0	0.0	0
Jul-32	1,862.3	2,190.3	1400	0.0	0	0.0	0
Aug-32	1,122.7	1,603.5	1400	0.0	0	277.3	17,049
Sep-32	858.7	1,391.1	1400	8.9	528	541.3	32,200
Oct-32	1,103.0	1,617.5	1400	0.0	0	297.0	18,260
Nov-32	842.5	1,163.0	1400	237.0	14,096	557.4	33,156
Dec-32	884.2	1,216.9	1400	183.1	11,255	515.8	31,705
Jan-33	1,048.1	1,546.3	1400	0.0	0	351.9	21,634
Feb-33	716.8	983.0	1400	417.0	23,156	683.2	37,934
Mar-33	785.3	1,110.6	1400	289.4	17,788	614.7	37,786
Apr-33	1,534.1	2,190.3	1400	0.0	0	0.0	0
May-33	1,005.4	1,692.4	1400	0.0	0	394.6	24,259
Jun-33	1,687.4	1,991.8	1400	0.0	0	0.0	0
Jul-33	1,933.1	2,273.5	1400	0.0	0	0.0	0
Aug-33	1,165.3	1,664.5	1400	0.0	0	234.7	14,426
Sep-33	891.4	1,444.0	1400	0.0	0	508.6	30,258
Oct-33	1,144.9	1,679.0	1400	0.0	0	255.1	15,684
Nov-33	874.6	1,207.2	1400	192.8	11,470	525.4	31,253
Dec-33	917.8	1,263.2	1400	136.8	8,412	482.2	29,640
Jan-34	1,087.9	1,605.0	1400	0.0	0	312.1	19,185
Feb-34	744.0	1,020.3	1400	379.7	21,082	656.0	36,422
Mar-34	815.2	1,152.6	1400	247.2	15,194	584.8	35,951
Apr-34	1,592.4	2,273.5	1400	0.0	0	0.0	0
May-34	1,043.6	1,756.7	1400	0.0	0	356.4	21,911
Jun-34	1,751.5	2,067.5	1400	0.0	0	0.0	0
Jul-34	2,006.8	2,359.9	1400	0.0	0	0.0	0
Aug-34	1,209.6	1,727.7	1400	0.0	0	190.4	11,704
Sep-34	925.2	1,498.9	1400	0.0	0	474.8	28,243
Oct-34	1,188.4	1,742.8	1400	0.0	0	211.6	13,009
Nov-34	907.9	1,253.1	1400	146.9	8,741	492.1	29,276
Dec-34	952.7	1,311.2	1400	88.8	5,462	447.3	27,496
Jan-35	1,129.2	1,666.0	1400	0.0	0	270.8	16,644
Feb-35	772.3	1,059.1	1400	340.9	18,929	627.7	34,852
Mar-35	846.1	1,196.6	1400	203.4	12,501	553.9	34,047
Apr-35	1,652.8	2,359.9	1400	0.0	0	0.0	0
May-35	1,083.2	1,823.5	1400	0.0	0	316.8	19,473
Jun-35	1,818.1	2,146.0	1400	0.0	0	0.0	0
Jul-35	2,082.8	2,449.6	1400	0.0	0	0.0	0

Table 6. Continued:

Aug-35	1,255.58	1,793.36	1400	-	-	144.4	8,878
Sep-35	960.40	1,556.82	1400	-	-	439.6	26,152
Oct-35	1,233.53	1,809.00	1400	-	-	166.5	10,233
Nov-35	942.38	1,300.68	1400	99.3	5,908	457.6	27,224
Dec-35	988.92	1,360.98	1400	39.0	2,399	411.1	25,270

Table 7. Projected and Historical Capacity Use (af) by Other Southern California SWP Contractors
(excluding Castaic Lake Water Agency and The Metropolitan Water District of Southern California)

Contractor	SWP Entitlement (a)	Maximum Historical Use (b) Quantity	Year
Antelope Valley - East Kern WA	138,400	83,577	2000
Coachella Valley WD	23,100	85,709	1998
Crestline - Lake Arrowhead WA	5,800	2,170	1989
Desert WA	38,100	102,622	1996
Littlerock Creek ID	2,300	1,747	1990
Mojave WA	75,800	16,852	1994
Palmdale WA	21,300	13,278	1999
San Bernadino Valley MWD	102,600	32,426	1973
San Gabriel Valley MWD	28,800	21,729	1999
San Gorgonio Pass WA	17,300	200	2001
Ventura County FCD	20,000	4,836	1990
Totals	**473,500**	**365,146**	**—**

(a) Maximum entitlement in 2035; reference Table B-4, Bulletin 132-01, Appendix B

(b) Maximum deliveries through and including 2001; reference Table B-5B, Bulletin 132-01, Appendix B; quantities can be greater than entitlement due to delivery of other water supplies

Table 8. Past Ten Year SWP Deliveries (1992 - 2001) by Other Southern California SWP Contractors

Contractor	SWP Entitlement (a)	Total SWP Deliveries (b)									
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Antelope Valley - East Kern WA	138,400	30,625	43,102	49,153	47,286	56,356	62,393	52,926	69,073	83,577	45,542
Coachella Valley WD	23,100	10,427	23,100	14,102	23,100	62,219	58,100	78,100	50,480	42,323	9,100
Crestline - Lake Arrowhead WA	5,800	519	439	785	409	485	651	187	1,132	1,194	1,057
Desert WA	38,100	17,197	38,100	23,257	38,100	102,622	53,100	58,100	58,100	58,234	15,010
Littlerock Creek ID	2,300	251	734	1,098	480	494	444	404	342	0	0
Mojave WA	75,800	10,686	11,514	16,852	8,722	7,427	10,374	3,925	5,144	9,135	4,357
Palmdale WD	21,300	4,035	7,761	8,418	6,961	11,434	11,861	8,752	13,278	9,060	10,427
San Bernardino Valley MWD	102,600	3,358	4,361	9,135	696	6,064	9,654	1,878	12,874	18,399	26,488
San Gabriel Valley MWD	28,800	7,908	14,397	15,230	12,922	15,989	18,175	9,310	18,000	14,475	6,534
San Gorgonio Pass WA	17,300	0	0	0	0	0	0	0	0	0	0
Ventura County FCD	20,000	0	0	0	0	0	1,850	1,850	1,850	4,050	1,850
Totals	**473,500**	**85,006**	**143,508**	**138,030**	**138,676**	**263,090**	**226,602**	**215,432**	**230,273**	**240,447**	**120,365**

(a) Maximum entitlement in 2035; reference Table B-4, Bulletin 132-01, Appendix B.

(b) Includes Table A, Article 14 (b) (curtailed delivery), Article 21 (interruptible), Turnback, and Carryover (from prior year's Table A) water; reference Draft State Water Project Reliability Report.

Table 9. Capacity Available (af) within 132 cfs capacity based on CLWA Demand Projections with 95,200 af/year and 7,853 af/month Caps

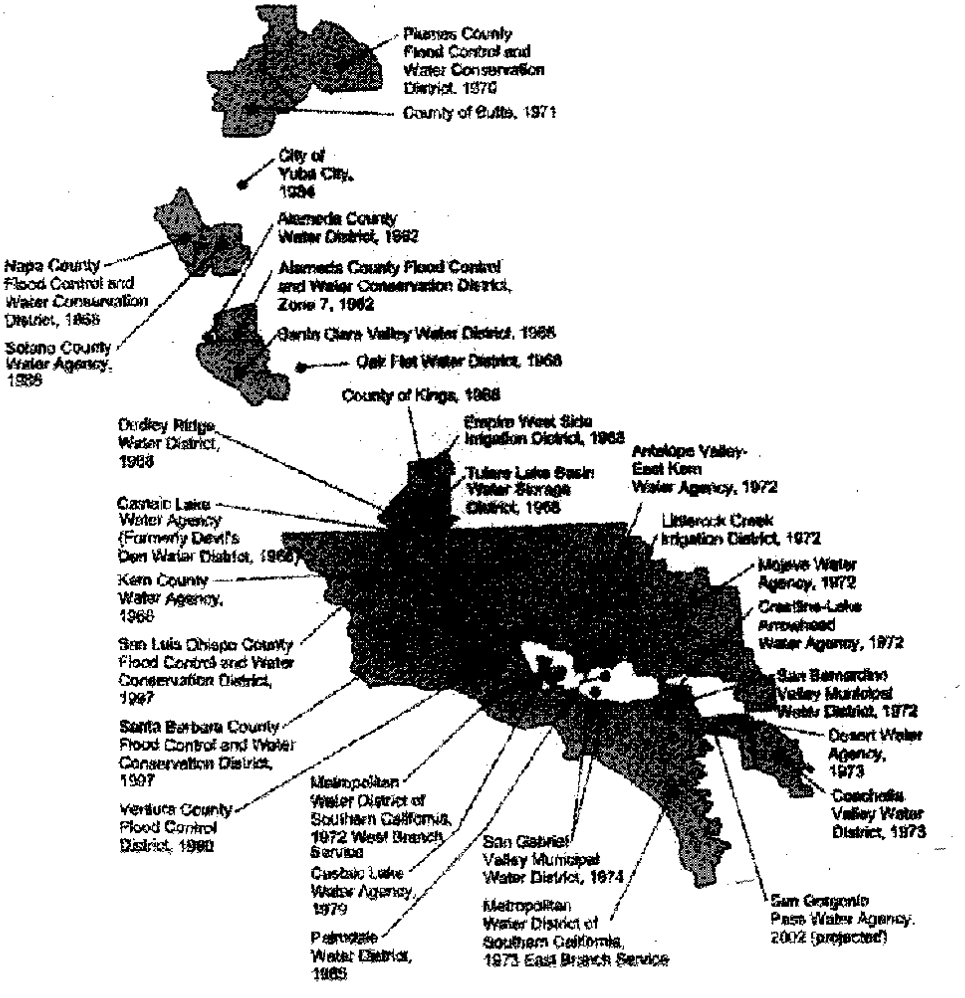
Year	CLWA Demand Estimate	Projection	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
1999	74400	74400	4,058.6	4,728.2	3,686.6	2,347.4	859.4	-	-	-	-	2,049.8	2,347.4	3,091.4	23,168.8
2000		74517	4,052.7	4,723.3	3,680.1	2,338.8	848.4	-	-	-	-	2,040.7	2,338.8	3,083.9	23,106.6
2001		74633	4,046.7	4,718.4	3,673.5	2,330.1	837.5	-	-	-	-	2,031.6	2,330.1	3,076.5	23,044.4
2002		74750	4,040.8	4,713.5	3,667.0	2,321.5	826.5	-	-	-	-	2,022.5	2,321.5	3,069.0	22,982.3
2003		74867	4,034.8	4,708.6	3,660.5	2,312.9	815.5	-	-	-	-	2,013.4	2,312.9	3,061.5	22,920.1
2004		74983	4,028.9	4,703.7	3,653.9	2,304.2	804.6	-	-	-	-	2,004.3	2,304.2	3,054.1	22,857.9
2005	75100	75100	4,022.9	4,698.8	3,647.4	2,295.6	793.6	-	-	-	-	1,995.2	2,295.6	3,046.6	22,795.7
2006		76580	3,948.4	4,637.5	3,565.6	2,187.6	656.4	-	-	-	-	1,881.3	2,187.6	2,953.2	22,017.5
2007		78020	3,874.0	4,576.2	3,483.9	2,079.5	519.1	-	-	-	-	1,767.4	2,079.5	2,859.7	21,239.3
2008		79480	3,799.5	4,514.8	3,402.1	1,971.5	381.9	-	-	-	-	1,653.6	1,971.5	2,766.3	20,461.2
2009		80940	3,725.1	4,453.5	3,320.4	1,863.4	244.6	-	-	-	-	1,539.7	1,863.4	2,672.8	19,683.0
2010	82400	82400	3,650.6	4,392.2	3,238.6	1,755.4	107.4	-	-	-	-	1,425.8	1,755.4	2,579.4	18,904.8
2011		84240	3,556.8	4,314.9	3,135.6	1,619.2	-	-	-	-	-	1,282.3	1,619.2	2,461.6	17,989.6
2012		86080	3,462.9	4,237.6	3,032.5	1,483.1	-	-	-	-	-	1,138.8	1,483.1	2,343.9	17,181.9
2013		87920	3,369.1	4,160.4	2,929.5	1,346.9	-	-	-	-	-	995.2	1,346.9	2,226.1	16,374.1
2014		89760	3,275.2	4,083.1	2,826.4	1,210.8	-	-	-	-	-	851.7	1,210.8	2,108.4	15,566.4
2015	91600	91600	3,181.4	4,005.8	2,723.4	1,074.6	-	-	-	-	-	708.2	1,074.6	1,990.6	14,758.6
2016		93780	3,070.2	3,914.2	2,601.3	913.3	-	-	-	-	-	538.2	913.3	1,851.1	13,801.6
2017		95960	2,959.0	3,822.7	2,479.2	752.0	-	-	-	-	-	368.1	752.0	1,711.6	12,844.6
2018		98140	2,847.9	3,731.1	2,357.2	590.6	-	-	-	-	-	198.1	590.6	1,572.0	11,887.5
2019		100320	2,736.7	3,639.6	2,235.1	429.3	-	-	-	-	-	28.0	429.3	1,432.5	10,930.5
2020	102500	102500	2,625.5	3,548.0	2,113.0	268.0	-	-	-	-	-	-	268.0	1,293.0	10,115.5
2021		104680	2,514.3	3,456.4	1,990.9	106.7	-	-	-	-	-	-	106.7	1,153.5	9,328.5
2022		106860	2,403.1	3,364.9	1,868.8	-	-	-	-	-	-	-	-	1,014.0	8,650.8
2023		109040	2,292.0	3,273.3	1,746.8	-	-	-	-	-	-	-	-	874.4	8,186.5
2024		111220	2,180.8	3,181.8	1,624.7	-	-	-	-	-	-	-	-	734.9	7,722.1
2025		113400	2,069.6	3,090.2	1,502.6	-	-	-	-	-	-	-	-	595.4	7,257.8
2026		115580	1,958.4	2,998.6	1,380.5	-	-	-	-	-	-	-	-	455.9	6,793.5
2027		117760	1,847.2	2,907.1	1,258.4	-	-	-	-	-	-	-	-	316.4	6,329.1
2028		119940	1,736.1	2,815.5	1,136.4	-	-	-	-	-	-	-	-	176.8	5,864.8
2029		122120	1,624.9	2,724.0	1,014.3	-	-	-	-	-	-	-	-	37.3	5,400.4
2030		124300	1,513.7	2,632.4	892.2	-	-	-	-	-	-	-	-	-	5,038.3
2031		126480	1,402.5	2,540.8	770.1	-	-	-	-	-	-	-	-	-	4,713.5
2032		128660	1,291.3	2,449.3	648.0	-	-	-	-	-	-	-	-	-	4,388.7
2033		130840	1,180.2	2,357.7	526.0	-	-	-	-	-	-	-	-	-	4,063.8
2034		133020	1,069.0	2,266.2	403.9	-	-	-	-	-	-	-	-	-	3,739.0
2035		135200	957.8	2,174.6	281.8	-	-	-	-	-	-	-	-	-	3,414.2

Table 10. Summary of Available Capacity in West Branch

Assumes No East Branch Enlargement Implementation
Underlying MWDSC Demands From The 2000 Sales Forecast

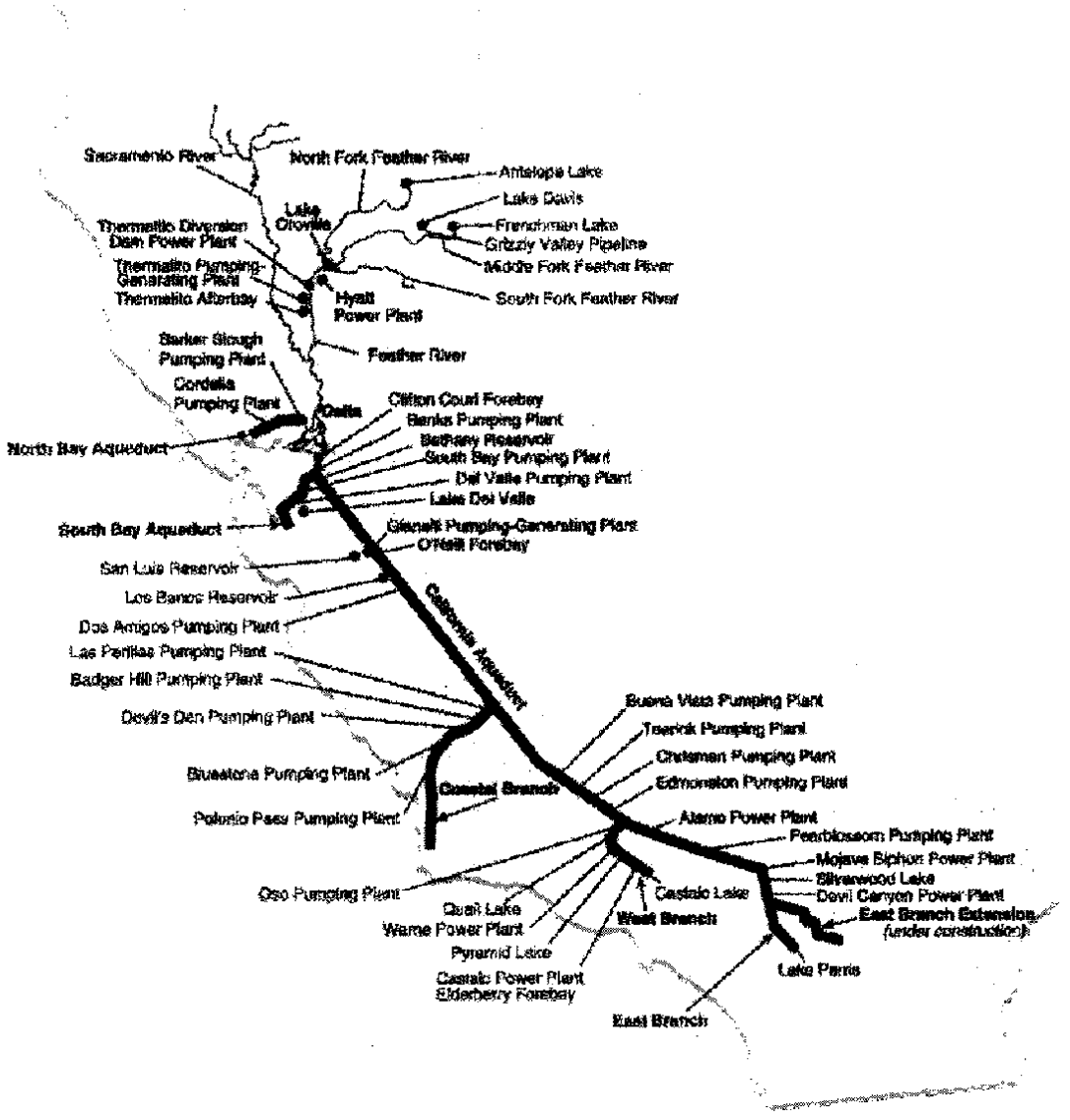
Year	Availability of Capacity over 95th % (af)	Availability of Capacity over Median (af)
2002	557,064	708,030
2003	515,339	683,836
2004	514,675	681,630
2005	512,981	675,331
2006	505,395	676,919
2007	525,844	676,749
2008	527,048	671,942
2009	513,765	664,654
2010	489,288	661,499
2011	489,574	653,135
2012	472,987	643,682
2013	465,669	633,170
2014	449,957	623,647
2015	419,109	616,113
2016	400,772	604,864
2017	359,600	550,292
2018	337,375	538,418
2019	326,194	521,217
2020	304,297	503,259
2021	280,624	483,877
2022	259,217	463,758
2023	236,996	442,875
2024	215,350	421,198
2025	194,628	400,814
2026	173,118	380,810
2027	150,791	360,045
2028	127,890	338,512
2029	112,036	319,305
2030	97,199	299,368
2031	83,957	280,092
2032	71,323	261,830
2033	60,826	242,873
2034	50,478	223,197
2035	39,737	202,773

Figure 1. Locations of State Water Project Contractors



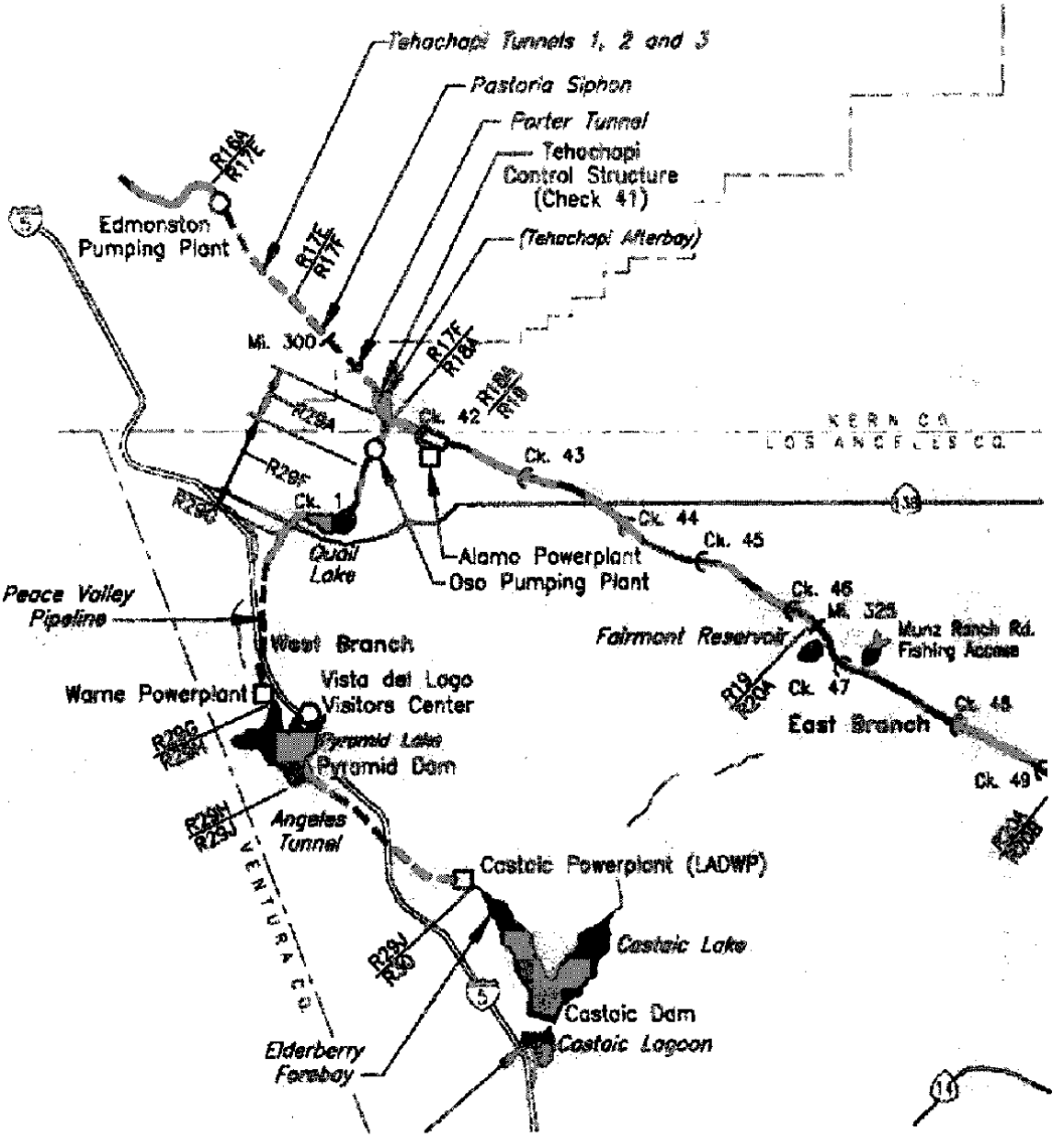
Ref: DWR Bulletin 132-00

Figure 2. Locations of Primary State Water Project Facilities



Ref. DWR Bulletin 132-00

Figure 3. Locations of Reaches and Facilities
Kern County to Castaic Lake



Ref: DWR Data Handbook

Figure 4. Castaic Lake Water Agency 2020 SWP Demand Distribution

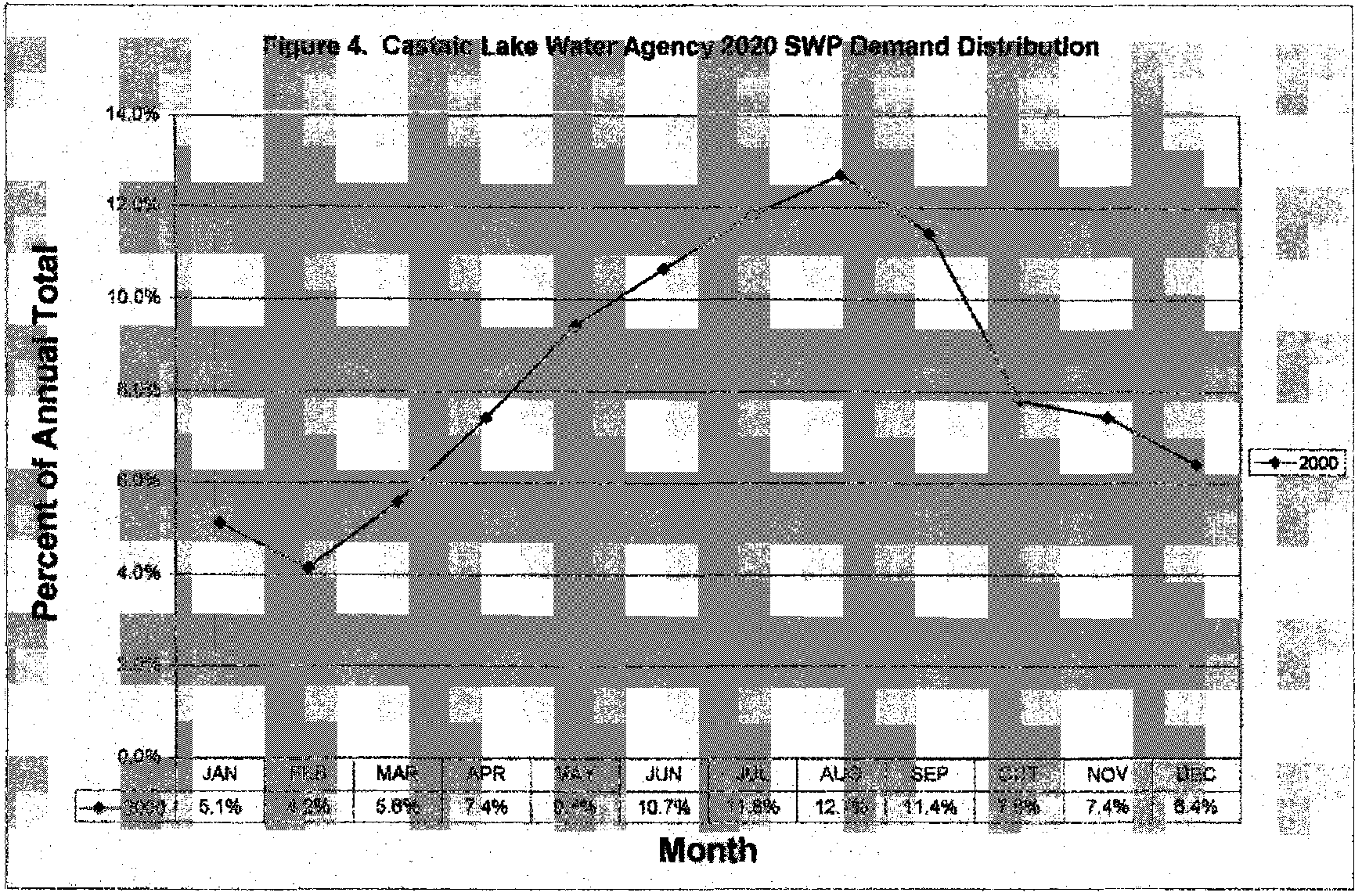


Figure 5. West Branch Flow Profile

Without an Increase to East Branch Capacity

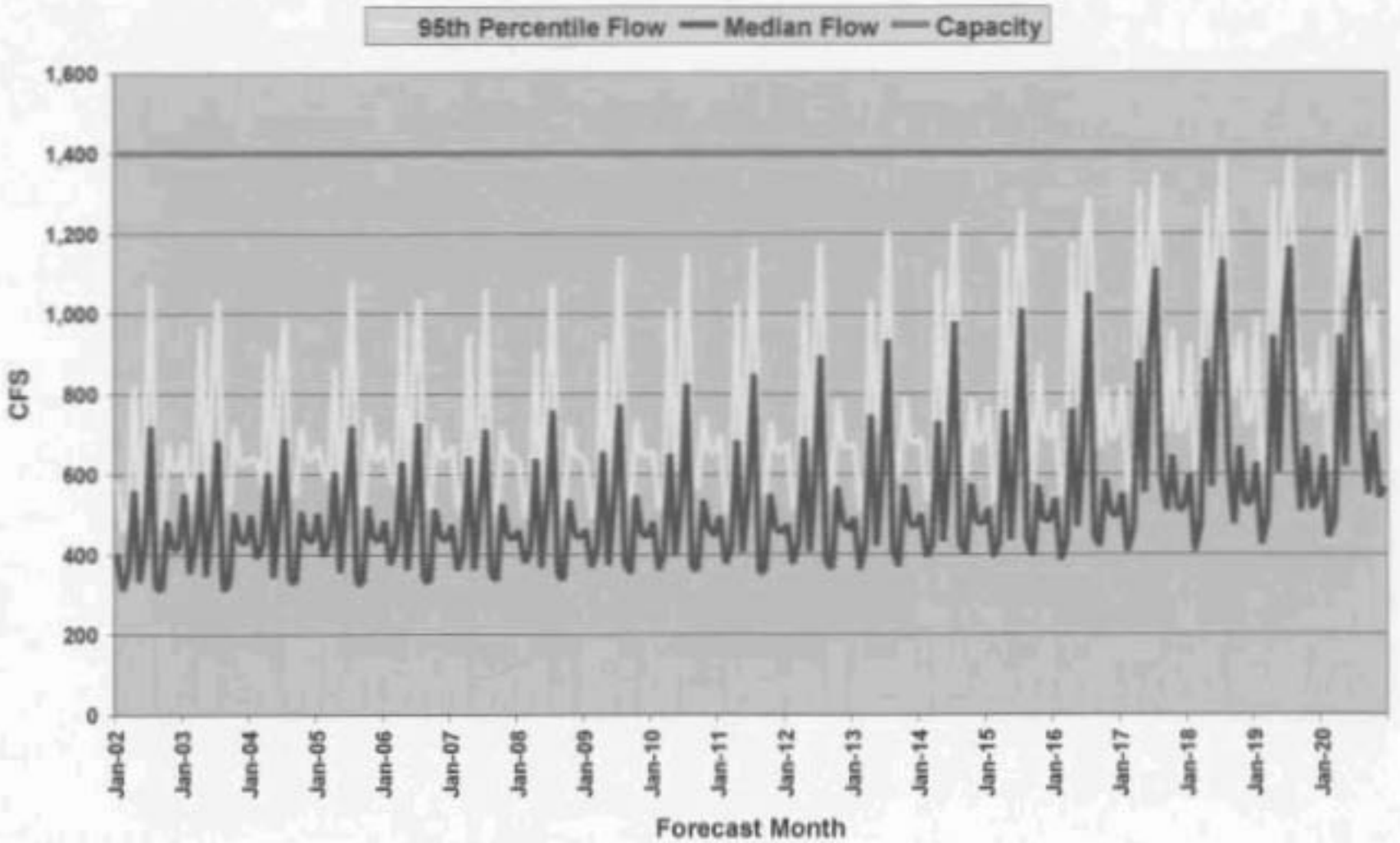
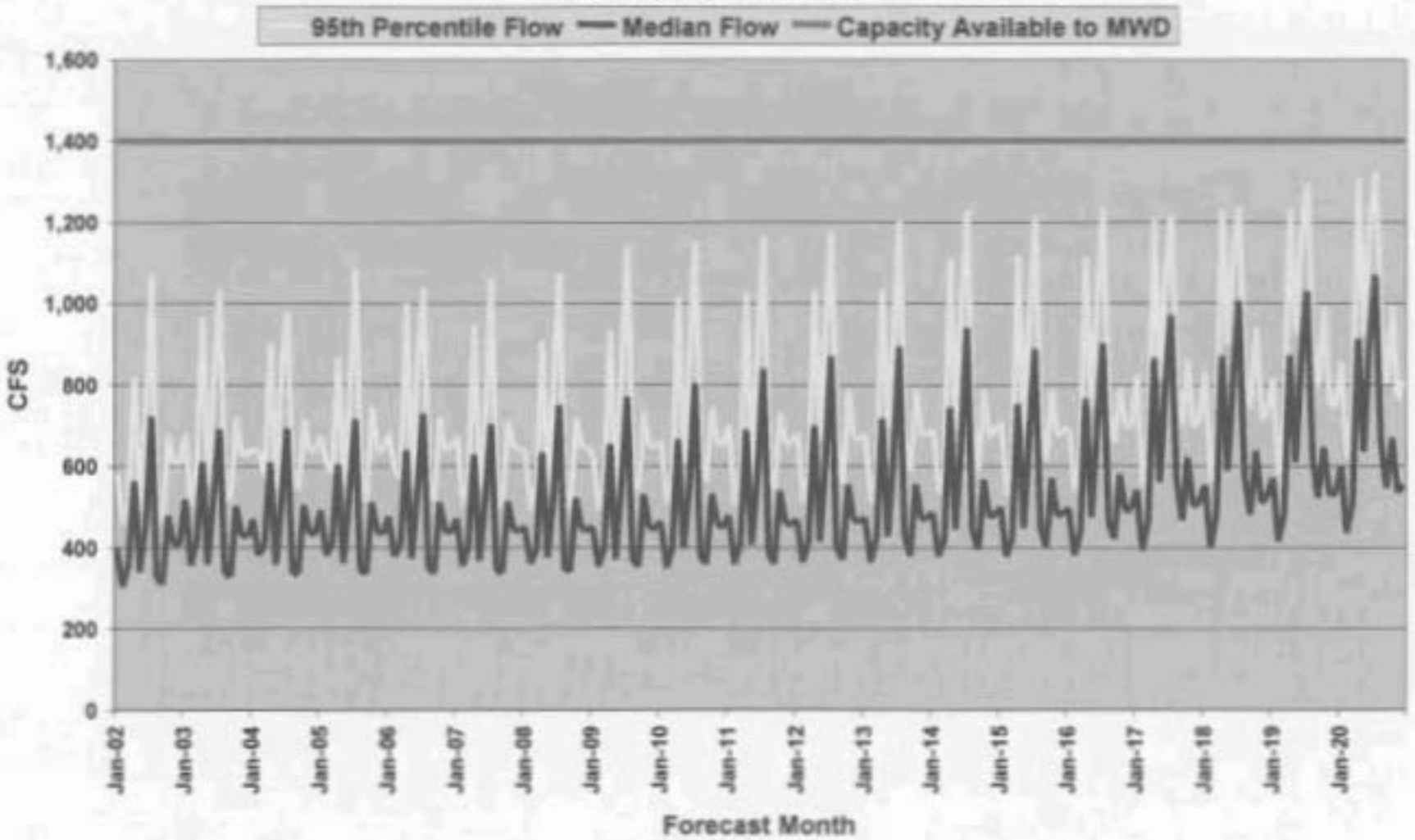


Figure 6. West Branch Flow Profile

With Enlargement to East Branch Capacity in 2015
and Full Enlargement in 2017



APPENDIX: Table A. SWP Delta Average and Wet-Year Delivery (1922-1994 hydrology, in percent of SWP entitlement)[a]

Study	*Average*	*Single wet year 1983*	*2-year wet 1982-1983*	*4-year wet 1980-1983*	*6-year wet 1978-1983*	*10-year wet 1978-1987*
2001	72	73	79	80	80	80
2021A	75	82	89	86	87	84
2021B	76	100	100	91	91	87

[a] Reference: Table 5 from DWR "The State Water Project Delivery Reliability Report", August 2002 draft.

APPENDIX: Table B. State Water Project Delivery (1922 – 1993) Hydrology

SWP ENTITLEMENT DELIVERY (*w/o Article 21 water*)
(summary of 8-15-00 work by SWRI)

YEAR	4.2 MAF, VARIABLE		4.2 MAF, FIXED	
1922	4123	100%	4123	100%
1923	4132	100%	4132	100%
1924	1510	37%	1511	37%
1925	1632	39%	1632	39%
1926	2648	64%	2649	64%
1927	4123	100%	4123	100%
1928	3453	84%	3453	84%
1929	1965	48%	1965	48%
1930	2651	64%	2651	64%
1931	1743	42%	1747	42%
1932	2035	49%	2035	49%
1933	1597	39%	1597	39%
1934	1687	41%	1687	41%
1935	3711	90%	3711	90%
1936	3479	84%	3478	84%
1937	3245	79%	3243	78%
1938	4125	100%	4125	100%
1939	3746	91%	3762	91%
1940	4004	97%	4004	97%
1941	3474	84%	4124	100%
1942	3878	94%	4126	100%
1943	3883	94%	3883	94%
1944	3703	90%	4056	98%
1945	3931	95%	3878	94%
1946	3964	96%	4124	100%
1947	3098	75%	2883	70%
1948	3104	75%	3084	75%
1949	2952	71%	2925	71%
1950	3057	74%	3059	74%
1951	4093	98%	4132	100%
1952	3508	85%	4132	100%
1953	4055	98%	4126	100%
1954	4124	100%	4120	100%
1955	2375	57%	2368	57%
1956	4124	100%	4124	100%
1957	3532	85%	3538	86%
1958	3932	95%	4123	100%
1959	3934	95%	3933	95%
1960	2332	56%	2331	56%
1961	2643	64%	2642	64%
1962	3214	78%	3213	78%
1963	4123	100%	4123	100%
1964	3699	90%	3694	89%
1965	3132	76%	3136	76%
1966	4044	98%	4132	100%
1967	4022	97%	4122	100%
1968	3746	91%	3746	91%
1969	3575	87%	4124	100%
1970	3997	97%	4126	100%
1971	4127	100%	4125	100%
1972	3192	77%	3143	76%
1973	4108	99%	4123	100%
1974	4090	99%	4132	100%
1975	4102	99%	4123	100%
1976	3294	80%	3305	80%
1977	937	23%	937	23%
1978	3874	94%	4063	98%
1979	3752	91%	3750	91%
1980	3614	87%	3614	87%
1981	3654	88%	3653	88%
1982	4008	97%	4132	100%
1983	3342	81%	4132	100%
1984	4060	98%	4132	100%
1985	3895	94%	3963	96%
1986	3241	78%	3303	80%
1987	3169	77%	3146	76%
1988	1565	38%	1562	38%
1989	2878	70%	2878	70%
1990	1744	42%	1744	42%
1991	1067	26%	1067	26%
1992	1432	35%	1432	35%
1993	4115	100%	4115	100%
MIN		23%		23%
AVG		79%		81%
MAX		100%		100%

Draft
Nov. 2001

CALSIM Modeling Assumptions
(2020 Level Base study)

Hydrology and Demands

- 2020 Level of Hydrology (2020009E) and upstream depletions are based on DWR Bulletin 160-98 land use projections (73-years: 1922-1994).
- 75% deficiency is applied to CVP project users in the Sacramento River basin in 1924, 1929-1934, 1976-1977, 1987-1992, and 1994 in order to have sufficient water in Shasta to meet temperature control flows below Keswick.
- South of Delta SWP Demand varies from varies from 3.51 maf to 4.19 maf/yr. based on local wetness index in Southern California.
- Maximum SWP Interruptible Demand is 134 taf/month.
- South of Delta CVP demand is 3.62 maf/year.

Regulatory and Environmental Standards

- Meet SWRCB D-1641 Delta Standards.
- Vernalis minimum flows from Feb. – June and Oct. are **not** modeled.
- Meet upstream AFRP flows (November 20, 1997 AFRP Document) below Keswick, Whiskeytown and Nimbus Dams.
- Meet Vernalis Adaptive Management Plan (VAMP) flows during April 15 – May 15 at Vernalis.
- CVP export during April 15 – May 15 is restricted to the 2:1 export criteria (1995 Delta Smelt Biological Opinion) and is computed as 50% of the result of the maximum of VAMP flow – ⅓ Biological Opinion target flow or 1,500 cfs.
- SWP export during April 15 – May 15 is restricted to the 1:1 export criteria and is computed as 50% of the result of the maximum of 100% of Vernalis base flow or 1500 cfs.
- Meet 1993 Winter-run Biological Opinion (NMFS) temperature control flows below Keswick in April through September. These flows are assumed to be in the range of 5,500 cfs to 11,000 cfs for most years and reduced to 3,750 cfs to 7,125 cfs in drier years.
- Full and unlimited joint point of diversion (SWP wheels for the CVP whenever unused capacity at Banks P.P. is available).
- Banks pumping capacity is 6,680 cfs and can be increased up to 8,500 cfs from December 15 to March 15 when San Joaquin River flows are above 1,000 cfs.
- Stanislaus River operations are in accordance with the USBR's New Melones Interim Operation Plan.
- Meet Trinity River minimum flows of 340 taf/yr.

Appendix: Table C. Turn-back Water Pool Program (Results for 2000, 2001 & 2002)

2000 TURN-BACK WATER POOL PROGRAM
REVISED RESULTS

[90% SWP Alloc.]

S.W.P. CONTRACTORS	POOL A				POOL B			
	SELLERS' OFFERS	BUYERS' REQUESTS	AMOUNT PURCHASED BY BUYERS	REMAIN. WATER	SELLERS' OFFERS	BUYERS' REQUESTS	AMOUNT PURCHASED BY BUYERS	REMAIN. WATER
FEATHER RIVER:								
County of Butte	645				1,156			
Plumas County FC&WCD								
City of Yuba City	3,300				3,840			
NORTH BAY:								
Napa County FC&WCD								
Solano County WA								
SOUTH BAY:								
Alameda County FC&WCD,Zone 7								
Alameda County WD								
Santa Clara Valley WD								
SAN JOAQUIN VALLEY:								
Oak Flat WD								
County of Kings								
Castaic Lake WA								
Dudley Ridge WD		12,400	3,615			17,800	5,578	
Empire West Side ID								
Kern County WA		81,886	69,145			228,449	164,057	
Tulare Lake Basin WSD		81,886	8,027			80,000	19,046	
CENTRAL COASTAL:								
San Luis Obispo County FC&WCD	8,561				10,000			
Santa Barbara County FC&WCD					8,392			
SOUTHERN CALIFORNIA:								
Antelope Valley-East Kern WA	430				48,630			
Castaic Lake WA	4,101				40,000			
Coachella Valley WD						35,000	3,713	
Crestline-Lake Arrowhead WA	750				2,320			
Desert WA						40,000	6,124	
Littlerock Creek ID								
Mojave WA	29,000				28,220			
Metropolitan WDSC								
Palmdale WD								
San Bernardino Valley MWD	25,000				42,340			
San Gabriel Valley MWD					11,920			
San Gorgonio Pass WA	1,500				1,200			
Ventura County FCD	7,500				5,500			
TOTAL	80,787	175,772	80,787	0	201,518	401,249	201,518	0

Appendix: Table C. Turn-back Water Pool Program (Results for 2000, 2001 & 2002)

2000 TURN-BACK WATER POOL PROGRAM
REVISED RESULTS

[90% SWP ALLOC.]

S.W.P. CONTRACTORS	POOL A				POOL B			
	SELLERS' OFFERS	BUYERS' REQUESTS	AMOUNT PURCHASED BY BUYERS	REMAIN. WATER	SELLERS' OFFERS	BUYERS' REQUESTS	AMOUNT PURCHASED BY BUYERS	REMAIN. WATER
FEATHER RIVER:								
County of Butte	645				1,156			
Plumas County FC&WCD								
City of Yuba City	3,300				3,840			
NORTH BAY:								
Napa County FC&WCD								
Solano County WA								
SOUTH BAY:								
Alameda County FC&WCD,Zone 7								
Alameda County WD								
Santa Clara Valley WD								
SAN JOAQUIN VALLEY:								
Oak Flat WD								
County of Kings								
Castaic Lake WA								
Dudley Ridge WD		12,400	3,615			17,800	8,578	
Empire West Side ID								
Kern County WA		81,686	69,145			228,449	164,057	
Tulare Lake Basin WSD		81,686	8,027			80,000	19,048	
CENTRAL COASTAL:								
San Luis Obispo County FC&WCD	8,581				10,000			
Santa Barbara County FC&WCD					8,392			
SOUTHERN CALIFORNIA:								
Antelope Valley-East Kern WA	430				48,630			
Castaic Lake WA	4,101				40,000			
Coachella Valley WD						35,000	3,713	
Crestline-Lake Arrowhead WA	750				2,320			
Desert WA						40,000	6,124	
Littlerock Creek ID								
Mojave WA	29,000				28,220			
Metropolitan WDSC								
Palmdale WD								
San Bernardino Valley MWD	25,000				42,340			
San Gabriel Valley MWD					11,920			
San Gorgonio Pass WA	1,500				1,200			
Ventura County FCD	7,500				5,500			
TOTAL	80,787	175,772	80,787	0	201,518	401,249	201,518	0

[39% SWP ALLOC.]

2001 Turn-Back Water Pool Program Results
(acre-feet)

PARTICIPATING SWP CONTRACTORS	TABLE A	Pool A		Pool B	
		Sell	Buy	Sell	Buy
NORTH BAY					
Napa County FC&WCD	20,725				82
SOUTH BAY					
Alameda County FC&WCD, Zone 7	78,000				308
Alameda County WD	42,000		107		
SAN JOAQUIN VALLEY					
Oak Flat WD	5,700				22
Castaic Lake WA	12,700		32		50
Dudley Ridge WD	53,370		136		211
Kern County WA	1,000,949		2,546		3,956
Tulare Lake Basin WSD	118,500		301		468
CENTRAL COASTAL					
San Luis Obispo County FC&WCD	25,000				99
Santa Barbara County FC&WCD	45,486		116		180
SOUTHERN CALIFORNIA					
Antelope Valley-East Kern WA	138,400		352		547
Castaic Lake WA	82,500		210		326
Coachella Valley WD	23,100				91
Desert WA	38,100				151
Mojave WA	75,800			14,240	
Metropolitan WDSC	2,011,500				7,949
San Gorgonio Pass WA	4,000	800		200	
Ventura County FCD	20,000	3,000			
TOTAL		3,800	3,800	14,440	14,440

SWPAO
04/06/2001

[65% SWP ALLOC.]

2002 Turn-Back Water Pool Program Results
(acre-feet)

PARTICIPATING SWP CONTRACTORS	TABLE A	Pool A		Pool B	
		Sell	Buy	Sell	Buy
FEATHER RIVER					
County of Butte				900	
City of Yuba				3,261	
NORTH BAY					
Napa County FC&WCD	21,100				283
SOUTH BAY					
Alameda County FC&WCD Zone 7	78,000		556		
Alameda County WD	42,000		299		563
Santa Clara Valley WD	100,000		713		1,340
SAN JOAQUIN VALLEY					
County of Kings	4,000				54
Dudley Ridge WD	57,343		409		768
Kern County WA	1,000,949		7,133		13,410
Oak Flat WD	5,700				76
Tulare Lake Basin WSD	111,527		795		1,494
CENTRAL COASTAL					
San Luis Obispo County FC&WCD				100	
Santa Barbara County FC&WCD	45,486		324		
SOUTHERN CALIFORNIA					
AVEK WA	141,400		1,008		
Coachella Valley WD	23,100		165		309
Desert WA	38,100		271		510
MWDSC	2,011,500		14,335		
Mojave WA		19,110		11,379	
Palmdale WD	21,300		152		285
San Gorgonio Pass WA		300		1,200	
Ventura County FCD		6,750		2,252	
TOTAL		26,160	26,160	19,092	19,092

APPENDIX: Table D. Amendment No. 18 to the Water Supply Contract between the State of California Department of Water Resources and Castaic Lake Water Agency

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

AMENDMENT NO. 18 TO THE WATER SUPPLY CONTRACT
BETWEEN
THE STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
AND
CASTAIC LAKE WATER AGENCY

THIS AMENDMENT to the Water Supply Contract is made this 31st day of March, 1999, pursuant to the provisions of the California Water Resources Development Bond Act, the Central Valley Project Act, and other applicable laws of the State of California, between the State of California, acting by and through its Department of Water Resources, herein referred to as the "State," and Castaic Lake Water Agency, herein referred to as the "Agency,"

RECITALS:

A. The State and the Agency have entered into and subsequently amended a Water Supply Contract (the "Water Supply Contract") providing that the State will supply certain quantities of water to the Agency, and providing that the Agency shall make certain payments to the State, and setting forth the terms and conditions of such supply and such payment.

B. The contractors and the State have amended the Water Supply Contracts to implement provisions of the Monterey Agreement (the "Monterey Amendment").

C. Among other things, Article 53 of the Water Supply Contract provides for the permanent transfer of up to 130,000 acre-feet of agricultural entitlement water to urban agencies.

D. The Agency and the Wheeler Ridge-Maricopa Water Storage District have entered into an Agreement to Purchase Wheeler Ridge-Maricopa Water Storage District State Water Project Entitlement to Water executed as of this date to provide for the sale by Kern County Water Agency, herein referred to as "KCWA", on behalf of Wheeler Ridge-Maricopa to the Agency of 41,000 acre-feet per year of KCWA's annual entitlement that has been allocated to Wheeler Ridge-Maricopa by KCWA under the contract between Wheeler Ridge-Maricopa and KCWA dated January 8, 1970 and all amendments thereto.

E. The State and Agency wish to set forth their agreement as to such matters as (i) the 41,000 acre-feet per year increase in the Agency's annual entitlement, (ii) the transfer of related transportation repayment obligations, and (iii) the revision of proportionate use of facilities factors set forth in the Water Supply Contract.

F. The State and KCWA are simultaneously with the execution and delivery of this Amendment, entering into Amendment No. 28 to KCWA's Water Supply Contract between KCWA and the State in order to reflect (i) the transfer of Table A Entitlement described herein, (ii) the transfer of related transportation repayment obligations, and (iii) the revision of proportionate use of facilities factors.

G. This Amendment is permitted by the terms of the Water Supply Contract, and except as amended herein, the provisions of the Water Supply Contract will remain in full force and effect.

NOW, THEREFORE, it is mutually agreed that the following changes are hereby made to the Agency's Water Supply Contract:

1. Article 53(j) is added to read:

(j) In accordance with Article 53(a) the Agency is increasing its Table A annual entitlements by 41,000 acre-feet beginning in year 2000 and each succeeding year thereafter for the term of the contract through a sale from Kern County Water Agency of 41,000 acre-feet of the 130,000 acre-feet made available to Urban Contractors. As a result of this sale, Table A as designated in Article 6(b) is amended as follows:

TABLE A

ANNUAL ENTITLEMENTS
CASTAIC LAKE WATER AGENCY
(Acre-feet)

Year		
1	(1968)	3,700
2	(1969)	5,000
3	(1970)	5,700
4	(1971)	6,700
5	(1972)	8,936
6	(1973)	12,400
7	(1974)	15,400
8	(1975)	18,200
9	(1976)	21,200
10	(1977)	24,100
11	(1978)	24,762
12	(1979)	28,000
13	(1980)	30,400
14	(1981)	32,800
15	(1982)	34,800
16	(1983)	37,300
17	(1984)	39,600
18	(1985)	41,800
19	(1986)	43,600
20	(1987)	45,600
21	(1988)	48,000
22	(1989)	50,100
23	(1990)	52,000
24	(1991)	54,200
25	(1992)	54,200
26	(1993)	54,200
27	(1994)	54,200
28	(1995)	54,200
29	(1996)	54,200
30	(1997)	54,200
31	(1998)	54,200
32	(1999)	54,200
~~33~~	~~(2000)~~	~~54,200~~
33	(2000)	95,200
And each succeeding year thereafter, for the term of this contract as an annual entitlement:		~~54,200~~ 95,200

The following apply to this sale:

(1) Increases in the Agency's Delta Water and Transportation Charges and Water System Revenue Bond Surcharge resulting from the increase in the Agency's annual entitlements for 2000 and each year thereafter shall commence January 1, 2000, and be identified by the State and included in its annual Statement of Charges to the Agency.

(2) All future adjustments in charges and credits of past costs associated with the 41,000 acre-feet of annual entitlement (or applicable portion thereof) and the related transportation capacity in Reaches 1 through 16A of the California Aqueduct shall be attributable to the Agency as if the Agency's annual entitlement and the related transportation capacity had been increased by the 41,000 acre-feet of annual entitlement purchased from the KCWA in years prior to January 1, 2000.

(3) For cost allocation and repayment purposes, Exhibit A attached hereto shows entitlement and capacity amounts for each aqueduct reach in which the Agency participates. These redetermined values shall be used to derive the proportionate use of facilities factors as set forth in Table B as designated in Article 24(b). The capacity amounts shown in Exhibit A are estimated values. Actual values will be used by the State in implementing the terms of this Amendment and in redetermination of Table B of this Water Supply Contract under Article 28.

2. Article 12(c)(1) which defines the limits on the instantaneous rate of flow to the Agency from Castaic Lake based on peaking factors, is modified to delete "ninety-nine (99)" and replace it with "one hundred fifty (150)."

3. This Amendment is contingent upon the effectiveness of Water Supply Contract Amendment No. 28, between the State and the KCWA. If either amendment ceases to be effective, the State may identify the date on which the contract amendments shall be deemed inoperative, for the purpose of assuring timely repayment of contract obligations and orderly administration of the long-term water supply contracts.

4. The Agency agrees to indemnify, defend, and hold harmless the State and any of its officers, agents, or employees from any liability, expenses, defense costs, attorney fees, claims, actions, liens and lawsuits of any kind arising from or related to any and all actions implementing this Amendment and associated agreements.

IN WITNESS WHEREOF, the parties hereto have executed this Amendment on the date first above written.

Approved as to legal form and sufficiency:

for Chief Counsel
Department of Water Resources

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

Stephen J. Kashiwada
for Director

CASTAIC LAKE WATER AGENCY

ATTEST:

Robert H. Clark
Signature

Ass't Secretary
Title

Signature

President, Board of Directors
Title

AMENDMENT NO. 18
EXHIBIT A

CASTAIC LAKE WATER AGENCY
ANNUAL ENTITLEMENT AND CAPACITY VALUES FOR EACH REACH
FOR COST ALLOCATION AND REPAYMENT ONLY

The values related to this transfer are estimated to be as follows:

California Aqueduct [1]	Before Transfer		Entitlement Transferred from KCWA (AF) (3)	Capacity Transferred from KCWA (cfs) (4)	Additional Capacity Required (cfs) (5)	After Transfer	
	Annual Entitlement (AF) (1)	Capacity (cfs) (2)				Total Annual Entitlement (AF) (6)	Total Capacity (2)+(4)+(5) (cfs) (7)
Reach 1	54,200	95	41,000	122	0	95,200	217
Reach 2A	54,200	95	41,000	122	0	95,200	217
Reach 2B	54,200	95	41,000	122	0	95,200	217
Reach 3	54,200	95	41,000	122	0	95,200	217
Reach 4	54,200	95	41,000	122	0	95,200	217
Reach 5	54,200	95	41,000	122	0	95,200	217
Reach 6	54,200	95	41,000	122	0	95,200	217
Reach 7	54,200	95	41,000	122	0	95,200	217
Reach 8C	54,200	95	41,000	122	0	95,200	217
Reach 8D	54,200	95	41,000	122	0	95,200	217
Reach 9	54,200	75	41,000	122	0	95,200	197
Reach 10A	54,200	75	41,000	122	0	95,200	197
Reach 11B	54,200	75	41,000	122	0	95,200	197
Reach 12D	54,200	75	41,000	122	0	95,200	197
Reach 12E	54,200	75	41,000	122	0	95,200	197
Reach 13B	54,200	75	41,000	122	0	95,200	197
Reach 14A	54,200	75	41,000	120	0	95,200	195
Reach 14B	54,200	75	41,000	77	0	95,200	152
Reach 14C	54,200	75	41,000	46	11	95,200	132
Reach 15A	54,200	75	41,000	39	18	95,200	132
Reach 16A	54,200	75	41,000	25	32	95,200	132
Reach 17E	54,200	75	41,000	0	57	95,200	132
Reach 17F	54,200	75	41,000	0	57	95,200	132
West Branch							
Reach 29A	54,200	75	41,000	0	57	95,200	132
Reach 29F	54,200	75	41,000	0	57	95,200	132
Reach 29G	54,200	75	41,000	0	57	95,200	132
Reach 29H /2/	54,200	--	41,000	0	--	95,200	--
Reach 29J	54,200	75	41,000	0	57	95,200	132
Reach 30 /2/	54,200	--	41,000	0	--	95,200	--

[1] These numbers apply to the reaches as set forth in Bulletin 132, Figure B-4, "Repayment Reaches and Descriptions."

[2] Aqueduct capacity in cfs is not applicable to Pyramid Lake (Reach 29H) and Castaic Lake (Reach 30). The maximum instantaneous flow rate for deliveries to the Agency from Castaic Lake is 150 cfs.