TECHNICAL M E M O R A N D U M No. 1

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TO: John Gray
URS Corp., Santa Barbara, CA

DATE: December 22, 2000
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FROM: Curtis Lawler

JOB NO.: 1815

RE: **Impacts of EIR Alternatives Using the Santa Ynez River Hydrology Model**

1. INTRODUCTION

This memorandum is prepared for the Cachuma Water Rights EIR in which seven alternatives were identified (see Table 1). For each of these seven EIR alternatives, analyses of surface water hydrologic impacts were performed, using the Santa Ynez River Hydrology Model (SYRHM) and Lompoc groundwater models (USGS and HCI). Included in this memorandum are the EIR hydrologic impact analyses for:

- Cachuma Reservoir Operations
- Cachuma Storage and Elevations
- Santa Ynez River Flows
- Groundwater Storage in the Above Narrows Riparian Aquifer
- Water Rights Releases (WR 89-18)
- Cachuma Project Deliveries

In addition to this technical memorandum, hydrologic analyses for biologic impacts and salinity impacts are provided in separate technical memoranda.

TABLE 1
SUMMARY OF ALTERNATIVES ADDRESSED IN THE EIR

Alternative	Key Elements
1. WR 89-18 operations	Does NOT include WR 94-5 Fish Reserve Account releases, 0.75' surcharging, emergency winter storm operations, or delivery of SWP water
2. Current operations (Interim BO operations)	Includes WR 89-18 releases with revised ramping schedule, Interim BO operations, emergency winter storm operations, SWP water release restrictions, Hilton Creek gravity feed and pumped releases, and surcharging at 0.75'.
3A. Operations incorporating the mandatory Biological Opinion (BO) actions with no surcharging above current 0.75' surcharging and all releases for public trust and fisheries protection are provided from water supply and current surcharging.	This alternative represents the new operations to be implemented as required by NMFS in the Final BO, except that all releases for rearing and passage will be provided from water supply and current surcharging. Includes emergency winter storm operations, SWP water release restrictions, Hilton Creek gravity feed and pumped releases, and 89-18 releases with revised ramping schedule. This alternative also includes non-flow fish conservation measures from the BO, affecting the mainstem and tributaries.
3B. Operations incorporating BO actions with 1.8' surcharging.	This alternative represents the new operations to be implemented as required by NMFS in the Final BO, except that all releases for rearing and passage will be provided from a combination of 1.8' surcharging and water supply. Includes emergency winter storm operations, SWP water release restrictions, Hilton Creek gravity and pumped releases, and 89-18 releases with revised ramping schedule. This alternative also includes non-flow fish conservation measures from the BO, affecting the mainstem and tributaries.

Alternative	Key Elements
3C. Operations incorporating BO actions with 3' surcharging.	This alternative represents the new operations to be implemented as required by NMFS in the Final BO. All releases for rearing and passage will be provided from a phased implementation of surcharging (1.8' followed by 3'), as described in the BO. Includes emergency winter storm operations, SWP water release restrictions, Hilton Creek gravity feed and pumped releases, and 89-18 releases with revised ramping schedule. This alternative also includes non-flow fish conservation measures from the BO, affecting the mainstem and tributaries.
4. Operations incorporating BO actions, with additional actions to address water quality in the Lompoc Basin	Includes fish releases under Alternative 3C, as well as one of the following options to address water quality issues in the Lompoc Basin, or other options identified based on impact assessment: ▪ Option A: Below Narrows Exchange Project in which BNA water is provided by direct delivery of SWP water to the City of Lompoc ▪ Option B: Below Narrows Exchange Project in which all BNA water is provided by discharging SWP water to the river near Lompoc for recharge

2. SYRHM OVERVIEW AND RECENT MODIFICATIONS FOR EIR

2.A OVERVIEW

The SYRHM was first developed in 1979 and has been used in the past to evaluate various management alternatives in the basin. The SYRHM was developed by the Santa Barbara County Water Agency (SBCWA). Over the last two decades, the SYRHM has been expanded and modified in consultation with the Santa Ynez River Hydrology Committee. The model is written in Microsoft Quick Basic code and is publicly available from SBCWA.

In all of the EIR alternatives, watershed runoff based on historical hydrology is routed through the Santa Ynez River basin and alternatives are varied based on the differences in Cachuma Reservoir operations and State Water Project (SWP) water deliveries. The impacts to surface water and groundwater conditions downstream of Cachuma Reservoir are then compared between the alternatives.

Figure 1 shows how flows of the Santa Ynez River are routed through the Santa Ynez River basin. The SYRHM includes operations of Juncal, Gibraltar, and Bradbury Dams, the Santa Ynez River alluvial groundwater basins, and Santa Ynez River recharge (percolation) in Lompoc basin. The model uses historic records of rainfall, runoff, evaporation, and tunnel infiltration for the period 1918 through 1993. Reservoir releases, diversions, streamflow percolation, groundwater pumping, and depletions are based on monthly time steps. The model includes the Gibraltar operations under the Upper Santa Ynez River Operations Agreement, and the Cachuma operations under the State Water Resources Control Board (SWRCB) Order WR 73-37 as amended by WR 89-18 (Santa Ynez River Hydrology Model Manual, 9/8/1997). In addition, the model has been expanded to include releases for fisheries and SWP water deliveries through the Bradbury Dam outlet works.

The Santa Ynez River between Bradbury Dam and Lompoc Narrows is divided into four reaches in the model: (1) Bradbury Dam-Solvang; (2) Solvang-Buellton Bend; (3) Buellton Bend-Salsipuedes Creek; and (4) Salsipuedes Creek-Narrows Gage. Recently, the SBCWA expanded the operation model (SYRHM) to incorporate a detailed version of the Bradbury-Solvang reach, in which the reach is divided into 12 segments between tributaries. This allows for a direct modeling of tributary flow

contributions in the Bradbury Dam-Solvang reach of the SYRHM. This version of the model is referred to as SYRHM 498 which was used for the analyses of the Biological Assessment resulting in the Biological Opinion. The same version of the model (SYRHM 498) has been used for the analyses of the Cachuma water rights EIR.

2.B MODIFICATIONS TO SYRHM

Table 2 displays the operational elements in the EIR alternatives that have been included in the operational modeling in the SYRHM including releases for habitat and passage of steelhead, surcharges, State Water Project imports, and the Below Narrows Exchange Project. Emergency winter storm operations and ramping of outlet releases have not been included in the SYRHM due to its limitation, use of monthly time steps. Whereas, winter storm operations and ramping of outlet releases would occur within days.

2.B.1 Releases Below Cachuma Reservoir for Habitat and Passage of Steelhead

Releases from Cachuma Reservoir for steelhead rearing and passage have been modeled for two sets of operating criteria. Both are derived from the issuance of the Biological Opinion (BO) by the National Marine Fisheries Service (NMFS) (Sep. 2000) and the Lower Santa Ynez Fish Management Plan (FMP) (Oct. 2000). The first set of operating criteria involves releases for steelhead rearing associated with the interim phase as outlined in the BO and FMP and is used in EIR Alternative 2. The second set of operating criteria involves releases for steelhead rearing and passage associated with the final phase as outlined in the BO and FMP and is used in EIR Alternatives 3A, 3B, 3C, 4A, and 4B.

One element that is common to both sets of the fish release operating criteria is the conjunctive operation of water rights releases with fish releases. This conjunctive use operation would extend the period of time each year when instream flows improve fisheries habitat for oversummering and juvenile rearing within the mainstream river.

EIR Alternative 2 operates using the interim rearing target flow levels. Under both the BO and the FMP, the interim rearing flows in the Santa Ynez River at Highway 154 use the

TABLE 2
KEY ELEMENTS OF THE ALTERNATIVES

Key Elements	Alternatives					
	1	2	3A	3B	3C	4
Releases for downstream water rights pursuant to WR 89-18 releases	X	X	X	X	X	X
Fish releases under BO Interim phase		X				
Emergency winter storm operations		X	X	X	X	X
Revised 89-18 ramping schedule		X	X	X	X	X
SWP water seasonal restrictions on releases, and limits on mixing percentage		X	X	X	X	X
Surcharge to 0.75’		X	X			
Surcharge to 1.8’				X		
Surcharge to 3’					X	X
Fish releases under BO for rearing and passage; Adaptive Management Account for fish releases			X	X	X	X
Other habitat enhancement actions under BO and Fish Management Plan, including projects on tributaries		X	X	X	X	X
Below Narrows Exchange Project to delivery SWP water to Lompoc Valley						X

targets shown in Table 3. In years when Cachuma reservoir spills 20,000 acre-feet or more, a target of 5 cfs will be maintained at Highway 154 Bridge. In years when Cachuma Reservoir does not spill or spills less than 20,000 acre-feet, the Highway 154 target flow will be determined at the start of each month based on reservoir storage: 2.5 cfs when storage is greater than 120,000 acre-feet and 1.5 cfs when storage is less than 120,000 acre-feet. Periodic releases to refresh the Stilling Basin and Long Pool will be made when storage is less than 30,000 acre-feet. (Lower Santa Ynez River Fish Management Plan, October 2000). These BO interim target flows are similar to the historic fish releases under WR94-5 as shown in Figure 2. Figure 2 shows the historic daily releases from 1995 through 2000 for fishery enhancement and studies with the median release for fish being 2.5 cfs. In addition, the BO requires a 2 cfs target flow in Hilton Creek as part of the terms and conditions to implement reasonable and prudent measure No. 2. (Biological Opinion, September 2000).

Table 3
NMFS' Biological Opinion and Fish Management Plan
Mainstem Rearing Target Flows for Interim Phase

Lake Cachuma Storage	Reservoir Spill?	Target Flow	Target Site
> 120,000 AF	Spill > 20,000 AF	5 cfs	Highway 154 Bridge
> 120,000 AF	Spill <20,000 AF or No Spill	2.5 cfs	Highway 154 Bridge
< 120,000 AF	No Spill	1.5 cfs	Highway 154 Bridge
<30,000 AF	No Spill	Periodic Release; ≤30AF per month	Stilling Basin and Long Pool

(Source: Lower Santa Ynez River Fish Management Plan, October 2, 2000, pg. 3-12)

Both the BO and FMP in the interim phase also include a provision that Reclamation shall maintain full residual pool depth in Alisal and Refugio reaches downstream of the Highway 154 Bridge during spill years and the first year after spill years if steelhead are present. Because the quantity of water needed to maintain residual pool depth has not yet been determined and is necessary only when steelhead are present, this provision has not been included in the SYRHM for EIR Alternative 2.

EIR Alternatives 3A, 3B, 3C, 4A, and 4B operate using the final phase rearing target flow levels. Under both the BO and the FMP, fish releases from Cachuma Reservoir are structured as follows in Table 4 for the final implementation stage for enhancing steelhead habitat. In years when Cachuma reservoir spills 20,000 acre-feet or more, a target of 10 cfs will be maintained at Highway 154 Bridge. In years when Cachuma Reservoir does not spill or spills less than 20,000 acre-feet, the Highway 154 target flow will be determined at the start of each month based on reservoir storage: 5.0 cfs when storage is greater than 120,000 acre-feet and 2.5 cfs when storage is less than 120,000 acre-feet. In addition, in years when the Cachuma spill more than 20,000 acre-feet and steelhead are present, a target flow of 1.5 cfs will be maintained at Alisal Road Bridge. A 1.5 cfs target will also be maintained in the year immediately flowing such a spill year if steelhead are present. Periodic releases to refresh the Stilling Basin and Long Pool will be made when storage is less than 30,000 acre-feet. (Lower Santa Ynez River Fish Management Plan, October 2000).

Table 4
NMFS' Biological Opinion and Fish Management Plan
Mainstem Rearing Target Flows for Final Phase

Lake Cachuma Storage	Reservoir Spill?	Target Flow	Target Site
> 120,000 AF	Spill > 20,000 AF	10 cfs	Highway 154 Bridge
> 120,000 AF	Spill > 20,000 AF	1.5 cfs*	Alisal Road Bridge
> 120,000 AF	Spill <20,000 AF or No Spill	5 cfs	Highway 154 Bridge
< 120,000 AF	No Spill	2.5 cfs	Highway 154 Bridge
<30,000 AF	No Spill	Periodic release; ≤30AF per month	Stilling Basin and Long Pool
> 30,000 AF	Spill < 20,000 AF or No Spill	1.5 cfs*	Alisal Road Bridge**

(Source: Lower Santa Ynez River Fish Management Plan, October 2, 2000, pg. 3-9)
* When rainbow trout/steelhead are present in the Alisal Reach.
** This target will be met in the year immediately following a >20,000 AF spill year.

In addition, under the final implementation phase, a specific volume of water is dedicated for the "Fish Passage Account" of 3,200 Acre-feet and for the "Adaptive Management Account" of 500 Acre-feet for a total of 3,700 acre-feet. The water in these two accounts is allowed to carryover from one year to the next; however, the accounts are deemed to spill first and are then reset to their maximum amount of 3,700 acre-feet. Water in the passage account is experimentally planned to be used to

supplement storms by augmenting the descending limb of the storm hydrograph below Bradbury Dam. Table 5 lists some of the Passage Supplementation Criteria which were incorporated into analyses for the Biological Opinion and Fish Management Plan.

Table 5
Passage Supplementation Criteria

- Passage releases will be made in years following a spill until accounts have run out
- January through May
- Continuous Flow to the Ocean
- Santa Ynez River at Solvang reaches 25 cfs during a storm
- 1st Storm in January may not be Supplemented
- Cachuma releases through outlet works based on matching Cachuma inflow decay curve and boosting storm peak to 150 cfs at Solvang

Modeled fish releases for Alternatives 3A, 3B, 3C, 4A, and 4B use the same model programming code for releases for steelhead rearing habitat and passage as used by the SYRTAC in the Biological Assessment (June 2000) and the Fish Management Plan (Oct. 2000) and as outlined in Tables 4 and 5 above. However, an additional target flow in Hilton Creek of 2 cfs has been added to the SYRHM as related to the issuance of the Biological Opinion by NMFS. In addition, the BO calls for the SYRTAC and NMFS to meet and come up with more strategies to improve the use of the Passage Account water by February 2001, with an emphasis on avoiding passage releases in "dry" years. For purposes of these analyses, the Passage Account and Adaptive Management Account are used in the SYRHM as they were presented in the Fish Management Plan (Oct. 2000). Given the nature of adaptive management, releases for passage could actually be a number of different scenarios that may have untested biologic impacts. Changes in timing of the passage releases are currently unknown and would not significantly change the hydrologic impacts, given that the Passage and Adaptive Management Accounts are created after a spill event and therefore are a fixed quantity of water, which would be released for the designated purpose.

2.B.2 Cachuma Reservoir Surcharging and Maximum Storage Capacities

Recently, a year 2000 Cachuma Lake bathymetric Study (MNSCE, Oct. 2000) shows that Cachuma Lake capacity at 750.0 feet is 188,035 acre-feet, a reduction of 2,374 acre-feet from the year 1989 survey capacity of 190,409 acre-feet. Table 6 shows the maximum surface elevation and storage

capacity associated with each EIR alternative and corresponding surcharge level using the 2000 elevation-area-capacity curves for Cachuma.

Table 6a
Cachuma Reservoir Surcharge Used for EIR Modeling

Alternative	Surcharge (feet)	Maximum Elevation (feet)	Maximum Storage (acre-feet)	Storage Difference from No Surcharge (acre-feet)	Maximum Surface Area (acres)
1	0	750.0	188,035	0	3,048
2	0.75	750.75	190,336	2,301	3,076
3A	0.75	750.75	190,336	2,301	3,076
3B	1.8	751.8	193,585	5,550	3,113
3C	3.0	753.0	197,343	9,308	3,155
4A	3.0	753.0	197,343	9,308	3,155
4B	3.0	753.0	197,343	9,308	3,155

The version of the SYRHM that was used for the Biological Opinion/Fish Management Plan has been modified to incorporate the year 2000 elevation-area-capacity curves for Cachuma Reservoir. Since the modeling was completed for the EIR in December 2000, in March 2001 the results from the 2000 Cachuma survey capacity were adjusted for elevations above 749.0 feet. The adjustments were relatively small as shown below in Table 6b.

Table 6b
Comparison of Elevation-Storage Capacities
of Cachuma Reservoir Above 749.0 Feet

Elevation feet	Bathymetric Study October 2000 acre-feet	*Revised* March 2001 Acre-feet	Difference acre-feet	as %
749.0	185,007	185,007	0	0.000%
750	188,030	188,035	5	0.003%
750.75	190,325	190,336	11	0.006%
751.8	193,562	193,585	23	0.012%
753	197,302	197,343	41	0.021%

Because the differences between the October 2000 bathymetric study and the March 2001 revision are small and apply to elevations above 749.0 feet, the October 2000 bathymetric study was used for the EIR modeling.

2.B.3 State Water Project Imports

The State Water Project (SWP) Coastal Branch Extension Phase II extends from Devil's Den in Kern County to the Santa Ynez River basin and includes a water treatment plant in San Luis Obispo County known as the Polonio Pass Water Treatment Plant. Since 1997, the Central Coast Water Authority (CCWA) delivers SWP water to Cachuma Reservoir for the SWP contractors on the South Coast. The treated SWP water is dechloraminated at the Santa Ynez Pumping Facility and then pumped via the Santa Ynez Extension through the existing Bradbury outlet works into Lake Cachuma. The commingled water is then delivered through Tecolote Tunnel to the Member Units on the South Coast. The total annual entitlement of SWP deliveries under contractual agreements to the South Coast is a total of 13,750 acre-feet per year. Table 7 lists the scheduled deliveries of SWP to the South Coast and the actual deliveries into Cachuma Reservoir after exchanges on a calendar year basis.

Santa Ynez River Water Conservation District, Improvement District No. 1 (ID No. 1) exchanges its allocation of Cachuma Project water for an equal amount of SWP water that would have been delivered to the South Coast members of Cachuma Project. The amount of this exchange is about 10%

(10.313%) of the Cachuma Project supply of 25,714 acre-feet per year or 2,571 acre-feet per year. The amount of exchange with ID No.1 is affected by Cachuma Project shortages.

Table 7
State Water Delivery Schedule Through Cachuma Outlet Works
CCWA South Coast Member Agencies
(Acre-feet/year)

Calendar Year	Scheduled Deliveries	Actual Deliveries
1997	1,334	1,335
1998	4,217	0
1999	4,437	505
2000	4,587	2,333
2001	5,454	459*
2002	5,479	NA
2003	5,544	NA
2004	5,614	NA
2005	5,684	NA

* Total through September 2001

In Alternatives 2, 3A, 3B, 3C, 4A, and 4B, the full SWP entitlements are assumed to be delivered each year, subject to the following assumptions and results of hydrologic modeling:

- A maximum delivery rate of 22 cfs is assumed which provides a monthly delivery capacity of 1,220 to 1,310 acre-feet per month.

- The total annual entitlement of SWP deliveries under contractual agreements to the South Coast is a total of 13,750 acre-feet per year.

- Shortages in SWP deliveries to municipal and industrial contractors in the coastal aqueduct due to state-wide and Delta shortages are used from the output of the California Department of Water Resources' hydrologic model DWRSIM v.9.06T. (DWRSIM studies that have been performed for CALFED Bay-Delta Program are preliminary and have been currently updated by a new State Water Project/Central Valley Project simulation model called CALSIM and are currently being

updated by CALSIM II. Due to small differences in Central Coast M&I delivery shortages resulting from the above modeling work, the modeling performed for theses EIR analyses continue to use the output from the DWRSIM version.)

- ID No. 1 exchanges its allocation of Cachuma Project water for an equal amount of SWP water that would have been delivered to the South Coast members of Cachuma Project. The amount of this exchange is 10.313% of the Cachuma Project supply of 25,714 acre-feet per year. For the purpose of these EIR analyses, the ID No. 1 exchange is based on 10% of Cachuma Project supply.

- SWP water imported into Cachuma Reservoir is assumed to be exported out through Tecolote Tunnel in the same month. Although the SWP could be stored in Cachuma Reservoir for an additional cost, same month imports and exports are assumed for this EIR modeling analysis.

- SWP deliveries are not made in months when Cachuma Reservoir is spilling. Although SWP deliveries can be made up in other months, spill conditions usually indicate a wet period in which additional SWP deliveries probably would not be needed. Therefore, it was assumed that SWP deliveries would not be made during spills and would not be made up in subsequent months.

- In this study, the proportion of the SWP water as a part of a Cachuma water rights release is limited to 50 percent of the total release to provide protection to steelhead.

- Reclamation shall avoid mixing CCWA water in the Santa Ynez River downstream of Bradbury Dam when steelhead smolts could be subject to imprint. This limits the SWP deliveries when releases for steelhead passage are being made from Cachuma.

Given the above restrictions and modeling assumptions, the imports of SWP water vary for each alternative and would be less than the full 13,750 acre-feet per year. The SWP deliveries for each EIR alternative are shown in the next section of hydrologic modeling results.

2.B.4 Below Narrows Exchange Project (BNE)

Currently, the BNE is incorporated into the SYRHM by using average Below Narrows deliveries of 1,771 acre-feet per year as an amount for an exchange of SWP water with the South Coast member units. Currently, there is no actual agreement between the parties of the Below Narrows Account and the SWP south coast contractors. These modeling analyses assume that an even amount of 1,771 acre-feet per year will be exchanged every year and not as Below Narrows Account credits accrue. In Alternative 4A, the exchanged BNA water would be provided directly to the City of Lompoc. In Alternative 4B, the exchanged BNA water would be provided by discharging SWP water to the Santa Ynez River near Lompoc for recharge.

2.C MODEL LIMITATIONS OF THE SYRHM

The intended use of the SYRHM is for comparative purposes between the EIR alternatives. The simulated flow data generated from the SYRHM is not meant to be predictive, but it is used as an analytical tool for statistical and comparative purposes. Since the model is used for comparative analyses, some of the inherent inaccuracies in the model are expected to cancel out when comparing the results of one scenario with another.

The SYRHM operations have some limitations because the model uses monthly time steps. Other limitations of the SYRHM are related to real time management decisions. For example, WR89-18 releases, project delivery reductions in times of shortages, and SWP deliveries could vary based on real time management decisions.

3. SYRHM OPERATIONAL MODELING RESULTS

3.A CACHUMA RESERVOIR OPERATIONS

The surface water budget for Cachuma Reservoir for all of the alternatives is shown in Table 8A for the hydrologic period 1918-1993 and in Table 8B for the years 1947-1951, the critical drought period in the Santa Ynez River basin.

TABLE 8A						
Surface Water Budgets for Cachuma Reservoir						
Average Values from SYRHM, 1918-1993 (76 years) [1)]						
(Acre-feet/year)						
	EIR ALTERNATIVES					
	Alt	**Alt**	**Alt**	**Alt**	**Alt**	**Alt**
	1	**2**	**3A**	**3B**	**3C**	**4A&B**
Inflow						
Runoff	74,171	74,171	74,171	74,171	74,171	74,171
Precipitation	3,869	3,869	3,827	3,876	3,935	3,945
SWP water [2)]	0	7,619	7,648	7,652	7,663	6,006
TOTAL INFLOW	78,040	85,659	85,646	85,699	85,769	84,122
Outflow						
Evaporation	10,876	10,876	10,752	10,892	11,067	11,108
Spills/Leakage	37,580	36,693	36,037	35,784	35,415	35,288
Project Deliveries (no tunnel) [3)]	23,262	23,069	22,855	22,940	23,076	23,123
WR89-18 releases	6,322	6,023	5,658	5,682	5,737	5,711
Fish/Habitat releases	0	1,362	2,690	2,701	2,715	2,801
SWP Exchange [4)]	0	-2,512	-2,490	-2,499	-2,512	-4,288
SWP Deliveries to South Coast	0	10,131	10,138	10,150	10,175	10,294
TOTAL OUTFLOW	78,040	85,642	85,640	85,651	85,673	84,037
Change in Storage	0	17	6	48	96	84
	43,902	44,078	44,385	44,167	43,867	43,800
MEAN DIFFERENCE IN WATER PASSING THROUGH CACHUMA (Spills and Releases)						
Cachuma Spills & Releases	43,902	44,078	44,385	44,167	43,867	42,029
Difference in Cachuma Spills & Releases (AFY)	-176		307	89	-211	-2,049
Difference in Cachuma Spills & Releases (%)	-0.4%		0.7%	0.2%	-0.5%	-4.6%
MEAN NET DIFFERENCE WITH ALTERNATIVE 2 (AFY)						
Fish/Habitat releases	-1,350	0	1,325	1,350	1,350	1,450
WR89-18 releases	300	0	-375	-350	-275	-300
Project Deliveries (no tunnel) [3)]	200	0	-225	-125	0	50
Spills/Leakage	875	0	-650	-900	-1,275	-1,400
Net Evaporation	0	0	-75	0	125	150
Change in Storage	-25	0	0	25	75	75
SUM	1,350	0	-1,325	-1,350	-1,350	-1,425
Average Change In Water Right Releases	5%		-6%	-6%	-5%	-5%
Average Change In Spills/Leakage	2%		-2%	-2%	-3%	-4%
Average Change In Project	1%		-1%	-1%	0%	0%
NOTES						
1) See Table 1 for description of alternatives; fish releases include rearing and passage flows.						
2) Includes SWP deliveries in outlet works and into Cachuma Reservoir.						
3) Does not include Tecolote Tunnel infiltration which averages which average about 2,050 acre-feet/year						
4) Includes SWP exchange with SYRWCD ID No 1 and for Alternatives 4A and 4B, the BNE of 1,771 AF						

TABLE 8B						
Surface Water Budgets for Cachuma Reservoir						
Average Values from SYRHM, 1947-1951 (5 years) [1)]						
(Acre-feet/year)						
	EIR ALTERNATIVES					
	Alt	**Alt**	**Alt**	**Alt**	**Alt**	**Alt**
	1	**2**	**3A**	**3B**	**3C**	**4A&B**
Inflow						
Runoff	4,578	4,578	4,578	4,578	4,578	4,578
Precipitation	1,894	1,876	1,854	1,879	1,922	2,020
SWP water [2)]	0	7,712	7,797	7,772	7,709	5,888
TOTAL INFLOW	6,472	14,166	14,229	14,229	14,209	12,486
Outflow						
Evaporation	7,794	7,694	7,565	7,670	7,860	8,294
Spills/Leakage	119	109	105	105	114	143
Project Deliveries (no tunnel) [3)]	21,617	20,568	19,716	19,987	20,614	21,096
WR89-18 releases	5,415	5,713	5,605	5,812	5,602	5,240
Fish/Habitat releases	0	1,324	2,457	2,505	2,605	2,984
SWP Exchange [4)]	0	-2,219	-2,134	-2,161	-2,223	-4,043
SWP Deliveries to South Coast	0	9,931	9,930	9,932	9,932	9,931
TOTAL OUTFLOW	34,945	43,120	43,244	43,850	44,504	43,645
Change in Storage	-28,473	-28,954	-29,015	-29,621	-30,295	-31,159
MEAN DIFFERENCE IN WATER PASSING THROUGH CACHUMA (Spills and Releases)						
Cachuma Spills & Releases	5,534	7,146	8,167	8,422	8,321	8,367
Difference in Cachuma Spills & Releases (AFY)	-1,612		1,021	1,276	1,175	1,221
Difference in Cachuma Spills & Releases (%)	-22.6%		14.3%	17.9%	16.4%	17.1%
MEAN NET DIFFERENCE WITH ALTERNATIVE 2 (AFY)						
Fish/Habitat releases	-1,320	0	1,130	1,180	1,280	1,660
WR89-18 releases	-300	0	-110	100	-110	-470
Project Deliveries (no tunnel) [3)]	1,050	0	-850	-580	50	530
Spills/Leakage	10	0	0	0	0	30
Net Evaporation	80	0	-110	-30	120	460
Change in Storage	480	0	-60	-670	-1,340	-2,210
SUM	1,320		-1,130	-1,180	-1,280	-1,660
Average Change In Water Right Releases	-5%		-2%	2%	-2%	-8%
Average Change In Spills/Leakage	9%		0%	0%	0%	28%
Average Change In Project	5%		-4%	-3%	0%	3%
NOTES						
1) See Table 1 for description of alternatives; fish releases include rearing and passage flows.						
2) Includes SWP deliveries in outlet works and into Cachuma Reservoir.						
3) Does not include Tecolote Tunnel infiltration which averages which average about 1,620 acre-feet/year						
4) Includes SWP exchange with SYRWCD ID No 1 and for Alternatives 4A and 4B, the BNE of 1,771 AF						

Table 8A shows that on average over the hydrologic period, the amount of water passed through at Bradbury Dam, either by spills and leakage, water right releases, and fish releases, is relatively the same or with less than 1% variation (except for Alternative 4 in which about 4% less water would pass through at the dam). Because the only difference between Alternatives 4A and 4B is how the SWP water is delivered below the Narrows, both have the same operation from Cachuma Reservoir to the Lompoc Narrows and are presented as one in this table. (Note: The precipitation and evaporation vary for each of the EIR alternatives due to differences in the surface area of the reservoir. Also, Tecolote Tunnel infiltration is not shown on these tables but is considered a component of the Project yield. Tecolote Tunnel infiltration averages about 2,050 acre-feet/year for the period 1918-1993 and 1,620 acre-feet/year during the period 1947-1951.)

Table 8A also shows that the water that will now be used for steelhead rearing and passage releases comes from not just the surcharge (i.e. reduction in spills) but also a reduction in water right releases and Cachuma Project deliveries. Table 8A shows that water right releases, on average, are reduced significantly under the fish release alternatives when compared as a percentage of water right releases without fish release requirements. Table 8B shows that Cachuma Project deliveries are reduced the most during critical drought periods. Project deliveries are reduced by fish releases because additional releases lower the reservoir more quickly resulting in shortages in Project deliveries when the reservoir recedes below 100,000 acre-feet of storage.

Figures 3A and 3B show the frequency of releases and spills from Cachuma Reservoir for all alternatives on different scales of flow. In summary, the major changes to the Santa Ynez River flow system, due to changes in Cachuma Reservoir operations, is that when there are more low flow releases, there are less spills or high flow releases. The reduction in spills is relatively small compared with the overall magnitude of spills.

3.B LAKE STORAGE AND ELEVATION

Figure 4 shows the simulated Cachuma Reservoir storage level for the 76 year simulation period extending from 1918 through 1993. The minimum storage level (minimum pool) for all alternatives is set to 12,000 acre-feet which occurs during the critical drought of 1947-1951 for all alternatives.

Table 9 summarizes average Lake Cachuma elevation, storage, and surface area for each alternative. In general, the median elevation, storage, and surface area for all alternatives are very similar.

Table 9
Cachuma Reservoir Elevation, Storage, and Surface Area
Average for 1918-1993 (SYRHM)

Alternative	Surcharge (feet)	Median Elevation (feet)	Median Storage (acre-feet)	Median Surface Area (acres)
1	0	734.08	144,318	2,471
2	0.75	733.73	143,573	2,463
3A	0.75	732.25	139,961	2,425
3B	1.8	733.31	142,531	2,452
3C	3.0	734.62	145,761	2,488
4A&B	3.0	735.19	147,205	2,505

Several issues that involve the reservoir water surface elevation, including Hilton Creek Siphon, Tecolote Tunnel Intake valves, and duration of the 3.0' surcharge, were analyzed using frequency curves of reservoir elevation as shown in Figures 5A through 5D.

Figures 6A through 6D show the intra-annual variations in reservoir storage for the six alternatives.

3.C SANTA YNEZ RIVER FLOWS

Figures 7A through 7F show the frequency of flows at six different locations downstream of Cachuma Reservoir for the various alternatives based on the results of the SYRHM. Appendix A contains the monthly flows for the six alternatives from 1918 through 1993 (912 months).

Figures 8A through 8D show the intra-annual variations in median Santa Ynez River flow for the six alternatives. Only Alternative 3A is compared with Alternatives 1 and 2 on these graphs due to the close similarity of Alternatives 3A, 3B, 3C, and 4 on impact to median Santa Ynez River flows. In general, Figures 8A through 8D show that flow decreases downstream during summer and dry years. However, during winter months and wet years, flow increases as it moves downstream due to tributary contributions below Cachuma Reservoir.

Figures 9A through 9D shows the intra-annual variations in mean Santa Ynez River flows. Because the mean statistic is dominated by high flow storm events and the changes in the flow regime is predominantly in low flows among the various alternatives, there is no significant change to the mean monthly flows.

3.D GROUNDWATER STORAGE IN THE ABOVE NARROWS RIPARIAN AQUIFER

During the low flow periods, there is more percolation into the Above Narrows Riparian Aquifer with releases for steelhead. As shown in Figure 10A, the above Narrows riparian aquifer recovers to the same levels with the recharge of winter runoff under Alternatives 1, 2, and 3A. Figures 10A-C show the changes in total dewatered storage in the entire above Narrows riparian aquifer. These figures show less total dewatered storage during low flow periods when there are more fish releases. Figure 10b shows that there is only a very small to no difference between Alternatives 3A, 3B, 3C, 4A, and 4B on groundwater storage in the Above Narrows Riparian Aquifer. Figures 11A-B, 12A-B, and 13A-B show the effects to total dewatered storage for the three different sub-units of the above Narrows riparian aquifer, the Santa Ynez, Buellton, and Santa Rita sub-basins. The greatest effect is on the Santa Ynez sub-basin.

Tables 10a-d show statistics on monthly total dewatered storage for the Above Narrows riparian aquifer and for the three different sub-units. For comparison, the last four columns show the difference in dewatered storage relative to Alternative 1, which has no fish releases. For example, Table 10a shows that Alternative 3C would increase groundwater storage by 871 acre-feet 50% of the time. Tables 10b through 10c show that this increase in ground water storage is larger in the Santa Ynez sub-

Table 10a
Statistics on Monthly Total Dewatered Storage
for the Above Narrows Riparian Aquifer, 1918-1993
(acre-feet)

EIR					Difference with Alt 1			
Alternative	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
1	11,524	10,952	2,329	36,463	----	----	----	----
2	10,769	10,517	2,324	32,936	755	435	5	3,527
3A	10,332	10,102	2,314	31,375	1,192	850	15	5,089
3B	10,310	10,099	2,315	31,094	1,214	853	14	5,370
3C	10,281	10,081	2,315	30,948	1,243	871	14	5,515
4A&B	10,240	10,031	2,311	30,235	1,284	921	18	6,228

Table 10b
Statistics on Monthly Total Dewatered Storage
for the Santa Ynez Riparian Subarea, 1918-1993
(acre-feet)

EIR					Difference with Alt 1			
Alternative	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
1	2,471	2,148	0	12,089	----	----	----	----
2	1,926	1,769	0	9,048	544	379	0	3,041
3A	1,734	1,612	0	8,624	737	536	0	3,464
3B	1,722	1,606	0	8,445	748	542	0	3,644
3C	1,704	1,584	0	8,231	766	564	0	3,858
4A&B	1,647	1,510	0	7,616	824	638	0	4,473

Table 10c
Statistics on Monthly Total Dewatered Storage
for the Buellton Riparian Subarea, 1918-1993
(acre-feet)

EIR					Difference with Alt 1			
Alternative	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
1	5,691	5,634	2,164	11,098	----	----	----	----
2	5,598	5,570	2,160	11,018	92	65	4	80
3A	5,485	5,447	2,166	10,876	206	187	-2	222
3B	5,482	5,449	2,167	10,878	208	185	-3	220
3C	5,471	5,442	2,153	10,869	220	193	12	229
4A&B	5,438	5,382	2,144	10,822	253	253	20	276

Table 10d
Statistics on Monthly Total Dewatered Storage
for the Santa Rita Riparian Subarea, 1918-1993
(acre-feet)

EIR					Difference with Alt 1			
Alternative	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
1	3,363	3,156	0	13,445	----	----	----	----
2	3,244	3,080	0	13,042	118	76	0	402
3A	3,113	2,993	0	12,053	249	163	0	1,392
3B	3,105	2,981	0	11,954	257	175	0	1,490
3C	3,105	2,978	0	12,037	257	178	0	1,407
4A&B	3,155	3,105	0	12,004	207	51	0	1,440

unit; which is the sub-unit closest to Bradbury Dam and also includes Highway 154 and Alisal Bridge which are the fish releases' target sites.

Tables 11a-c show the impact of the EIR alternatives on the average water level elevations in the Santa Ynez, Buellton, and Santa Rita sub-basins of the above Narrows riparian aquifer. Relationships developed by Reclamation between groundwater storage and groundwater elevation were used to develop the relative changes in depths to water for various alternatives with values being rounded to the nearest foot. The most significant change among the EIR alternatives occurs in the Santa Ynez subarea with water levels in the ground water increasing one to two feet on average. Also, for the alternatives with fish releases (Alternatives 2, 3A, 3B, 3C, 4A, and 4B), during prolonged droughts the groundwater levels in the Santa Ynez subarea would be 8 to11 feet higher when compared with Alternative 1.

3.E WATER RIGHTS RELEASES (WR 89-18)

Table 12 shows the impacts to water rights releases for the various alternatives as determined by the Santa Ynez River Hydrology Model. The Above Narrows Account is dependent upon groundwater storage in the Above Narrows Riparian Aquifer because the account can not be larger than the dewatered storage under WR89-18. Because there will be less dewatered storage in the Above Narrows aquifer due to fish releases, the Above Narrows account will be reduced consistent with WR89-19 and compared to Alternative 1 the reduction would be 300 to 660 acre-feet per year.

Table 12
Impacts to Water Right Releases for Water Years 1918-1993
(acre-feet/year)

	Alt 1	Alt 2	Alt 3A	Alt 3B	Alt 3C	Alt 4 A&B
WR89-18 Releases	6,322	6,023	5,658	5,682	5,737	5,711
Difference in WR89-18 releases	---	-299	-660	-640	-590	-611

Table 11a

Statistics on Monthly Average Water Level Elevation

for the Santa Ynez Riparian Subarea, 1918-1993

(feet)

EIR					Difference with Alt 1			
Alternative	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
1	458	459	435	464	----	----	----	----
2	459	460	443	464	1	1	8	0
3A	460	460	444	464	2	1	9	0
3B	460	460	444	464	2	1	9	0
3C	460	460	445	464	2	1	10	0
4A&B	460	460	446	464	2	2	11	0

Table 11b

Statistics on Monthly Average Water Level Elevation

for the Buellton Riparian Subarea, 1918-1993

(feet)

EIR					Difference with Alt 1			
Alternative	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
1	304	304	295	310	----	----	----	----
2	304	304	295	310	0	0	0	0
3A	304	304	295	310	0	0	0	0
3B	304	304	295	310	0	0	0	0
3C	304	304	295	310	0	0	0	0
4A&B	304	304	295	310	0	0	0	0

Table 11c

Statistics on Monthly Average Water Level Elevation

for the Santa Rita Riparian Subarea, 1918-1993

(feet)

EIR					Difference with Alt 1			
Alternative	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
1	176	176	163	180	----	----	----	----
2	176	176	163	180	0	0	1	0
3A	176	176	165	180	0	0	2	0
3B	176	176	165	180	0	0	2	0
3C	176	176	165	180	0	0	2	0
4A&B	176	176	165	180	0	0	2	0

NOTES

Relationships developed by Reclamation between groundwater storage and groundwater elevation were used to develop the relative changes in depths to water for various alternatives.

3.F CACHUMA PROJECT DELIVERIES

The Santa Ynez River Hydrology Model indicates that the proposed EIR alternatives will produce substantially greater shortages in water supply during droughts in comparison with Alternative 1. The historical precipitation at Gibraltar Dam from 1947 through 1951 was 35% to 60% below normal. The shortages to water supply during the last three years of this critical period for the various EIR alternatives are shown in Table 13a.

Table 13a
Impacts of Fish Releases on Project Water Supply
in Critical Drought Period, 1949 through 1951
(acre-feet)

EIR Alternative	Shortage in Critical Drought Year (1951)	Shortage as Percentage of Annual Draft	Cumulative Shortage in Critical Drought Period (1949-1951)	Shortage as Percentage of Annual Draft for Three Years
1	7,070	27%	14,210	18%
2	9,810	38%	20,130	26%
3A	11,810	46%	24,850	32%
3B	11,260	44%	23,370	30%
3C	9,890	38%	19,920	26%
4A&B	9,350	36%	17,470	23%

Note: Annual draft from Cachuma Project is 25,714 acre-feet.

As shown in the above table, by themselves, the Cachuma operations proposed in Alternative 3C already will produce substantially greater shortages in the Cachuma Project yield during the critically dry period compares with Alternative 1. During the last three years of the critical period (1946-1951), a cumulative shortage of approximately 5,700 acre-feet occurs. In the worst year of the critical period, a reduction in yield of 2,800 acre-feet occurs. Alternatives 3A and 3B substantially increase these already large shortages by an additional 4,930 acre-feet and 3,450 acre-feet, respectively in the last three years of the critical period.

It is also important to note that the shortages just described are in addition to shortages in available water supplies that would occur under WR89-18 Cachuma operations during the historical drought condition. The Cachuma Project members, which includes the cities of Santa Barbara, Goleta, Montecito, Carpinteria, and ID No.1, all share the concerns of prolonged drought which is quite common in Southern California, most recently 1985 through 1991.

In real-time planning for water supply during a prolonged drought, water supply managers do not know if they are in the last year of the drought. They have to plan as if the next year would be an additional dry year. The table above is based on the historical hydrology, with a perfect forecast, with the exact length of drought is already known. Whereas, in actual practice the Project managers have to plan for water supply assuming the year following the worst historical drought period itself would be dry. With reserves set aside for an additional dry year following the worst year of the critical period, the shortages are greater as described in Table 13b.

Table 13b
Impacts of Fish Releases on Project Water Supply
in Critical Drought Period, 1949 through 1951
With Reserves Set Aside for an Additional Dry Year
(acre-feet)

EIR Alternative	Shortage in Critical Drought Year (1951)	Shortage as Percentage of Annual Draft	Cumulative Shortage in Critical Drought Period (1949-1951)	Shortage as Percentage of Annual Draft for Three Years
1	12,740	50%	22,800	30%
2	14,790	58%	27,030	35%
3A	16,500	64%	31,220	40%
3B	15,940	62%	29,460	38%
3C	15,380	60%	27,750	36%
4A&B	15,090	59%	24,530	32%

Note: Annual draft from Cachuma Project is 25,714 acre-feet.

In summary, Alternatives 3A and 3B in comparison with Alternative 3C will exacerbate the water supply impacts of a prolonged drought and the shortages already associated with the steelhead fish releases in the BO, substantially increasing shortages further.

3.G STATE WATER PROJECT DELIVERIES

State Water Project (SWP) deliveries for each of the EIR alternatives are based upon demand and modeling results, which take into consideration limitations due to shortages in SWP supply during state-wide droughts, pipeline capacity, and Cachuma Reservoir operations. The modeling results actually uses two hydrologic models, the Santa Ynez River Hydrology Model (used for Cachuma Reservoir) and the DWRSIM (used for shortages in SWP deliveries). Table 14 shows the average deliveries for the period 1942-1993. The period 1942-1993 is chosen because this period coincides with the Lompoc groundwater models, which will be used to determine impacts on salinity in Lompoc. Alternatives 2, 3A, 3B, 3C, 4A, and 4B import 10,135 to 10,369 acre-feet per year of SWP water under South Coast contracts or around 74 to 75% of their full entitlement.

Deliveries of SWP vary substantially from year to year. Tables15a-e summarizes SWP for each year from 1942-1993. The largest shortages of SWP occur during the drought of 1985 through 1991.

TABLE 14
SUMMMARY OF STATE WATER PROJECT DELIVERIES
AVERAGE FOR PERIOD 1942-1993
(ACRE-FEET/YEAR)

EIR Alternative	ID No. 1 Exchange [1]	BNA Exchange [2]	SWP in Cachuma [3]	SWP in Outlet Works [4]	Total Imports under South Coast Contracts	Total Imports as a Percentage of 13,750 AF
1	0	0	0	0	0	
2	2,497	0	5,849	1,789	10,135	74%
3A	2,472	0	5,878	1,802	10,152	74%
3B	2,482	0	5,844	1,841	10,167	74%
3C	2,497	0	5,836	1,866	10,199	74%
4 A&B	2,501	1,770	4,853	1,245	10,369	75%

1) Based on shortages in Cachuma Project estimated by the SYRHM 0498

2) Based on exchange of 1,771 AF each year; actual Below Narrows Exchange might vary in timing and amount.

3) Based on shortages in SWP from DWRSIM and no deliveries when Cachuma is spilling from SYRHM

4) SWP reductions in delivery due to restrictions of 50% SWP during water right releases and 0% SWP during passage releases.

TABLE 15A
SUMMMARY OF STATE WATER PROJECT DELIVERIES
FOR EIR ALTERNATIVE 2
(ACRE-FEET/YEAR)

	DEMAND		SUPPLY			DELIVERY			
			M&I Projected	ID No. 1	Reduced				Total Imports
WATER	TOTAL	ID No. 1	Delivery as Percentage	Exchange	Delivery due	ID No. 1	SWP in	SWP in	under South
YEAR	SWP Demand [1]	Exchange	of Full Entitlement [2]	Shortage [3]	to Spill [4]	Exchange	Cachuma [5]	Outlet Works [6]	Coast Contracts
1942	13,750	2,571	100%	100%	2,370	2,571	8,937	641	12,149
1943	13,750	2,571	89%	100%	3,653	2,571	6,002	0	8,573
1944	13,750	2,571	92%	100%	3,487	2,571	7,623	255	10,449
1945	13,750	2,571	90%	100%	2,448	2,571	7,811	1,285	11,667
1946	13,750	2,571	88%	100%	2,012	2,571	5,313	2,801	10,685
1947	13,750	2,571	75%	100%	0	2,571	3,485	4,260	10,316
1948	13,750	2,571	67%	100%	1,351	2,571	4,856	1,744	9,171
1949	13,750	2,571	65%	92%	914	2,372	5,847	753	8,972
1950	13,750	2,571	67%	77%	1,118	1,989	6,419	757	9,165
1951	13,750	2,571	88%	62%	2,788	1,590	9,919	520	12,029
1952	13,750	2,571	96%	90%	2,551	2,320	6,314	1,990	10,624
1953	13,750	2,571	90%	100%	0	2,571	7,432	2,706	12,709
1954	13,750	2,571	83%	100%	598	2,571	5,218	3,776	11,565
1955	13,750	2,571	69%	100%	1,898	2,571	4,829	2,251	9,651
1956	13,750	2,571	90%	98%	2,528	2,509	8,401	1,460	12,370
1957	13,750	2,571	88%	87%	2,934	2,244	7,355	3,018	12,617
1958	13,750	2,571	90%	94%	4,732	2,414	7,039	285	9,737
1959	13,750	2,571	88%	100%	0	2,571	6,959	2,601	12,131
1960	13,750	2,571	63%	100%	222	2,571	3,826	2,097	8,494
1961	13,750	2,571	61%	100%	750	2,568	5,140	695	8,403
1962	13,750	2,571	78%	100%	1,712	2,569	6,746	1,379	10,694
1963	13,750	2,571	94%	100%	1,316	2,571	8,810	1,252	12,633
1964	13,750	2,571	88%	100%	1,388	2,571	8,772	1,040	12,383
1965	13,750	2,571	82%	98%	2,180	2,524	6,134	2,114	10,772
1966	13,750	2,571	96%	99%	0	2,557	9,164	1,946	13,667
1967	13,750	2,571	96%	100%	4,224	2,571	3,712	2,916	9,199
1968	13,750	2,571	89%	100%	1,717	2,571	5,816	4,087	12,474
1969	13,750	2,571	93%	100%	5,477	2,571	4,630	1,070	8,271
1970	13,750	2,571	89%	100%	1,080	2,571	6,308	3,061	11,940
1971	13,750	2,571	94%	100%	1,526	2,571	5,042	5,367	12,980
1972	13,750	2,571	88%	100%	1,214	2,571	4,464	4,595	11,630
1973	13,750	2,571	82%	100%	1,794	2,571	6,373	1,320	10,264
1974	13,750	2,571	94%	100%	1,890	2,571	7,104	2,293	11,968
1975	13,750	2,571	96%	100%	2,882	2,571	8,420	291	11,282
1976	13,750	2,571	88%	100%	22	2,571	6,391	3,457	12,419
1977	13,750	2,571	33%	100%	56	2,571	1,495	524	4,590
1978	13,750	2,571	68%	100%	2,080	2,571	4,704	0	7,275
1979	13,750	2,571	85%	100%	2,755	2,571	6,695	431	9,697
1980	13,750	2,571	82%	100%	3,438	2,571	5,531	411	8,513
1981	13,750	2,571	83%	100%	1,238	2,571	7,151	1,926	11,648
1982	13,750	2,571	94%	100%	808	2,571	6,899	3,416	12,886
1983	13,750	2,571	100%	100%	5,254	2,571	4,901	1,025	8,497
1984	13,750	2,571	100%	100%	3,523	2,571	6,553	2,695	11,819
1985	13,750	2,571	96%	100%	1,862	2,571	7,176	2,957	12,704
1986	13,750	2,571	81%	100%	2,198	2,571	6,219	1,071	9,861
1987	13,750	2,571	69%	100%	300	2,571	5,850	1,130	9,551
1988	13,750	2,571	43%	100%	0	2,571	2,121	1,228	5,920
1989	13,750	2,571	58%	95%	1,293	2,448	3,163	2,309	7,920
1990	13,750	2,571	46%	81%	1,212	2,077	2,776	1,092	5,944
1991	13,750	2,571	29%	81%	26	2,082	1,336	1,049	4,467
1992	13,750	2,571	31%	96%	108	2,478	1,143	578	4,200
1993	13,750	2,571	76%	100%	3,729	2,571	3,841	1,089	7,501
AVG	13,750	2,571	80%	97%	1,820	2,497	5,849	1,789	10,135

NOTES

1) Based on total South Coast contractual agreements with CCWA

2) Based on DWR's SWP model DWRSIM v. 9.06T
Uses results from DWR's No Action scenario 786 which uses Delta historic hydrology
with regulations (including 1995 WQCP Bay-Delta Accord, 1997 AFRP CVPIA(b) and the New Melones Interim Operation plan)
and no new storage facilities.
The percentages in this table do not include the option of purchasing the 10% drought buffer.

3) Based on shortages in Cachuma Project estimated by the SYRHM 0498

4) Assumes no CCWA deliveries when Cachuma is spilling and also that South Coast would not want to make-up that delivery water
because of the wetness of the basin and already assuming full deliveries of 13750 pending spills

5) SWP reductions in delivery (due to restrictions of 50% SWP during water right releases and 0% SWP during passage releases)
are redistributed to the following months up to one year.

6) Limited to being 50% of outlet releases

TABLE 15B

SUMMMARY OF STATE WATER PROJECT DELIVERIES

FOR EIR ALTERNATIVE 3A

(ACRE-FEET/YEAR)

	DEMAND		SUPPLY			DELIVERY			
WATER YEAR	TOTAL SWP Demand [1]	ID No. 1 Exchange	M&I Projected Delivery as Percentage of Full Entitlement [2]	ID No. 1 Exchange Shortage [3]	Reduced Delivery due to Spill [4]	ID No. 1 Exchange	SWP in Cachuma [5]	SWP in Outlet Works [6]	Total Imports under South Coast Contracts
1942	13,750	2,571	100%	100%	1,602	2,571	9,059	519	12,149
1943	13,750	2,571	89%	100%	3,653	2,571	6,002	0	8,573
1944	13,750	2,571	92%	100%	2,157	2,571	7,878	0	10,449
1945	13,750	2,571	90%	100%	1,410	2,571	7,308	1,121	11,000
1946	13,750	2,571	88%	100%	678	2,571	5,399	3,382	11,352
1947	13,750	2,571	75%	100%	0	2,571	3,485	4,260	10,316
1948	13,750	2,571	67%	100%	0	2,571	4,908	1,692	9,171
1949	13,750	2,571	65%	90%	0	2,305	5,613	1,054	8,972
1950	13,750	2,571	67%	71%	0	1,831	6,015	1,319	9,164
1951	13,750	2,571	88%	54%	0	1,390	10,120	520	12,029
1952	13,750	2,571	96%	88%	2,561	2,274	6,824	1,513	10,610
1953	13,750	2,571	90%	100%	0	2,571	6,423	3,416	12,410
1954	13,750	2,571	83%	100%	0	2,571	4,815	4,075	11,461
1955	13,750	2,571	69%	100%	0	2,571	3,780	3,809	10,160
1956	13,750	2,571	90%	96%	0	2,466	7,736	1,604	11,806
1957	13,750	2,571	88%	83%	0	2,143	6,536	3,351	12,030
1958	13,750	2,571	90%	92%	1,639	2,374	8,111	285	10,770
1959	13,750	2,571	88%	100%	0	2,571	6,180	3,279	12,030
1960	13,750	2,571	63%	100%	0	2,571	4,467	1,557	8,595
1961	13,750	2,571	61%	97%	0	2,499	5,201	701	8,401
1962	13,750	2,571	78%	99%	0	2,539	6,437	1,719	10,695
1963	13,750	2,571	94%	100%	0	2,571	9,225	1,190	12,986
1964	13,750	2,571	88%	100%	0	2,571	8,415	1,044	12,030
1965	13,750	2,571	82%	95%	0	2,446	5,641	3,182	11,268
1966	13,750	2,571	96%	99%	0	2,534	8,695	1,952	13,181
1967	13,750	2,571	96%	100%	4,224	2,571	2,492	3,888	8,951
1968	13,750	2,571	89%	100%	0	2,571	6,867	2,788	12,226
1969	13,750	2,571	93%	100%	3,869	2,571	5,278	1,077	8,926
1970	13,750	2,571	89%	100%	0	2,571	6,669	2,986	12,226
1971	13,750	2,571	94%	100%	0	2,571	5,439	4,976	12,986
1972	13,750	2,571	88%	100%	0	2,571	4,523	4,936	12,030
1973	13,750	2,571	82%	100%	1,246	2,571	6,651	797	10,019
1974	13,750	2,571	94%	100%	746	2,571	7,276	2,393	12,240
1975	13,750	2,571	96%	100%	1,520	2,571	8,410	674	11,655
1976	13,750	2,571	88%	100%	0	2,571	7,505	1,954	12,030
1977	13,750	2,571	33%	100%	0	2,571	1,640	368	4,579
1978	13,750	2,571	68%	100%	2,080	2,571	4,704	0	7,275
1979	13,750	2,571	85%	100%	1,953	2,571	6,740	386	9,697
1980	13,750	2,571	82%	100%	2,666	2,571	6,028	0	8,599
1981	13,750	2,571	83%	100%	0	2,571	6,719	2,171	11,461
1982	13,750	2,571	94%	100%	0	2,571	5,824	4,590	12,985
1983	13,750	2,571	100%	100%	5,254	2,571	5,926	0	8,497
1984	13,750	2,571	100%	100%	2,403	2,571	7,753	1,024	11,348
1985	13,750	2,571	96%	100%	1	2,571	7,687	2,917	13,175
1986	13,750	2,571	81%	100%	1,220	2,571	6,230	1,060	9,861
1987	13,750	2,571	69%	100%	0	2,571	6,071	909	9,551
1988	13,750	2,571	43%	100%	0	2,571	1,881	1,468	5,920
1989	13,750	2,571	58%	92%	1	2,369	3,619	2,032	8,020
1990	13,750	2,571	46%	74%	0	1,899	3,449	959	6,306
1991	13,750	2,571	29%	75%	0	1,927	963	1,119	4,009
1992	13,750	2,571	31%	95%	0	2,447	1,170	587	4,204
1993	13,750	2,571	76%	100%	2,999	2,571	3,847	1,083	7,501
AVG	13,750	2,571	80%	96%	844	2,472	5,878	1,802	10,152

NOTES

1) Based on total South Coast contractual agreements with CCWA

2) Based on DWR's SWP model DWRSIM v. 9.06T
Uses results from DWR's No Action scenario 786 which uses Delta historic hydrology
with regulations (including 1995 WQCP Bay-Delta Accord, 1997 AFRP CVPIA(b) and the New Melones Interim Operation plan)
and no new storage facilities.
The percentages in this table do not include the option of purchasing the 10% drought buffer.

3) Based on shortages in Cachuma Project estimated by the SYRHM 0498

4) Assumes no CCWA deliveries when Cachuma is spilling and also that South Coast would not want to make-up that delivery water
because of the wetness of the basin and already assuming full deliveries of 13750 pending spills

5) SWP reductions in delivery (due to restrictions of 50% SWP during water right releases and 0% SWP during passage releases)
are redistributed to the following months up to one year.

6) Limited to being 50% of outlet releases

TABLE 15C
SUMMMARY OF STATE WATER PROJECT DELIVERIES
FOR EIR ALTERNATIVE 3B
(ACRE-FEET/YEAR)

DEMAND			SUPPLY			DELIVERY			
			M&I Projected	ID No. 1	Reduced				Total Imports
WATER	TOTAL	ID No. 1	Delivery as Percentage	Exchange	Delivery due	ID No. 1	SWP in	SWP in	under South
YEAR	SWP Demand [1]	Exchange	of Full Entitlement [2]	Shortage [3]	to Spill [4]	Exchange	Cachuma [5]	Outlet Works [6]	Coast Contracts
1942	13,750	2,571	100%	100%	1,602	2,571	9,058	520	12,149
1943	13,750	2,571	89%	100%	3,653	2,571	6,002	0	8,573
1944	13,750	2,571	92%	100%	2,157	2,571	7,878	0	10,449
1945	13,750	2,571	90%	100%	1,410	2,571	7,308	1,121	11,000
1946	13,750	2,571	88%	100%	678	2,571	4,446	4,335	11,352
1947	13,750	2,571	75%	100%	0	2,571	3,485	4,260	10,316
1948	13,750	2,571	67%	100%	0	2,571	4,991	1,609	9,171
1949	13,750	2,571	65%	91%	0	2,333	5,886	757	8,976
1950	13,750	2,571	67%	73%	0	1,883	5,997	1,289	9,168
1951	13,750	2,571	88%	56%	0	1,445	10,065	520	12,030
1952	13,750	2,571	96%	89%	1,779	2,286	7,147	1,965	11,398
1953	13,750	2,571	90%	100%	0	2,571	6,497	3,342	12,410
1954	13,750	2,571	83%	100%	0	2,571	3,932	4,958	11,461
1955	13,750	2,571	69%	100%	0	2,571	3,780	3,199	9,550
1956	13,750	2,571	90%	97%	0	2,498	8,357	1,561	12,416
1957	13,750	2,571	88%	86%	0	2,200	6,481	3,351	12,031
1958	13,750	2,571	90%	93%	1,637	2,393	8,101	285	10,779
1959	13,750	2,571	88%	100%	0	2,571	6,180	3,279	12,030
1960	13,750	2,571	63%	100%	0	2,571	3,936	2,088	8,595
1961	13,750	2,571	61%	98%	0	2,531	5,173	698	8,402
1962	13,750	2,571	78%	99%	0	2,553	6,418	1,718	10,689
1963	13,750	2,571	94%	100%	0	2,571	9,225	1,190	12,986
1964	13,750	2,571	88%	100%	0	2,571	8,415	1,044	12,030
1965	13,750	2,571	82%	96%	0	2,469	5,599	3,198	11,266
1966	13,750	2,571	96%	99%	0	2,541	8,685	1,950	13,176
1967	13,750	2,571	96%	100%	4,224	2,571	2,492	3,888	8,951
1968	13,750	2,571	89%	100%	0	2,571	7,045	2,610	12,226
1969	13,750	2,571	93%	100%	3,869	2,571	5,278	1,077	8,926
1970	13,750	2,571	89%	100%	0	2,571	6,669	2,986	12,226
1971	13,750	2,571	94%	100%	0	2,571	4,685	5,730	12,986
1972	13,750	2,571	88%	100%	1	2,571	4,257	5,202	12,030
1973	13,750	2,571	82%	100%	1,246	2,571	6,651	797	10,019
1974	13,750	2,571	94%	100%	746	2,571	7,270	2,398	12,239
1975	13,750	2,571	96%	100%	1,520	2,571	8,400	684	11,655
1976	13,750	2,571	88%	100%	0	2,571	7,858	1,601	12,030
1977	13,750	2,571	33%	100%	0	2,571	1,640	368	4,579
1978	13,750	2,571	68%	100%	2,080	2,571	4,704	0	7,275
1979	13,750	2,571	85%	100%	1,953	2,571	6,726	400	9,697
1980	13,750	2,571	82%	100%	2,666	2,571	6,028	0	8,599
1981	13,750	2,571	83%	100%	0	2,571	7,019	1,871	11,461
1982	13,750	2,571	94%	100%	0	2,571	5,824	4,590	12,985
1983	13,750	2,571	100%	100%	5,254	2,571	5,926	0	8,497
1984	13,750	2,571	100%	100%	2,403	2,571	7,752	1,025	11,348
1985	13,750	2,571	96%	100%	1	2,571	7,687	2,917	13,175
1986	13,750	2,571	81%	100%	1,220	2,571	6,228	1,062	9,861
1987	13,750	2,571	69%	100%	0	2,571	6,067	913	9,551
1988	13,750	2,571	43%	100%	0	2,571	1,881	1,468	5,920
1989	13,750	2,571	58%	93%	0	2,404	3,513	2,107	8,024
1990	13,750	2,571	46%	76%	0	1,961	3,388	953	6,302
1991	13,750	2,571	29%	77%	0	1,975	917	1,122	4,014
1992	13,750	2,571	31%	96%	0	2,457	1,105	640	4,202
1993	13,750	2,571	76%	100%	2,999	2,571	3,849	1,081	7,501
AVG	13,750	2,571	80%	97%	829	2,482	5,844	1,841	10,167

NOTES

1) Based on total South Coast contractual agreements with CCWA

2) Based on DWR's SWP model DWRSIM v. 9.06T
Uses results from DWR's No Action scenario 786 which uses Delta historic hydrology
with regulations (including 1995 WQCP Bay-Delta Accord, 1997 AFRP CVPIA(b) and the New Melones Interim Operation plan)
and no new storage facilities.
The percentages in this table do not include the option of purchasing the 10% drought buffer.

3) Based on shortages in Cachuma Project estimated by the SYRHM 0498

4) Assumes no CCWA deliveries when Cachuma is spilling and also that South Coast would not want to make-up that delivery water
because of the wetness of the basin and already assuming full deliveries of 13750 pending spills

5) SWP reductions in delivery (due to restrictions of 50% SWP during water right releases and 0% SWP during passage releases)
are redistributed to the following months up to one year.

6) Limited to being 50% of outlet releases

TABLE 15D
SUMMMARY OF STATE WATER PROJECT DELIVERIES
FOR EIR ALTERNATIVE 3C
(ACRE-FEET/YEAR)

DEMAND			SUPPLY			DELIVERY			
			M&I Projected	ID No. 1	Reduced				Total Imports
WATER	TOTAL	ID No. 1	Delivery as Percentage	Exchange	Delivery due	ID No. 1	SWP in	SWP in	under South
YEAR	SWP Demand [1]	Exchange	of Full Entitlement [2]	Shortage [3]	to Spill [4]	Exchange	Cachuma [5]	Outlet Works [6]	Coast Contracts
1942	13,750	2,571	100%	100%	1,602	2,571	9,057	521	12,149
1943	13,750	2,571	89%	100%	2,768	2,571	6,887	0	9,458
1944	13,750	2,571	92%	100%	2,157	2,571	7,878	0	10,449
1945	13,750	2,571	90%	100%	1,410	2,571	7,308	1,121	11,000
1946	13,750	2,571	88%	100%	678	2,571	4,446	4,335	11,352
1947	13,750	2,571	75%	100%	0	2,571	3,485	4,260	10,316
1948	13,750	2,571	67%	100%	0	2,571	5,049	1,551	9,171
1949	13,750	2,571	65%	93%	0	2,393	5,630	951	8,974
1950	13,750	2,571	67%	78%	0	2,000	5,850	1,319	9,169
1951	13,750	2,571	88%	62%	0	1,582	9,931	520	12,032
1952	13,750	2,571	96%	90%	1,773	2,317	7,092	1,990	11,399
1953	13,750	2,571	90%	100%	0	2,571	6,497	3,342	12,410
1954	13,750	2,571	83%	100%	0	2,571	4,302	4,588	11,461
1955	13,750	2,571	69%	100%	1	2,571	3,868	3,112	9,551
1956	13,750	2,571	90%	98%	0	2,529	8,324	1,558	12,411
1957	13,750	2,571	88%	88%	0	2,270	6,739	3,026	12,035
1958	13,750	2,571	90%	94%	1,632	2,420	8,075	285	10,780
1959	13,750	2,571	88%	100%	0	2,571	6,180	3,279	12,030
1960	13,750	2,571	63%	100%	0	2,571	3,936	2,088	8,595
1961	13,750	2,571	61%	100%	0	2,563	5,145	695	8,403
1962	13,750	2,571	78%	100%	0	2,567	6,399	1,726	10,692
1963	13,750	2,571	94%	100%	0	2,571	9,221	1,194	12,986
1964	13,750	2,571	88%	100%	0	2,571	8,415	1,044	12,030
1965	13,750	2,571	82%	97%	0	2,497	5,557	3,216	11,270
1966	13,750	2,571	96%	99%	0	2,549	8,680	1,948	13,177
1967	13,750	2,571	96%	100%	3,464	2,571	3,252	3,888	9,711
1968	13,750	2,571	89%	100%	0	2,571	6,871	2,784	12,226
1969	13,750	2,571	93%	100%	3,870	2,571	5,279	1,076	8,926
1970	13,750	2,571	89%	100%	0	2,571	6,669	2,986	12,226
1971	13,750	2,571	94%	100%	0	2,571	4,685	5,730	12,986
1972	13,750	2,571	88%	100%	0	2,571	4,257	5,202	12,030
1973	13,750	2,571	82%	100%	1,246	2,571	6,651	797	10,019
1974	13,750	2,571	94%	100%	746	2,571	7,166	2,502	12,239
1975	13,750	2,571	96%	100%	1,520	2,571	8,308	776	11,655
1976	13,750	2,571	88%	100%	0	2,571	7,857	1,602	12,030
1977	13,750	2,571	33%	100%	0	2,571	1,640	368	4,579
1978	13,750	2,571	68%	100%	2,080	2,571	4,704	0	7,275
1979	13,750	2,571	85%	100%	1,953	2,571	6,687	439	9,697
1980	13,750	2,571	82%	100%	2,666	2,571	6,028	0	8,599
1981	13,750	2,571	83%	100%	1	2,571	6,720	2,170	11,461
1982	13,750	2,571	94%	100%	0	2,571	5,804	4,611	12,986
1983	13,750	2,571	100%	100%	5,254	2,571	5,926	0	8,497
1984	13,750	2,571	100%	100%	2,403	2,571	7,752	1,025	11,348
1985	13,750	2,571	96%	100%	1	2,571	7,687	2,917	13,175
1986	13,750	2,571	81%	100%	1,220	2,571	6,226	1,064	9,861
1987	13,750	2,571	69%	100%	0	2,571	5,863	1,117	9,551
1988	13,750	2,571	43%	100%	0	2,571	1,334	2,015	5,920
1989	13,750	2,571	58%	95%	0	2,450	3,017	2,555	8,022
1990	13,750	2,571	46%	80%	0	2,062	3,299	944	6,304
1991	13,750	2,571	29%	80%	0	2,057	894	1,059	4,010
1992	13,750	2,571	31%	96%	0	2,472	1,097	636	4,205
1993	13,750	2,571	76%	100%	2,999	2,571	3,846	1,084	7,501
AVG	13,750	2,571	80%	97%	797	2,497	5,836	1,866	10,199

NOTES

1) Based on total South Coast contractual agreements with CCWA

2) Based on DWR's SWP model DWRSIM v. 9.06T
Uses results from DWR's No Action scenario 786 which uses Delta historic hydrology
with regulations (including 1995 WQCP Bay-Delta Accord, 1997 AFRP CVPIA(b) and the New Melones Interim Operation plan)
and no new storage facilities.
The percentages in this table do not include the option of purchasing the 10% drought buffer.

3) Based on shortages in Cachuma Project estimated by the SYRHM 0498

4) Assumes no CCWA deliveries when Cachuma is spilling and also that South Coast would not want to make-up that delivery water
because of the wetness of the basin and already assuming full deliveries of 13750 pending spills

5) SWP reductions in delivery (due to restrictions of 50% SWP during water right releases and 0% SWP during passage releases)
are redistributed to the following months up to one year.

6) Limited to being 50% of outlet releases

TABLE 15E

SUMMMARY OF STATE WATER PROJECT DELIVERIES

FOR EIR ALTERNATIVE 4 A&B

(ACRE-FEET/YEAR)

	DEMAND			SUPPLY				DELIVERY				
WATER YEAR	TOTAL SWP Demand [1]	ID No. 1 Exchange	BNA Exchange	M&I Projected Delivery as Percentage of Full Entitlement [2]	ID No. 1 Exchange Shortage [3]	BNA Exchange Shortage	Reduced Delivery due to Spill [4]	ID No. 1 Exchange	BNA Exchange	SWP in Cachuma [5]	SWP in Outlet Works [6]	Total Imports under South Coast Contracts
1942	13,750	2,571	1,771	100%	100%	none	674	2,571	1,771	8,197	533	13,072
1943	13,750	2,571	1,771	89%	100%	none	2,260	2,571	1,771	5,619	0	9,961
1944	13,750	2,571	1,771	92%	100%	none	1,776	2,571	1,771	6,483	0	10,825
1945	13,750	2,571	1,771	90%	100%	none	1,156	2,571	1,771	5,554	1,360	11,256
1946	13,750	2,571	1,771	88%	100%	none	551	2,571	1,771	4,996	2,143	11,481
1947	13,750	2,571	1,771	75%	100%	none	0	2,571	1,771	4,328	1,641	10,311
1948	13,750	2,571	1,771	67%	100%	none	1	2,571	1,771	3,191	1,632	9,165
1949	13,750	2,571	1,771	65%	96%	none	0	2,473	1,771	4,136	597	8,977
1950	13,750	2,571	1,771	67%	82%	none	0	2,106	1,771	4,706	584	9,167
1951	13,750	2,571	1,771	88%	64%	none	0	1,636	1,771	8,107	520	12,034
1952	13,750	2,571	1,771	96%	90%	none	1,484	2,322	1,771	5,936	1,666	11,695
1953	13,750	2,571	1,771	90%	100%	none	0	2,571	1,771	5,881	2,189	12,412
1954	13,750	2,571	1,771	83%	100%	none	0	2,571	1,771	4,643	2,471	11,456
1955	13,750	2,571	1,771	69%	100%	none	0	2,571	1,771	2,819	2,385	9,546
1956	13,750	2,571	1,771	90%	99%	none	0	2,549	1,771	6,517	1,577	12,413
1957	13,750	2,571	1,771	88%	89%	none	0	2,285	1,771	4,937	3,040	12,033
1958	13,750	2,571	1,771	90%	94%	none	1,343	2,420	1,771	6,595	285	11,070
1959	13,750	2,571	1,771	88%	100%	none	0	2,571	1,771	6,280	1,410	12,032
1960	13,750	2,571	1,771	63%	100%	none	0	2,571	1,771	3,085	1,170	8,597
1961	13,750	2,571	1,771	61%	99%	none	0	2,550	1,771	3,549	534	8,404
1962	13,750	2,571	1,771	78%	100%	none	0	2,562	1,771	5,039	1,322	10,694
1963	13,750	2,571	1,771	94%	100%	none	0	2,571	1,771	7,437	1,202	12,981
1964	13,750	2,571	1,771	88%	100%	none	0	2,571	1,771	6,808	882	12,032
1965	13,750	2,571	1,771	82%	95%	none	1	2,432	1,771	4,474	2,592	11,269
1966	13,750	2,571	1,771	96%	98%	none	0	2,530	1,771	7,250	1,628	13,179
1967	13,750	2,571	1,771	96%	100%	none	2,886	2,571	1,771	4,690	1,259	10,291
1968	13,750	2,571	1,771	89%	100%	none	0	2,571	1,771	5,983	1,896	12,221
1969	13,750	2,571	1,771	93%	100%	none	3,199	2,571	1,771	4,180	1,076	9,598
1970	13,750	2,571	1,771	89%	100%	none	0	2,571	1,771	6,682	1,197	12,221
1971	13,750	2,571	1,771	94%	100%	none	0	2,571	1,771	5,923	2,716	12,981
1972	13,750	2,571	1,771	88%	100%	none	0	2,571	1,771	5,179	2,511	12,032
1973	13,750	2,571	1,771	82%	100%	none	992	2,571	1,771	5,298	635	10,275
1974	13,750	2,571	1,771	94%	100%	none	0	2,571	1,771	6,393	2,246	12,981
1975	13,750	2,571	1,771	96%	100%	none	1,266	2,571	1,771	6,343	1,225	11,910
1976	13,750	2,571	1,771	88%	100%	none	0	2,571	1,771	5,939	1,751	12,032
1977	13,750	2,571	1,771	33%	100%	none	0	2,571	1,771	195	44	4,581
1978	13,750	2,571	1,771	68%	100%	none	1,537	2,571	1,771	3,478	0	7,820
1979	13,750	2,571	1,771	85%	100%	none	1,572	2,571	1,771	5,225	513	10,080
1980	13,750	2,571	1,771	82%	100%	none	2,123	2,571	1,771	4,235	567	9,144
1981	13,750	2,571	1,771	83%	100%	none	0	2,571	1,771	5,404	1,710	11,456
1982	13,750	2,571	1,771	94%	100%	none	0	2,571	1,771	6,267	2,371	12,980
1983	13,750	2,571	1,771	100%	100%	none	4,420	2,571	1,771	4,276	708	9,326
1984	13,750	2,571	1,771	100%	100%	none	2,022	2,571	1,771	6,520	862	11,724
1985	13,750	2,571	1,771	96%	100%	none	0	2,571	1,771	6,242	2,593	13,177
1986	13,750	2,571	1,771	81%	100%	none	966	2,571	1,771	4,827	941	10,110
1987	13,750	2,571	1,771	69%	100%	none	0	2,571	1,771	4,390	814	9,546
1988	13,750	2,571	1,771	43%	100%	none	0	2,571	1,771	1,145	435	5,922
1989	13,750	2,571	1,771	58%	96%	none	0	2,460	1,771	2,297	1,492	8,019
1990	13,750	2,571	1,771	46%	81%	none	0	2,073	1,771	1,693	762	6,298
1991	13,750	2,571	1,771	29%	80%	none	0	2,044	1,771	88	108	4,011
1992	13,750	2,571	1,771	31%	96%	34	0	2,465	1,737	0	0	4,202
1993	13,750	2,571	1,771	76%	100%	none	2,333	2,571	1,771	2,902	930	8,174
AVG	13,750	2,571	1,771	80%	97%	1	626	2,501	1,770	4,853	1,245	10,369

NOTES

1) Based on total South Coast contractual agreements with CCWA

2) Based on DWR's SWP model DWRSIM v. 9.06T
Uses results from DWR's No Action scenario 786 which uses Delta historic hydrology
with regulations (including 1995 WQCP Bay-Delta Accord, 1997 AFRP CVPIA(b) and the New Melones Interim Operation plan)
and no new storage facilities.
The percentages in this table do not include the option of purchasing the 10% drought buffer.

3) Based on shortages in Cachuma Project estimated by the SYRHM 0498

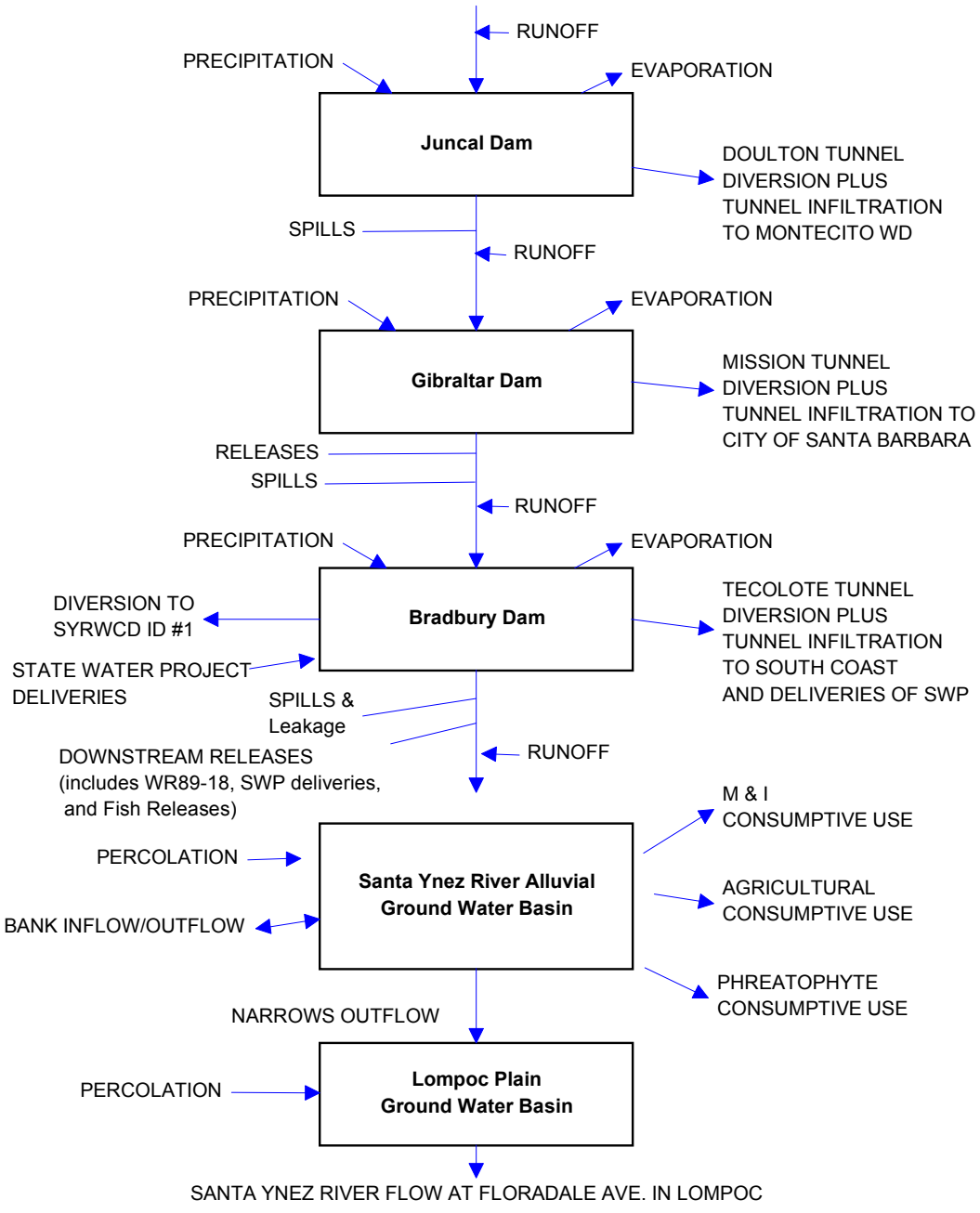
4) Assumes no CCWA deliveries when Cachuma is spilling and also that South Coast would not want to make-up that delivery water
because of the wetness of the basin and already assuming full deliveries of 13750 pending spills

5) SWP reductions in delivery (due to restrictions of 50% SWP during water right releases and 0% SWP during passage releases)
are redistributed to the following months up to one year.

6) Limited to being 50% of outlet releases

FIGURE 1

SCHEMATIC PRESENTATION OF THE HYDROLOGIC MODEL FOR THE SANTA YNEZ WATERSHED (SYRHM)



Historic Releases from Cachuma Reservoir
for Fishery Enhancement Studies
1995-2000

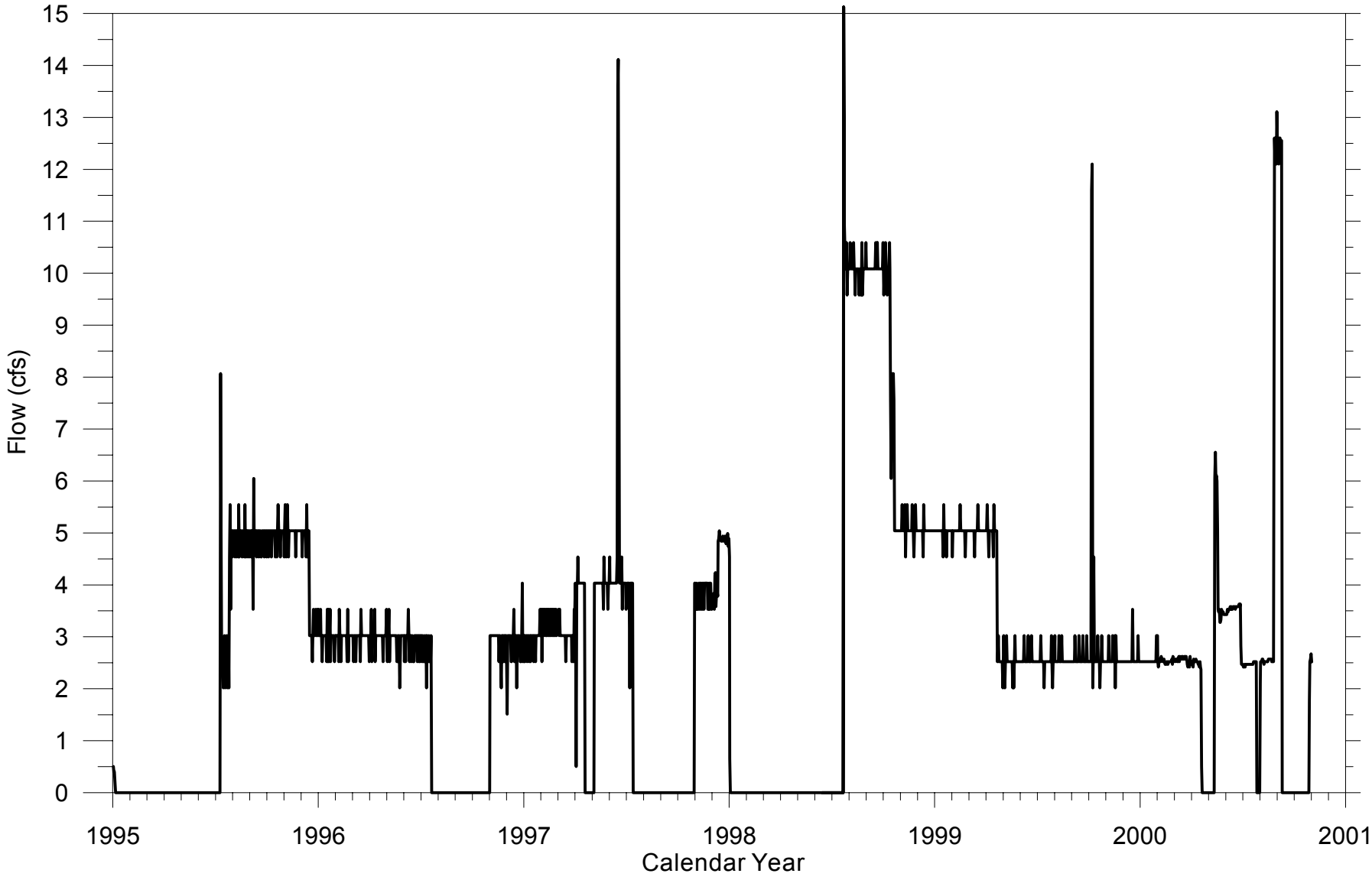


FIGURE 2

FIGURE 3A

FREQUENCY OF SPILLS AND DOWNSTREAM RELEASES FROM CACHUMA RESERVOIR (WY 1918-1993)

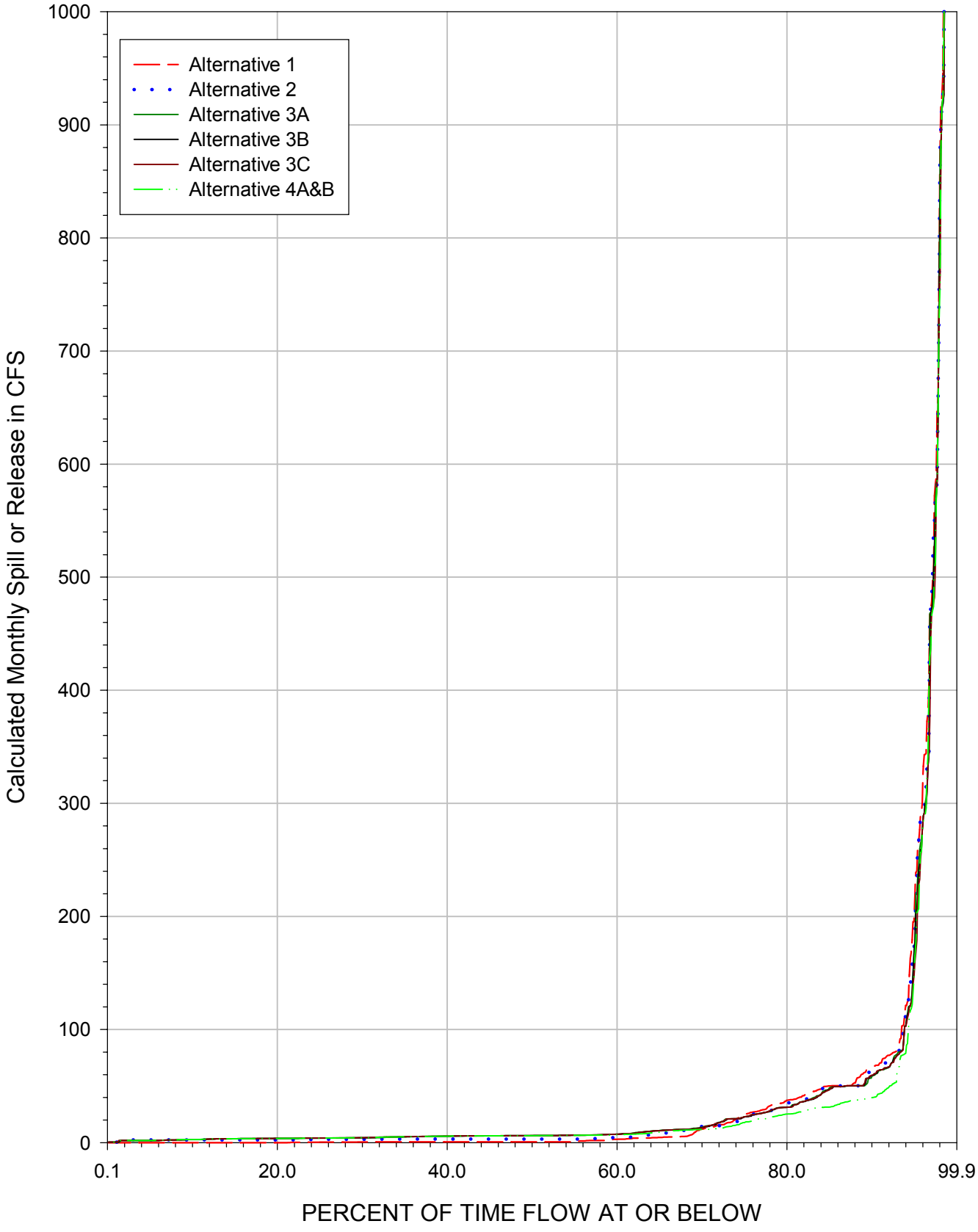
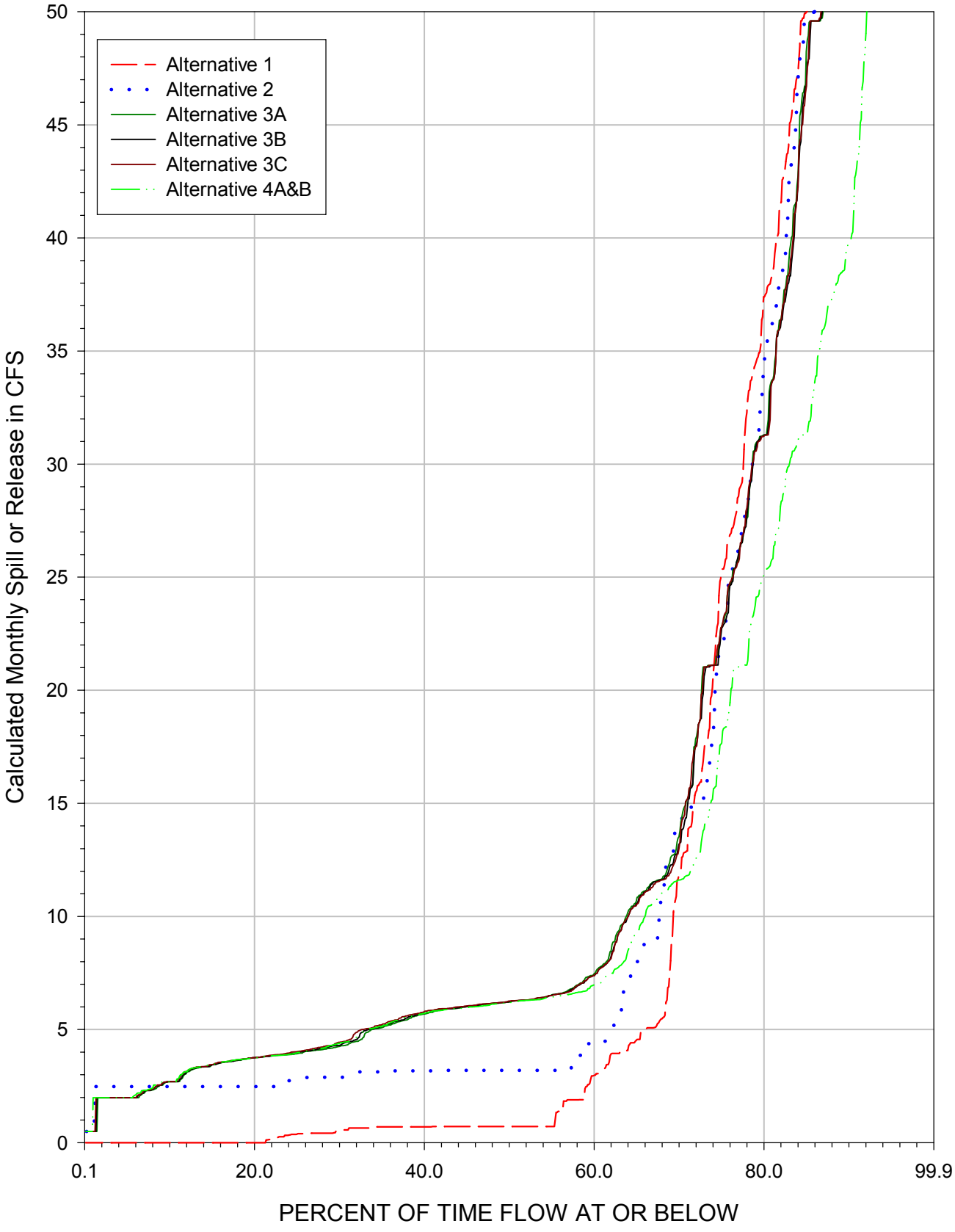


FIGURE 3B

FREQUENCY OF SPILLS AND DOWNSTREAM RELEASES FROM CACHUMA RESERVOIR (WY 1918-1993)



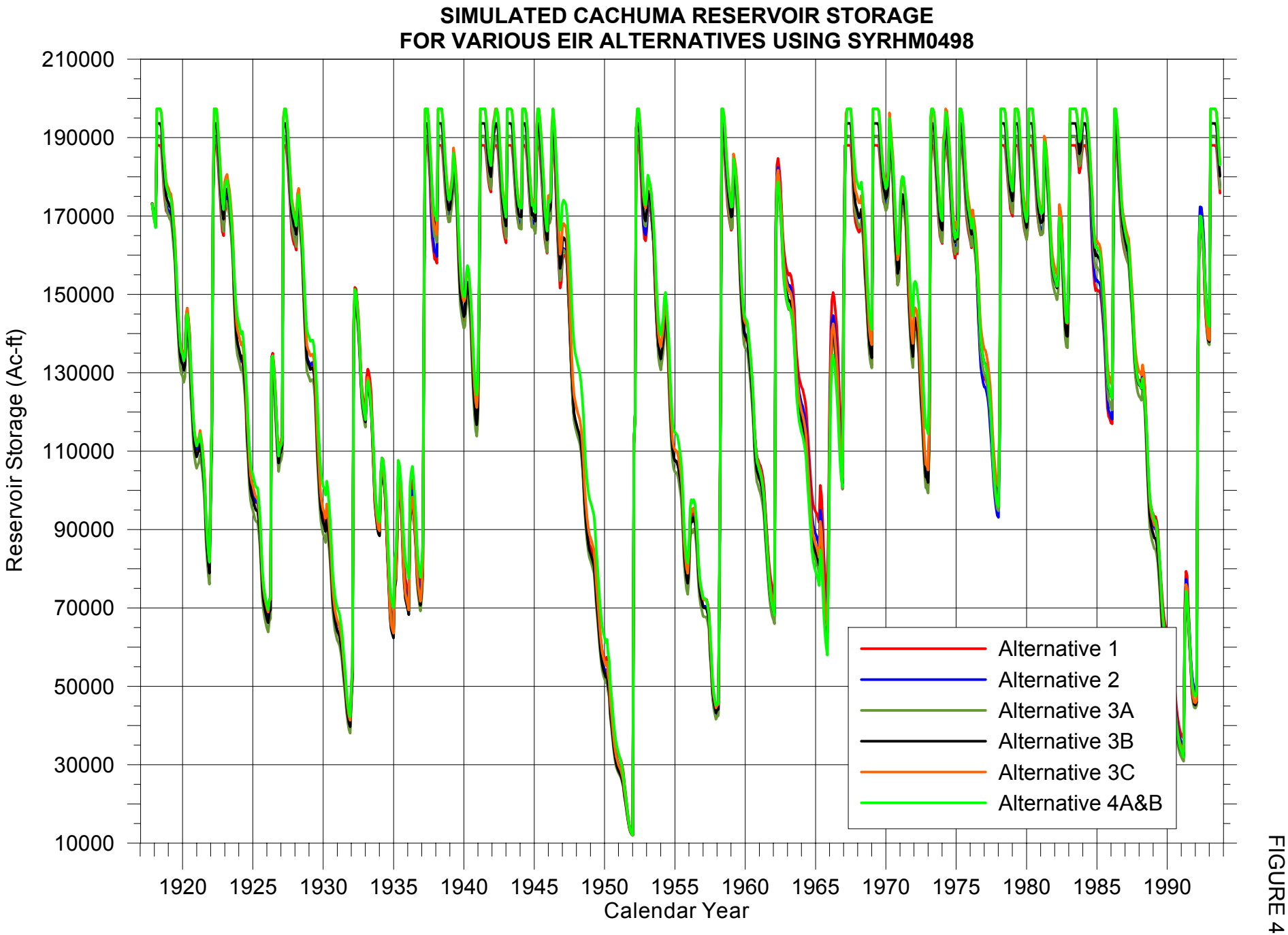

SIMULATED CACHUMA RESERVOIR STORAGE
FOR VARIOUS EIR ALTERNATIVES USING SYRHM0498
Reservoir Storage (Ac-ft)
210000
190000
170000
150000
130000
110000
90000
70000
50000
30000
10000
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
Calendar Year
Alternative 1
Alternative 2
Alternative 3A
Alternative 3B
Alternative 3C
Alternative 4A&B

FIGURE 4

Frequency of Lake Cachuma EOM Water Surface Elevation
Hydrologic Period 1918-1993 (76 Years, 912 months)

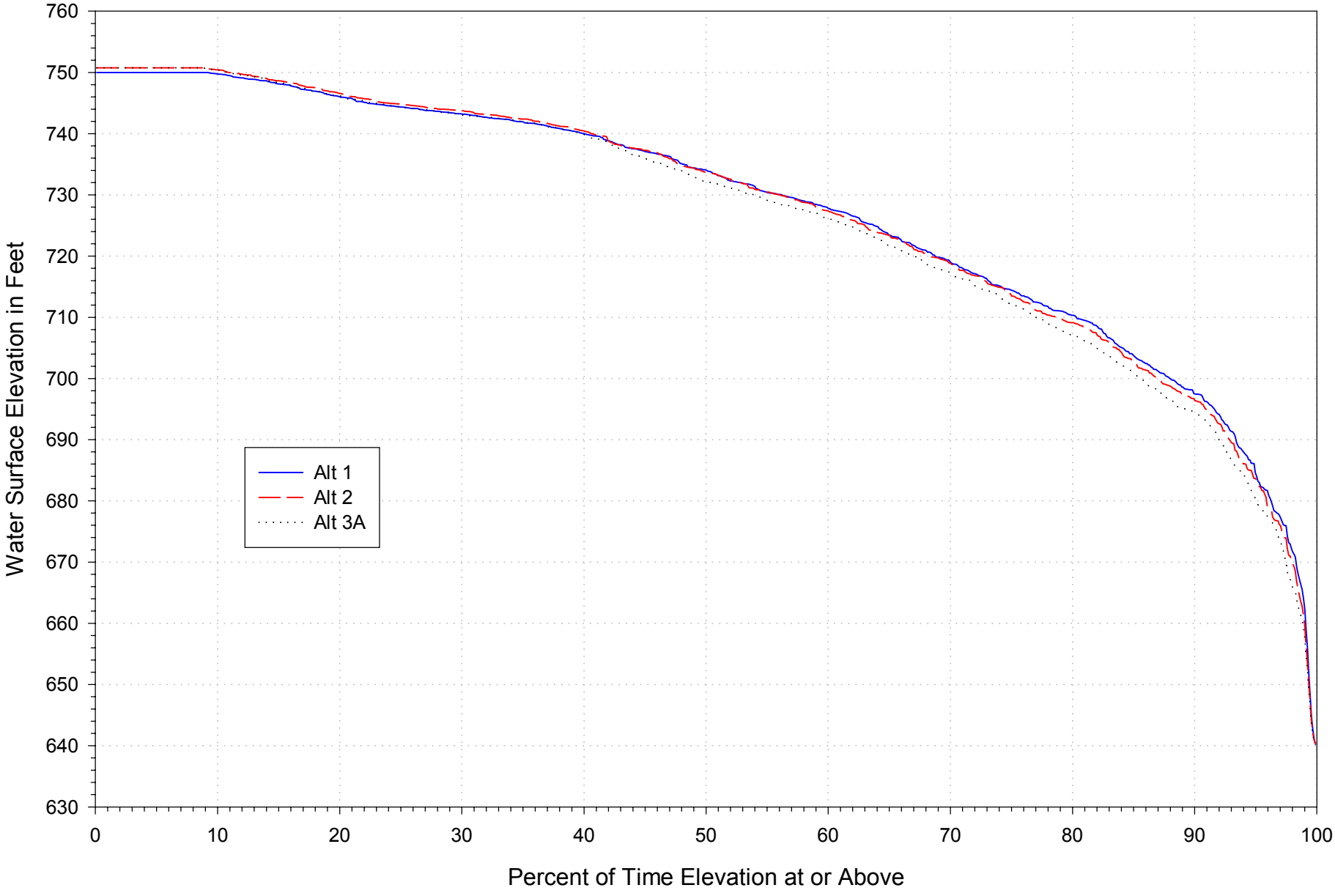


FIGURE 5A

Frequency of Lake Cachuma EOM Water Surface Elevation
Hydrologic Period 1918-1993 (76 Years, 912 months)

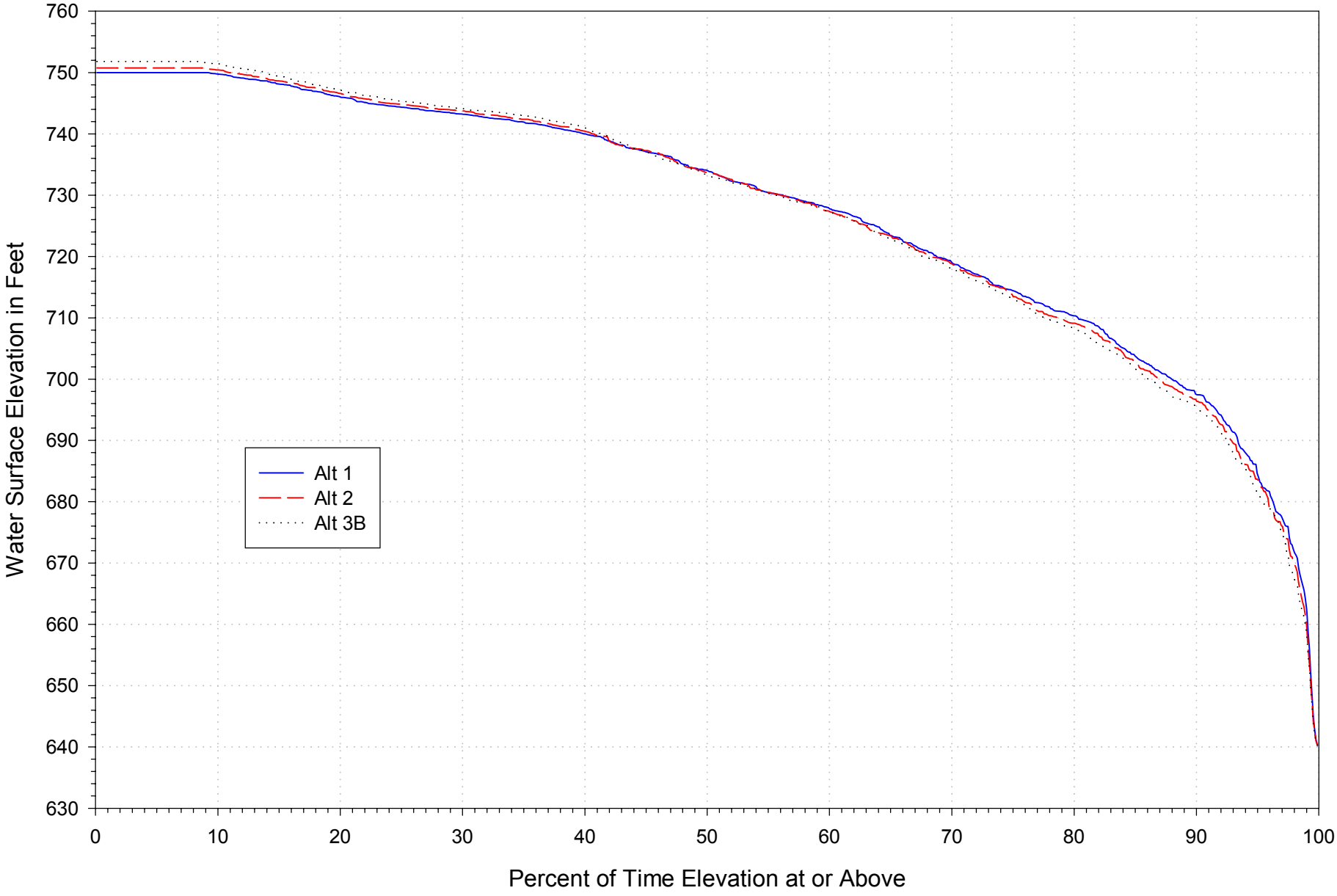


FIGURE 5B

Frequency of Lake Cachuma EOM Water Surface Elevation
Hydrologic Period 1918-1993 (76 Years, 912 months)

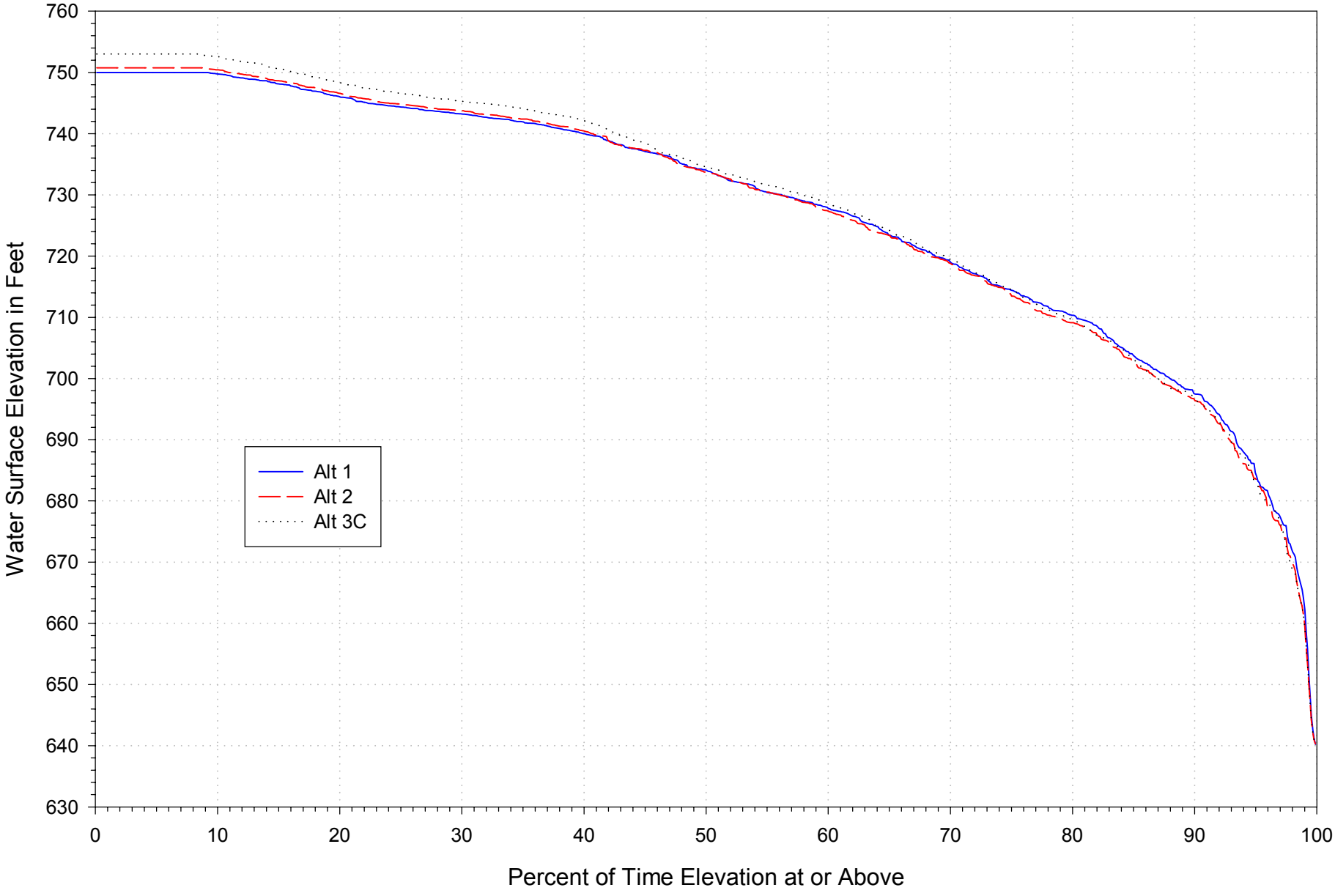


FIGURE 5C

Frequency of Lake Cachuma EOM Water Surface Elevation
Hydrologic Period 1918-1993 (76 Years, 912 months)

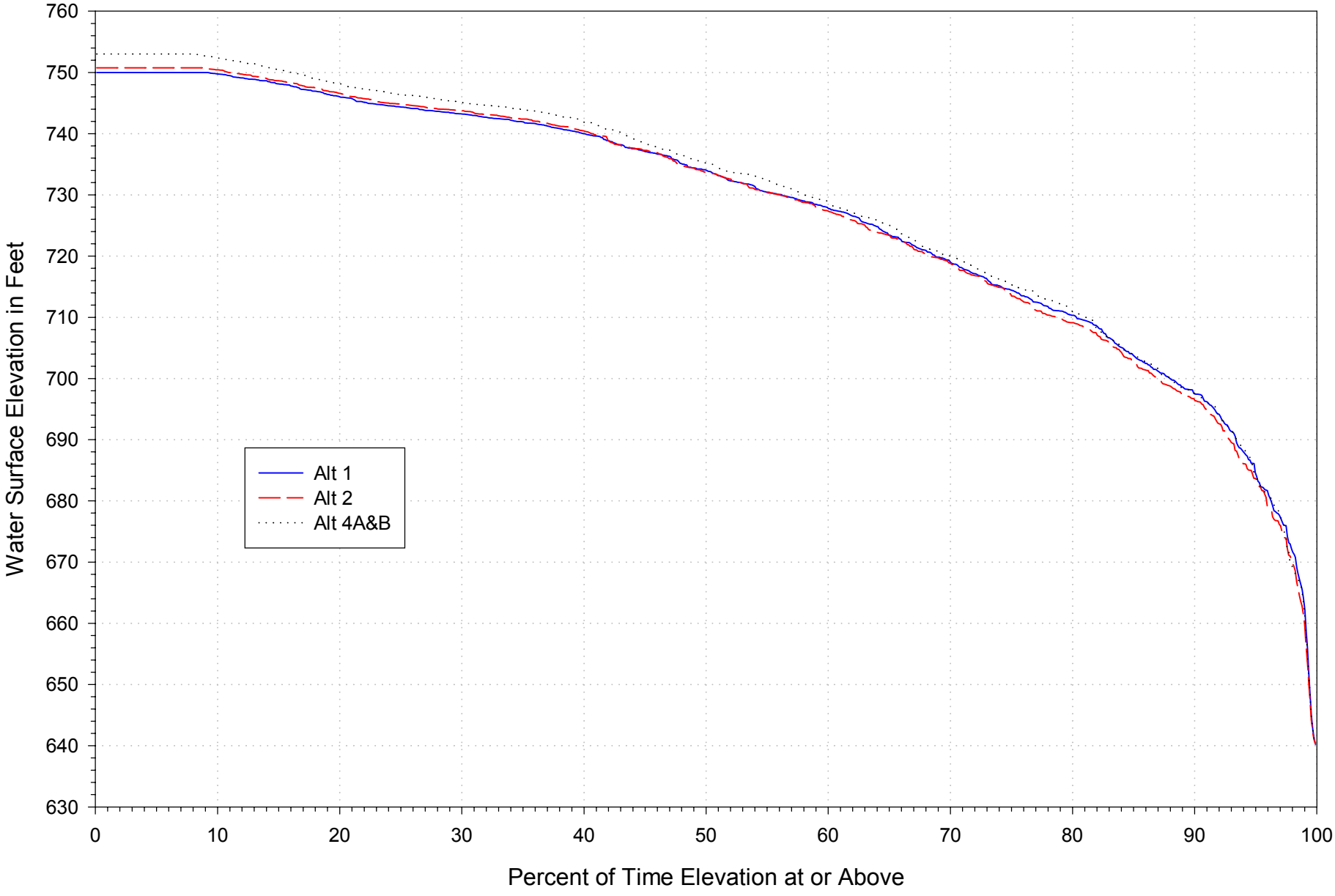


FIGURE 5D

FIGURE 6A
SIMULATED MEDIAN LAKE STORAGE (1918-1993)

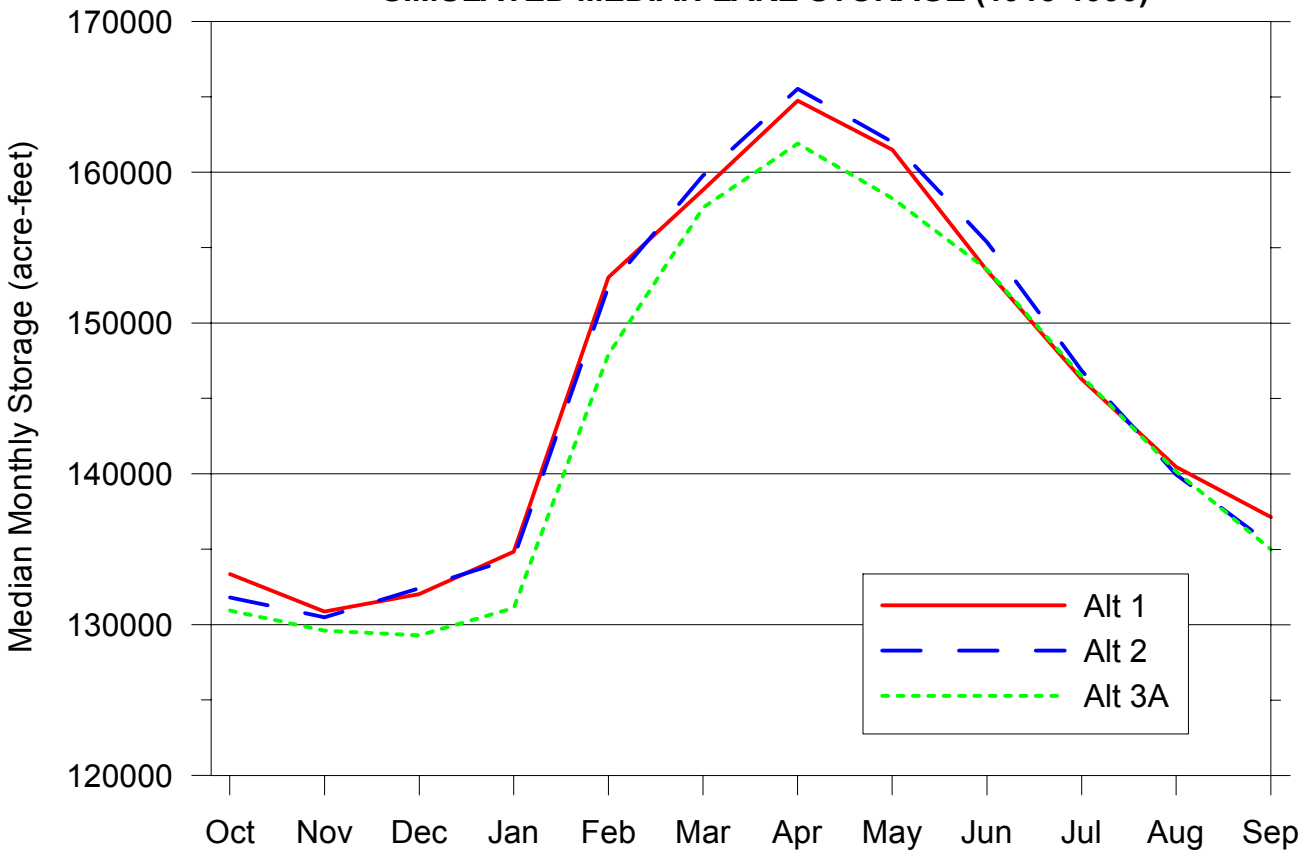


FIGURE 6B
SIMULATED MEDIAN LAKE STORAGE (1918-1993)

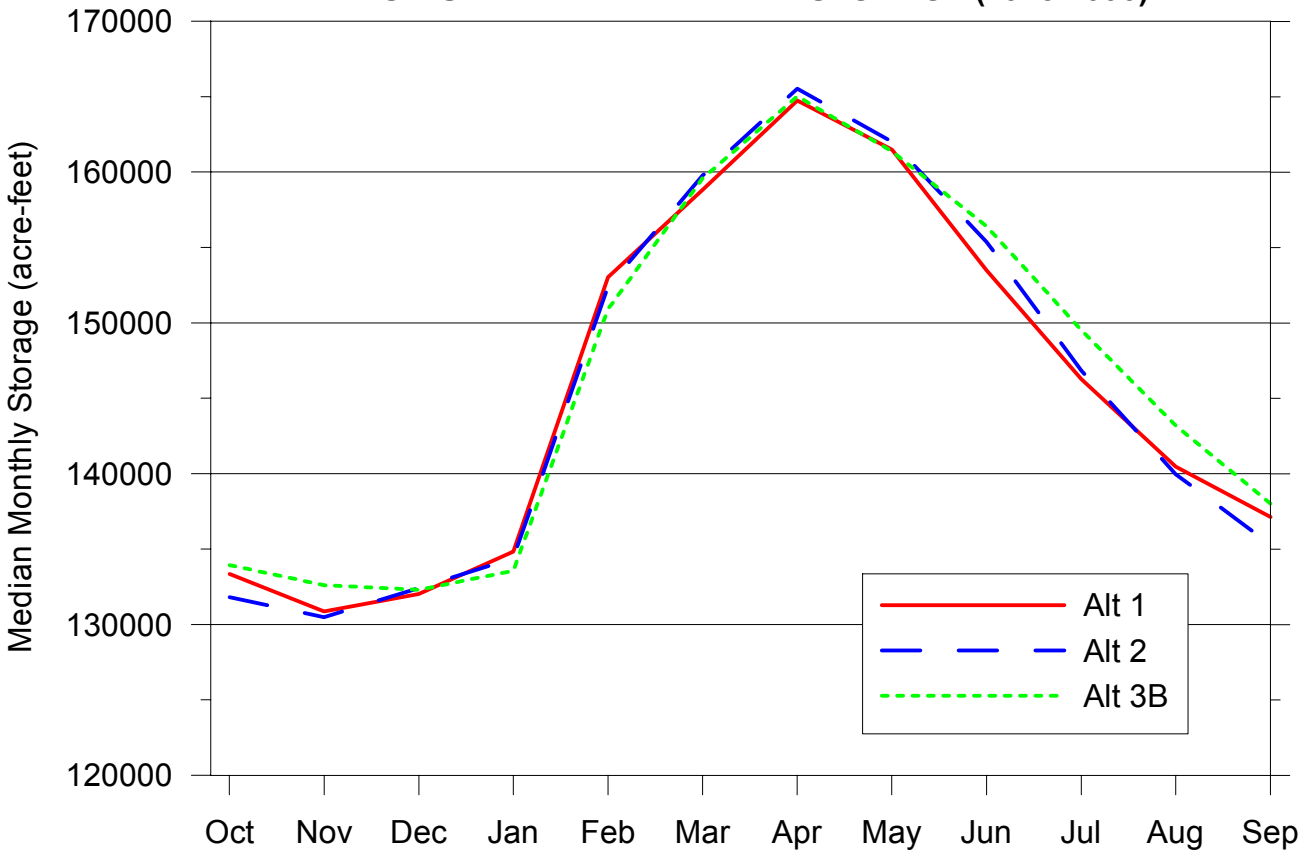


FIGURE 6C
SIMULATED MEDIAN LAKE STORAGE (1918-1993)

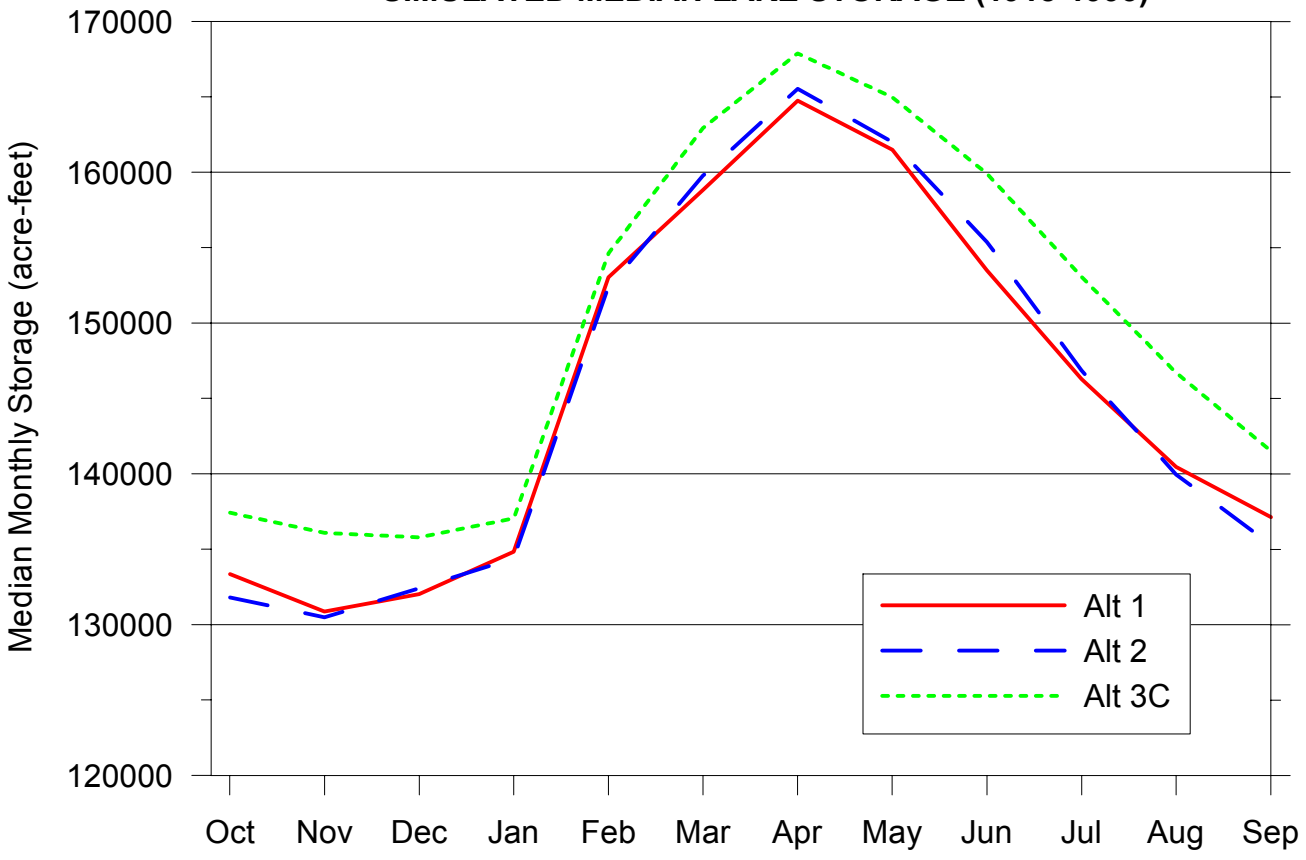


FIGURE 6D
SIMULATED MEDIAN LAKE STORAGE (1918-1993)

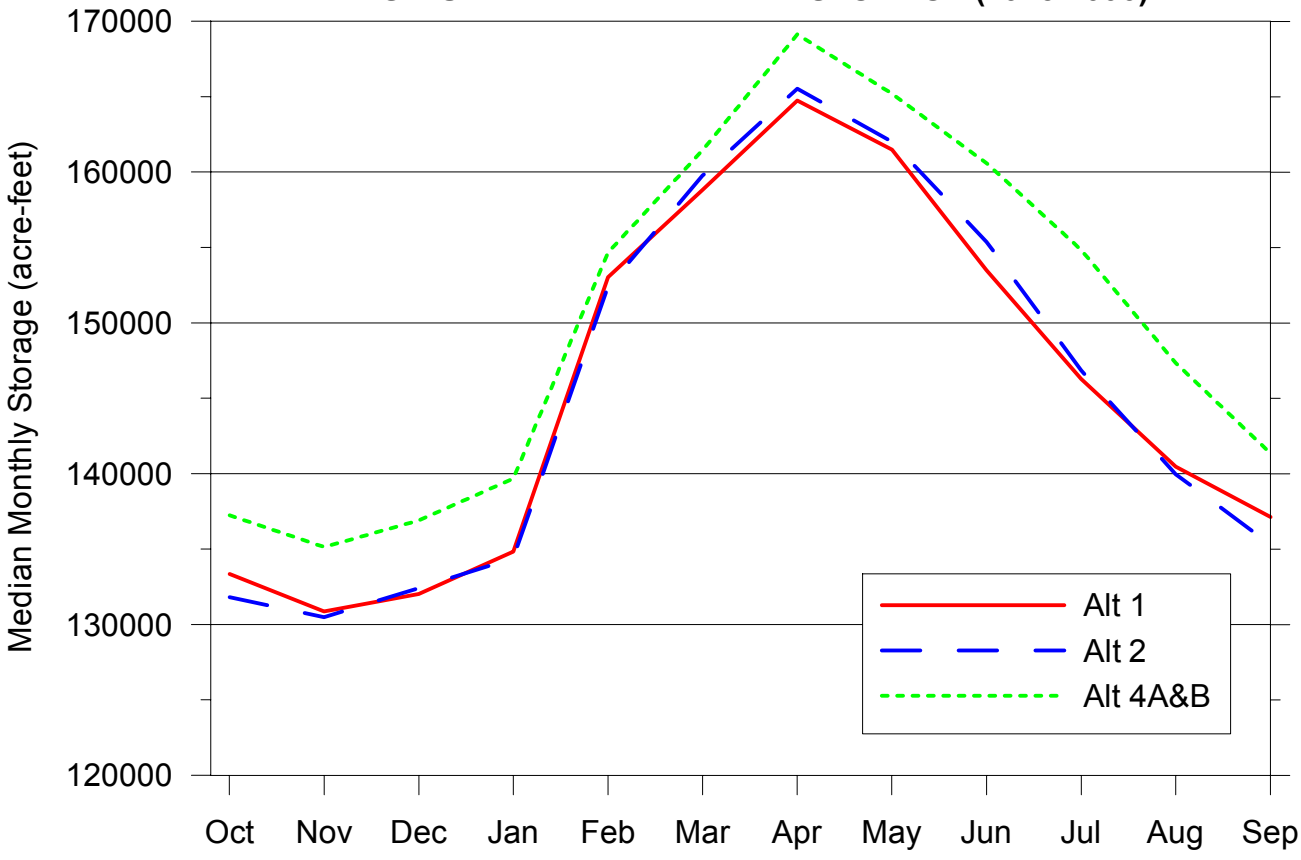


FIGURE 7A

FREQUENCY OF SANTA YNEZ RIVER FLOW BELOW HILTON CREEK (WY 1918-1993)

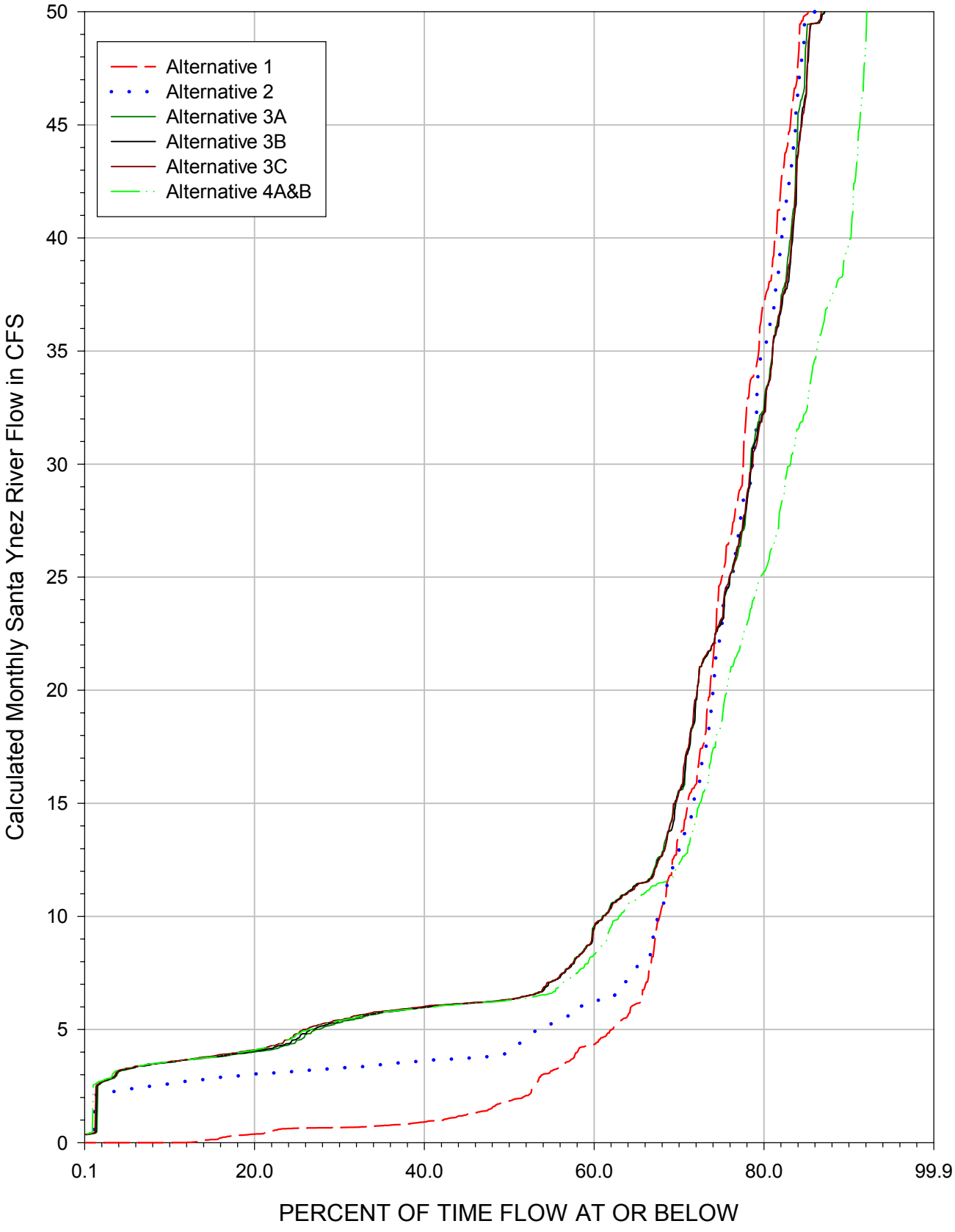


FIGURE 7B

FREQUENCY OF SANTA YNEZ RIVER FLOW AT 154 BRIDGE (WY 1918-1993)

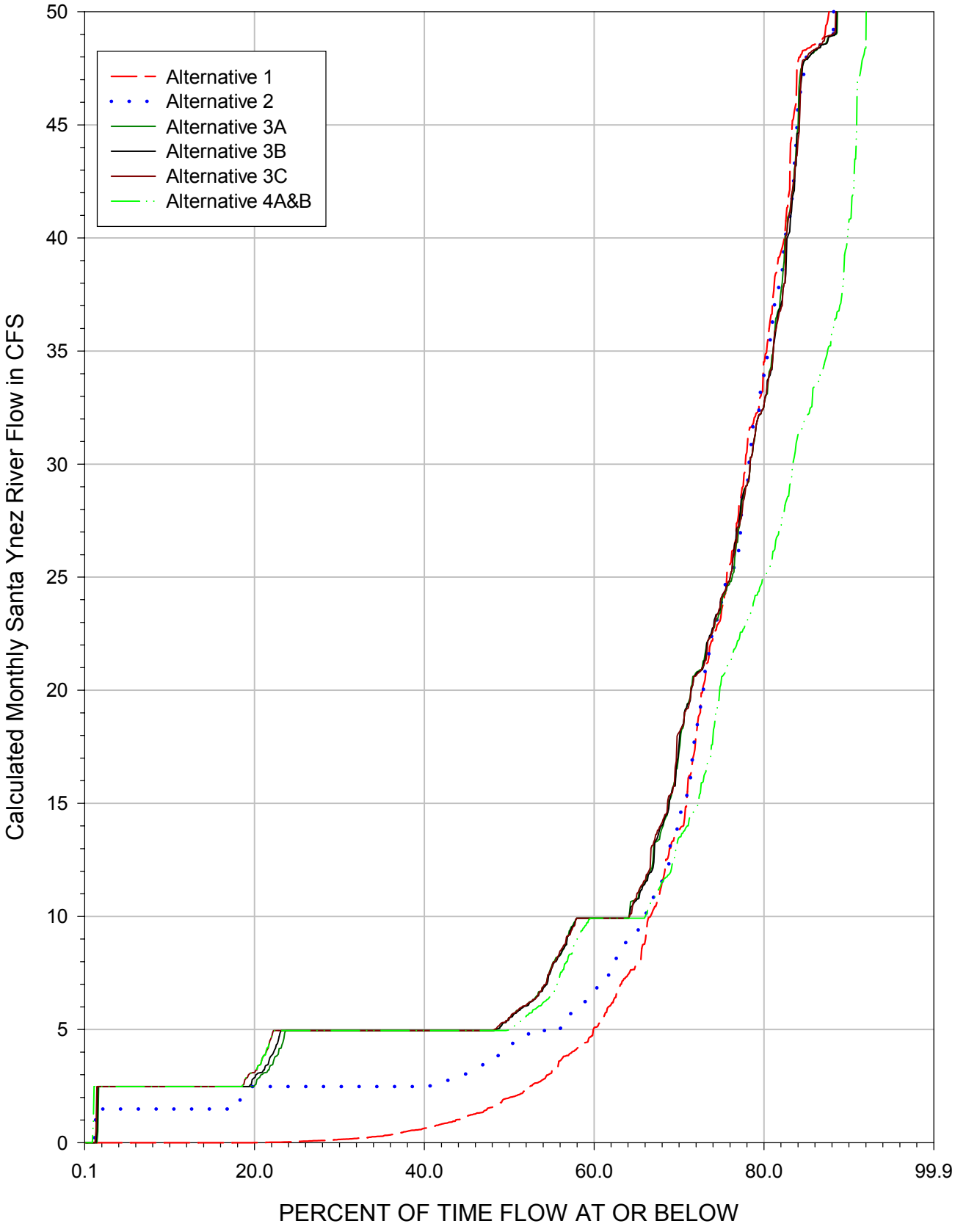


FIGURE 7C

FREQUENCY OF SANTA YNEZ RIVER FLOW ABOVE ALISAL BRIDGE (WY 1918-1993)

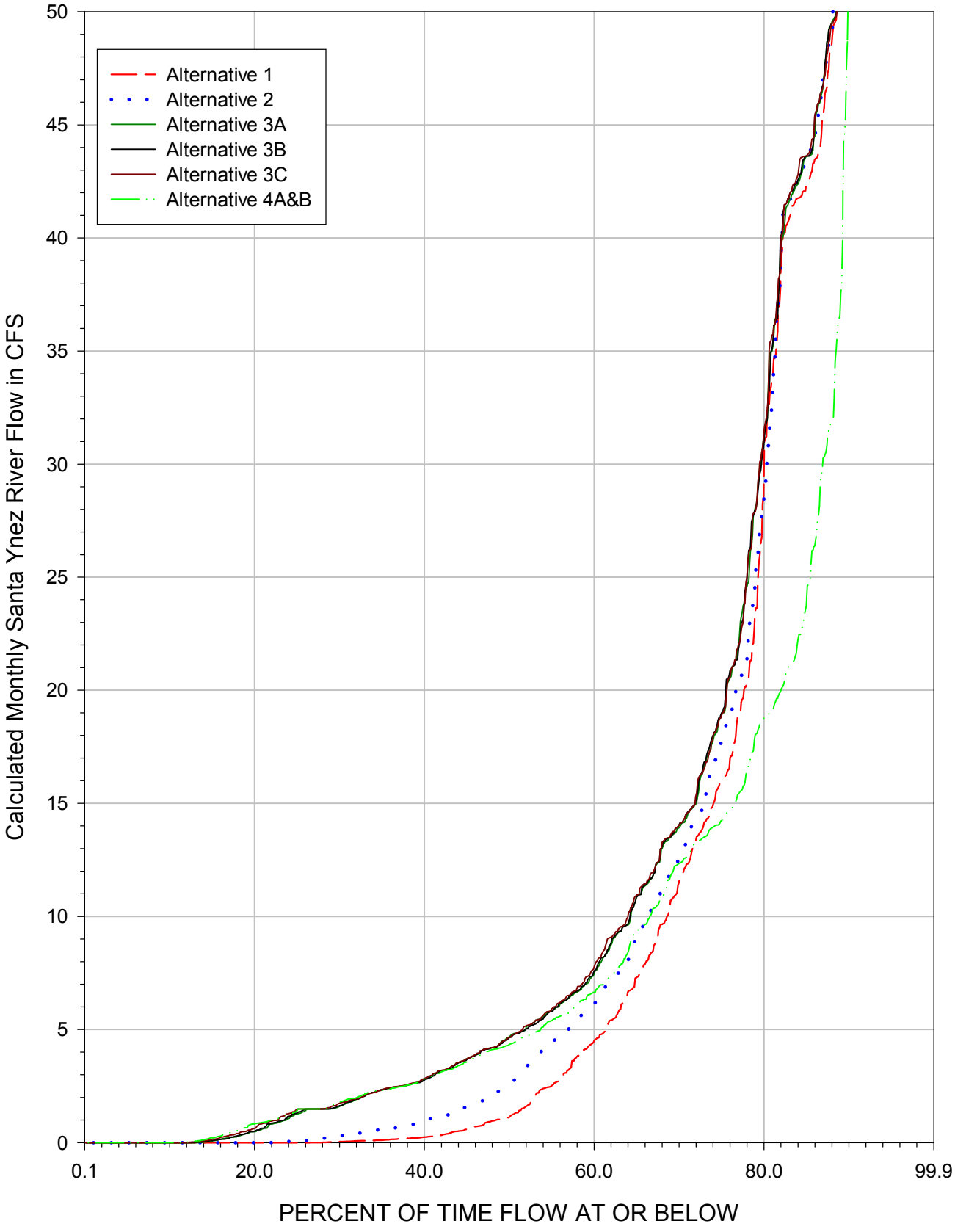


FIGURE 7D

FREQUENCY OF SANTA YNEZ RIVER FLOW NEAR BUELLTON (WY 1918-1993)

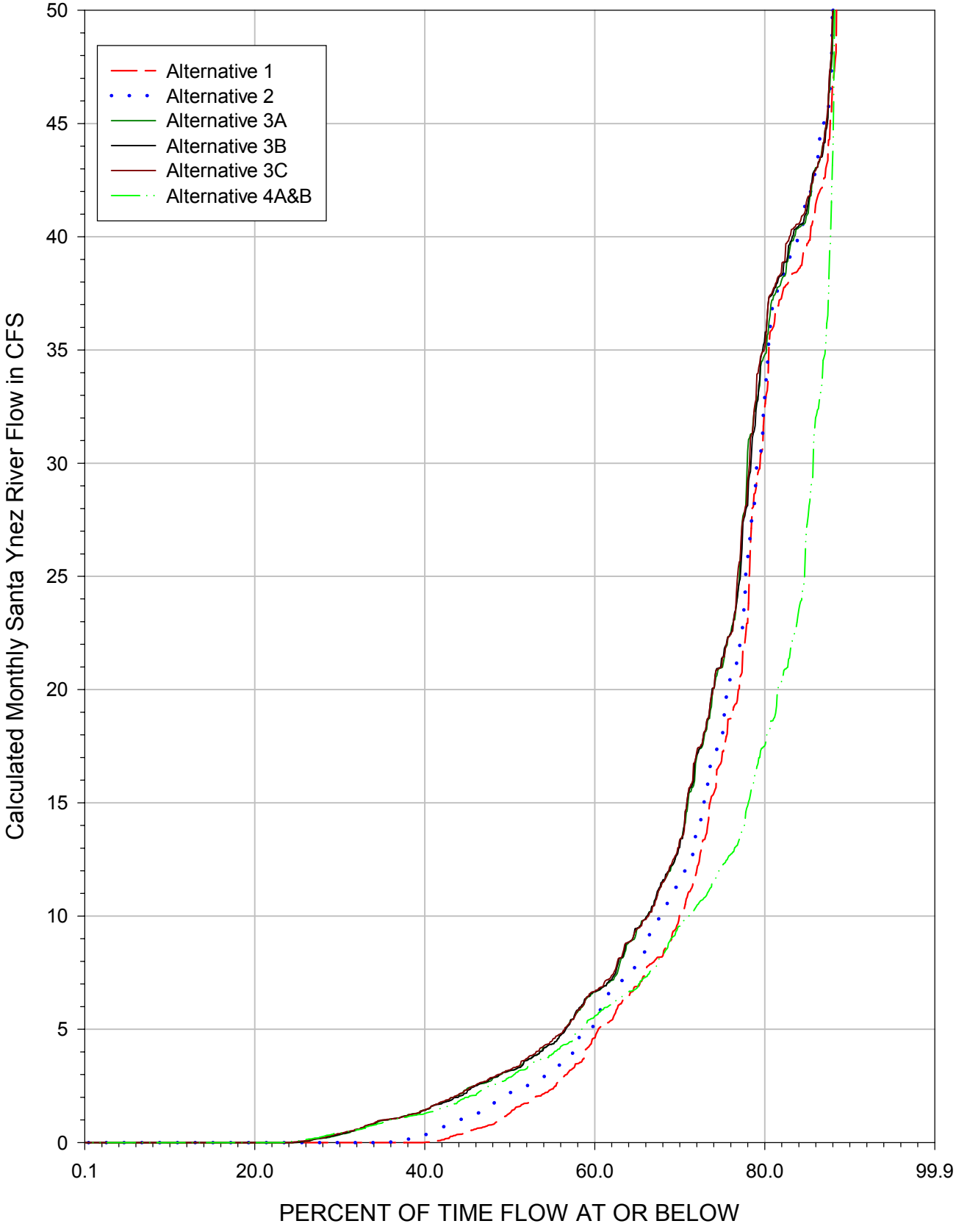


FIGURE 7E

FREQUENCY OF SANTA YNEZ RIVER FLOW ABOVE SALSIPUEDES CREEK CONFLUENCE (WY 1918-1993)

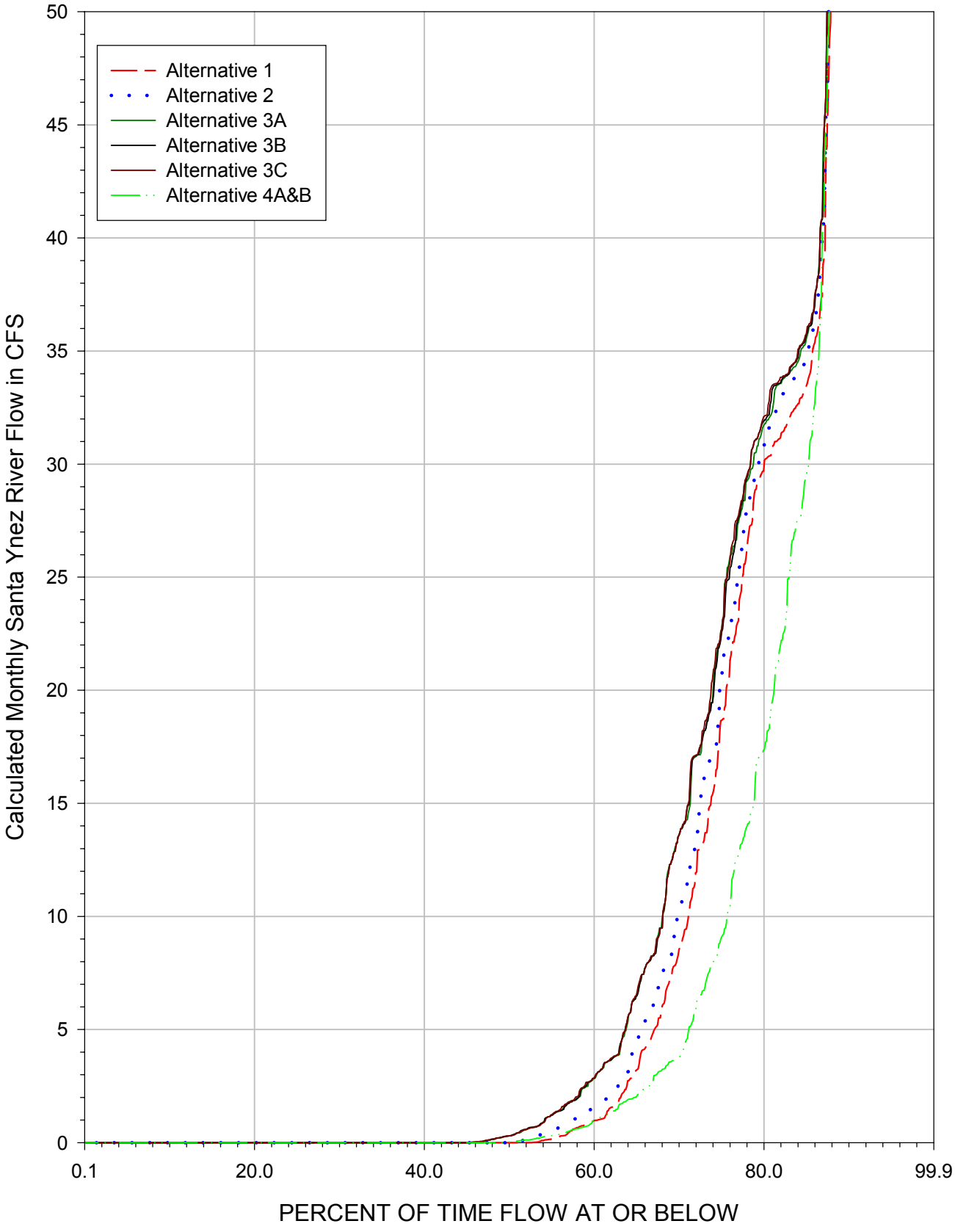


FIGURE 7F

FREQUENCY OF SANTA YNEZ RIVER FLOW AT LOMPOC NARROWS (WY 1918-1993)

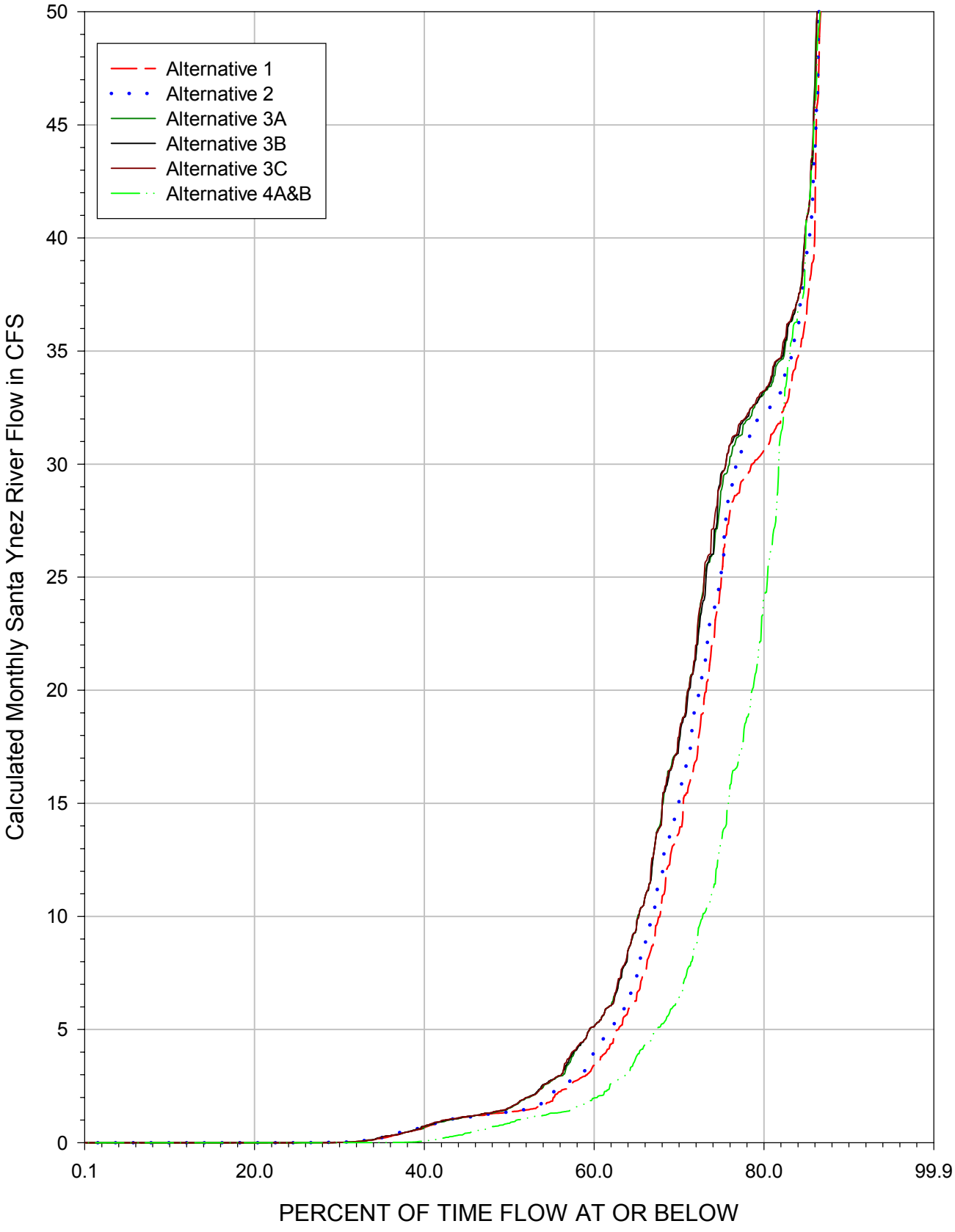


FIGURE 8A
SIMULATED MEDIAN STREAMFLOW (1918-1993)
AT HIGHWAY 154 BRIDGE

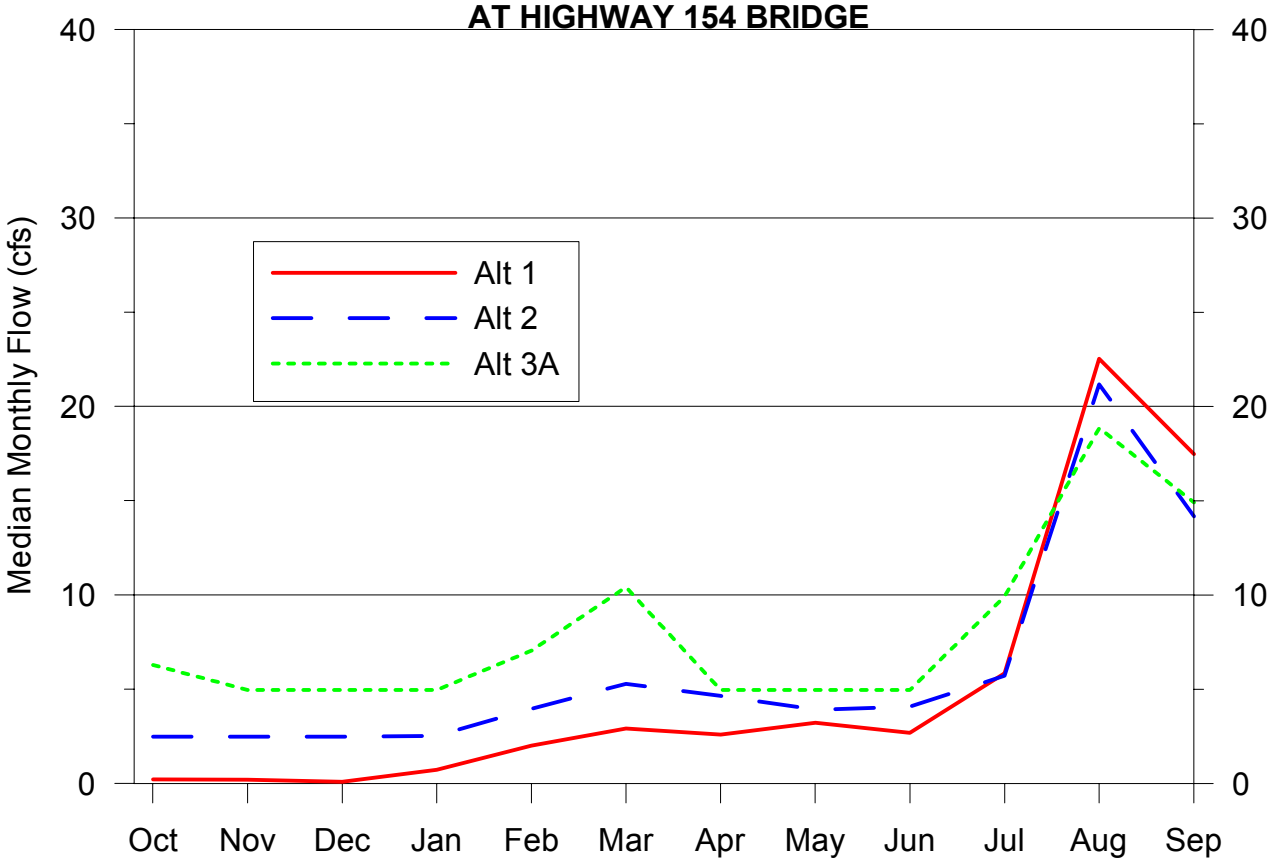


FIGURE 8B
SIMULATED MEDIAN STREAMFLOW (1918-1993)
ABOVE ALISAL BRIDGE

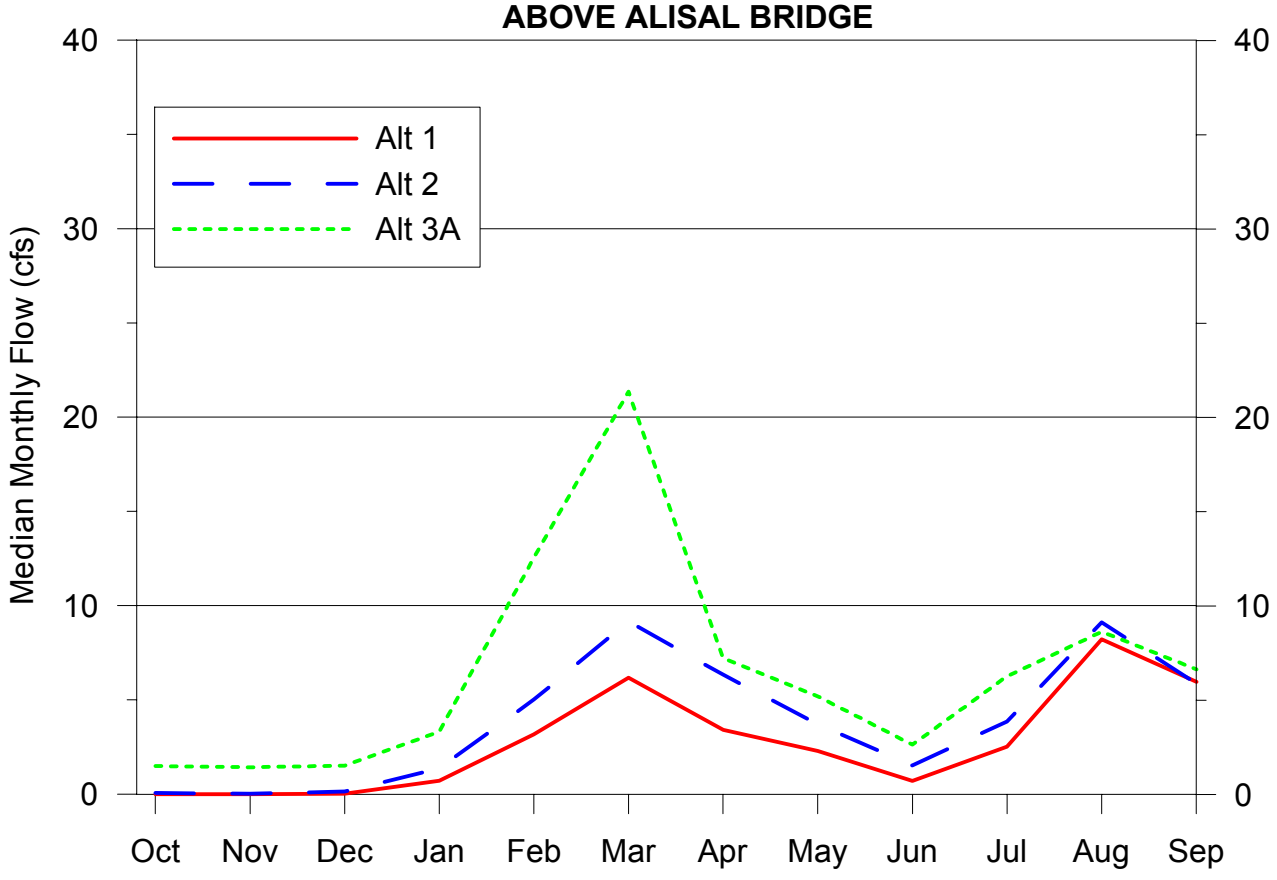


FIGURE 8C
SIMULATED MEDIAN STREAMFLOW (1918-1993)
ABOVE SALSIPUEDES CREEK CONFLUENCE

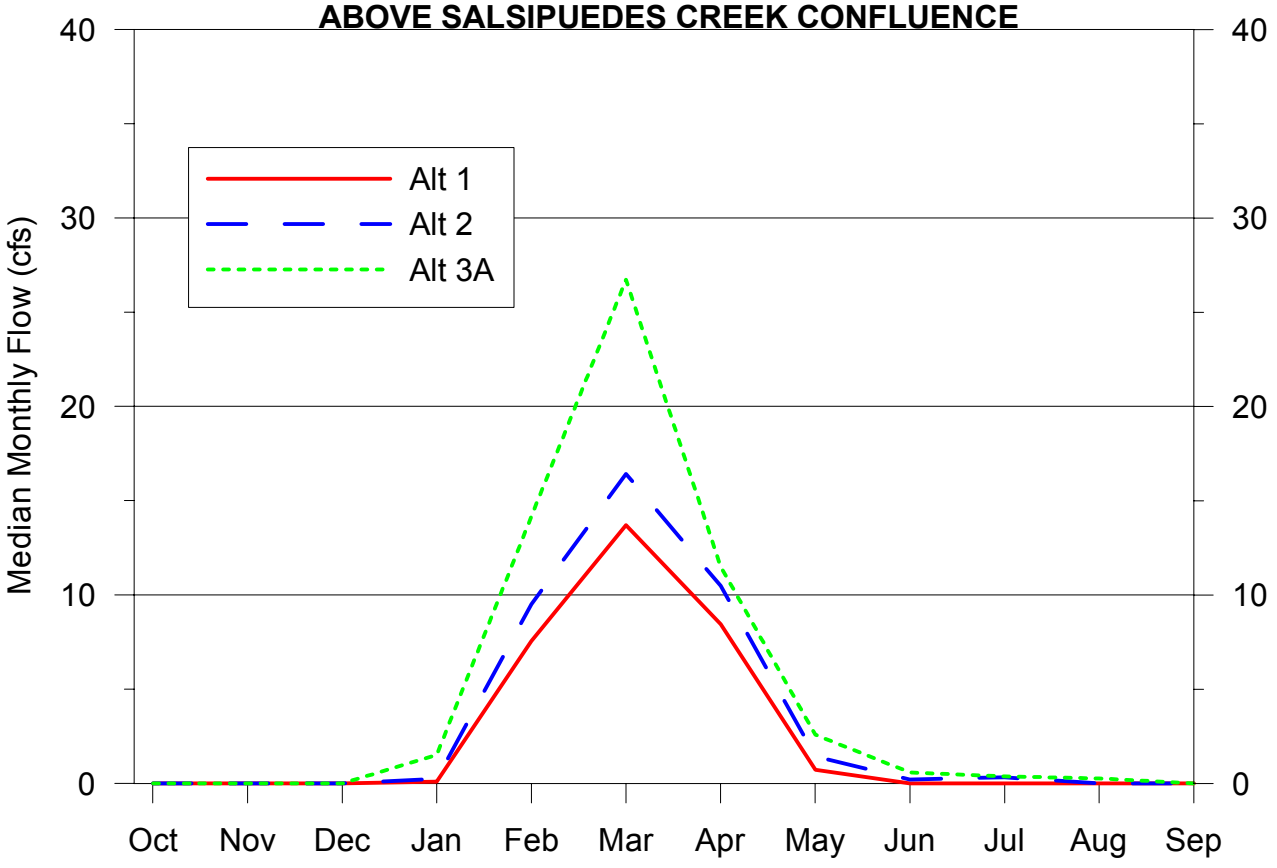


FIGURE 8D
SIMULATED MEDIAN STREAMFLOW (1918-1993)
AT NARROWS

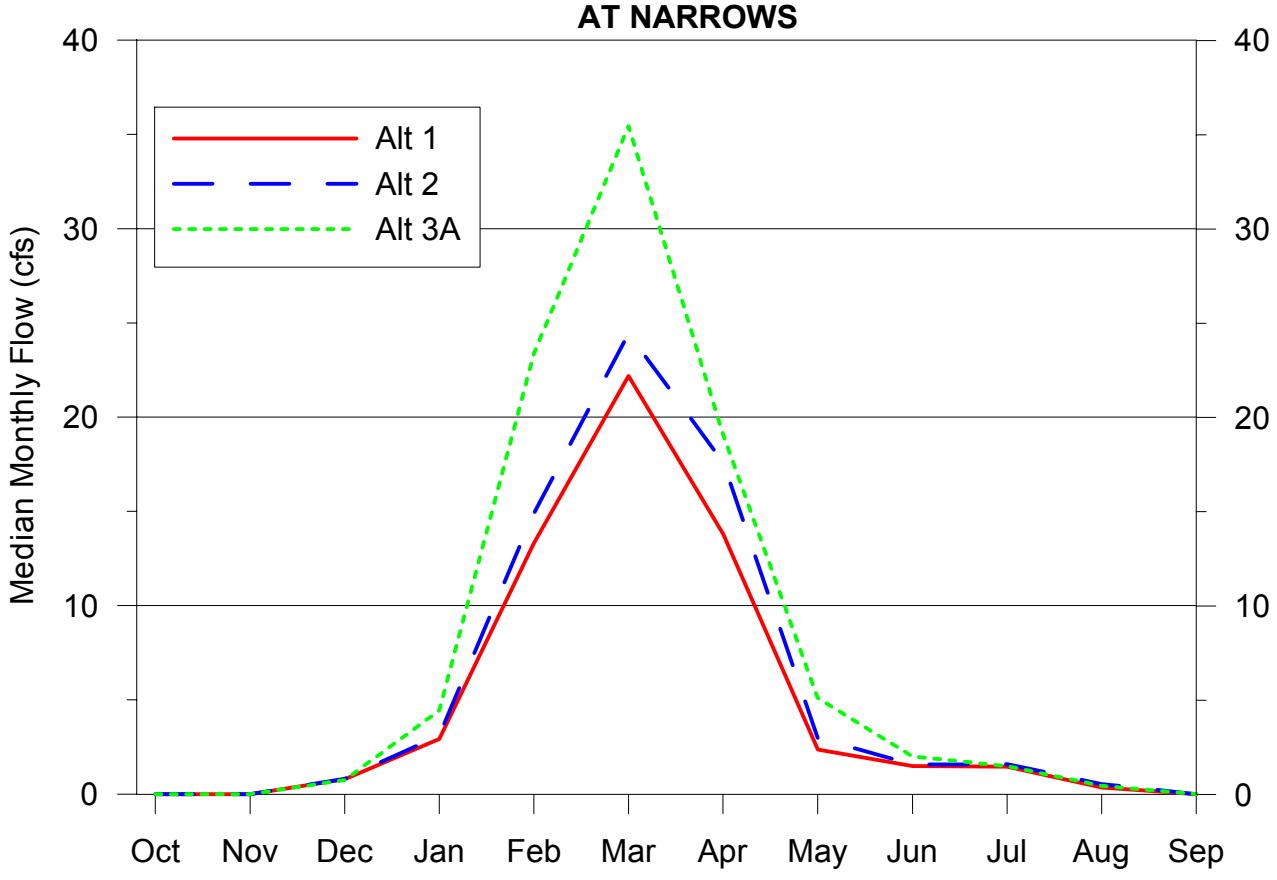


FIGURE 9A
SIMULATED MEAN STREAMFLOW (1918-1993)
AT HIGHWAY 154 BRIDGE

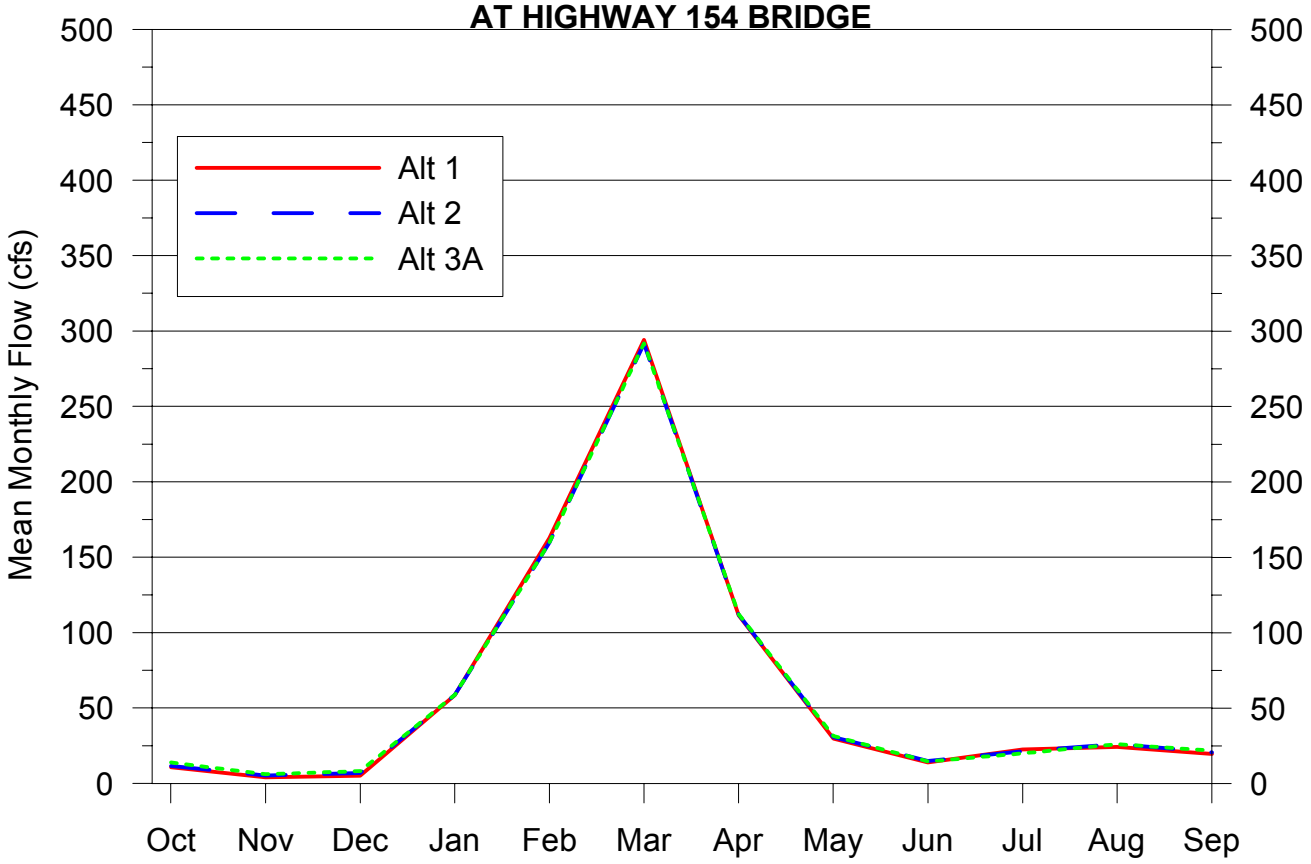


FIGURE 9B
SIMULATED MEAN STREAMFLOW (1918-1993)
ABOVE ALISAL BRIDGE

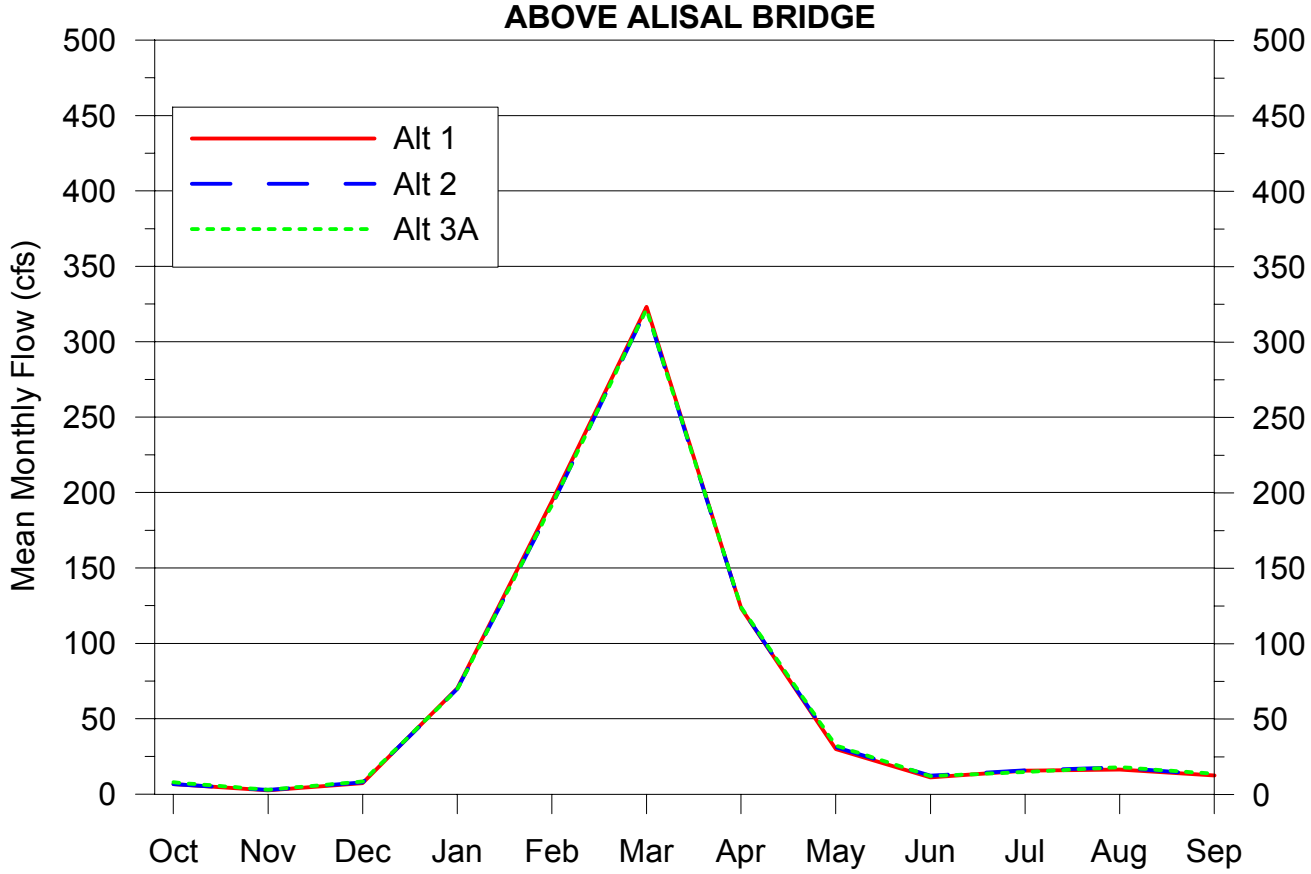


FIGURE 9C
SIMULATED MEAN STREAMFLOW (1918-1993)
ABOVE SALSIPUEDES CREEK CONFLUENCE

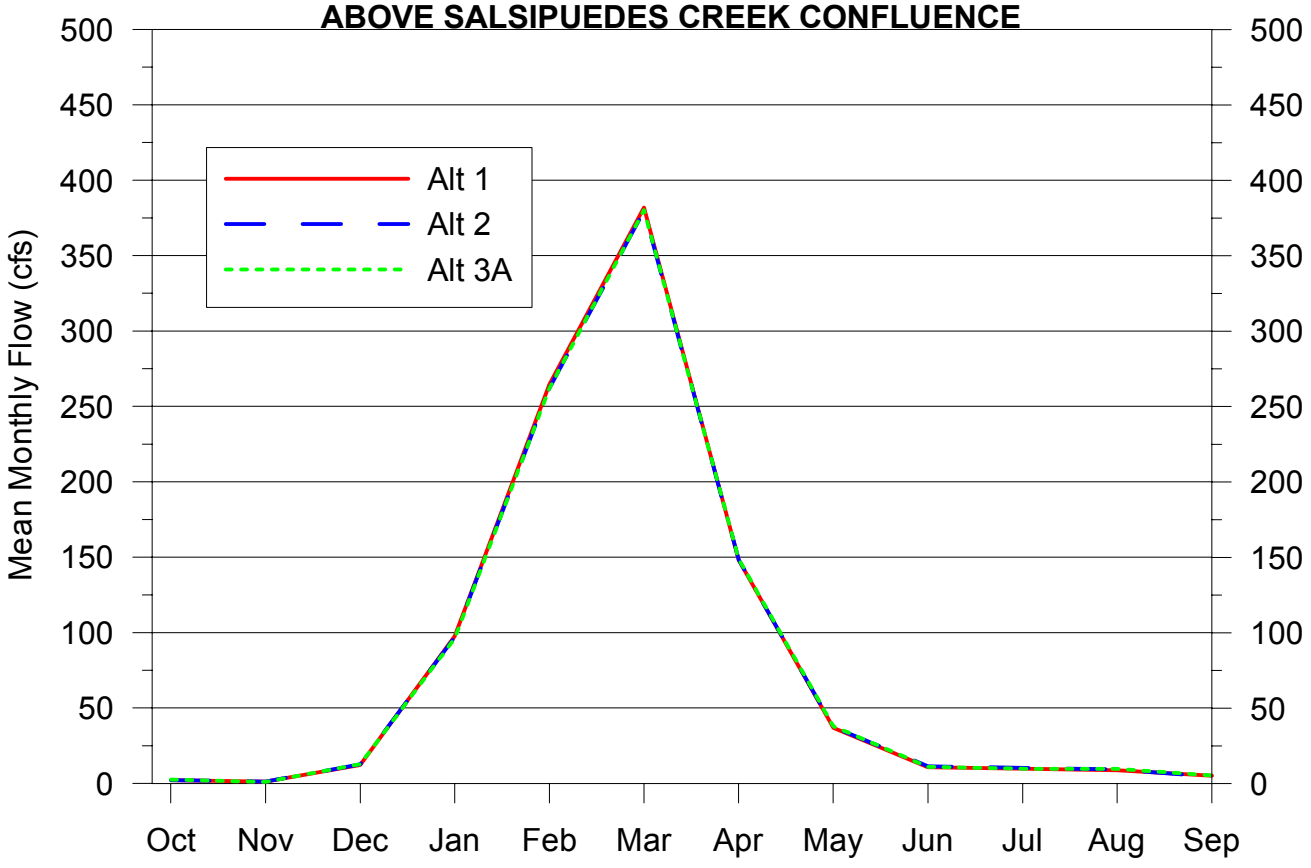


FIGURE 9D
SIMULATED MEAN STREAMFLOW (1918-1993)
AT NARROWS

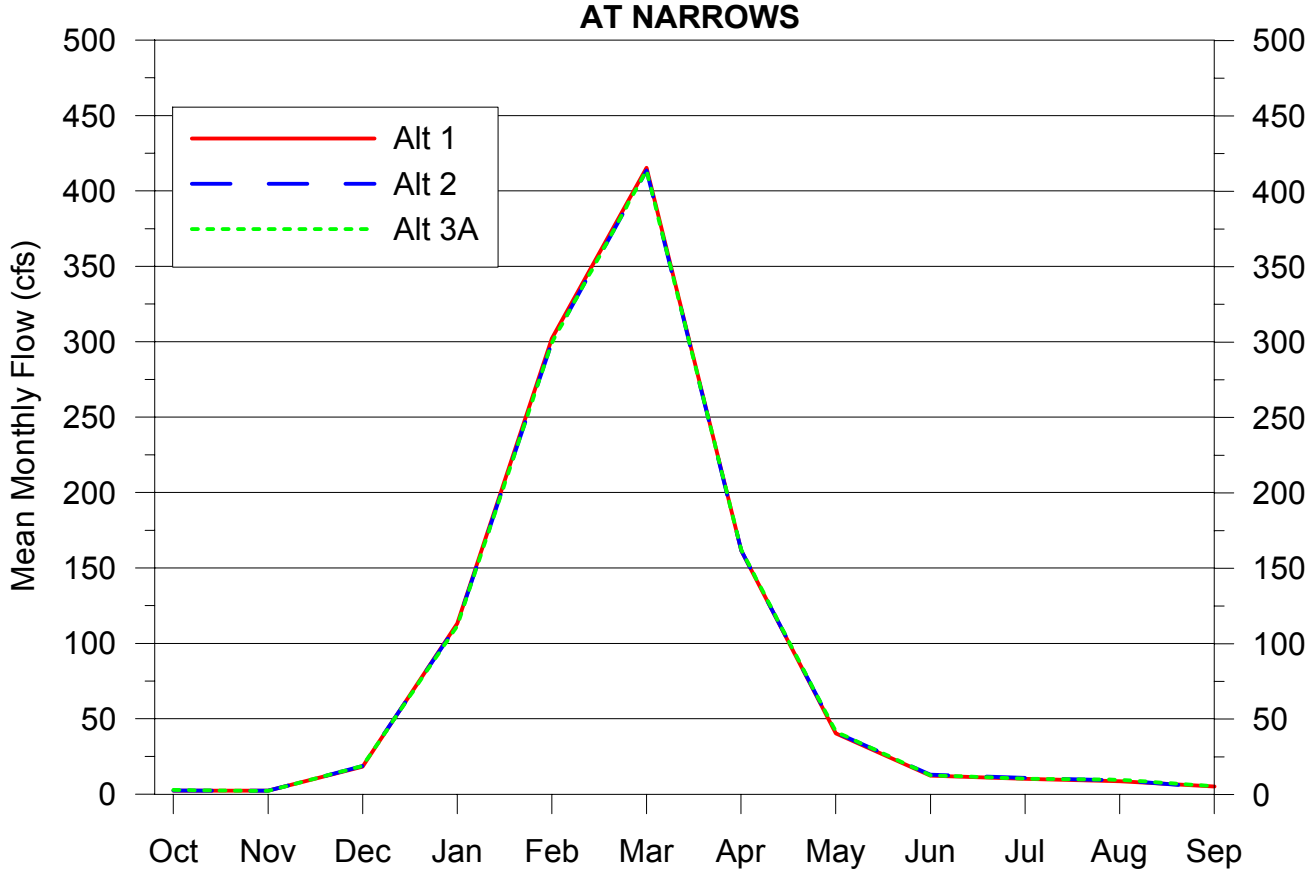


FIGURE 10A

Total Dewatered Storage for Above Narrows Aquifer
Based on Santa Ynez River Hydrology Model

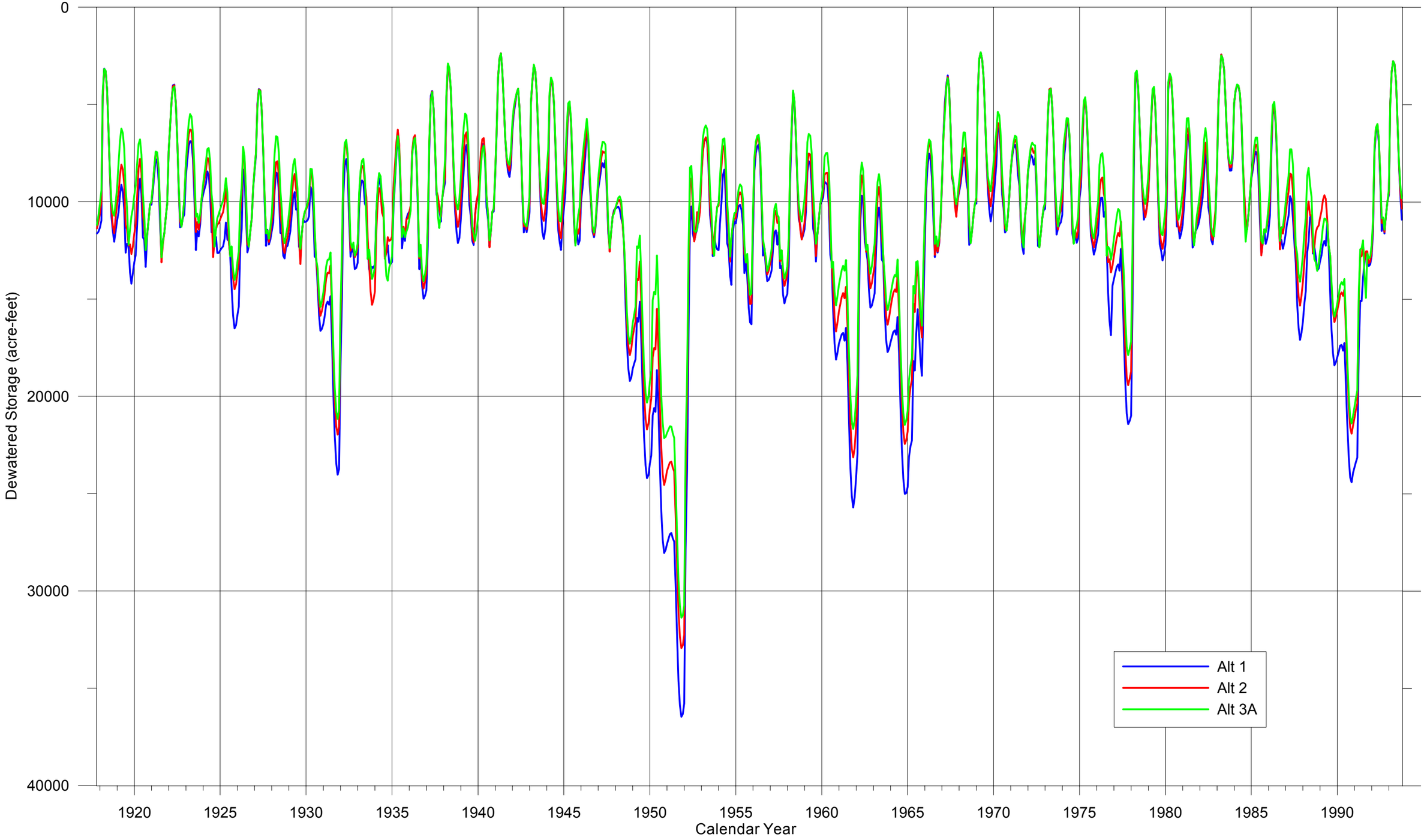
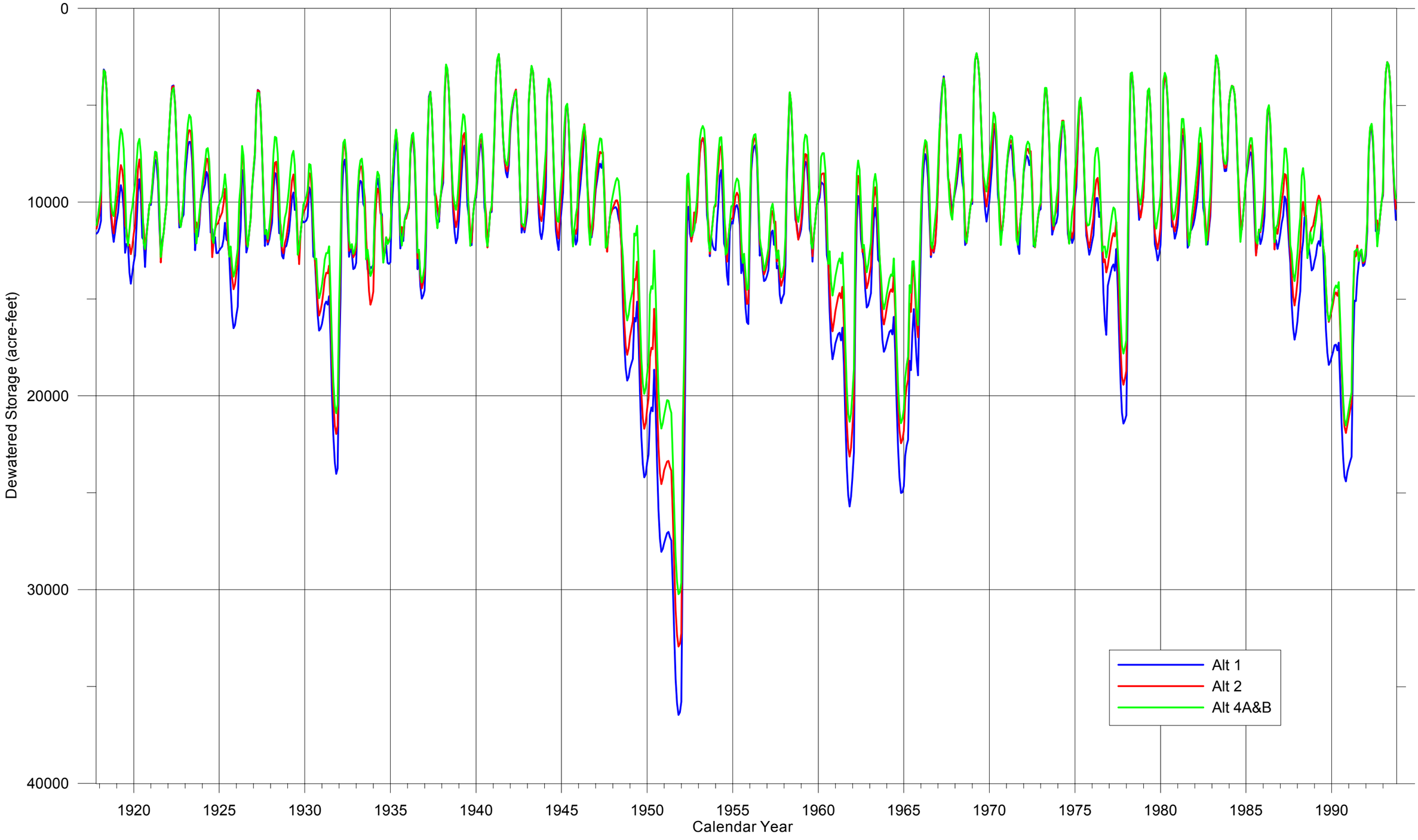


FIGURE 10B

Total Dewatered Storage for Above Narrows Aquifer
Based on Santa Ynez River Hydrology Model

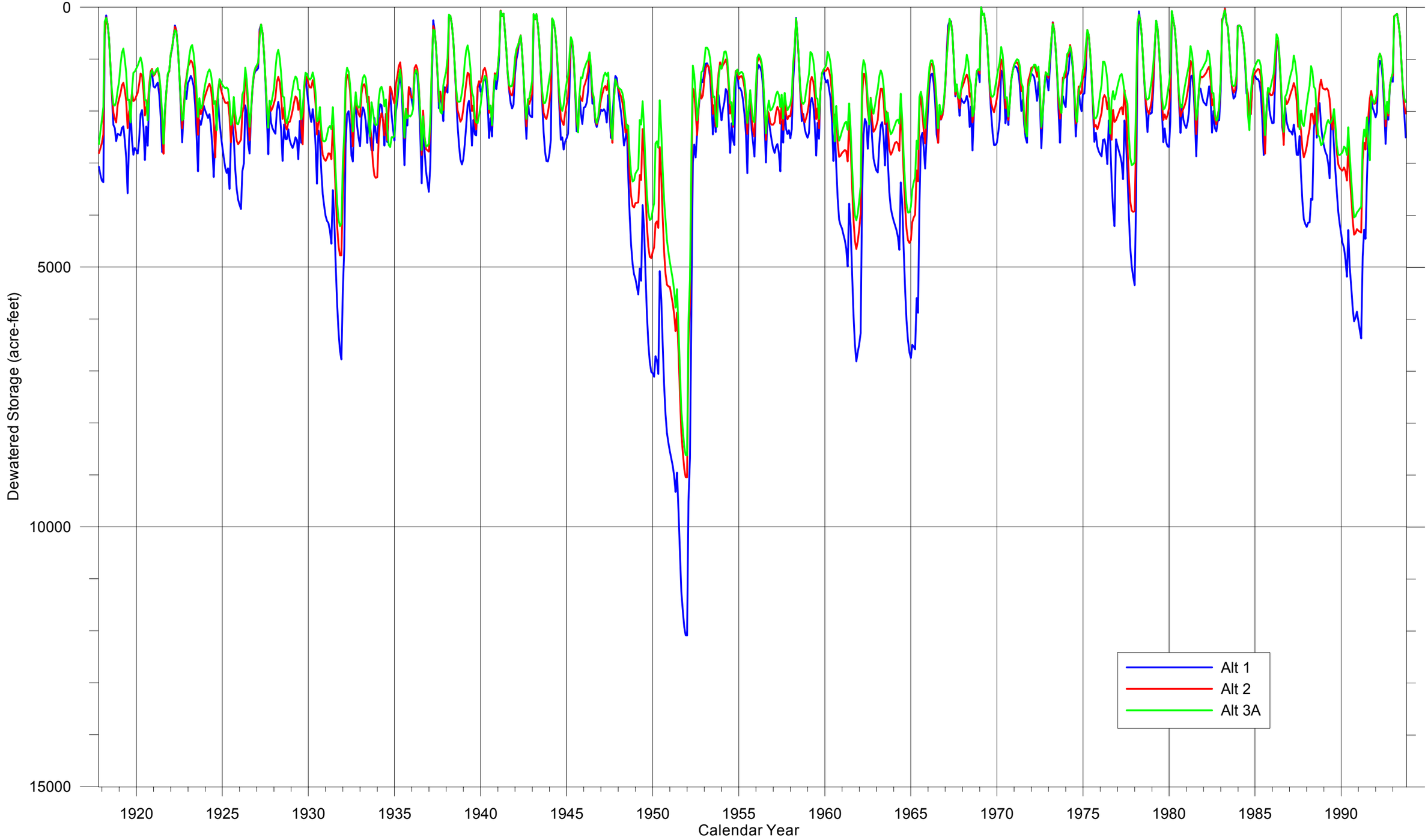
Total Dewatered Storage for Above Narrows Aquifer
Based on Santa Ynez River Hydrology Model

FIGURE 10C



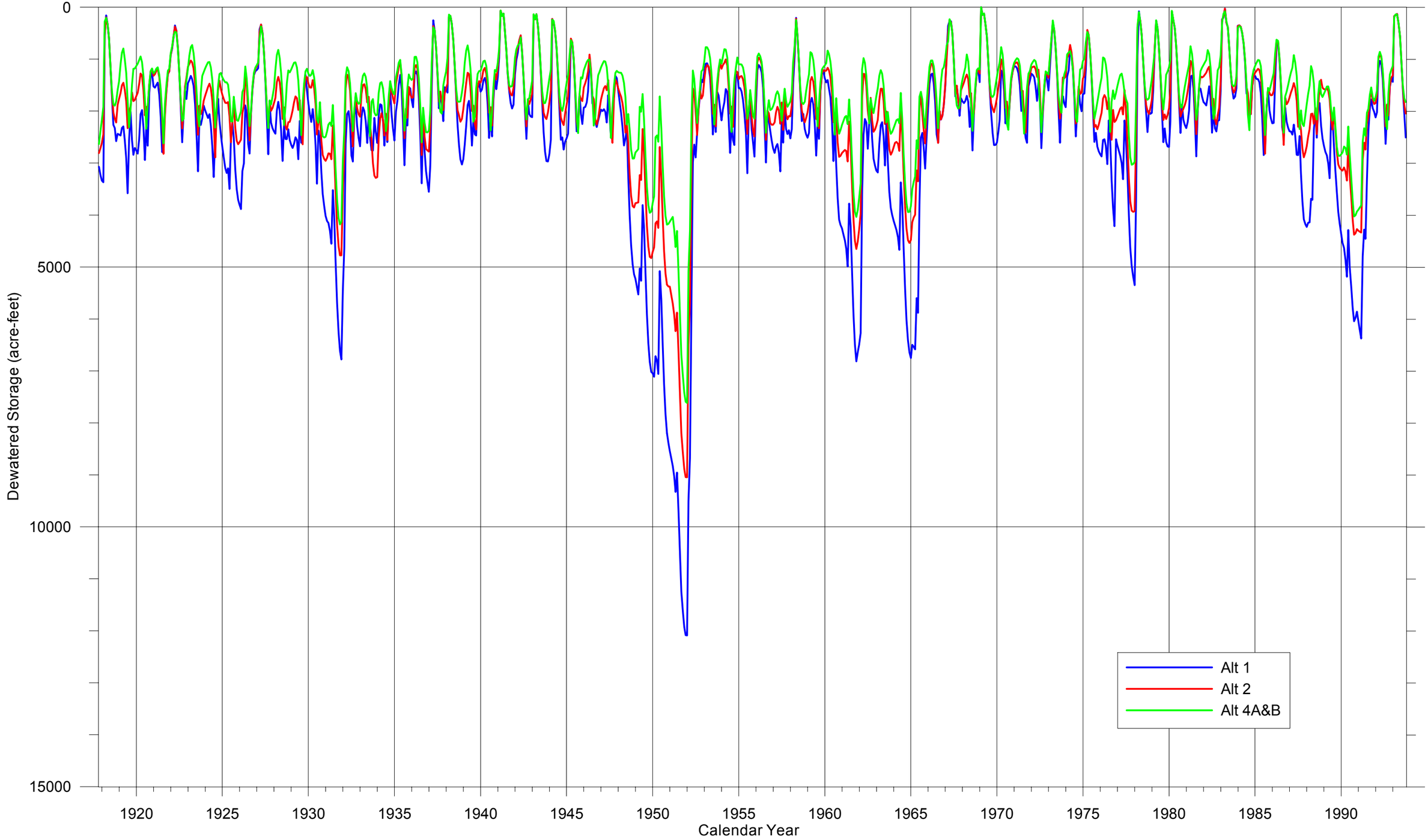
Santa Ynez Sub-area Dewatered Storage for Above Narrows Aquifer
Based on Santa Ynez River Hydrology Model

FIGURE 11A



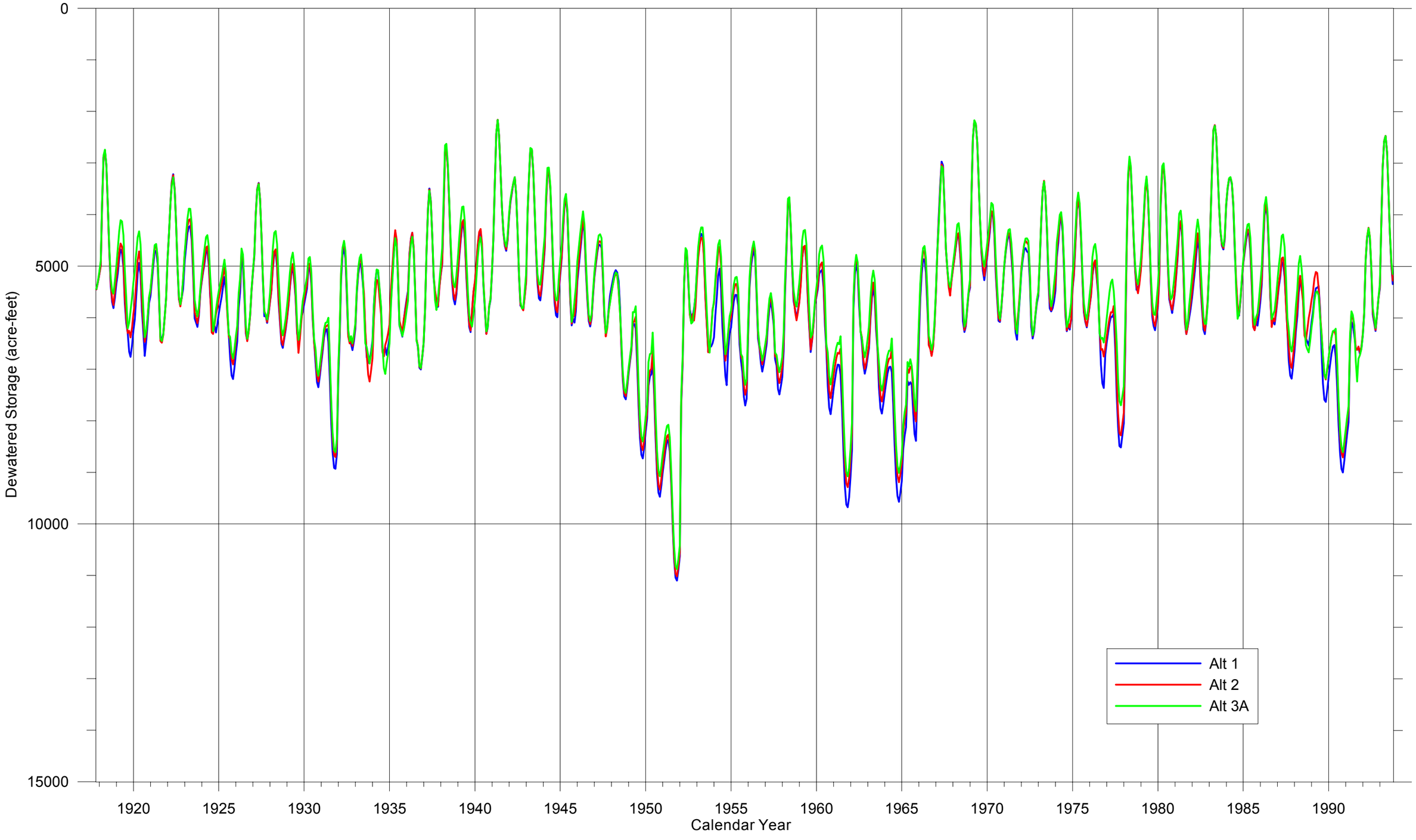
Santa Ynez Sub-area Dewatered Storage for Above Narrows Aquifer
Based on Santa Ynez River Hydrology Model

FIGURE 11B



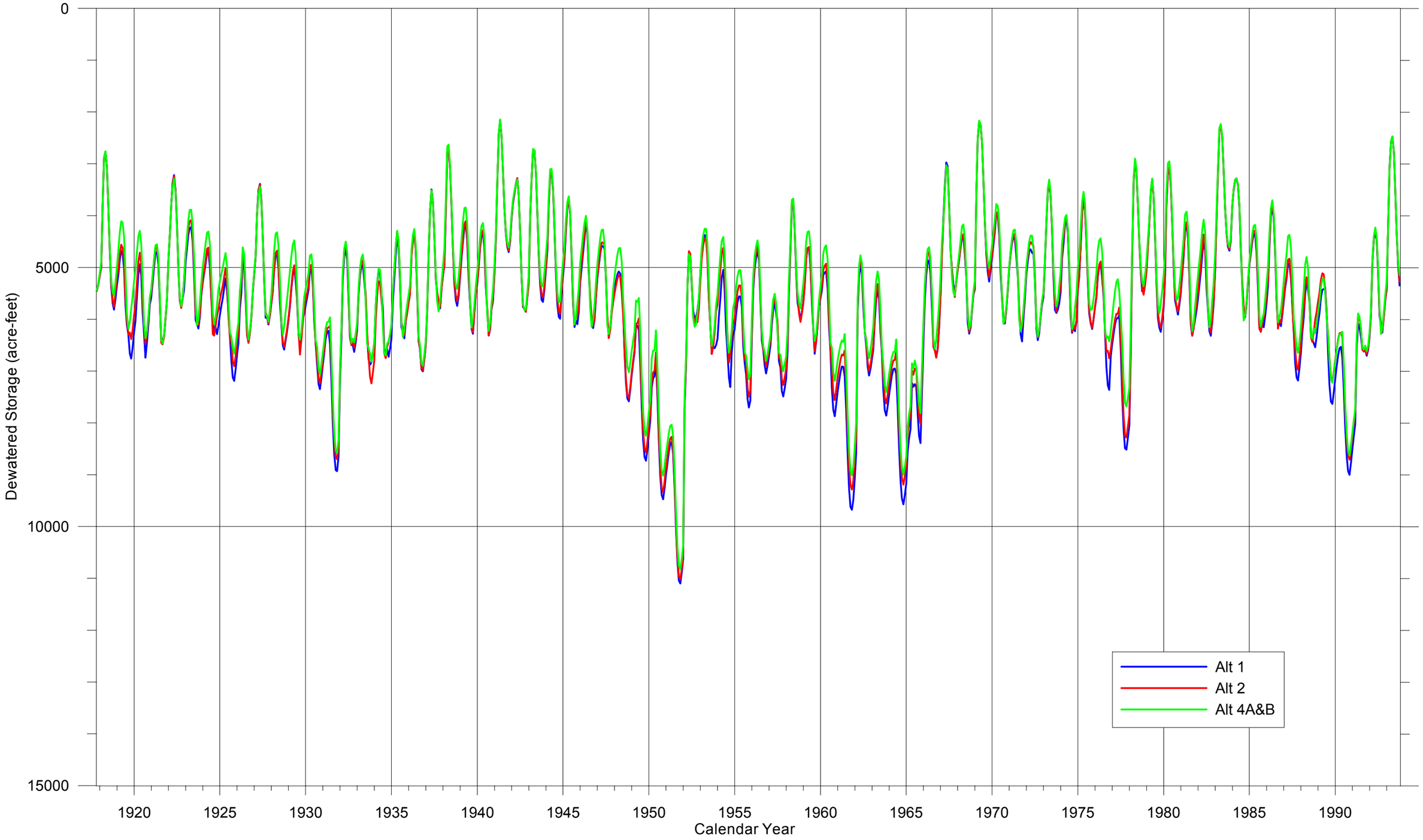
Buellton Sub-area Dewatered Storage for Above Narrows Aquifer
Based on Santa Ynez River Hydrology Model

FIGURE 12A



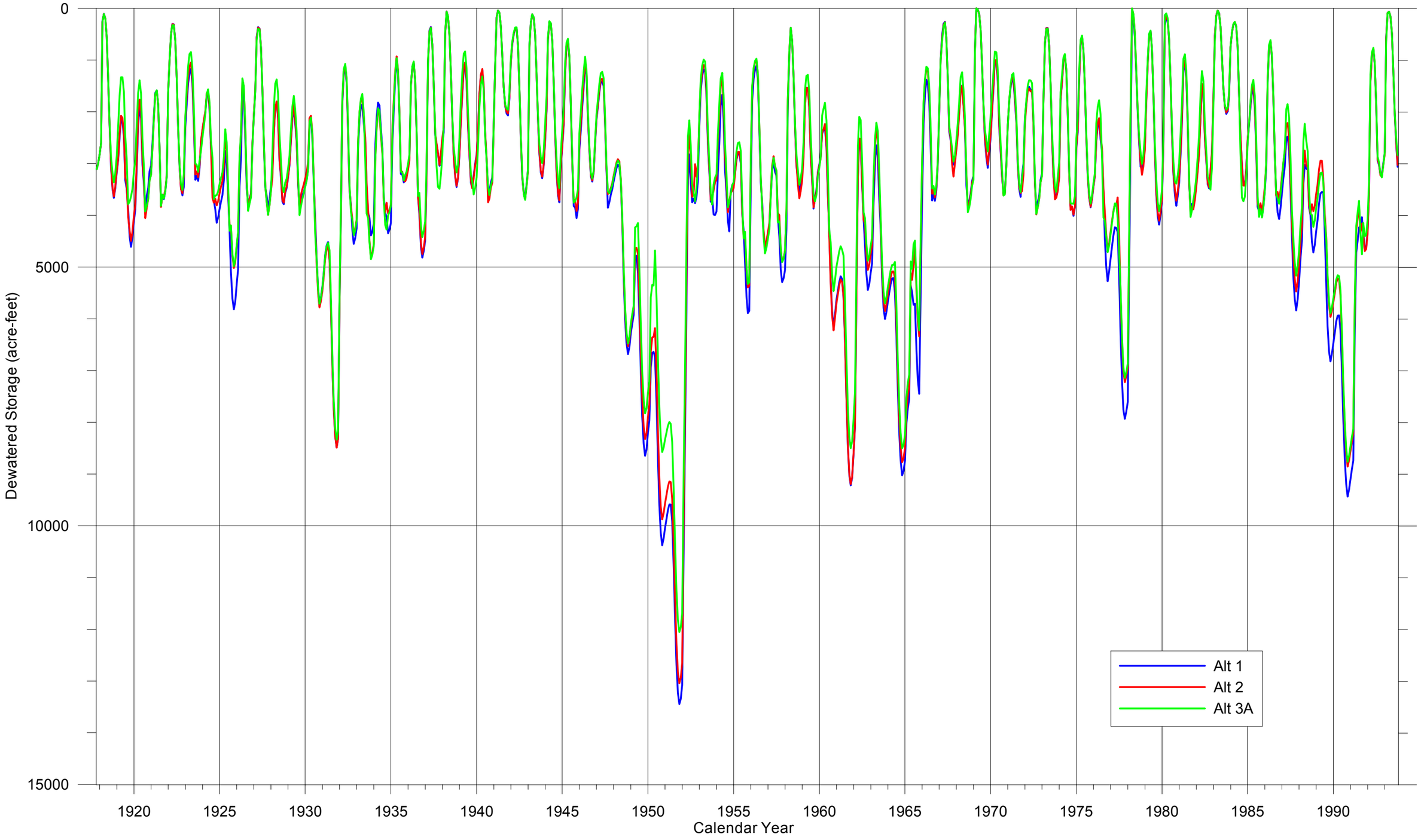
Buellton Sub-area Dewatered Storage for Above Narrows Aquifer
Based on Santa Ynez River Hydrology Model

FIGURE 12B



Santa Rita Sub-area Dewatered Storage for Above Narrows Aquifer
Based on Santa Ynez River Hydrology Model

FIGURE 13A



Santa Rita Sub-area Dewatered Storage for Above Narrows Aquifer
Based on Santa Ynez River Hydrology Model

FIGURE 13B