Cachuma Project Water Rights Hearing

October 2003

Panel I

Presenter:

Ali Shahroody

Stetson Engineers

Santa Ynez River Watershed Hydrology

- Streamflow Characteristics
  - Intermittent Surface Flow Conditions
  - Average Annual Natural Flow at Cachuma Damsite
  - Average Flow influenced by Wet years
  - Median Annual Flow at Cachuma Damsite

Figure 3

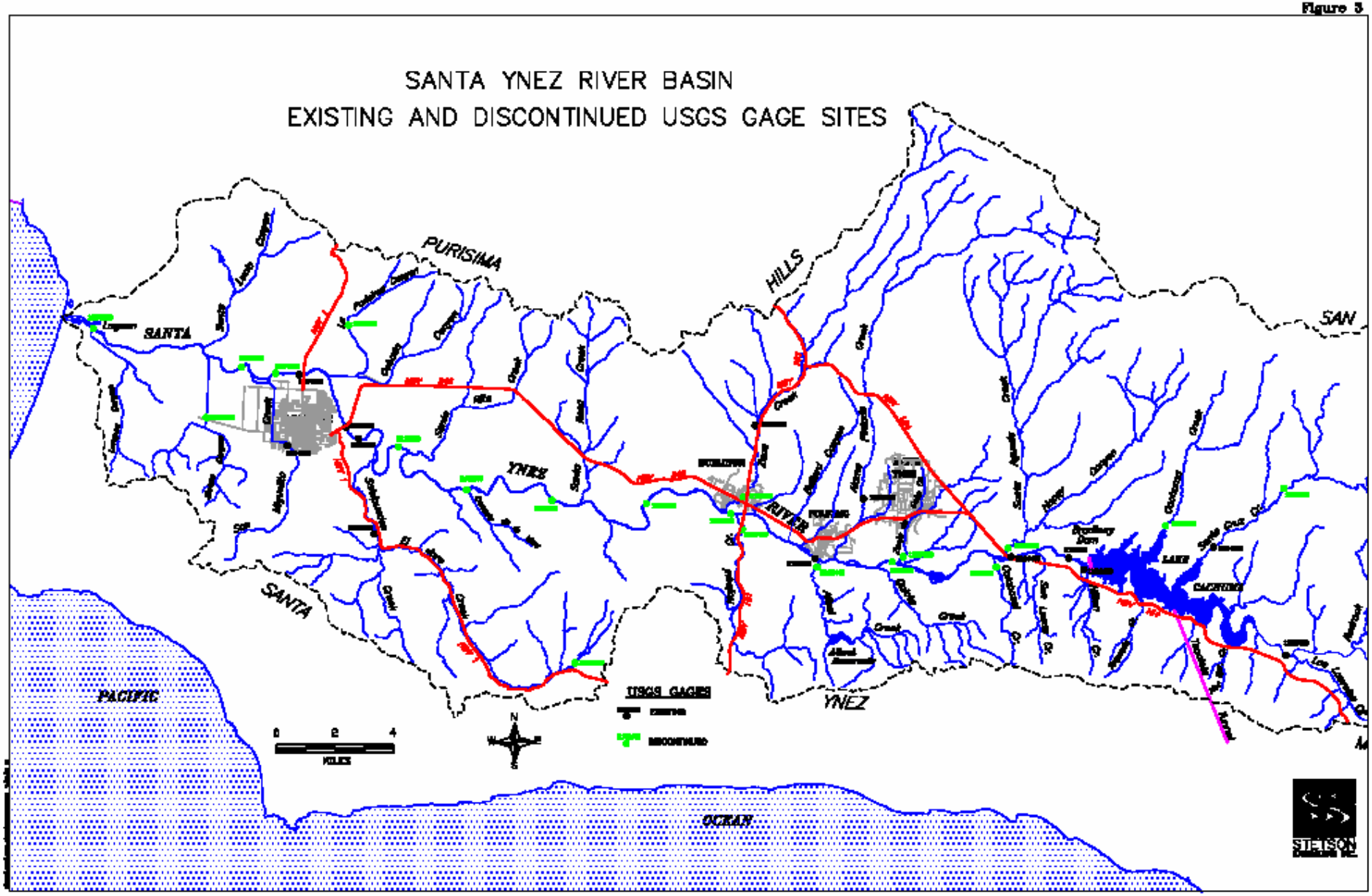
SANTA YNEZ RIVER BASIN
EXISTING AND DISCONTINUED USGS GAGE SITES
PURISIMA
HILLS
SAN
SANTA
YNEZ
RIVER
SANTA
YNEZ
PACIFIC
OCEAN
USGS GAGES
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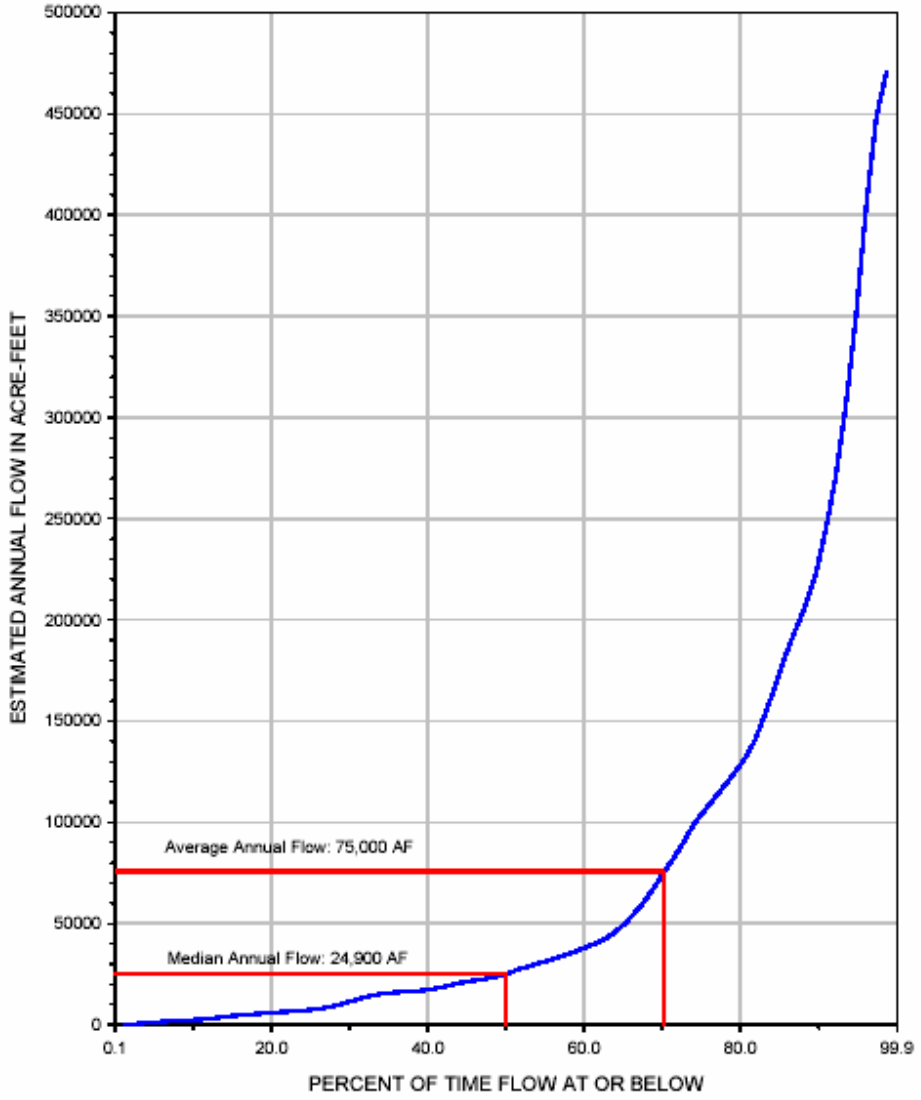
Figure 4

Frequency of Natural Flow
Santa Ynez River at Bradbury Dam Site
Water Years 1918 through1993



Cachuma Member Units Exhibit No. 241/Slide-**4**

Critical Droughts

- Critical Drought Period 1947-1951 (5 years)
- Critical Drought Period 1987-1991 (4 ½ years)
- Storage in Gibraltar Reservoir in 1987-1991
- Storage in Cachuma Reservoir in 1987-1991

TABLE 1 ESTIMATED WATERSHED RUNOFF AT BRADBURY DAM SITE DURING CRITICAL PERIODS 1947-1951 AND 1987-1991

Water Year	Runoff (acre-feet)	Water Year	Runoff (acre-feet)
1947	16,100	1987	2,100
1948	400	1988	14,300
1949	1,900	1989	4,800
1950	4,600	1990	1,900
1951	100	1991*	1,300
Total	23,100		24,400

** Oct 90 – Feb 91*

Figure 5a

End-of-Month Storage Hydrograph
for the 1987-1991 Drought Period
Gibraltar Reservoir

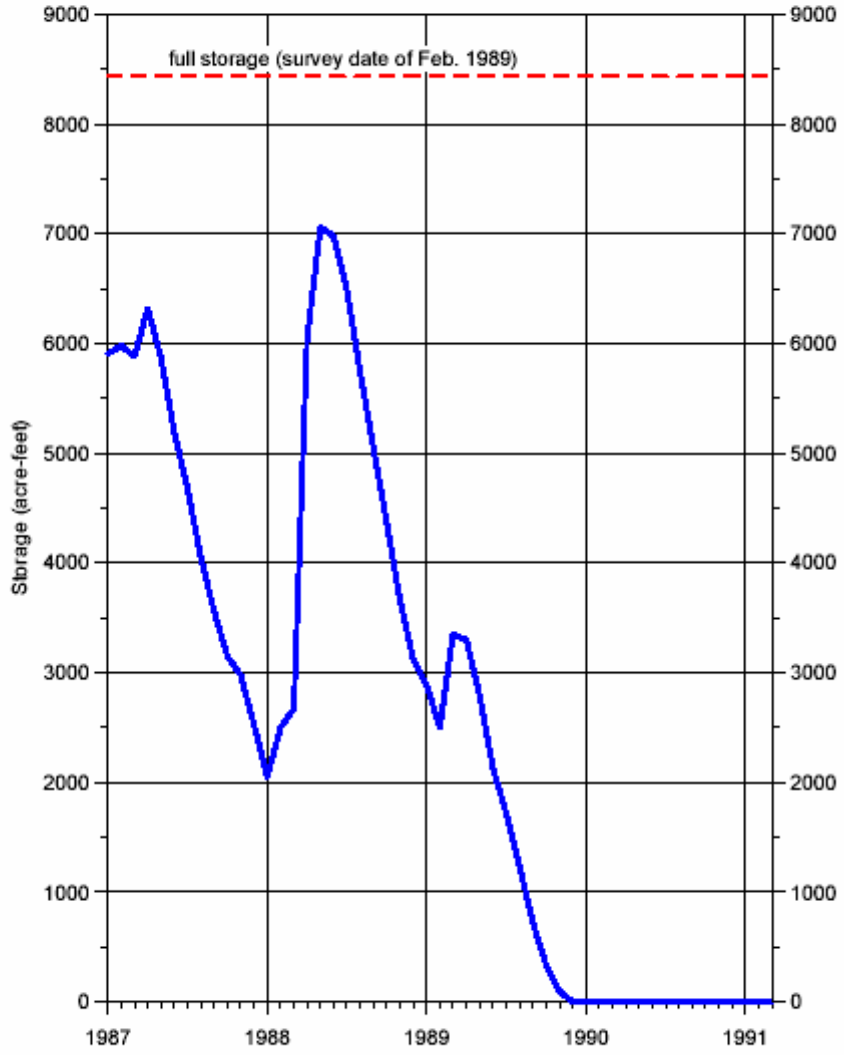


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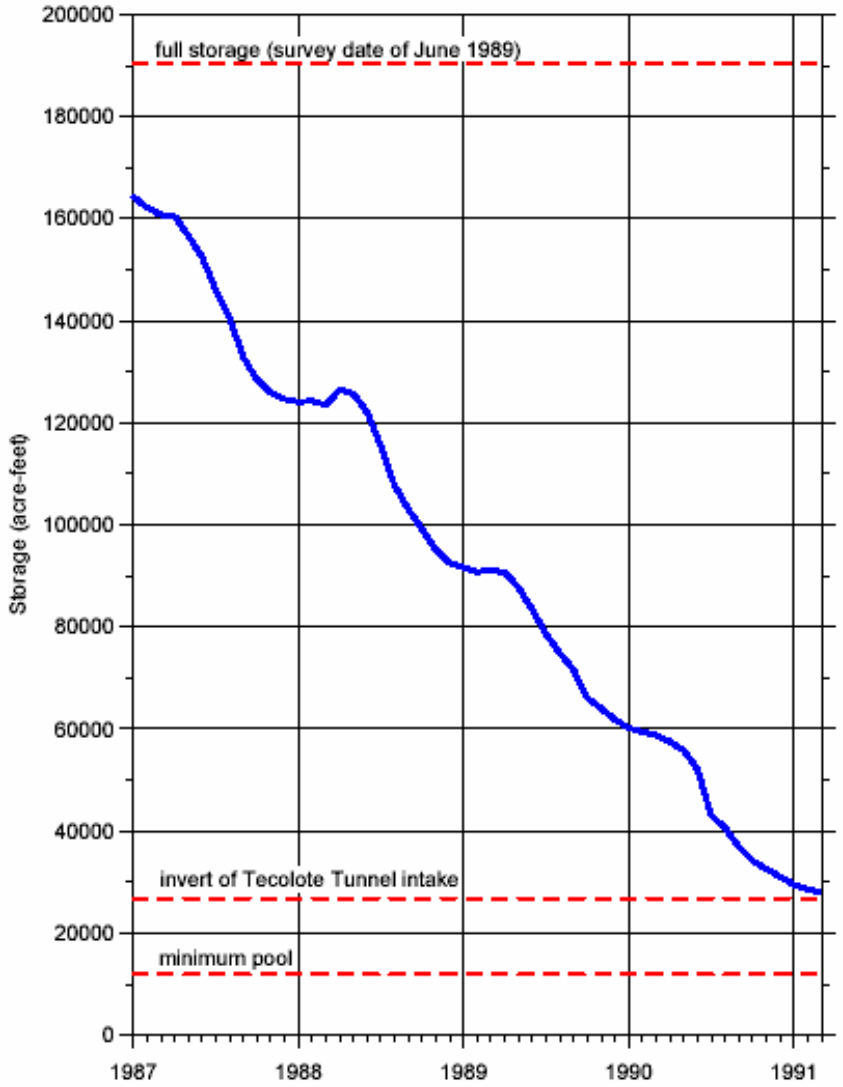
Figure 5b

End-of-Month Storage Hydrograph
for the 1987-1991 Drought Period
Cachuma Reservoir



Cachuma Member Units Exhibit No. 241/Slide-**8**

Streamflow Prior to Construction of Bradbury Dam

- USGS Gage Near Bradbury Dam Site
- Daily Flow hydrographs, January 1929-October 1952 (data for WY1932 not available)
- Frequency of daily flows
- Median daily flow

FIGURE 6a

Santa Ynez River Flow at San Lucas Bridge (HWY 154)
Prior to Storge by Cachuma Project

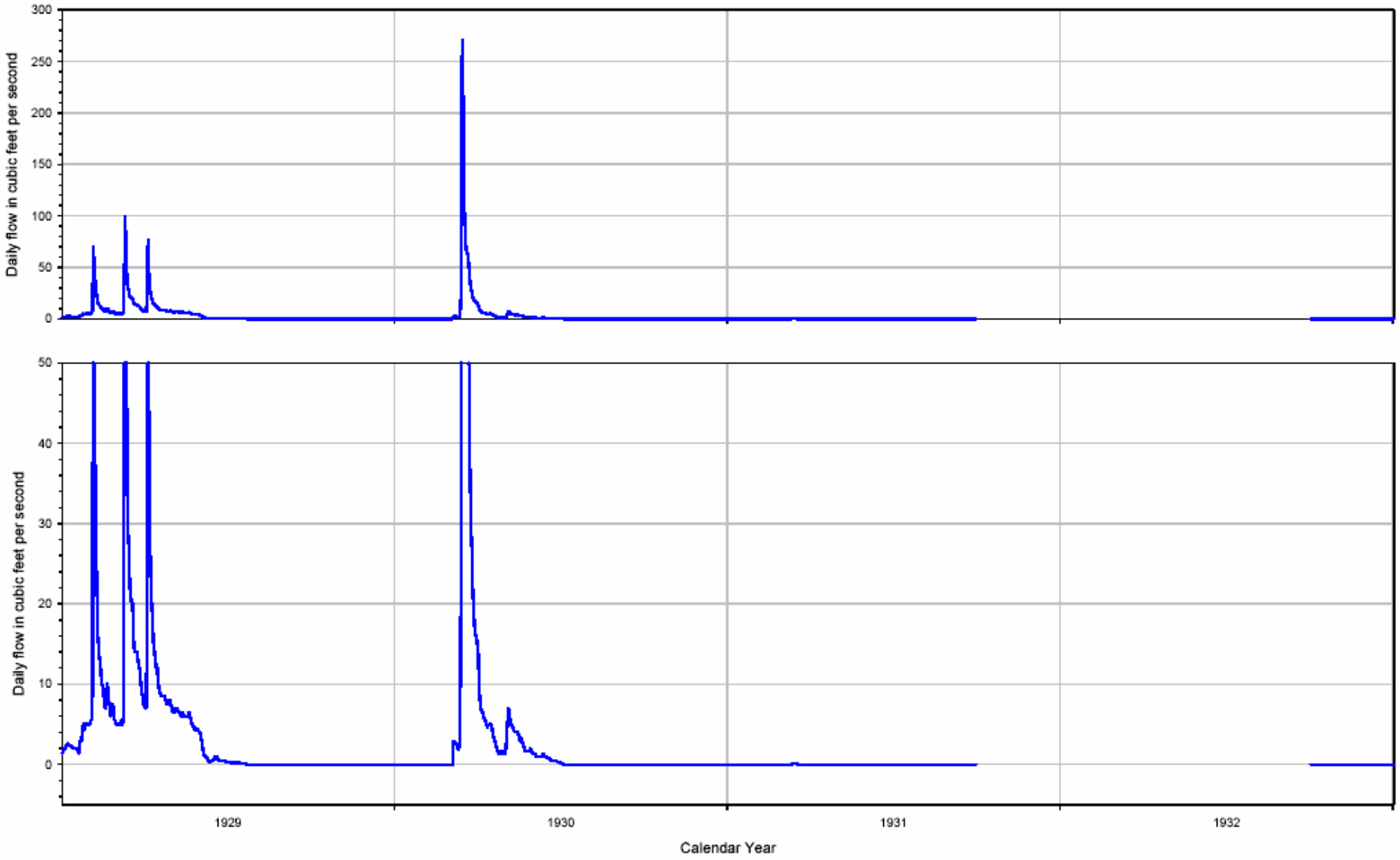


FIGURE 6b

Santa Ynez River Flow at San Lucas Bridge (HWY 154)
Prior to Storge by Cachuma Project

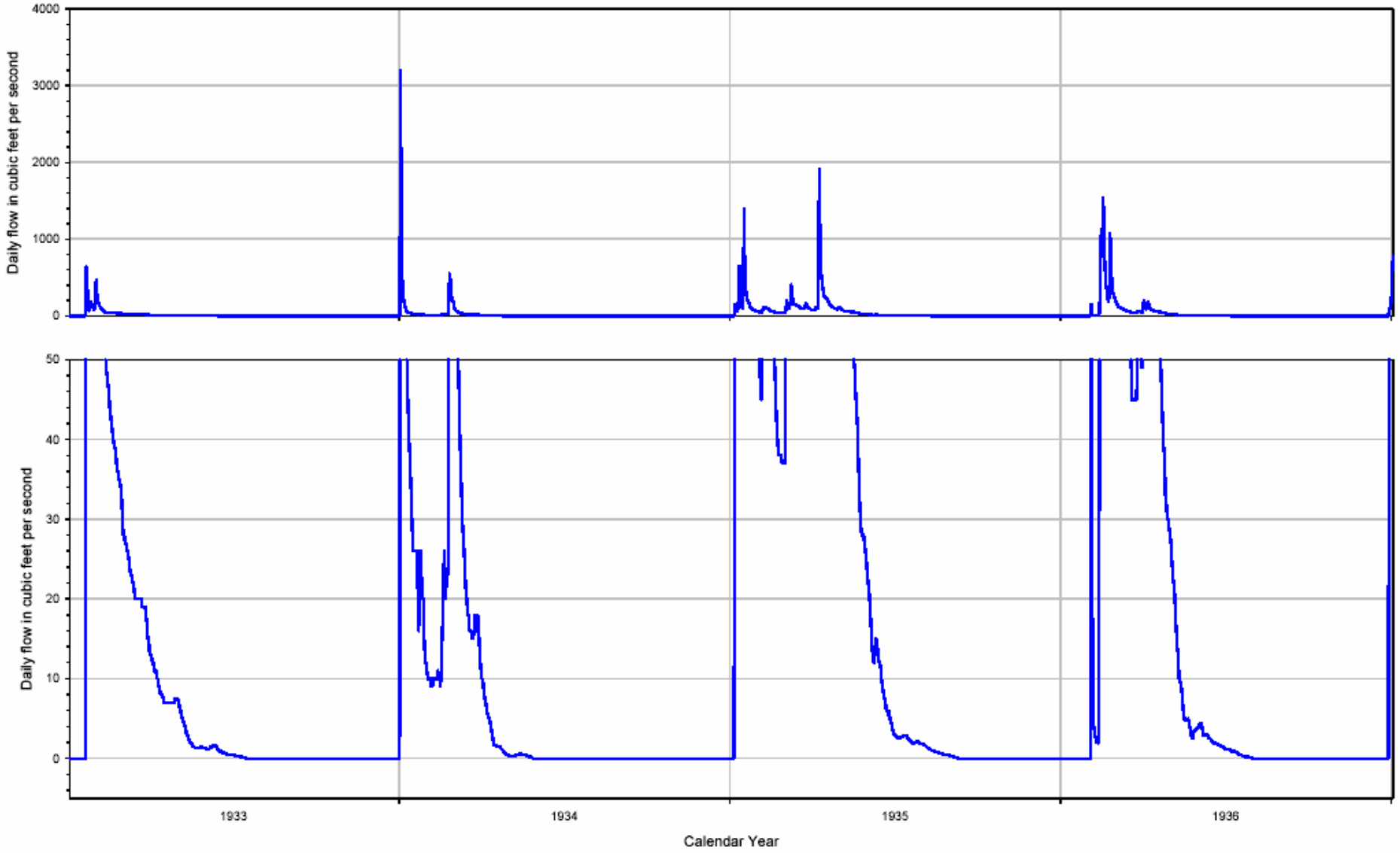


FIGURE 6c

Santa Ynez River Flow at San Lucas Bridge (HWY 154)
Prior to Storge by Cachuma Project

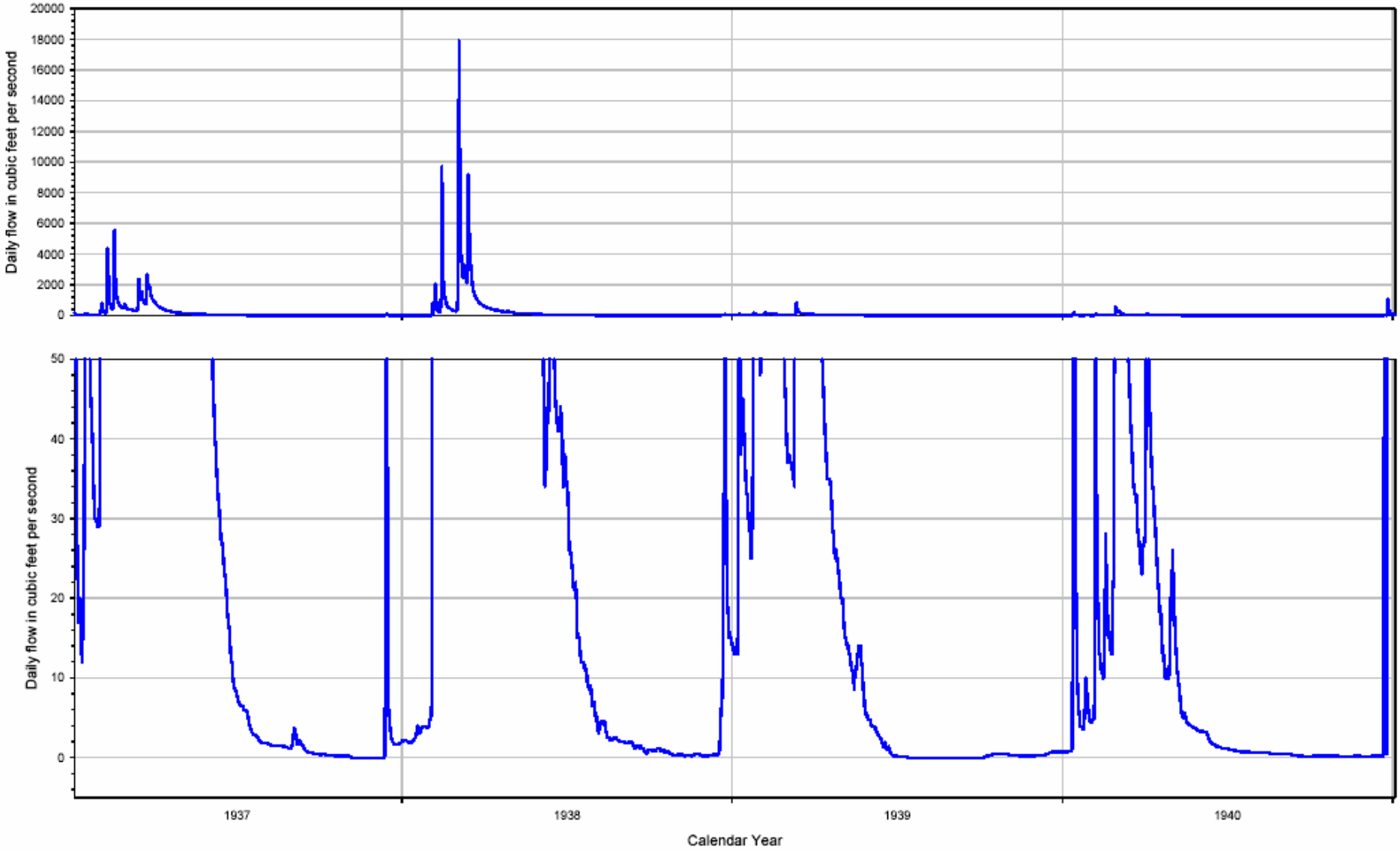


FIGURE 6d

Santa Ynez River Flow at San Lucas Bridge (HWY 154)
Prior to Storge by Cachuma Project

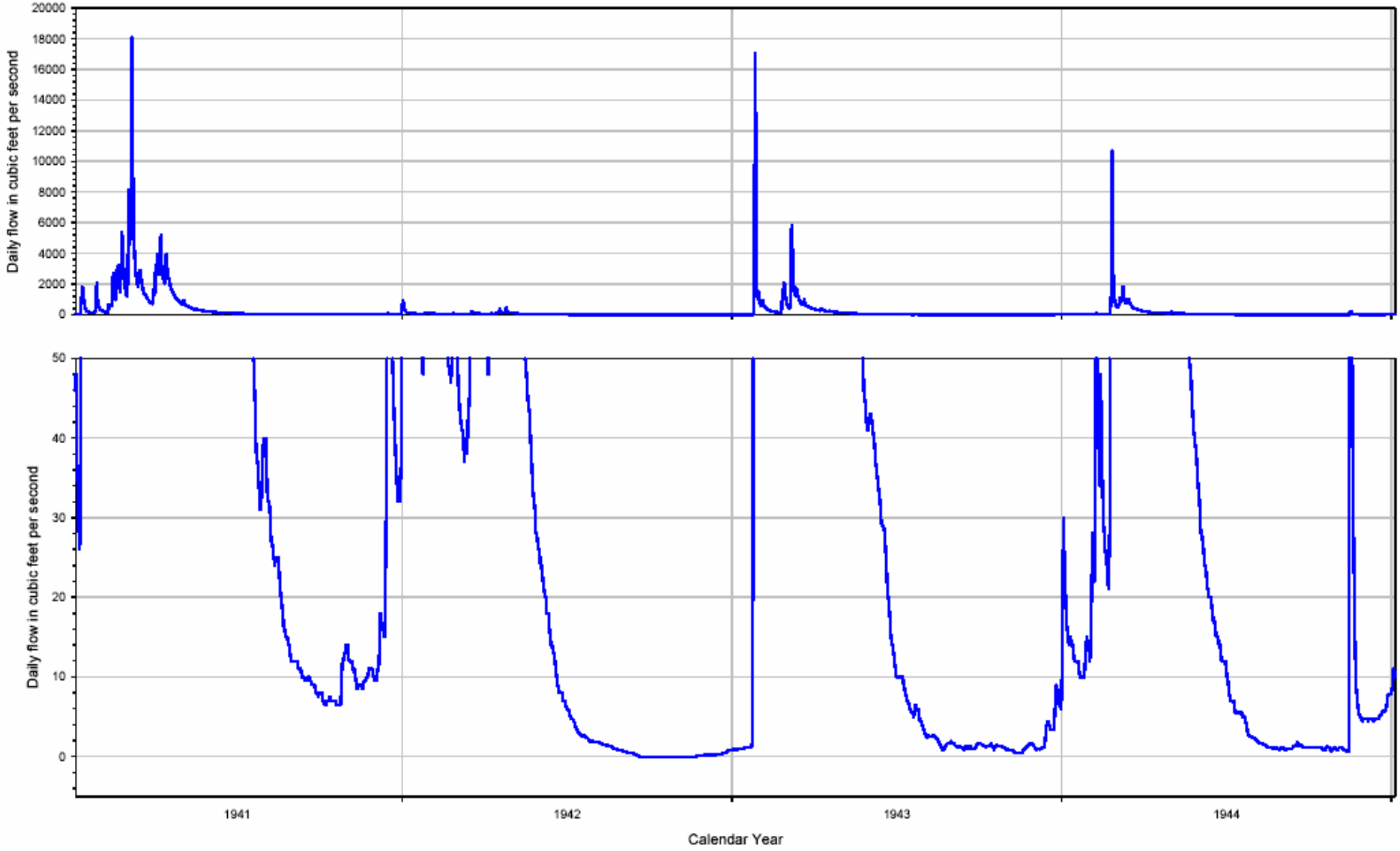


FIGURE 6e

Santa Ynez River Flow at San Lucas Bridge (HWY 154)
Prior to Storge by Cachuma Project

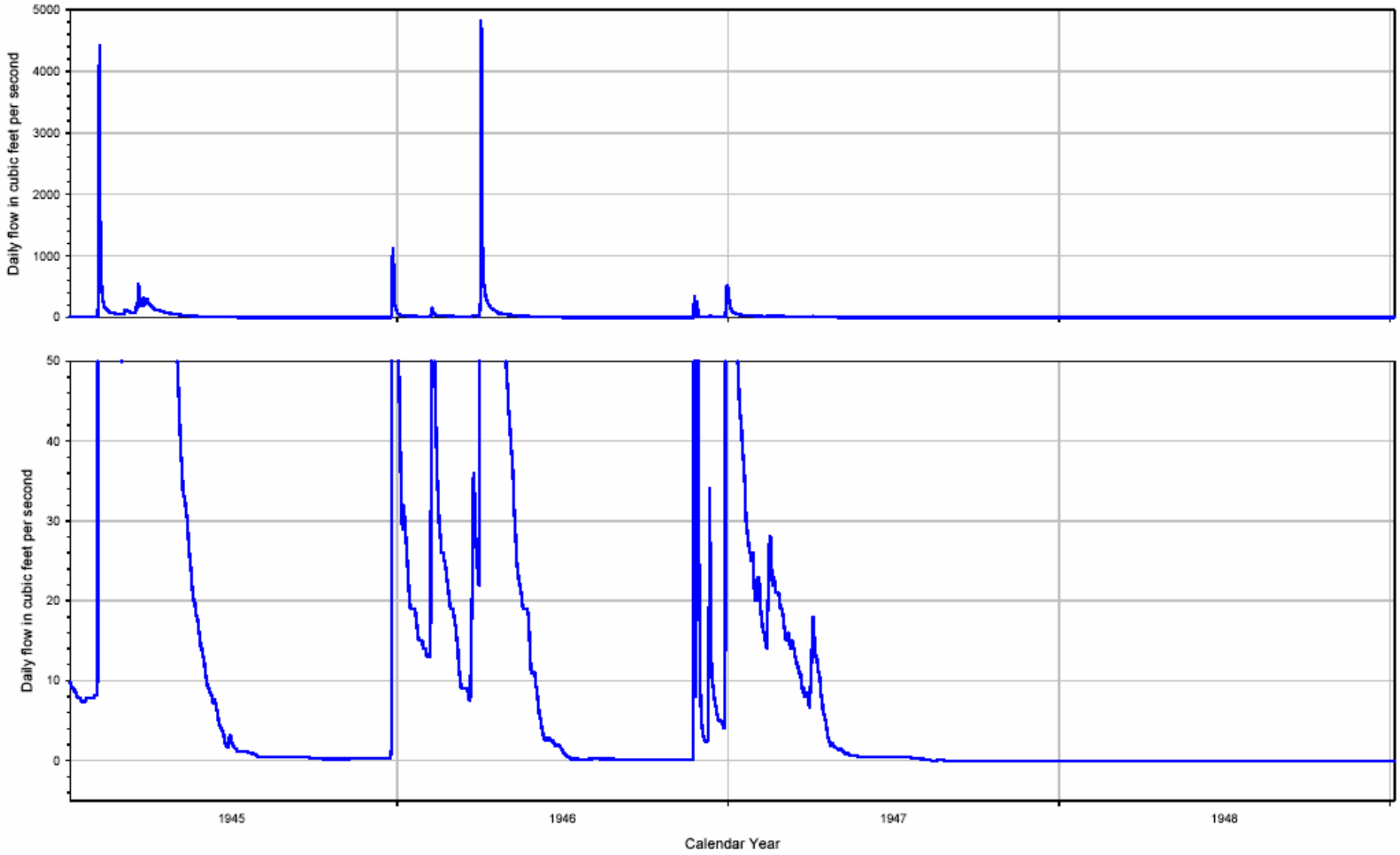


FIGURE 6f

Santa Ynez River Flow at San Lucas Bridge (HWY 154)
Prior to Storge by Cachuma Project

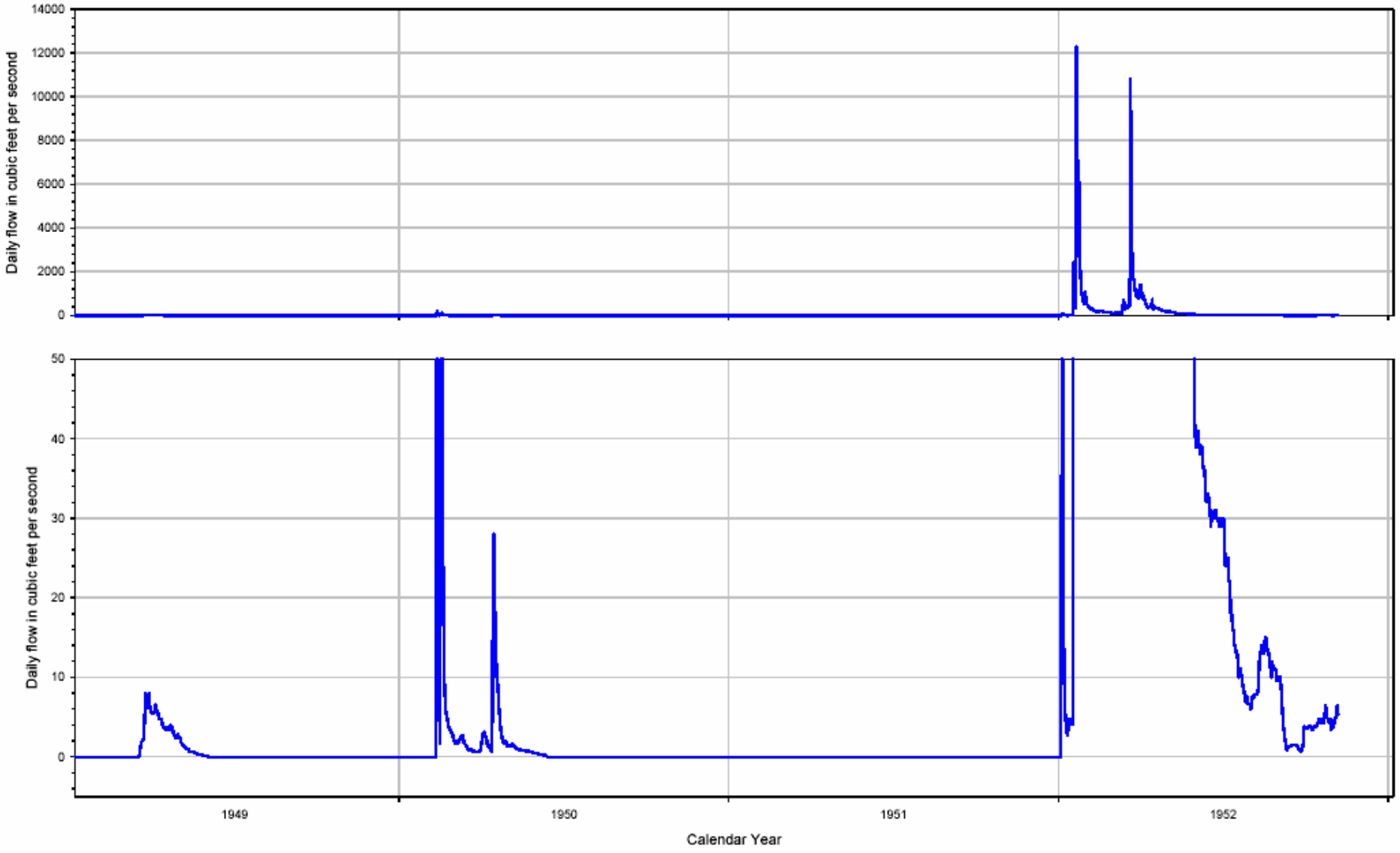
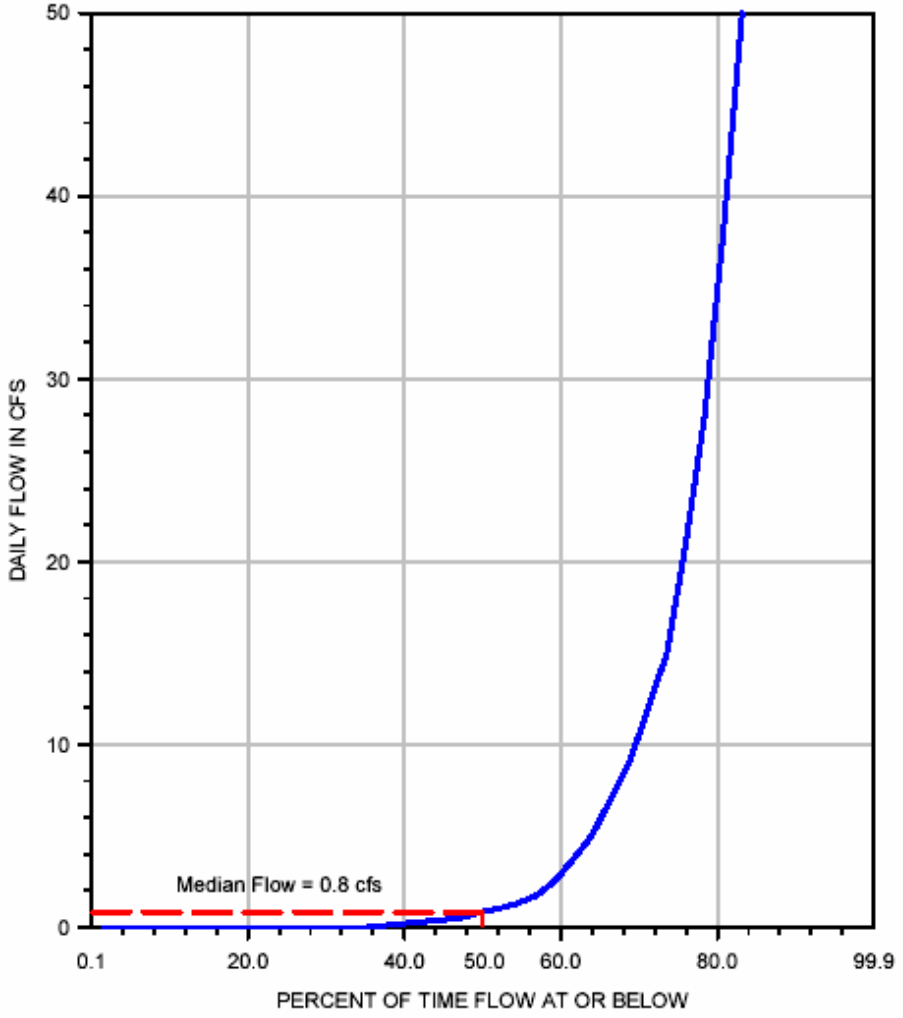


Figure 7

Measured Santa Ynez River Flows
at San Lucas Bridge (HWY 154)
Prior to Storage by Cachuma Reservoir
January 1929-October 1952



Note: Water Year 1932 data not available

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Cachuma Member Units Exhibit No. 241/Slide-**16**

Wet period from 1993-2002

- Last 10 years one of the wettest decades
- Cachuma spilled in 5 out of 10 years

TABLE 2 ESTIMATED SPILLS FROM CACHUMA RESERVOIR (ACRE-FEET)

Water Year	Spill
1993	280,698
1994	0
1995	354,402
1996	0
1997	0
1998	386,055
1999	0
2000	6,295
2001	112,312
2002	0

Source: U.S. Bureau of Reclamation

Conclusions

- Most streams in the Santa Ynez River Watershed, including Santa Ynez River, are intermittent.
- The Santa Ynez River is characterized as a “flashy” system.
- There are long drought periods and some very wet years in between.
- Flows in the Santa Ynez River at the damsite, prior to the construction of Bradbury Dam, were less than 0.8 cfs in 50% of days for 23 years of record.


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