

RESERVOIR SEDIMENT
DATA SUMMARY

CACHUMA
NAME OF RESERVOIR

71-44
DATA SHEET NO.

DAM	1. OWNER DEPT OF THE INTERIOR, USBR		2. STREAM SANTA YNEZ RIVER		3. STATE CALIFORNIA											
	4. SEC. 19 TWP. 6N RANGE 29W		5. NEAREST P O. SANTA YNEZ 6E		6. COUNTY SANTA BARBARA											
	7. LAT 34 ° 35 ' " LONG: 119 ° 59 ' "		8. TOP OF DAM ELEVATION 766		9. SPILLWAY CREST ELEV. 750											
RESERVOIR	10. STORAGE ALLOCATION		11. ELEVATION TOP OF POOL		12. ORIGINAL SURFACE AREA, ACRES		13. ORIGINAL CAPACITY, ACRE-FEET		14. GROSS STORAGE, ACRE-FEET		15. DATE STORAGE BEGAN					
	a. FLOOD CONTROL										15. JAN. 7, 1953					
	b. MULTIPLE USE															
	c. POWER															
	d. WATER SUPPLY 1/		750		3,092		172,360		204,874		16. DATE NORMAL OPER. BEGAN					
	e. IRRIGATION 1/		750		3,092		172,360		204,874							
	f. CONSERVATION 1/		750		3,092		172,360		204,874							
	g. INACTIVE		660		916		2/32,514		2/32,514							
WATERSHED	17. LENGTH OF RESERVOIR 3/				11.3 MILES		AV. WIDTH OF RESERVOIR				0.43 MILES					
	18. TOTAL DRAINAGE AREA				417 SQ. MI.		22. MEAN ANNUAL PRECIPITATION				20 - 30 INCHES					
	19. NET SEDIMENT CONTRIBUTING AREA				196 SQ. MI.		23. MEAN ANNUAL RUNOFF 5/				2.56 INCHES					
	20. LENGTH 31.6 MILES		AV. WIDTH 13.2 MILES		24. MEAN ANNUAL RUNOFF (45 yrs)				57,000 AC.-F.T.							
	21. MAX. ELEV. 4/ 6,400		MIN. ELEV. 560		25. ANNUAL TEMP: MEAN 60 RANGE 23-115											
SURVEY DATA	26. DATE OF SURVEY		27. PERIOD YEARS		28. ACCL. YEARS		29. TYPE OF SURVEY		30. NO. OF RANGES OR CONTOUR INT.		31. SURFACE AREA, ACRES		32. CAPACITY, ACRE-FEET		33. C/I. RATIO, AC.-FT. PER AC.-FT.	
	1-7-53		0		0		RANGE (D)		33		3,092		204,874		Upstream Reservoir Controls 52% of total drainage area	
	6/8-7-69		16.58		16.58		RANGE (D)		26		Z/		6/ 192,574			
	26. DATE OF SURVEY		34. PERIOD ANNUAL PRECIPITATION		35. PERIOD WATER INFLOW, ACRE-FEET g/				36. WATER INFL. TO DATE, AC.-FT.							
	8-7-69		*17.23		75,500		9/ 526,048		1,251,793		75,500		1,251,793			
	26. DATE OF SURVEY		37. PERIOD CAPACITY LOSS, ACRE-FEET				38. TOTAL SED. DEPOSITS TO DATE, ACRE-FEET									
	8-7-69		10/ 12,300		11/ 742		3.79		12,300		11/ 742		11/ 3.79			
	26. DATE OF SURVEY		39. AV. DRY WGT., LBS. PER CU. FT.		40. SED. DEP., TONS PER SQ. MI.-YR.		41. STORAGE LOSS, PCT.		42. SED. INFLOW, PPM							
			12/													

*Estimated

26. DATE OF SURVEY	43. DEPTH DESIGNATION RANGE IN FEET BELOW, AND ABOVE, CREST ELEVATION <u>13/</u>												
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN DEPTH DESIGNATION												

26. DATE OF SURVEY	44. REACH DESIGNATION PERCENT OF TOTAL ORIGINAL LENGTH OF RESERVOIR														
	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	-105	-110	-115	-120	-125
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN REACH DESIGNATION														
8-7-69	24.6	18.0	8.8	4.3	3.2	16.5	9.5	4.5	7.6	3.0					

45. RANGE IN RESERVOIR OPERATION							
WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC. FT.	WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC.-FT.
1953	621.53	569.00	18,071	1963	745.19	738.61	5,277
1954	648.44	619.74	18,953	1964	738.58	726.93	3,010
1955	645.00	643.80	4,569	1965	726.88	718.66	12,546
1956	668.47	644.00	24,330	1966	745.93	716.63	79,293
1957	666.06	657.37	6,150	1967	750.65	736.18	208,960
1958	750.64	653.10	219,130	1968	745.59	734.57	10,403
1959	749.53	744.09	15,552	1969	755.11	732.59	526,048
1960	744.06	735.43	3,202				
1961	735.40	724.00	1,074				
1962	750.38	721.75	100,221				

46. ELEVATION-AREA-CAPACITY DATA <u>14/</u>								
ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY

47. REMARKS AND REFERENCES

- 1/ Storage space is combined for multiple uses of M&I water supply, irrigation, recreation, water rights releases and fish and wildlife enhancement.
- 2/ Includes 3,114 AF of dead storage.
- 3/ 8.0 miles on Santa Ynez River, 1.9 miles on Santa Cruz Creek and 1.4 miles on Cachuma Creek.
- 4/ Maximum elevation of net sediment contributing area.
- 5/ USBR water supply estimate for Cachuma Reservoir - period: 1918-1962.
- 6/ Data at elevation 748 ft (limit of 8-7-69 survey).
- 7/ Data insufficient for determining surface area at elevation 748 ft. However, it should be less than the original surface area of 3,092 acres.
- 8/ Does not include precipitation on reservoir of 53,286 AF for 16.58 year period.
- 9/ Abnormally high inflow occurred in 1969. The maximum annual inflow of 526,048 AF for 1969 is 42% of the total inflow of 1,251,793 AF for the 16.58 years included in the survey.
- 10/ Capacity loss to elevation 748 ft. Volume of sediments deposited between elevations 748 and 750 ft estimated to be 100 to 200 AF.

NOTE: Remarks and References continued on attached sheet.

48. AGENCY MAKING SURVEY DEPT INT-U.S.G.S.-DISTRICT OFFICE-MENLO PARK, CALIF

49. AGENCY SUPPLYING DATA DEPT INT-U.S.B.R.-REGION 2-HYDROLOGY BRANCH

50. DATE 3-9-70

47. REMARKS AND REFERENCES - Continued

- 11/ These amounts excessive because upstream dam and reservoir (Gibraltar) controls 216 square miles of the 417 square miles total drainage area. Estimated sedimentation in Gibraltar for the period of 16.58 years related to the 8-7-69 survey is about 6500 acre-feet. Sediment deposition from the total net contributing drainage area (417 square miles) for the 16.58 year period would amount to approximately 18,800 acre-feet or 2.76 acre-feet per square mile per year.
- 12/ No representative sample available for analysis as of Feb. 1970.
- 13/ Not available for 8-7-69 survey.
- 14/ Original elevation-area-capacity relationships were not updated because of the small effect on operation of the lake that sedimentation has had to date.

References

Letter report on silt survey of Gibraltar-Reservoir from U. S. Grant and Son to City of Santa Barbara Water Department dated September 4, 1969.

An unknown quantity of silt was flushed from the reservoir after the flood of January 25, 1969, by making releases of 20 c.f.s. through the outlet works by-pass line which discharged muddy water for more than a month. It is estimated the muddy water contained 25 percent silt by weight.

RESERVOIR SEDIMENT
DATA SUMMARY

Cachuma Reservoir
NAME OF RESERVOIR

71-44 a
DATA SHEET NO.

D A M	1. OWNER Bureau of Reclamation			2. STREAM Santa Ynez River			3. STATE California							
	4. SEC 19 T 6N R 29 W			5. NEAREST PO Santa Ynez 6E			6. COUNTY Santa Barbara							
	7. LAT 34° 35' LONG 119° 59'			8. TOP OF DAM 766			9. SPILLWAY CREST 750							
R E S E R V O I R	10. STORAGE ALLOCATION		11. ELEVATION TOP OF POOL		12. ORIGINAL SURFACE AREA, Ac		13. ORIGINAL CAPACITY, AF		14. GROSS STORAGE ACRE FEET		15. DATE STORAGE BEGAN			
	a. FLOOD CONTROL										1/7/1953			
	b. MULTIPLE USE													
	c. POWER													
	d. WATER SUPPLY		750 ¹		3,092		172,360		204,874		16. DATE NORMAL OPERATION BEGAN			
	e. IRRIGATION		750 ¹		3,092		172,360		204,874					
	f. CONSERVATION		750 ¹		3,092		172,360		204,874					
	g. INACTIVE		660		916		32,514 ²		32,514 ²					
17. LENGTH OF RESERVOIR 11.3 MILES ³							AVG. WIDTH OF RESERVOIR 0.43 MILES							
B A S I N	18. TOTAL DRAINAGE AREA 417 SQ. MI.					22. MEAN ANNUAL PRECIPITATION 19-30 IN.								
	19. NET SEDIMENT CONTRIBUTING AREA 196 SQ. MI.					23. MEAN ANNUAL RUNOFF 2.56 IN. ⁵								
	20. LENGTH 31.6 MI.			AV. WIDTH 13.2 MI.			24. MEAN ANNUAL RUNOFF (36 yrs) 74,400 AC.-FT.							
	21. MAX. ELEV. 6,400 FT. ⁴			MIN. ELEV. 560 FT.			25. ANNUAL TEMP. MEAN 60 RANGE 23-115							
S U R V E Y D A T A	26. DATE OF SURVEY		27. PER. YRS.	28. ACCL. YRS.	29. TYPE OF SURVEY		30. NO. OF RANGES OR INTERVAL		31. SURFACE AREA, AC.		32. CAPACITY ACRE-FEET		33. C/I RATIO AF/AF	
	1/7/53				Range(D)		33		3,092		204,874			
	8/7/69 ⁶		16.58	16.58	Range(D)		26		see note 7		192,574 ⁶			
	3/31/89		19.67	36.25	Contour(D)		5 Ft(CI)		3,043		190,409		2.59	
	26. DATE OF SURVEY		34. PERIOD ANNUAL PRECIP.		35. PERIOD WATER INFLOW, ACRE FEET				36. WATER INFLOW TO DATE, AF					
					a. MEAN ANN.		b. MAX. ANN.		c. TOTAL		a. MEAN ANN.		b. TOTAL	
	8/7/69 ⁶		*17-23		75,500		526,048 ⁹		1,251,793		75,500		1,251,793	
	3/31/89		*19-30		73,443		428,601		1,444,627		74,384		2,696,420	
	26. DATE OF SURVEY		37. PERIOD CAPACITY LOSS, ACRE-FEET				38. TOTAL SEDIMENT DEPOSITS TO DATE, AF							
			a. TOTAL		b. AV. ANN.		c. /MI. ² -YR.		a. TOTAL		b. AV. ANNUAL		c. /MI. ² -YR.	
8/7/69 ⁶		12,300 ¹⁰		742 ¹¹		3.79		12,300 ¹⁰		742 ¹¹		3.79		
3/31/89		14,465		399		2.04		14,465 ¹²		399 ¹²		2.04		
26. DATE OF SURVEY		39. AV. DRY WT. (#/FT ³)		40. SED. DEP. TONS/MI. ² -YR.			41. STORAGE LOSS, PCT.			42. SED. INFLOW, PPM				
				a. PERIOD		b. TOTAL TO DATE		a. AV. ANNUAL		b. TOTAL TO DATE		a. PER.	b. TOT.	
8/7/69 ⁶		see note 13												
3/31/89														

26. DATE OF SURVEY	43. DEPTH DESIGNATION RANGE IN FEET BELOW AND ABOVE CREST ELEVATION														
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN DEPTH DESIGNATION														
N/A															
26. DATE OF SURVEY	44. REACH DESIGNATION PERCENT OF TOTAL ORIGINAL LENGTH OF RESERVOIR														
	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-105	105-110	110-115	115-120	120-125
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN REACH DESIGNATION														
8/7/69	24.6	18.0	8.8	4.3	3.2	16.5	9.5	4.5	7.6	3.0					

45. RANGE IN RESERVOIR OPERATION							
WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AF	WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AF
1953	621.53	569.00	18,071	1972	733.44	718.21	10,985
1954	648.44	619.74	18,953	1973	750.55	716.19	131,750
1955	645.00	643.80	4,569	1974	750.31	742.09	10,985
1956	668.47	644.00	24,330	1975	750.08	740.42	51,544
1957	666.06	657.37	6,150	1976	739.37	728.43	5,308
1958	750.64	653.10	219,130	1977	728.22	713.90	1,519
1959	749.53	744.09	15,552	1978	751.98	710.56	329,220
1960	744.06	735.43	3,202	1979	750.67	742.97	61,692
1961	735.40	724.00	1,074	1980	750.57	740.45	153,543
1962	750.38	721.75	100,221	1981	747.56	737.56	22,066
1963	745.19	738.61	5,277	1982	742.35	734.06	26,848
1964	738.58	726.93	3,010	1983	752.19	731.31	428,601
1965	726.88	718.66	12,546	1984	750.15	738.56	39,036
1966	745.93	716.63	79,293	1985	738.52	724.53	5,110
1967	750.65	736.18	208,960	1986	748.54	724.43	76,572
1968	745.59	734.57	10,403	1987	738.63	721.35	2,372
1969	755.11	732.59	535,091	1988	721.31	696.28	9,034
1970	749.96	740.30	30,812	1989	707.34	687.99	4,045
1971	744.22	734.75	34,542				

46. ELEVATION - AREA - CAPACITY DATA FOR 1989¹⁵

ELEV.	AREA	CAP.	ELEV.	AREA	CAP.	ELEV.	AREA	CAP.
591.6	0	0	650	738	18,839	710	1,891	93,627
595	58	99	655	792	22,664	715	2,009	103,377
600	115	531	660	851	26,771	720	2,127	113,716
605	154	1,204	665	920	31,199	725	2,259	124,680
610	202	2,094	670	1,030	36,074	730	2,392	136,306
615	248	3,219	675	1,130	41,474	735	2,542	148,641
620	279	4,536	680	1,219	47,346	740	2,693	161,730
625	335	6,071	685	1,319	53,691	745	2,868	175,633
630	384	7,869	690	1,435	60,576	750	3,043	190,409
635	446	9,944	695	1,538	68,009	755	3,202	206,021
640	540	12,409	700	1,647	75,972	760	3,362	222,431
645	647	15,376	705	1,764	84,490			

47. REMARKS AND REFERENCES

¹Storage space is combined for multiple uses of M&I water supply, irrigation, recreation, water rights releases and fish and wildlife enhancement.

²Includes 3,114 AF of dead storage.

³8.0 miles on Santa Ynez River, 1.9 miles on Santa Cruz Creek and 1.4 miles on Cachuma Creek.

⁴Maximum elevation of net sediment contributing area.

⁵USBR water supply estimate for Cachuma Reservoir - period: 1918-1962, estimated 1962-1989.

⁶Data at elevation 748 ft. (limit of 8-7-69 survey).

⁷Data insufficient for determining surface area at elevation 748 ft. Should be less than original 3092 acres.

⁸Excludes precipitation on reservoir of 53,286 AF for 16.58 yr period, or 76,461 AF for 19.67 yr period.

⁹Very high inflow occurred in 1969. The annual inflow of 535,091 AF for 1969 was 42% of the total inflow of 1,251,793 AF for the 16.58 yr period.

¹⁰Capacity loss to elev. 748 ft. Sediments deposited between elev. 748 and 750 ft. estimated at 100 to 200 AF.

¹¹These amounts excessive because upstream dam and reservoir (Gibraltar) controls 216 square miles of the 417 square mile total drainage area. Estimated sedimentation in Gibraltar for the period of 16.58 years related to the 8-7-69 survey is about 6500 AF. Sediment deposition from the total net contributing drainage area (411 square miles) for the 16.58 year period would be approximately 18,800 AF or 2.76 AF per square mile per year.

¹²1969 survey results not used since values computed to elevation 748 ft. only, whereas 1989 values computed to elevation 750 ft.

¹³No representative samples available for analysis as of Feb. 1970 and March 1989.

¹⁴Not available for 8-7-69 and 3-31-89 surveys.

¹⁵Original area and capacity table presented on summary tables dated 3-9-70 to elevation 760.

48. AGENCY MAKING SURVEY Bureau of Reclamation

49. AGENCY SUPPLYING DATA Bureau of Reclamation

DATE December/1991