DEPARTMENT OF THE ARMY — CORPS OF ENGINEERS

RESERVOIR SEDIMENTATION DATA SUMMARY

Lake Texoma (Denison Dam) — NAME OF RESERVOIR

50-12 — DATA SHEET NO.

DAM

1. OWNER Dept of Army, C. of E.	2. RIVER Red	3. STATE Texas-Oklahoma
4. SEC. — TWP. 8S RANGE 7E	5. NEAREST TOWN Denison, Texas	6. COUNTY Grayson, Tex. Bryan, Okla.
7. STREAM BED ELEV. 510.0	8. TOP OF DAM ELEV. 670.0	9. SPILLWAY CREST ELEV. 640.0

RESERVOIR

10. STORAGE ALLOCATION	11. ELEVATION TOP OF POOL	12. SURFACE AREA ACRES	13. STORAGE ACRE-FEET	14. ACCUMULATED ACRE-FEET	15. DATE STORAGE BEGAN
a. FLOOD CONTROL	640	144,088	2,727,000	5,859,000	27 July 1942
b. POWER	617	94,874	1,911,000	3,132,000	1/
c. WATER SUPPLY					16. DATE NORMAL OPER. BEGAN
d. IRRIGATION					
e. CONSERVATION	590	47,562	1,221,000	1,221,000	15 March 1945
f. INACTIVE					

17. LENGTH OF RESERVOIR 2/ Red River 82 MILES — AV. WIDTH OF RESERVOIR 2 MILES

WATERSHED

18. TOTAL DRAINAGE AREA 38,291 SQ.MI.		22. MEAN ANNUAL PRECIPITATION	26.93 INCHES
19. NET SEDIMENT CONTRIBUTING AREA 28,971 SQ.MI.		23. MEAN ANNUAL RUNOFF	2.03(25) INCHES
20. LENGTH 375 MILES	AV. WIDTH 100 MILES	24. MEAN ANNUAL RUNOFF 4,138,000 (25)	AC.-FT.
21. MAX. ELEV. 3,500	MIN. ELEV. 510	25. CLIMATIC CLASSIFICATION Subhumid	

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/W RATIO AC.-FT. PER SQ.MI.
27 July 1942			Range	80	144,088	5,859,000	-
Oct 1948	6.2	6.2	Range	80		5,718,000	

26. DATE OF SURVEY	34. PERIOD ANNUAL PRECIPITATION	35. PERIOD WATER INFLOW ACRE-FEET			36. WATER INFL. TO DATE AC.-FT.	
		a. MEAN ANNUAL	b. MAX. ANNUAL	c. PERIOD TOTAL	a. MEAN ANNUAL	b. TOTAL TO DATE
Oct 1948	27.06	4,531,000	7,442,000	28,092,000	4,531,000	28,092,000

26. DATE OF SURVEY	37. PERIOD SEDIMENT DEPOSITS ACRE-FEET			38. TOTAL SED. DEPOSITS TO DATE ACRE-FEET		
	a. PERIOD TOTAL	b. AV. ANNUAL	c. PER SQ.MI.-YR.	a. TOTAL TO DATE	b. AV. ANNUAL	c. PER SQ.MI.-YR.
Oct 1948	141,000	22,700	0.784	141,000	22,700	0.784

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	
		a. PERIOD	b. TOTAL TO DATE	a. AV. ANNUAL	b. TO DATE	a. PERIOD	b. TO DATE
Oct 1948	52.1(53)	890	890	0.387	2.41	4190	4190

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26. DATE OF SURVEY	43. DEPTH DESIGNATION — RANGE IN FEET ABOVE, AND BELOW, CREST ELEVATION												
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN DEPTH DESIGNATION												
Oct. 1948	130-120	120-110	110-100	100-90	90-80	80-70	70-60	60-50					
	1.7.	4.0.	5.1.	7.0.	5.1.	5.6.	4.5.	5.8.					
	50-40	40-30	30-23	23-20	20-10	10-crest							
	11.7.	23.9.	15.6.	4.6.	6.6.	-1.2.							

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														
	RED RIVER ARM (Beginning at dam. Length 82 miles)														
Oct. 1948	8.0	10.4	7.3	2.9	10.4	16.3	32.5	8.4	3.5	0.3					
	WASHITA RIVER ARM 3/ (Beginning at mouth of Washita, Length 82 miles)														
	5.9	8.2	6.1	0	27.5	35.9	17.4	4.9	-5.6	-0.3					

45. RANGE IN RESERVOIR OPERATION

WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW AC-FT.	WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW AC-FT.
1942	-	-	536,000 4/				
1943	-	-	4,746,000				
1944	595.7	526.4	1,982,000				
1945	629.1	595.6	7,442,000				
1946	626.0	614.2	4,579,000				
1947	628.0	612.2	5,799,000				
1948	619.4	611.4	3,008,000				

46. ELEVATION-AREA-CAPACITY DATA

ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY
520		0	590		1,167,000			
530		4,440	600		1,709,000			
540		27,040	610		2,408,000			
550		92,110	617		3,005,000			
560		232,000	620		3,292,000			
570		446,800	630		4,392,000			
580		754,000	640		5,718,000			

47. REMARKS AND REFERENCES References: "Report on Sedimentation Survey, Denison Dam and Reservoir (Lake Texoma)" by Tulsa District, June 1950.

Sediment varies from 7 percent sand; 60 percent silt, and 33 percent clay near dam to 100 percent sand at upper end of reservoir.

1/ Diversion date. Also date when sediment deposits started.

2/ Based on river miles. 90 river miles from dam to upper end of Washita River Arm.

3/ Affected by Cumberland Oil Field protective levees.

4/ Includes only the portion of water year July 27 to Sept 30 (inc)

48. AGENCY SUPPLYING DATA Dept of the Army, CE, Tulsa District

49. DATE 11 October 1949

DEPARTMENT OF THE ARMY — CORPS OF ENGINEERS

RESERVOIR SEDIMENTATION DATA SUMMARY

Lake Texoma (Denison Dam) — NAME OF RESERVOIR

50-12a — DATA SHEET NO.

DAM

1. OWNER Dept. of Army, C. of E.	2. RIVER Red	3. STATE Texas-Oklahoma
4. SEC. - TWP. 8 S RANGE 7 E	5. NEAREST TOWN Denison, Texas	6. COUNTY Grayson, Texas / Bryan, Oklahoma
7. STREAM BED ELEV. 510.0	8. TOP OF DAM ELEV. 670.0	9. SPILLWAY CREST ELEV. 640.0

RESERVOIR

10. STORAGE ALLOCATION	11. ELEVATION TOP OF POOL	12. SURFACE AREA ACRES	13. STORAGE ACRE-FEET	14. ACCUMULATED ACRE FEET	15. DATE STORAGE BEGAN
a. FLOOD CONTROL	640.0	144,088	2,699,000	5,859,000	27 July 1942
b. POWER & c. WATER SUPPLY	617.25 (1)	95,300	1,935,000	3,156,000	(2)
d. IRRIGATION					16. DATE NORMAL OPER. BEGAN
e. CONSERVATION	590.0	47,562	1,221,000	1,221,000	15 March 1945
f. INACTIVE					

17. LENGTH OF RESERVOIR Red River 82(3) MILES — AV. WIDTH OF RESERVOIR 2 MILES

WATERSHED

18. TOTAL DRAINAGE AREA 39,719 (4) SQ. MI.	22. MEAN ANNUAL PRECIPITATION 25.77 INCHES
19. NET SEDIMENT CONTRIBUTING AREA 28,925 (4) SQ. MI.	23. MEAN ANNUAL RUNOFF 1.88 (30.8) INCHES
20. LENGTH 375 MILES AV. WIDTH 100 MILES	24. MEAN ANNUAL RUNOFF 3,987,000 (30.8) AC.-FT.
21. MAX. ELEV. 3,500 MIN. ELEV. 510	25. CLIMATIC CLASSIFICATION Subhumid

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/W RATIO AC.-FT. PER SQ. MI
July 1942			Range	80	144,088	5,859,000	
Oct. 1948	6.2	6.2	Range	80	144,088	5,718,000	
June 1954	5.7	11.9	Range	80	144,144	5,553,000	

26. DATE OF SURVEY	34. PERIOD ANNUAL PRECIPITATION	35. PERIOD WATER INFLOW ACRE-FEET a. MEAN ANNUAL	b. MAX. ANNUAL	c. PERIOD TOTAL	36. WATER INFL. TO DATE AC.-FT. a. MEAN ANNUAL	b. TOTAL TO DATE
Oct. 1948	27.06	4,531,000	7,442,000	28,092,000	4,531,000	28,092,000
June 1954	22.75	3,436,000	5,668,000	19,583,000	4,006,000	47,675,000

26. DATE OF SURVEY	37. PERIOD SEDIMENT DEPOSITS ACRE-FEET a. PERIOD TOTAL	b. AV. ANNUAL	c. PER SQ. MI.-YR	38. TOTAL SED. DEPOSITS TO DATE ACRE-FEET a. TOTAL TO DATE	b. AV. ANNUAL	c. PER SQ. MI-YR.
Oct. 1948	141,000	22,700	0.785	141,000	22,700	0.785
June 1954	165,000	29,000	1.00	306,000	25,700	0.889

26. DATE OF SURVEY	39. AV. DRY WGT. LBS. PER CU. FT.	40. SED. DEP. TONS PER SQ. MI.-YR. a. PERIOD	b. TOTAL TO DATE	41. STORAGE LOSS PCT. a. AV. ANNUAL	b. TO DATE	42. SED. INFLOW PPM a. PERIOD	b. TO DATE
Oct. 1948	52.1(53)	891	891	0.387	2.41	4190	4190
June 1954	65.4(53)	1430	1270	0.439	5.22	8830	6730

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26. DATE OF SURVEY	43. DEPTH DESIGNATION — RANGE IN FEET ABOVE, AND BELOW, CREST ELEVATION									
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN DEPTH DESIGNATION									
Oct. 1948	130-120	120-110	110-100	100-90	90-80	80-70	70-60	60-50		
	1.7	4.0	5.1	7.0	5.1	5.6	4.5	5.8		
	50-40	40-30	30-23	23-20	20-10	10-crest				
	11.7	23.9	15.6	4.6	6.6	-1.2				
June 1954	130-120	120-110	110-100	100-90	90-80	80-70	70-60	60-50		
	0.8	2.5	3.6	5.0	4.5	5.3	7.5	8.6		
	50-40	40-30	30-23	23-20	20-10	10-crest				
	17.4	23.4	10.6	3.4	6.1	1.3				

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														
	Red River Arm (Beginning at dam. Length 82 miles.)														
Oct. 1948	8.0	10.4	7.3	2.9	10.4	16.3	32.5	8.4	3.5	0.3					
June 1954	8.6	9.3	8.3	10.7	12.2	23.8	19.5	5.1	2.3	0.2					
	Washita River Arm (5) (Beginning at mouth of Washita. Length 82 miles.)														
Oct. 1948	5.9	8.2	6.1	0	27.5	35.9	17.4	4.9	-5.6	-0.3					
June 1954	4.6	8.7	6.0	2.3	41.4	21.5	10.2	4.8	0.3	0.2					

45. RANGE IN RESERVOIR OPERATION

WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW AC-FT	WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW AC.-FT
1942 (2 mo)	-	-	536,000	1950	624.4	612.7	5,668,000
1943	-	-	4,746,000	1951	626.6	610.5	4,722,000
1944	595.7	526.4	1,982,000	1952	615.9	607.6	1,508,000
1945	629.1	595.6	7,442,000	1953	608.7	601.7	1,145,000
1946	626.0	614.2	4,579,000	1954	618.8	602.3	3,335,000
1947	628.0	612.2	5,799,000	(9 mo)			
1948	619.4	611.4	3,008,000				
1949	618.4	607.4	3,205,000				

46. ELEVATION-AREA-CAPACITY DATA

ELEVATION	AREA	CAPACITY*	ELEVATION	AREA	CAPACITY*	ELEVATION	AREA	CAPACITY
520		0	590		1,106,000			
530		2,320	600		1,611,000			
540		21,150	610		2,273,000			
550		80,630	617		2,859,000			
560		213,800	620		3,142,000			
570		420,400	630		4,233,000			
580		711,200	640		5,553,000			

*Includes 22,800 acre-feet dead storage in Cumberland Pool below El.610

47. REMARKS AND REFERENCES

(1) Top of pool raised from 617.0 to 617.25 in 1953 to provide water supply storage for Denison, Texas.
(2) Date of diversion and beginning of sediment deposition.
(3) River miles. Distance from dam to upper end of Washita arm is 90 river miles.
(4) Reference "Drainage Area Data - AWR River Basins" publication dated Nov. 1954.
(5) Affected by Cumberland Oil Field protective levee, reach 40-100 incl.

48. AGENCY SUPPLYING DATA
Dept. of the Army, CE, Tulsa District

49. DATE 2 December 1955

ENG FORM 1787
1 AUG 49

RESERVOIR SEDIMENT
DATA SUMMARY

Lake Texoma (Denison Dam)
NAME OF RESERVOIR

DEPARTMENT OF THE AR
CORPS OF ENGINEERS

50-126
DATA SHEET NO.

DAM

1. OWNER Corps of Engineers	2. STREAM Red River	3. STATE Texas-Oklahoma
4. SEC. 33 TWP. 85 RANGE 7E	5. NEAREST P.O. Denison, TX	6. COUNTY Grayson-Bryan
7. LAT. 33° 49 '05 " LONG. 96 °34 ' 20 "	8. TOP OF DAM ELEVATION 670.0	9. SPILLWAY CREST ELEV. 640.0

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 BEGA
a. FLOOD CONTROL	640.0	144,088	2,703,000	5,859,000	27 July 1942
b. MULTIPLE USE					
c. POWER 1/	617.25	95,300	1,935,000	3,156,000	
d. WATER SUPPLY					15. DATE NOR MAL OPER. BEG
e. IRRIGATION					
f. CONSERVATION					January 1944
g. INACTIVE	590.0	47,562	1,221,000	1,221,000	

WATERSHED

17. LENGTH OF RESERVOIR 121 2/ MILES		AV. WIDTH OF RESERVOIR 1.9	MILE
18. TOTAL DRAINAGE AREA 33,783 3/ SQ. MI.		22. MEAN ANNUAL PRECIPITATION 17.4-38.5 5/	INCH
19. NET SEDIMENT CONTRIBUTING AREA 24,368 4/ SQ. MI.		23. MEAN ANNUAL RUNOFF (45.4 yrs) 2.05	INCH
20. LENGTH 375 MILES	AV. WIDTH 100 MILES	24. MEAN ANNUAL RUNOFF 3,691,000	AC.-F
21. MAX. ELEV. 3,500	MIN. ELEV. 510	25. ANNUAL TEMP MEAN 62 RANGE	

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/L RATIO, AC.-FT. PER AC.-F
1 Aug 1942			Range (D)	80	144088	5859000	1.587
1 Oct 1948	6.17	6.2	"	80	144088	5718000	1.549
1 Jun 1954	5.67	11.8	"	80	144144	5553000	1.504
31 Mar 1962	7.83	19.7	"	87	143300	5392900	1.461
1 Mar 1969	6.92	26.6	"	87	144000	~~5338400~~ 5312300	1.446 1.437

26. DATE OF SURVEY	34. PERIOD ANNUAL PRECIPITATION	35. PERIOD WATER INFLOW, ACRE-FEET			36. WATER INFL. TO DATE, AC.-F	
		a. MEAN ANNUAL	b. MAX. ANNUAL	c. PERIOD TOTAL	a. MEAN ANNUAL	b. TOTAL TO DA
1 Oct 1948	27.06	4,531,000	7,442,000	28,092,000	4,531,000	28,092,000
1 Jun 1954	22.75	3,436,000	5,668,000	19,583,000	4,006,000	47,675,000
31 Mar 1962	25.86	3,582,000	9,449,000	27,940,000	3,838,000	75,615,000
1 Mar 1969	~~15.8—37.4~~ 17.9 - 31.5	2,433,000	3,616,000	16,833,000	3,475,000	92,448,000

25. DATE OF SURVEY	37. PERIOD CAPACITY LOSS, ACRE-FEET			38. TOTAL SED. DEPOSITS TO DATE, ACRE-FEE		
	a. PERIOD TOTAL	b. AV. ANNUAL	c. PER SQ. MI.-YEAR	a TOTAL TO DATE	b. AV. ANNUAL	c. PER SQ. MI.-YE
1 Oct 1948	141,000	22,700	0.785	141,000	22,700	0.785
1 Jun 1954	165,000	29,000	1.000	306,000	25,700	0.889
31 Mar 1962	160,100	20,500	0.709	466,100	23,700	0.819
1 Mar 1969	54,500	7,876	0.323	520,600	19,600	0.803 6

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	
		a. PERIOD	b. TOTAL TO DATE	a. AV. ANN	b. TOT. TO DATE	a. PERIOD	b. TOT. TO DA
1 Oct 1948	52.1	891	891	0.387	2.41	4190	4190
1 Jun 1954	57.9	1261	1120	0.439	5.22	7820	5950
31 Mar 1962	62.5	965	1115	0.405	7.96	5570	6100
1 Mar 1969	65.3	628	1142	0.334	8.89	4629	5893

26. DATE OF SURVEY	43. DEPTH DESIGNATION RANGE IN FEET BELOW, AND ABOVE, CREST ELEVATION											
	130-110	110-90	90-70	70-50	50-40	40-30	30-23	23-20	20-10	10-C	C+10	+10-+20
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN DEPTH DESIGNATION											
31 Mar 1962	2.3	9.7	10.2	14.7	13.8	23.0	11.5	3.6	7.2	3.7	0.7	-0.4
	Red River Arm (Beginning at Dam - Original Length 70 miles)											
1 Mar 1969	2.26	9.06	8.96	15.86	15.95	23.59	10.42	3.19	6.22	4.14	0.73	-0.38
	Washita River Arm (Beginning at Mouth - Original Length 51 miles)											
1 Mar 1969	3.02	11.42	8.66	20.29	18.66	21.59	8.14	2.13	3.88	1.96	-0.24	0.49

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														
	Red River Arm (Beginning at Dam - Original Length 70 miles)														
	10.9	9.8	5.6	11.7	27.0	23.5	5.6	3.7	1.9	-0.4	0.7				
	Washita River Arm (Beginning at Confluence with Red River Arm- Original Length 51 miles)														
	9.4	8.9	4.9	23.0	32.2	11.6	10.5	0.3	-1.1	0.3					

45. RANGE IN RESERVOIR OPERATION

WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC.-FT.	WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC.-FT.
1942 (2 mo)	-	-	536,000	1956	620.5	600.3	1,934,000
1943	-	-	4,746,000	1957	643.2	599.9	9,449,000
1944	595.7	526.4	1,982,000	1958	620.4	612.2	3,112,000
1945	629.1	595.6	7,442,000	1959	618.4	607.5	2,090,000
1946	626.0	614.2	4,579,000	1960	620.7	613.5	3,942,000
1947	628.0	612.2	5,799,000	1961	618.4	613.2	3,419,000
1948	619.4	611.4	3,008,000	1962	619.8	612.8	3,646,000
1949	618.4	607.4	3,205,000	1963	617.1	608.1	1,825,000
1950	624.4	612.7	5,668,000	1964	608.1	600.4	1,134,100
1951	626.6	610.5	4,722,000	1965	614.7	603.9	2,337,460
1952	615.9	607.6	1,508,000	1966	617.6	609.5	2,428,570
1953	608.7	601.7	1,145,000	1967	614.4	602.2	1,894,450
1954	618.8	602.3	3,540,000	1968	622.2	607.3	3,615,560
1955	618.7	603.9	2,892,000	1969 (5 mo)	617.0	614.4	964,500

45. ELEVATION-AREA-CAPACITY DATA

ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY
Original Area-Capacity 6/ 7/			1969 Area-Capacity 6/ 8/ 9/10/			617.25	90000	2665000
510	0	0	520	0	0	620	96000	2920000
530	1545	12480	530	300	1500	630	119200	3996300
550	10400	117200	540	2380	14900	640	144000	5312000
570	26100	486900	550	7000	61800	650	170600	6835300
590	46840	1216000	560	16600	179800	660	198300	8729800
600	61309	1754000	570	22500	375300			
610	82170	2427000	580	32800	651800			
617.25	95300	3071000	590	43100	1031000			
620	101000	3340000	600	51300	1503000			
630	120900	4449000	610	69100	2105000			
640	144100	5774000						

47. REMARKS AND REFERENCES

1/ Top of power pool raised from 617.0 to 617.25 in 1953 to provide water supply storage.
2/ Length of Red River Arm from dam is 70 mi; Washita Arm from confluence is 51.
3/ Flow contributing drainage area above the dam.
4/ Sediment contributing drainage area reduced by numerous upstream projects.
5/ Based on ESSA normals for Dimmitt, Texas and Tishomingo, Oklahoma.
6/ Area of Cumberland Pool excluded below elevation 610.
7/ Excluding 85470 acre-feet dead storage in Cumberland Pool.
8/ One area of dead storage in Cumberland Pool excluded below elevation 616.
9/ Excluding all storage in Cumberland Pool below elevation 610.
10/ Excluding dead storage in Cumberland Pool below elevation 616.

48. AGENCY MAKING SURVEY Department of the Army, Corps of Engineers Tulsa District

49. AGENCY SUPPLYING DATA

50. DATE 10 December 1976

DEPARTMENT OF THE ARMY — CORPS OF ENGINEERS

RESERVOIR SEDIMENTATION DATA SUMMARY

Lake Texoma (Denison Dam) — NAME OF RESERVOIR

50-12b — DATA SHEET NO.

DAM

1. OWNER Dept. of Army, C. of E.	2. RIVER Red	3. STATE Texas - Oklahoma
4. SEC. - TWP. 8S RANGE 7E	5. NEAREST TOWN Denison, Texas	6. COUNTY Grayson, Texas / Bryan, Oklahoma
7. STREAM BED ELEV. 510.0	8. TOP OF DAM ELEV. 670.0	9. SPILLWAY CREST ELEV. 640.0

RESERVOIR

10. STORAGE ALLOCATION	11. ELEVATION TOP OF POOL	12. SURFACE AREA ACRES	13. STORAGE ACRE-FEET	14. ACCUMULATED ACRE-FEET	15. DATE STORAGE BEGAN
a. FLOOD CONTROL	640.0	144,088	2,703,000	5,859,000	27 July 1942
b. POWER	617.25 1/	95,300	1,935,000	3,156,000	
c. WATER SUPPLY					16. DATE NORMAL OPER. BEGAN
d. IRRIGATION					
e. CONSERVATION	590.0	47,562	1,221,000	1,221,000	15 March 1945
f. INACTIVE					

17. LENGTH OF RESERVOIR Red River 82 2/ MILES — AV. WIDTH OF RESERVOIR 2 MILES

WATERSHED

18. TOTAL DRAINAGE AREA	39,719 SQ. MI.	22. MEAN ANNUAL PRECIPITATION (30)	25.35 3/ INCHES
19. NET SEDIMENT CONTRIBUTING AREA	28,925 SQ. MI.	23. MEAN ANNUAL RUNOFF (38.5)	1.85 INCHES
20. LENGTH 375 MILES	AV. WIDTH 100 MILES	24. MEAN ANNUAL RUNOFF (38.5)	3,915,000 AC.-FT.
21. MAX. ELEV. 3,500	MIN. ELEV. 510	25. CLIMATIC CLASSIFICATION	Subhumid

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/W RATIO AC.-FT. PER SQ. MI
July 1942			Range	80	144,088	5,859,000	
Oct. 1948	6.2	6.2	Range	80	144,088	5,718,000	
June 1954	5.7	11.9	Range	80	144,144	5,553,000	
Mar. 1962	7.8	19.7	Range	87	143,300	5,392,900	

26. DATE OF SURVEY	34. PERIOD ANNUAL PRECIPITATION	35. PERIOD WATER INFLOW ACRE-FEET a. MEAN ANNUAL	b. MAX. ANNUAL	c. PERIOD TOTAL	36. WATER INFL. TO DATE AC.-FT. a. MEAN ANNUAL	b. TOTAL TO DATE
Oct. 1948	27.06	4,531,000	7,442,000	28,092,000	4,531,000	28,092,000
June 1954	22.75	3,436,000	5,668,000	19,583,000	4,006,000	47,675,000
Mar. 1962	25.86	3,582,000	9,449,000	27,940,000	3,838,000	75,615,000

26. DATE OF SURVEY	37. PERIOD SEDIMENT DEPOSITS ACRE-FEET a. PERIOD TOTAL	b. AV. ANNUAL	c. PER SQ. MI.-YR	38. TOTAL SED. DEPOSITS TO DATE ACRE-FEET a. TOTAL TO DATE	b. AV. ANNUAL	c. PER SQ. MI-YR.
Oct. 1948	141,000	22,700	0.785	141,000	22,700	0.785
June 1954	165,000	29,000	1.00	306,000	25,700	0.889
Mar. 1962	160,100	20,500	0.709	466,100	23,700	0.819
	(161,500	(20,700)	(0.716)	(467,500)	(23,700)	(0.819)

26. DATE OF SURVEY	39. AV. DRY WGT. LBS. PER CU. FT.	40. SED. DEP. TONS PER SQ. MI.-YR. a. PERIOD	b. TOTAL TO DATE	41. STORAGE LOSS PCT. a. AV. ANNUAL	b. TO DATE	42. SED. INFLOW PPM a. PERIOD	b. TO DATE
Oct. 1948	52.1 (53)	891	891	0.387	2.41	4190	4190
June 1954	57.9 (55)	1261	1120	0.439	5.22	7820	5950
Mar. 1962	62.5 (62)	965	1115	0.405	7.96	5740	6170
	(62.3) (62)	(971)	(1111)	(0.255)	(5.04)	(5770)	(6170)

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1 AUG 49

26. DATE OF SURVEY

43. DEPTH DESIGNATION — RANGE IN FEET ~~ABOVE~~ below AND ~~BELOW~~ above CREST ELEVATION (640.0)

PERCENT OF TOTAL SEDIMENT LOCATED WITHIN DEPTH DESIGNATION

DATE OF SURVEY	130-110	110-90	90-70	70-50	50-40	40-30	30-23	23-20	20-10	10-crest	Crest-10	10-20
Oct. 1948	5.7	12.1	10.7	10.3	11.7	23.9	15.6	4.6	6.6	-1.2	-	-
June 1954	3.3	8.6	9.8	16.1	17.4	23.4	10.6	3.4	6.1	1.3	-	-
Mar. 1962	2.3	9.7	10.2	14.7	13.8	23.0	11.5	3.6	7.2	3.7	0.7	-0.4

26. DATE OF SURVEY

44. REACH DESIGNATION — PERCENT OF TOTAL ORIGINAL LENGTH OF RESERVOIR

PERCENT OF TOTAL SEDIMENT LOCATED WITHIN REACH DESIGNATION

DATE OF SURVEY	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
	Red River Arm (Beginning at dam. Original Length 82 miles)														
Oct. 1948	8.0	10.4	7.3	2.9	10.4	16.3	32.5	8.4	3.5	0.3	-	-			
June 1954	8.6	9.3	8.3	10.7	12.2	23.8	19.5	5.1	2.3	0.2	-	-			
Mar. 1962	9.7	8.6	7.0	7.2	12.1	31.5	15.4	5.0	2.8	0.0	0.6	0.1			
	Washita River Arm 4/ (Beginning at mouth of Washita. Length 82 miles)														
Oct. 1948	5.9	8.2	6.1	0	27.5	35.9	17.4	4.9	-5.6	-0.3	-	-			
June 1954	4.6	8.7	6.0	2.3	41.4	21.5	10.2	4.8	0.3	0.2	-	-			
Mar. 1962	5.5	9.7	8.2	7.0	33.2	17.8	10.9	9.08	-0.6	-1.0	0.2	0.01	0.01		

45. RANGE IN RESERVOIR OPERATION

WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW AC-FT	WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW AC.-FT
1942-1945 5/	629.1	526.4	14,706,000	1954	618.8	602.3	3,540,000
1946	626.0	614.2	4,579,000	1955	618.7	604.0	2,892,000
1947	628.0	612.2	5,799,000	1956	620.5	600.5	1,934,000
1948	619.4	611.4	3,008,000	1957	643.2	600.0	9,449,000
1949	618.4	607.4	3,205,000	1958	620.4	612.2	3,112,000
1950	624.4	612.7	5,668,000	1959	618.4	607.5	2,090,000
1951	626.6	610.5	4,722,000	1960	620.7	613.9	3,942,000
1952	615.9	607.6	1,508,000	1961	618.4	613.2	3,419,000
1953	608.7	601.7	1,145,000	6/1962	617.2	613.3	986,000

46. ELEVATION-AREA-CAPACITY DATA

ELEVATION	AREA	CAPACITY 7/	ELEVATION	AREA	CAPACITY 7/	ELEVATION	AREA	CAPACITY 7/
520	0	0	580	33,300	661,200	630	119,000	4,086,200
530	500	1,480	590	44,100	1,049,200	640	143,300	5,392,900
540	2,500	15,990	600	54,620	1,542,800	650	170,700	6,968,600
550	7,200	60,910	610	72,200	2,167,900	660	198,000	8,812,500
560	16,890	184,000	617	89,000	2,733,300			
570	23,000	383,300	620	96,000	3,010,500			

47. REMARKS AND REFERENCES - 1/ Top of Pool raised from 617.0 to 617.25 in 1953 to provide water supply storage for Denison, Texas.

2/ Distance from dam to upper end of Washita arm is 90 river miles.

3/ Climates of the States, published January and February 1960, mean precipitation 1931-1955 except WB stations or 'normals' based on period 1921-50.

4/ Affected by Cumberland Oil Field protective levee, reach 40-100 incl.

5/ Two months 1942=536,000 A.F.; 1943=4,746,000 A.F.; 1944=1,982,000 A.F.; 1945=7,442,000 A.F.; see report of June 1954 Resurvey.

6/ For first six months of water year.

7/ Includes 11,000 acre-feet dead storage in Cumberland Pool below elevation 610.

48. AGENCY SUPPLYING DATA
Dept. of the Army, C. E., Tulsa District

49. DATE 27 March 1964

ENG FORM 1787
1 AUG 49

RESERVOIR SEDIMENT
DATA SUMMARY

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

LAKE TEXOMA (DENISON DAM)
NAME OF RESERVOIR

50-12d
DATA SHEET NO.

DAM

1. OWNER Corps of Engineers	2. STREAM Red River	3. STATE Texas-Oklahoma
4. SEC. 33 TWP. 85 RANGE 7E	5. NEAREST P.O. Denison, TX	6. COUNTY Grayson-Bryan
7. LAT. 33° 49' 05" LONG. 96°34' 20"	8. TOP OF DAM ELEVATION 670.0	9. SPILLWAY CREST ELEV. 640.0

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	640.0	144,088	2,703,000	5,859,000	27 July 1942
b. MULTIPLE USE					
c. POWER 1/	617.25	95,300	1,935,000	3,156,000	16. DATE NORMAL OPER. BEGAN
d. WATER SUPPLY					
e. IRRIGATION					
f. CONSERVATION					January 1944
g. INACTIVE	590.0	47,562	1,221,000	1,221,000	

17. LENGTH OF RESERVOIR 121 2/ MILES — AV. WIDTH OF RESERVOIR 1.9 MILES

WATERSHED

18. TOTAL DRAINAGE AREA 33 783 3/ SQ. MI.		22. MEAN ANNUAL PRECIPITATION (30 Yr) 26.74 INCHES	
19. NET SEDIMENT CONTRIBUTING AREA 24,368 4/ SQ. MI.		23. MEAN ANNUAL RUNOFF (79 Yrs) 2.19 INCHES	
20. LENGTH 375 MILES	AV. WIDTH 100 MILES	24. MEAN ANNUAL RUNOFF 3,949,905 (79 Yrs) AC.-FT.	
21. MAX. ELEV. 3,500	MIN. ELEV. 510	25. ANNUAL TEMP. MEAN 60°F RANGE 111° to -9°F	

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 Aug 1942			Range (D)	80	144088	5859000	1.587
1 Oct 1948	6.17	6.2	"	80	144088	5718000	1.549
1 Jun 1954	5.67	11.8	"	80	144144	5553000	1.504
31 Mar 1962	7.83	19.7	"	87	143300	5392900	1.461
1 Mar 1969	6.92	26.6	"	87	144000	5338400	1.446
7/ 1 Jul 1985	16.25	42.9	" (D)	80	141418	5194163	1.315

26. DATE OF SURVEY	34. PERIOD ANNUAL PRECIPITATION	35. PERIOD WATER INFLOW, ACRE-FEET			36. WATER INFL. TO DATE, AC.-FT.	
		a. MEAN ANNUAL	b. MAX. ANNUAL	c. PERIOD TOTAL	a. MEAN ANNUAL	b. TOTAL TO DATE
1 Oct 1948	27.06	4,531,000	7,442,000	28,092,000	4,531,000	28,092,000
1 Jun 1954	22.75	3,436,000	5,668,000	19,583,000	4,006,000	47,675,000
31 Mar 1962	25.86	3,582,000	9,449,000	27,940,000	3,838,000	75,615,000
1 Mar 1969	15.8 - 37.4	2,433,000	3,616,000	16,833,000	3,475,000	92,448,000
7/ 1 Jul 1985	17.6 - 42.1	3,457,680	8,245,320	56,187,340	3,464,690	148,635,340

26. DATE OF SURVEY	37. PERIOD CAPACITY LOSS, ACRE-FEET			38. TOTAL SED. DEPOSITS TO DATE, ACRE-FEET		
	a. PERIOD TOTAL	b. AV. ANNUAL	c. PER SQ. MI.-YEAR	a. TOTAL TO DATE	b. AV. ANNUAL	c. PER SQ. MI.-YEAR
1 Oct 1948	141,000	22,700	0.785	141,000	22,700	0.785
1 Jun 1954	165,000	29,000	1.000	306,000	25,700	0.889
31 Mar 1962	160,100	20,500	0.709	466,100	23,700	0.819
6/ 1 Mar 1969	54,500	7,876	0.323	520,600	19,600	0.803
7/ 1 Jul 1985	156,836	9,651	0.396	727,217	16,951	0.696

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	
		a. PERIOD	b. TOTAL TO DATE	a. AV. ANN.	b. TOT. TO DATE	a. PERIOD	b. TOT. TO DATE
1 Oct 1948	52.1	891	891	0.387	2.41	4190	4190
1 Jun 1954	57.9	1261	1120	0.439	5.22	7820	5950
31 Mar 1962	62.5	965	1115	0.405	7.96	5570	6100
6/ 1 Mar 1969	65.3	628	1142	0.334	8.89	4629	5893
7/ 1 Jul 1985	74.6	935	1131	0.286	12.28	4849	5849

ENG FORM 1787 NOV 66 PREVIOUS EDITIONS ARE OBSOLETE.

26. DATE OF SURVEY	43. DEPTH DESIGNATION RANGE IN FEET BELOW, AND ABOVE, CREST ELEVATION											
	130-110	110-90	90-70	70-50	50-40	40-30	30-23	23-20	20-10	10-C	C+10	+10-20
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN DEPTH DESIGNATION											
31 Mar 1962	2.3	9.7	10.2	14.7	13.8	23.0	11.5	3.6	7.2	3.7	0.7	-0.4
Red River Arm 2/												
1 Mar 1969	2.26	9.06	8.96	15.86	15.95	23.59	10.42	3.19	6.22	4.14	0.73	-0.38
7/ 1 Jul 1985	1.70	6.05	9.70	14.84	12.23	22.89	14.18	3.43	9.04	5.94	2.65	
Washita River Arm 2/												
1 Mar 1969	3.02	11.42	8.66	20.29	18.66	21.59	8.14	2.13	3.88	1.96	-0.24	0.49
7/ 1 Jul 1985	1.70	6.06	9.69	14.85	12.22	22.90	14.17	3.44	9.04	5.93	2.67	

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														
Red River Arm 2/															
1 Mar 1969	10.9	9.8	5.6	11.7	27.0	23.5	5.6	3.7	1.9	-0.4	0.7				
7/ 1 Jul 1985	4.9	5.4	3.6	5.9	19.0	15.6	2.8	1.9	0.9	0.1	0				
Washita River Arm 2/															
1 Mar 1969	9.4	8.9	4.9	23.0	32.3	11.6	10.2	0.3	-1.1	0.3					
7/ 1 Jul 1985	2.6	3.5	2.9	9.2	12.9	4.1	4.4	0.2	0.1	0					

45. RANGE IN RESERVOIR OPERATION

WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC.-FT.	WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC.-FT.
SEE ATTACHED TABLES							

46. ELEVATION-AREA-CAPACITY DATA

ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY
SEE ATTACHED TABLES								

47. REMARKS AND REFERENCES

1/ Top of power pool raised from 617.0 to 617.25 in 1953 to provide water supply storage.

2/ Length of Red River Arm from dam is 70 mi; Washita Arm from confluence is 51 mi.

3/ Flow contributing drainage area above the dam.

4/ Sediment contributing drainage area reduced by numerous upstream projects.

5/ Based on ESSA normals for Dimmitt, Texas and Tishomingo, Oklahoma.

6/ Area of Cumberland Pool excluded below elevation 610.

7/ The 1985 resurvey elevation-area-capacity data was computed using the segmental surface areas vs profile widths method. Data shown for the 1985 resurvey in Items 37, 38, 40, 41 and 46 are based on this computational method.

48. AGENCY MAKING SURVEY U.S. Army, Corps of Engineers, Tulsa District

49. AGENCY SUPPLYING DATA USAED, Tulsa

50. DATE 9 July 1990

LAKE TEXOMA 50-12d

ITEM 45

WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC.FT
1942 (2mo)	-	-	536,000
1943	-	-	4,746,000
1944	595.7	526.4	1,982.000
1945	629.1	595.6	7,442,000
1946	626.0	614.2	4,579,000
1947	628.0	612.2	3,799,000
1948	619.4	611.4	3,008,000
1949	618.4	607.4	3,205,000
1950	624.4	612.7	5,668,000
1951	626.6	610.5	4,722,000
1952	615.9	607.6	1,508,000
1953	608.7	601.7	1,145,000
1954	618.8	602.3	3,540,000
1955	618.7	603.9	2,892,000
1956	620.5	600.3	1,934,000
1957	643.2	599.9	9,449,000
1958	620.4	612.2	3,112,000
1959	618.4	607.5	2,090,000
1960	620.7	613.5	3,942,000
1961	618.4	613.2	3,419,000
1962	619.8	612.8	3,646,000
1963	617.1	608.1	1,825,000
1964	608.1	600.4	1,134,200
1965	614.7	603.9	2,337,370
1966	617.6	609.5	2,428,370
1967	614.4	602.2	1,894,450
1968	622.2	607.3	3,615,560
1969	620.7	613.1	3,755,270
1970	616.7	609.3	1,897,770
1971	617.1	608.8	1,507,580
1972	617.8	609.4	1,704,860
1973	623.9	608.2	5,745,990
1974	622.1	613.9	3,935,390
1975	623.1	616.2	6,777,770
1976	617.7	612.2	1,934,210
1977	619.9	609.7	3,128,790
1978	619.9	609.4	2,103,450
1979	620.4	610.0	2,477,700
1980	619.3	611.1	1,730,750
1981	620.7	611.4	2,101,900
1982	632.1	611.2	8,245,320
1983	619.5	612.3	2,228,790
1984	620.9	610.6	3,080,310
1985 (9 mo)	625.0	610.6	6,795,990

ITEM 46 7/ LAKE TEXOMA 50-12d

1942 ORIGINAL

Elevation	Area	Capacity
511	0	0
520	593	2,873
530	1,484	13,066
540	4,434	45,777
550	10,587	115,330
560	18,771	274,884
570	25,997	499,374
580	36,847	819,914
590	47,556	1,245,010
600	64,945	1,804,120
610	82,250	2,546,880
617.25	96,590	3,197,980
620	101,751	3,470,250
630	122,309	4,588,610
640	144,265	5,921,380
650	164,148	7,468,500

1969 RESURVEY

Elevation	Area	Capacity
524	0	0
530	292	725
540	2,418	14,786
550	7,402	55,829
560	16,539	183,264
570	23,091	381,564
580	32,217	654,108
590	42,887	1,035,910
600	53,943	1,509,780
610	71,047	2,119,660
617.25	89,874	2,710,920
620	96,330	2,966,600
630	118,294	4,404,110
640	143,093	5,351,000
650	163,350	6,890,720

1985 RESURVEY

Elevation	Area	Capacity
526	0	0
530	424	731
540	2,633	16,453
550	7,106	58,936
560	15,592	179,300
570	22,471	372,482
580	31,505	639,884
590	42,787	1,010,170
600	51,703	1,480,370
610	65,713	2,056,620
617.25	87,533	2,602,430
620	94,174	2,851,940
630	116,568	3,904,570
640	141,418	5,194,163
650	162,478	6,721,930