[illegible]-CWE-Z (6 Jul 73) 2nd Ind
SUBJECT: Carlyle Lake, Kaskaskia River, Illinois, Report on Sedimentation, 1971 Resurvey

DA, Office of the Chief of Engineers, Washington, D. C. 20314 15 Nov 73

TO: Division Engineer, Lower Mississippi Valley

The subject report is approved.

FOR THE CHIEF OF ENGINEERS:

[illegible] Incl

ROBERT [illegible] LITTLE
Chief, Engineering Division
Directorate of Civil Works

[illegible] (6 Jul 73) 3d Ind

[illegible] Mississippi Valley Division, Corps of Engineers, Vicksburg, [illegible]

[illegible] District Engineer, St. Louis, [illegible]

[illegible]

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
210 NORTH 12TH STREET
ST. LOUIS, MISSOURI 63101

IN REPLY REFER TO

LMSED-HD

6 July 1973

SUBJECT: Carlyle Lake, Kaskaskia River, Illinois, Report of Sedimentation, 1971 Resurvey

Division Engineer, Lower Mississippi Valley
ATTN: LMVED-H

Inclosed subject report, prepared in compliance with EM 1110-2-4036, is submitted for your review and approval.

FOR THE DISTRICT ENGINEER:

JACK R. NIEHI
Acting Chief, Engineering Division

1 incl (6 cys)
As

LMVED-H (CIL 6 Jul 73) 1st Ind

DA, Lower Mississippi Valley Division, Corps of Engineers, Vicksburg, Miss. 39180 18 Sep 73

TO: DIV ENGR (DAEN-CWE-Y) WASH DC 20314

Approval is recommended.

FOR THE DIVISION ENGINEER:

Richard L. Boudreaux
RICHARD L. BOUDREAUX
Acting Chief, Engineering Division

1 incl (Page)
As

REPORT ON RESURVEY OF SEDIMENTATION
CARLYLE RESERVOIR
KASKASKIA RIVER, ILLINOIS
1971

TABLE OF CONTENTS

LIST OF PLATES

PERTINENT DATA SUMMARY
CARLYLE LAKE

ITEM	UNIT		
DRAINAGE AREA	sq. mi.	2,680	
INACTIVE STORAGE POOL			
Elevation	m.s.l.	429.5	
Area	acres	7,100	
Storage	acre-feet	50,000	
Storage (runoff)	inches	0.35	
JOINT USE POOL			
Elevation	m.s.l.	429.5 - 445.0	
Area	acres	24,580	(76,000)
Storage	acre-feet	233,000	
Storage (runoff)	inches	1.63	
Regulated Outflow (min)	c.f.s.	50	
Regulated Outflow (max)	c.f.s.	4000	(7,000)
FLOOD CONTROL POOL			
Elevation	m.s.l.	445.0 - 462.5	
Area	acres	58,440	(57,500)
Storage	acre-feet	699,900	(700,000)
Storage (runoff)	inches	4.89	
Regulated Outflow (min)	c.f.s.	50	
Regulated Outflow (max)	c.f.s.	10,000	(7,000)
INDUCED SURCHARGE			
Elevation	m.s.l.	462.5 - 465.5	
Area	acres	65,000	
Storage	acre-feet	184,000	
Storage (runoff)	inches	1.29	
Outflow (max)	c.f.s.	149,000	
SURCHARGE POOL (TOTAL)			
Elevation	m.s.l.	462.5 - 467.2	
Area	acres	69,400	
Storage	acre-feet	304,000	
Storage (runoff)	inches	2.13	
Outflow (max)	c.f.s.	160,000	
FREEBOARD			
Elevation	m.s.l.	467.2 - 472.0	
Area	acres	111,600	82,000
Storage	acre-feet	409,000	388,000
Storage (runoff)	inches	2.71	
Height	feet	4.8	

REPORT ON RESURVEY OF SEDIMENTATION
CARLYLE RESERVOIR
KASKASKIA RIVER, ILLINOIS

1. INTRODUCTION.

This report is prepared according to instructions in EM 1110-2-4001, dated 29 December 1958. It presents the results of the resurvey of sediment ranges in Carlyle Reservoir and downstream retrogression ranges on the Kaskaskia River below Carlyle Reservoir. Initial operation began on 1 April 1967. The dam was completed June 1967. The purpose of the investigation was to obtain information on the amount and distribution of sediment in the reservoir and on the rate of depletion of storage.

2. LOCATION.

Carlyle Dam is located on the Kaskaskia River in Clinton County, Illinois, about 1 mile upstream of the town of Carlyle, Illinois, approximately 100 miles above the mouth of the Kaskaskia River. Carlyle Reservoir drains an area of 2,680 square miles, or about 46 percent of the total basin. The Kaskaskia River Basin is shown on Plate 1.

3. PURPOSE OF RESERVOIR.

Carlyle Reservoir is part of the Kaskaskia River Basin development plan which provides for project purposes of flood control, water supply, storage for navigation releases, recreation, and fish and wildlife conservation. Carlyle Reservoir is operated jointly with the other projects on the Kaskaskia River Basin.

4. RESERVOIR PERTINENT DATA - DAM AND APPURTENANT STRUCTURES.

The Pertinent Data Section contains pertinent information concerning the dam, outlet, and spillway structures and the elevations, areas, and capacities of the inactive joint-use, flood control, induced surcharge, and total surcharge pools.

5. WATERSHED CHARACTERISTICS.

The watershed has a total area of 2,680 square miles. The reservoir occupies about 90 square miles of this area at the top of the flood control pool EL. 462.5 m.s.l. The watershed has a median length of about 120 miles, an extreme width of 57 miles and an average width of about 30 miles. The course of the river is generally tortuous with many oxbow bends. The topography of the basin is generally flat or gently rolling, except for broken terrain near the stream.

of observing sediment distribution and the approximate rate of reservoir storage depletion. Plate 4 shows the locations of the pool sediment ranges. The cross section of the ranges are shown on Plates 5 to 13.

12. TYPE AND SCOPE OF 1971 SEDIMENT RESURVEY.

Detailed sediment surveys of the nine sediment ranges by direct leveling and by a Ratheon Recording Depth Sounder, Model EE-119 were made during the period of May - August 1971. The reservoir pool had an average elevation of about 443.0 feet, m.s.l. during the measurements.

AVE ELEV. 443.0 ft.

NOTE: Range 7c and 9c surveyed May 1961.

13. METHOD OF SEDIMENT COMPUTATIONS.

The prismoidal formula was used to compute the volume of sediment deposited. For further information on this method of computation, see USDA technical Bulletin No. 524, "Silting of Reservoirs" P 158-161.

14. SEDIMENT QUANTITIES AND RESERVOIR LIFE.

Table 3

Table 3 shows summaries of the area changes of each sediment range along with the volume of sediment deposited between each range and in the entire reservoir. Calculations of initial sedimentation show about 10% filling of the inactive storage of Carlyle Lake in the 4.3 year period between the dates of initial operation in April 1967 and the first hydrographic survey of the lake in 1971. At this rate of deposition, the inactive storage would be completely filled with sediment in about 45 years. The computed rate of sediment deposition for the initial period of reservoir operation was 1186 acre ft. per year.

These results compare favorably with the value of 820 Ac Ft/year which was the expected yearly sedimentation rate computed before the operation of the project. At this present rate of deposition the inactive storage pool would be filled in 45 years. It is expected that the long term rate of sedimentation would be lower than the initial rate so that the time of filling the inactive storage pool would probably be longer than that based on that initial rate.

15. TRAP EFFICIENCY OF THE RESERVOIR.

For the initial period of operation of Carlyle Lake the trap efficiency was found to be 95%. This computation was based on the method of Gunnar M. Brune as presented in transaction of the American Geophysical Union Volume 34, Number 3, June 1953.

16. DOWNSTREAM CHANNEL AND RESERVOIR OPERATION.

The course of the river downstream from Carlyle Dam is tortuous

TABLE NO. 1

MONTHLY PRECIPITATION AND RUNOFF
OVER DRAINAGE AREA ABOVE CARLYLE GAGE
(1966-1971)

Month	Maximum Rainfall (Inches)	Minimum Rainfall (Inches)	Average Rainfall (Inches)	Average Runoff (Inches)	Average Runoff (Percent)
January	4.57	.44	1.94	.81	41.7
February	3.45	.97	1.84	1.66	90.2
March	3.54	1.46	2.18	.92	42.2
April	8.48	.64	4.41	1.61	36.5
May	6.97	2.23	4.20	1.29	30.7
June	5.46	1.54	3.54	1.00	28.2
July	7.41	1.49	4.46	.59	13.2
August	4.97	.57	2.31	.27	11.6
September	6.72	1.92	4.15	.13	43.1
October	5.27	.65	2.66	.29	10.9
November	5.69	1.03	2.65	.19	7.1
December	7.21	1.06	3.84	1.56	40.6
Annual	42.22	35.12	38.18	10.32	27.0

TABLE NO. 2

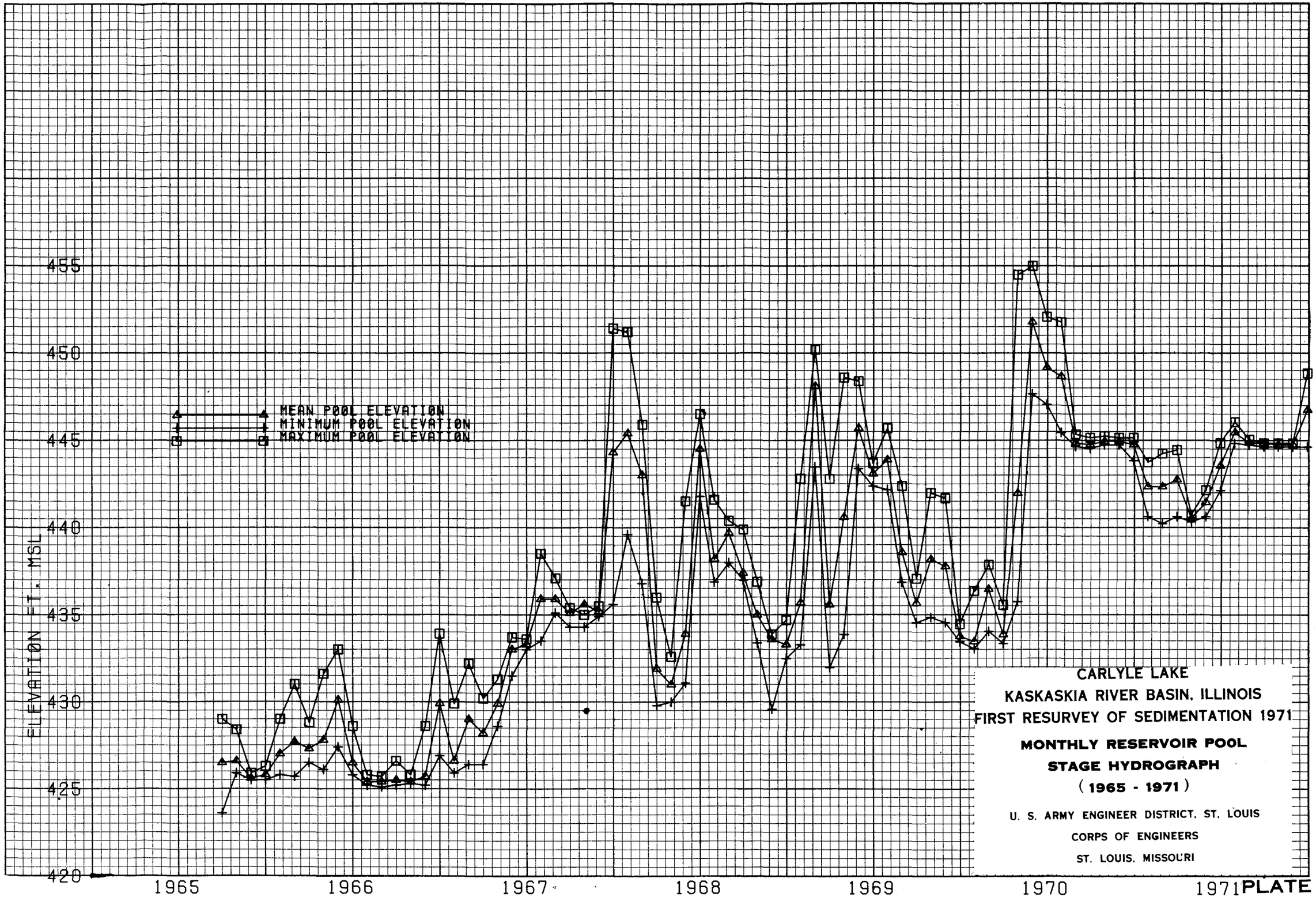
ANNUAL PRECIPITATION
AND RUNOFF FOR DRAINAGE AREA
ABOVE CARLYLE GAGE
1966-1971

Year	Rainfall (Inches)	Runoff (Inches)	Runoff (Percent)	Average Daily Runoff (CFS)
1966	36.08	9.31	25.8	1838
1967	41.26	13.17	31.9	2599
1968	37.37	9.59	25.6	1894
1969	42.22	13.15	31.1	2595
1970	37.03	10.82	29.2	2137
1971	35.12	5.85	16.6	1156
Average	38.18	10.32	27.0	2036
Maximum	42.22	13.17	31.9	2599
Minimum	35.12	5.85	16.65	1156

TABLE NO. 3

TABULATION OF AREA AND VOLUME
CHANGES IN CARLYLE LAKE

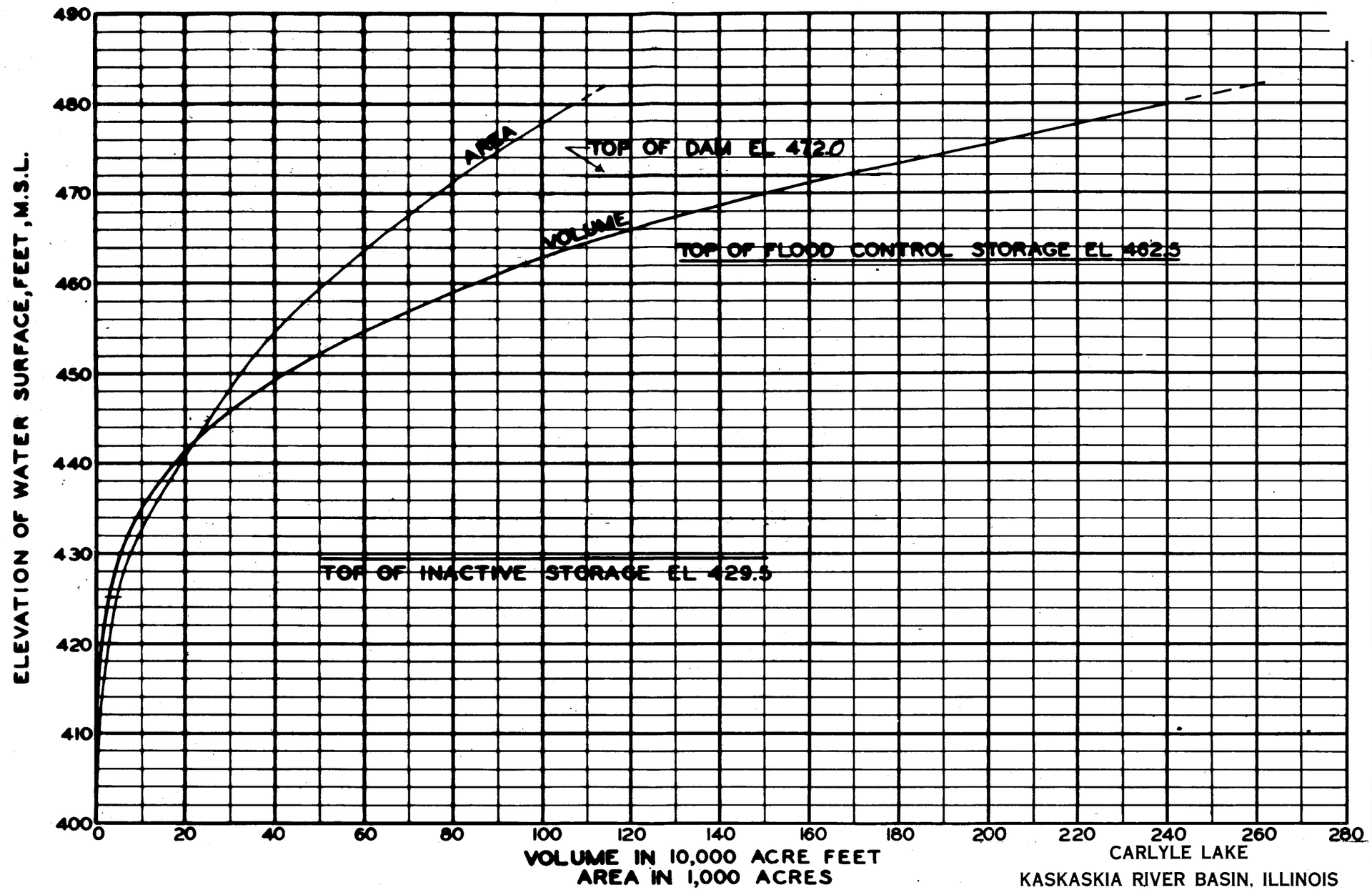
Dam	Area Change Range (Ft)		Volume Sediment Deposited Ac Ft
			320
1A	2666		
			258
2A	879		
			143
3A	519		
			2236
4A	9749		
			1853
7A	214		
			216
9A	761		
			166
Top of Res			
			-114
8B	-567	Volume	
		deposited	- 90
6B	-420	to top of	
		tributary	+111
5B	456	streams	
		Total	5100 Ac Ft



CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971

MONTHLY RESERVOIR POOL STAGE HYDROGRAPH
(1965 - 1971)

U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI



CARLYLE LAKE

KASKASKIA RIVER BASIN, ILLINOIS

FIRST RESURVEY OF SEDIMENTATION 1971

RESERVOIR AREA AND VOLUME CURVES

U. S. ARMY ENGINEER DISTRICT, ST. LOUIS

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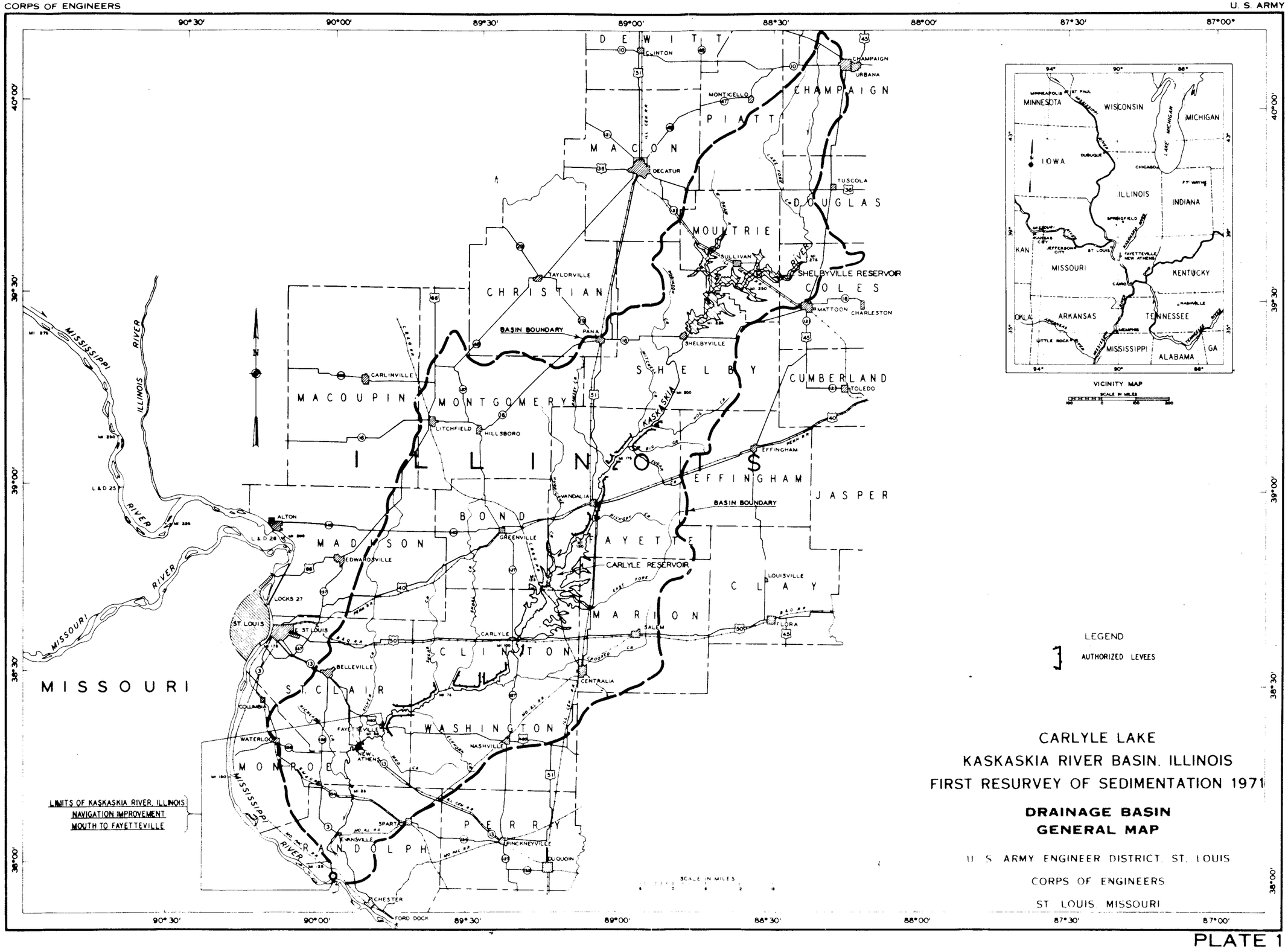
CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971
DRAINAGE BASIN
GENERAL MAP
U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI
LEGEND
AUTHORIZED LEVEES
VICINITY MAP
SCALE IN MILES
BASIN BOUNDARY
SHELBYVILLE RESERVOIR
CARLYLE RESERVOIR
LIMITS OF KASKASKIA RIVER, ILLINOIS
NAVIGATION IMPROVEMENT
MOUTH TO FAYETTEVILLE
MISSISSIPPI RIVER
ILLINOIS RIVER
MISSOURI RIVER
KASKASKIA
ILLINOIS
MISSOURI
DEWITT
CHAMPAIGN
PIATT
MACON
DOUGLAS
MOULTRIE
CHRISTIAN
COLES
SHELBY
CUMBERLAND
MACOUPIN
MONTGOMERY
EFFINGHAM
JASPER
BOND
FAYETTE
MADISON
CLAY
MARION
CLINTON
ST. CLAIR
WASHINGTON
MONROE
PERRY
RANDOLPH
DECATUR
CHAMPAIGN
URBANA
MONTICELLO
TUSCOLA
SULLIVAN
MATTOON
CHARLESTON
TAYLORVILLE
PANA
SHELBYVILLE
CARLINVILLE
LITCHFIELD
HILLSBORO
TOLEDO
EFFINGHAM
VANDALIA
GREENVILLE
ALTON
EDWARDSVILLE
LOCKS 27
ST. LOUIS
CARLYLE
SALEM
LOUISVILLE
FLORA
BELLEVILLE
CENTRALIA
COLUMBIA
WATERLOO
FAYETTEVILLE
NEW ATHENS
NASHVILLE
SPARTA
EVANSVILLE
PINCKNEYVILLE
DUQUOIN
CHESTER
FORD DOCK
L&D 25
L&D 26
MINNESOTA
WISCONSIN
MICHIGAN
IOWA
ILLINOIS
INDIANA
MISSOURI
KENTUCKY
KAN
OKLA
ARKANSAS
TENNESSEE
MISSISSIPPI
ALABAMA
GA
MINNEAPOLIS
ST. PAUL
DUBUQUE
CHICAGO
FT. WAYNE
SPRINGFIELD
KANSAS CITY
JEFFERSON CITY
ST. LOUIS
FAYETTEVILLE
NEW ATHENS
CAIRO
NASHVILLE
MEMPHIS
LITTLE ROCK
LAKE MICHIGAN
90° 30'
90° 00'
89° 30'
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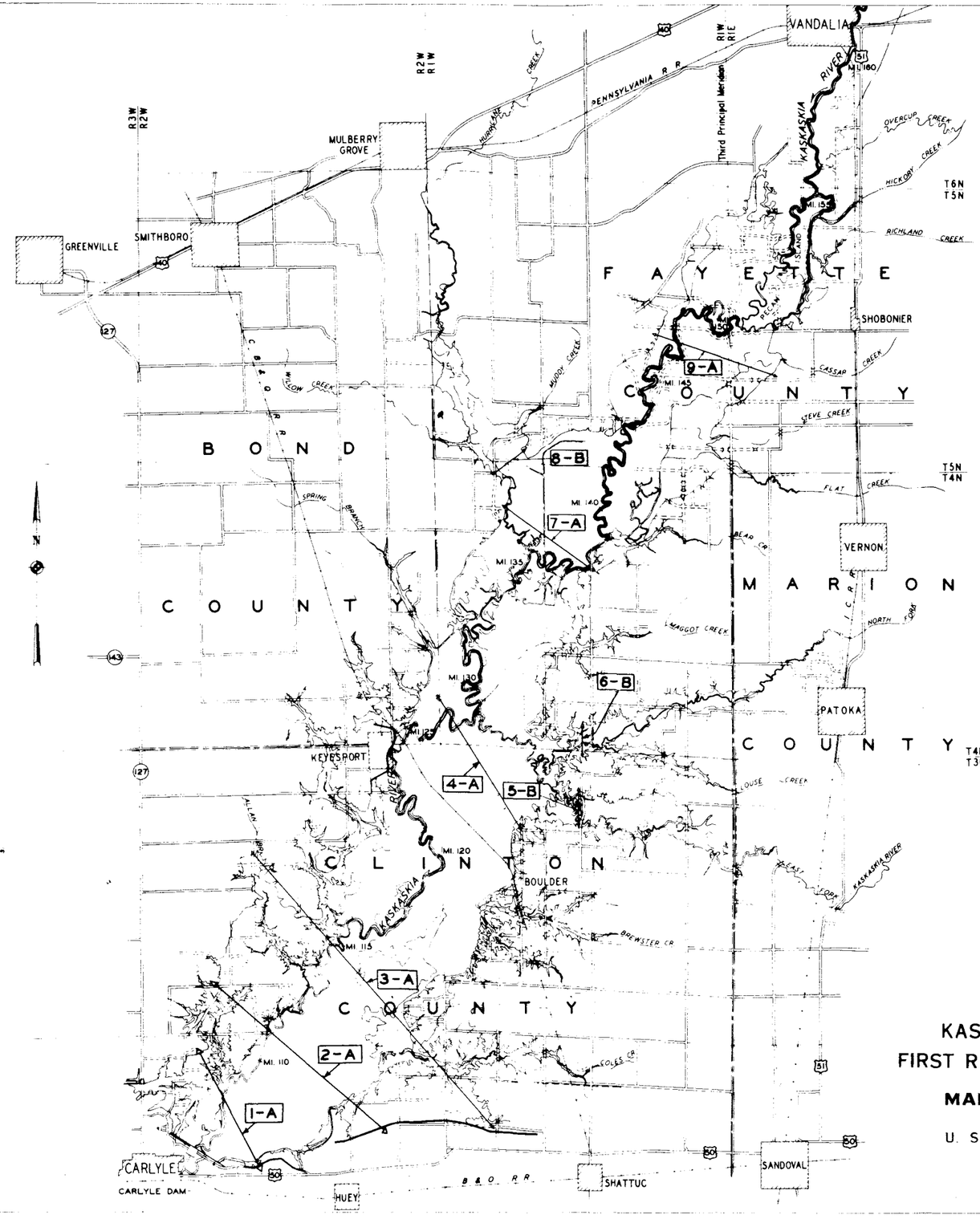
38° 30'
38° 00'



VICINITY MAP
SCALE IN MILES
50 0 50 100

CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971

MAP. POOL SEDIMENT RANGES

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CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971
SEDIMENT RANGE 1A
U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
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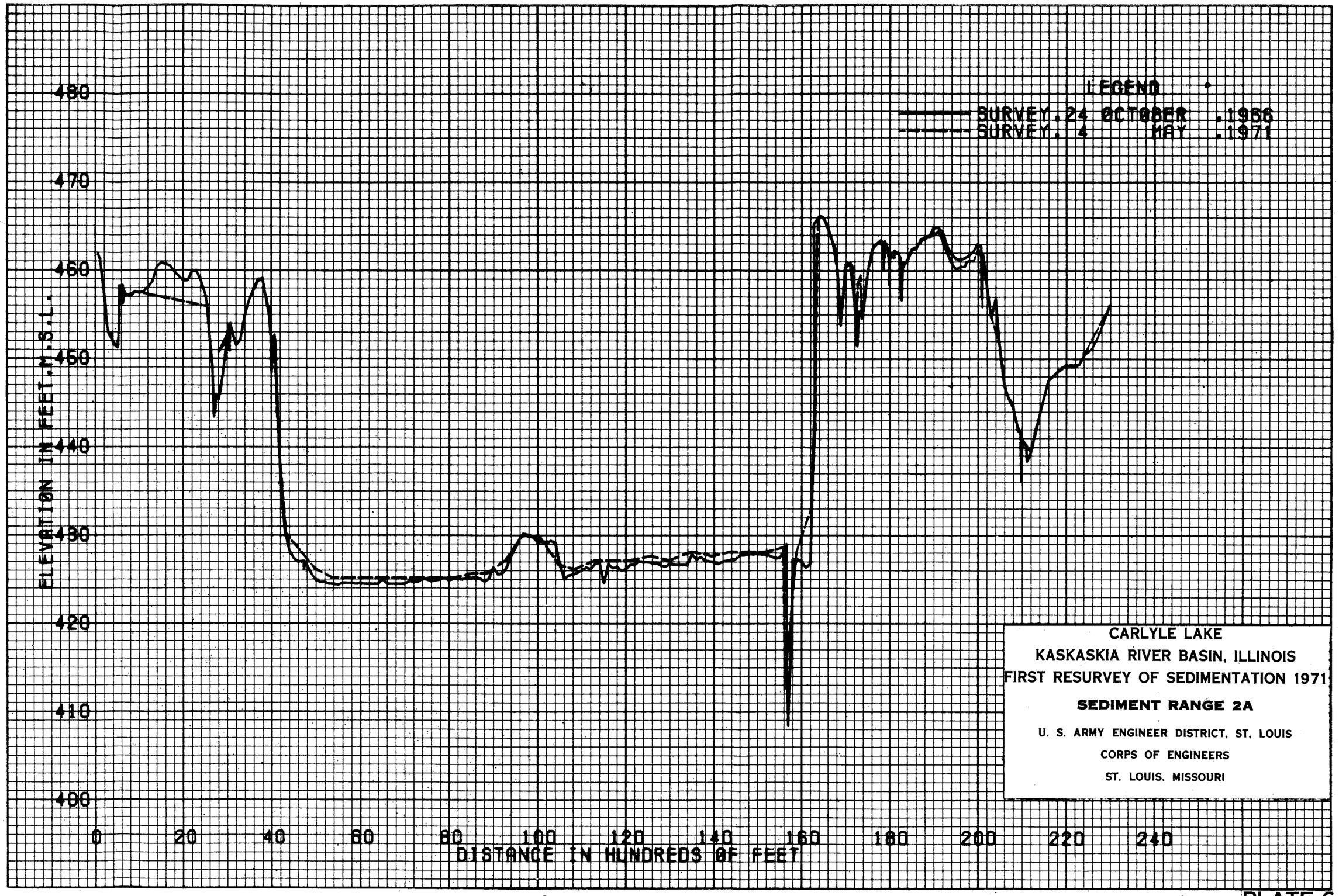

CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971

SEDIMENT RANGE 2A

U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
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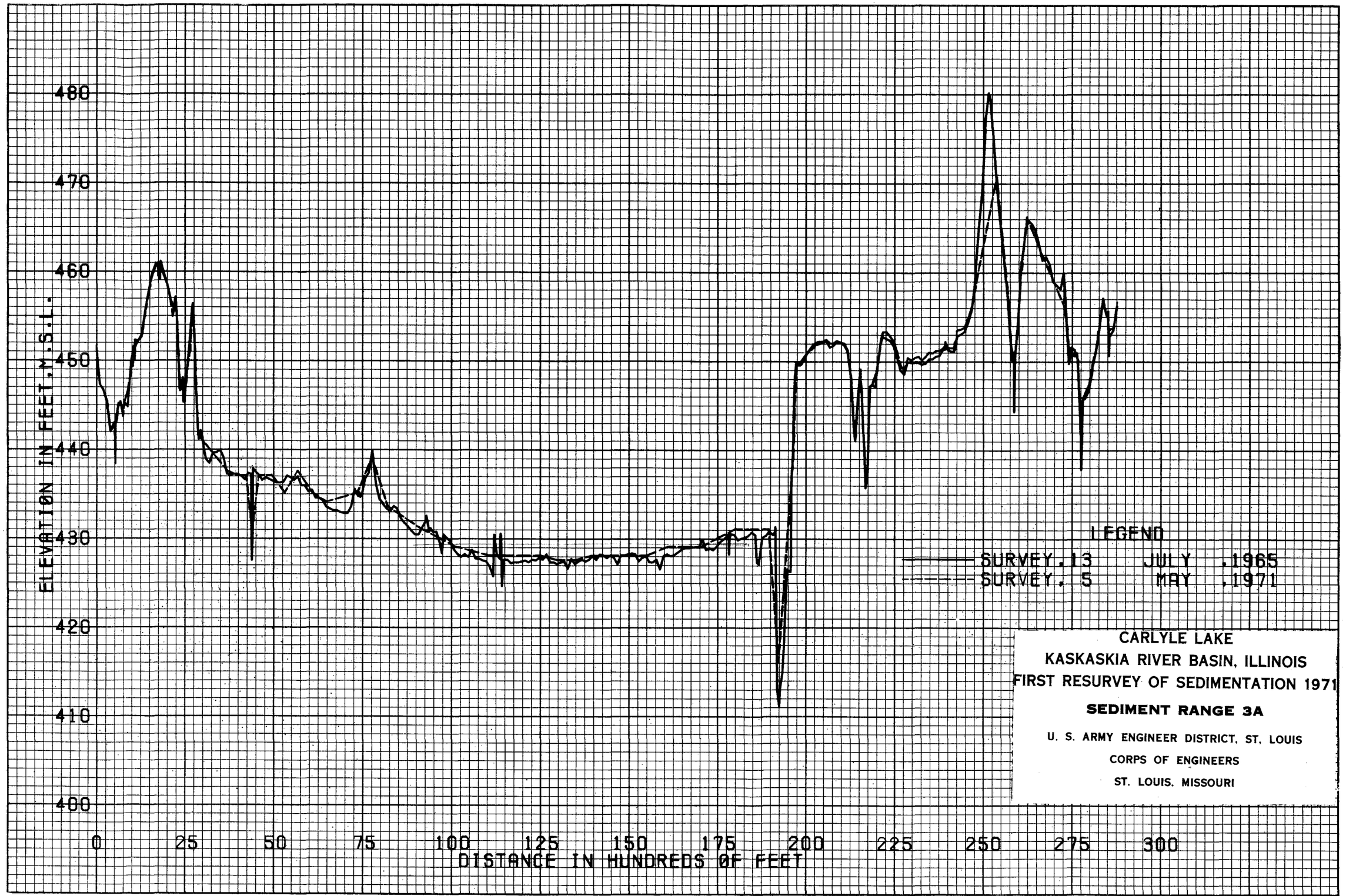

CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971

SEDIMENT RANGE 3A

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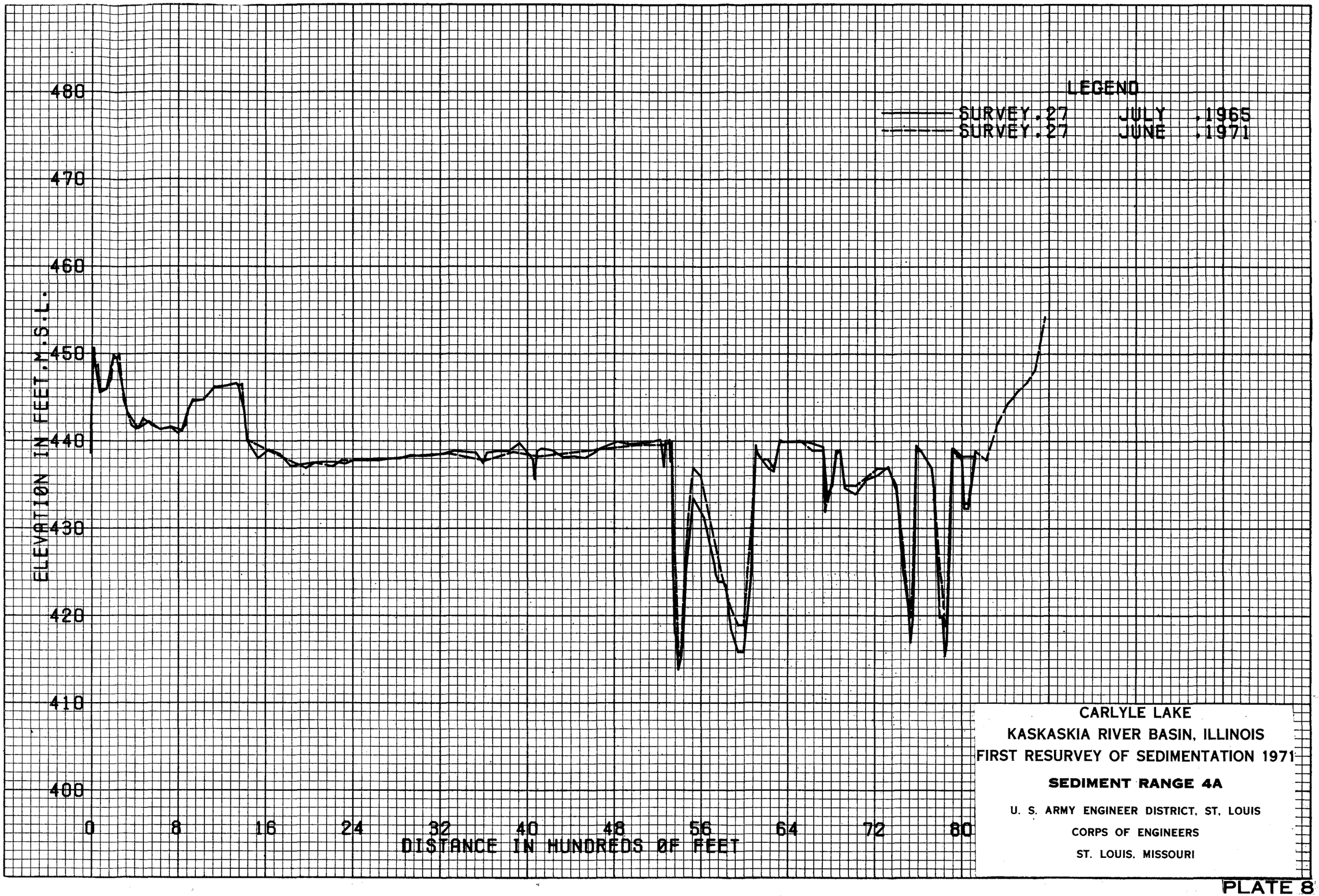

CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971

SEDIMENT RANGE 4A

U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
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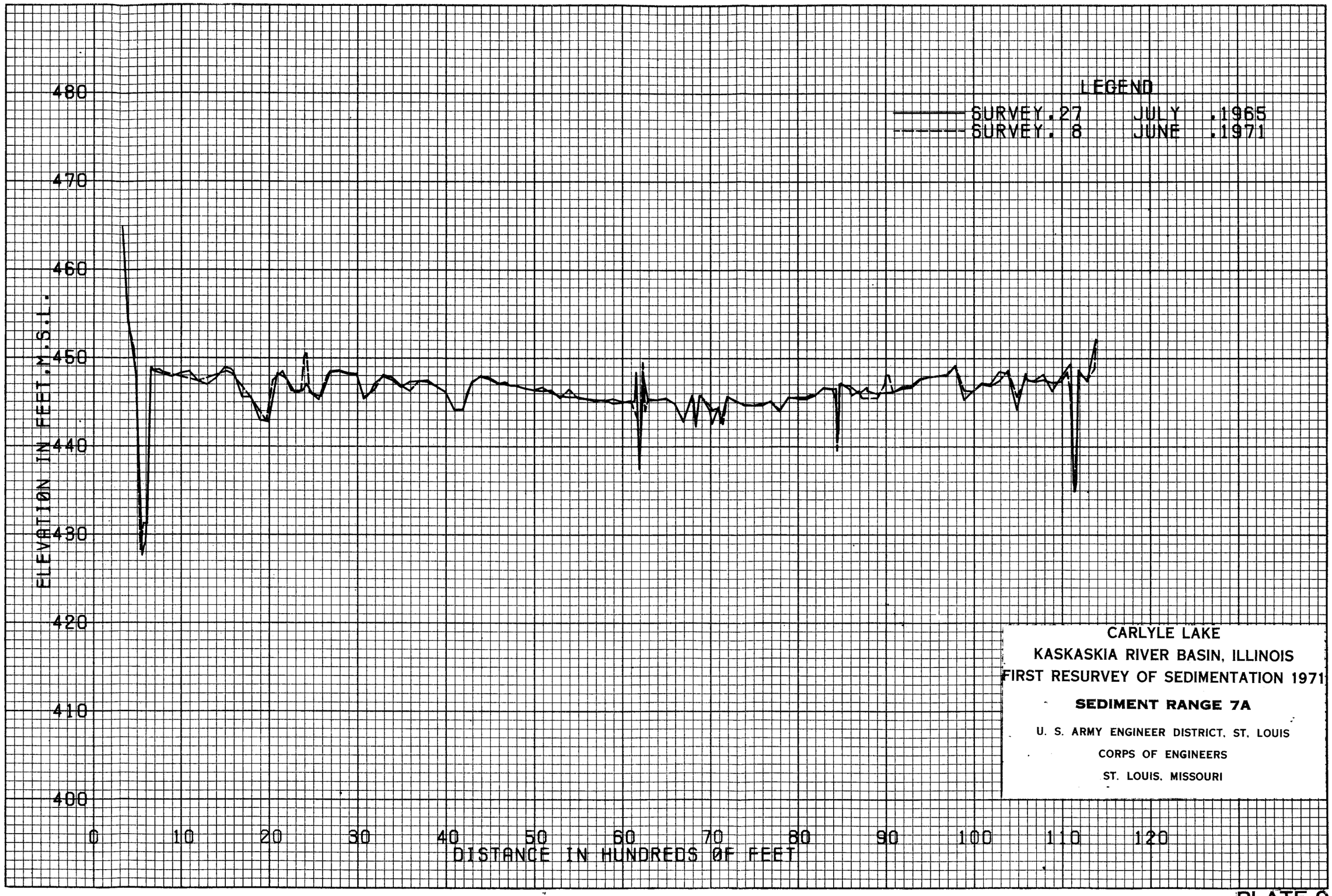
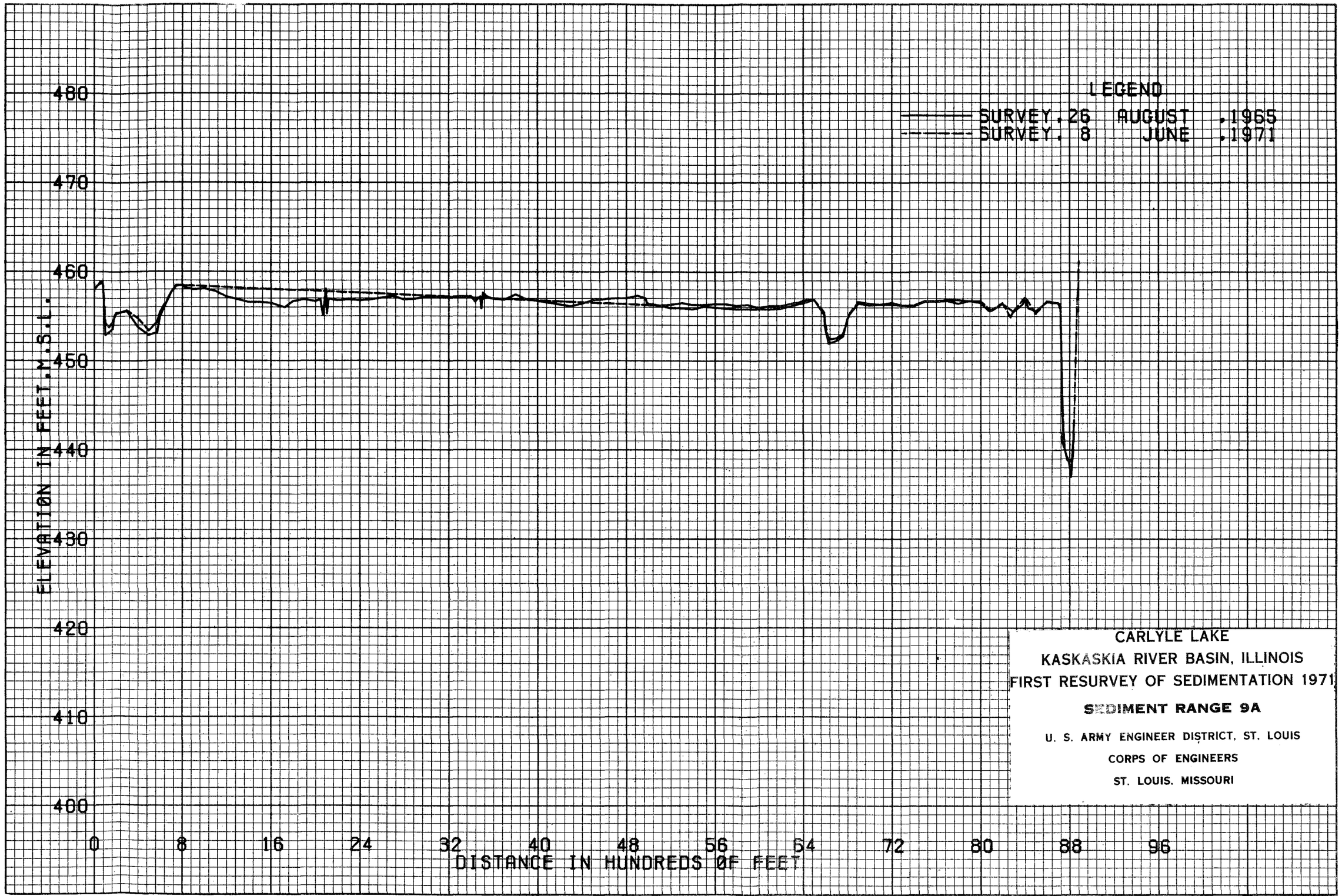
ST. LOUIS, MISSOURI



CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971

SEDIMENT RANGE 7A

U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI



CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971

SEDIMENT RANGE 9A

U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
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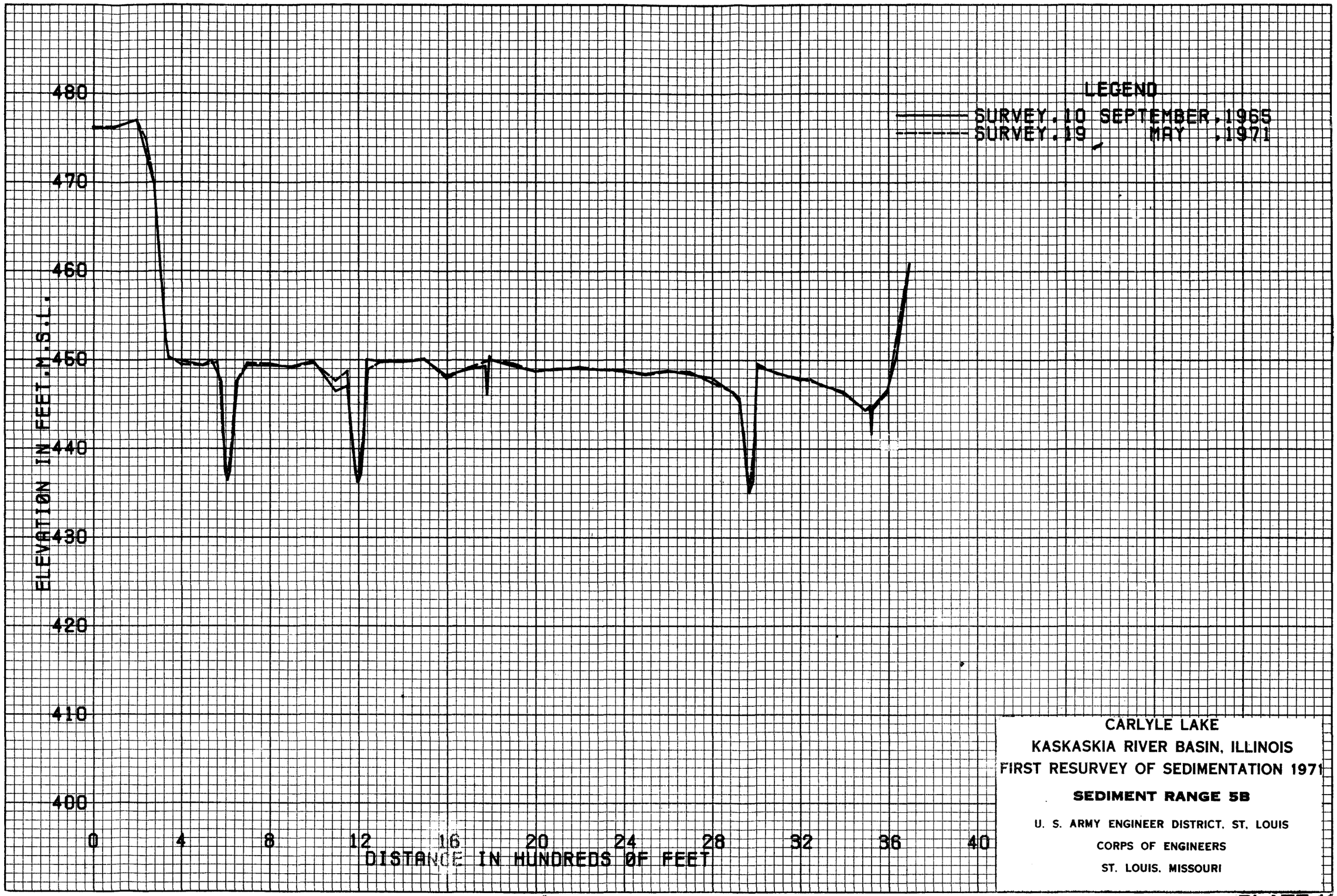

CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971

SEDIMENT RANGE 5B

U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
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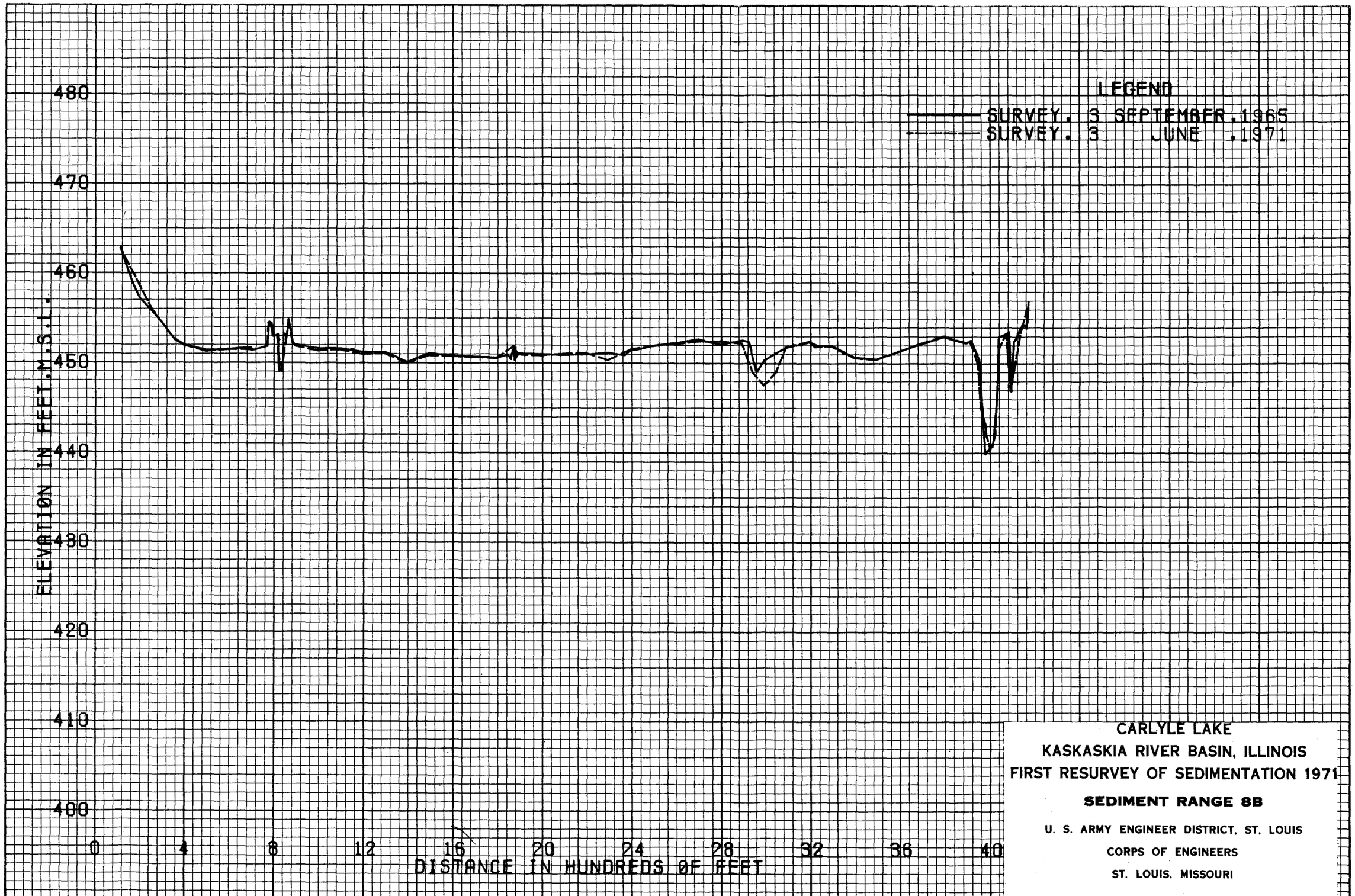
ST. LOUIS, MISSOURI

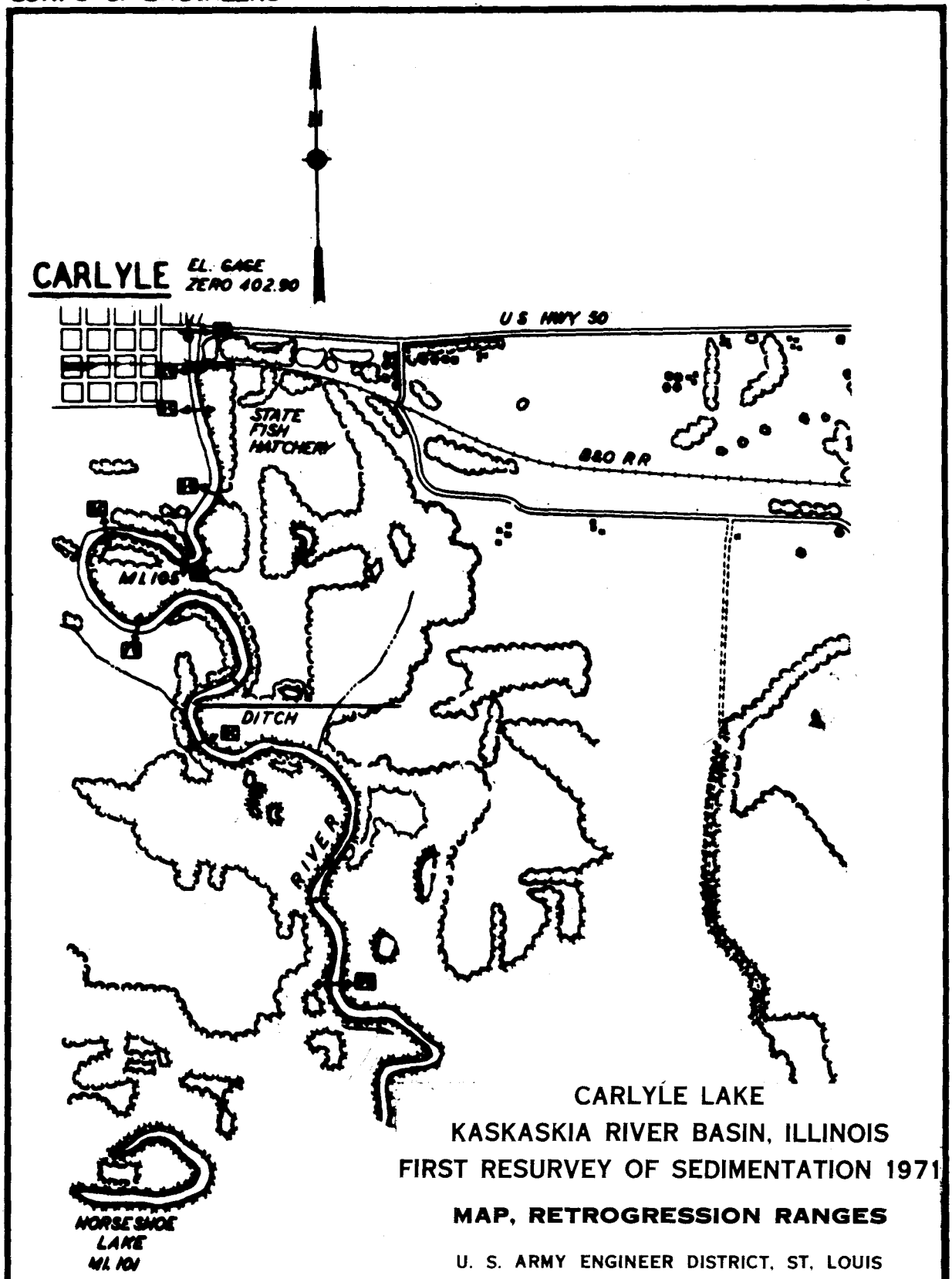
CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971
SEDIMENT RANGE 6B
U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI



CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971

SEDIMENT RANGE 8B

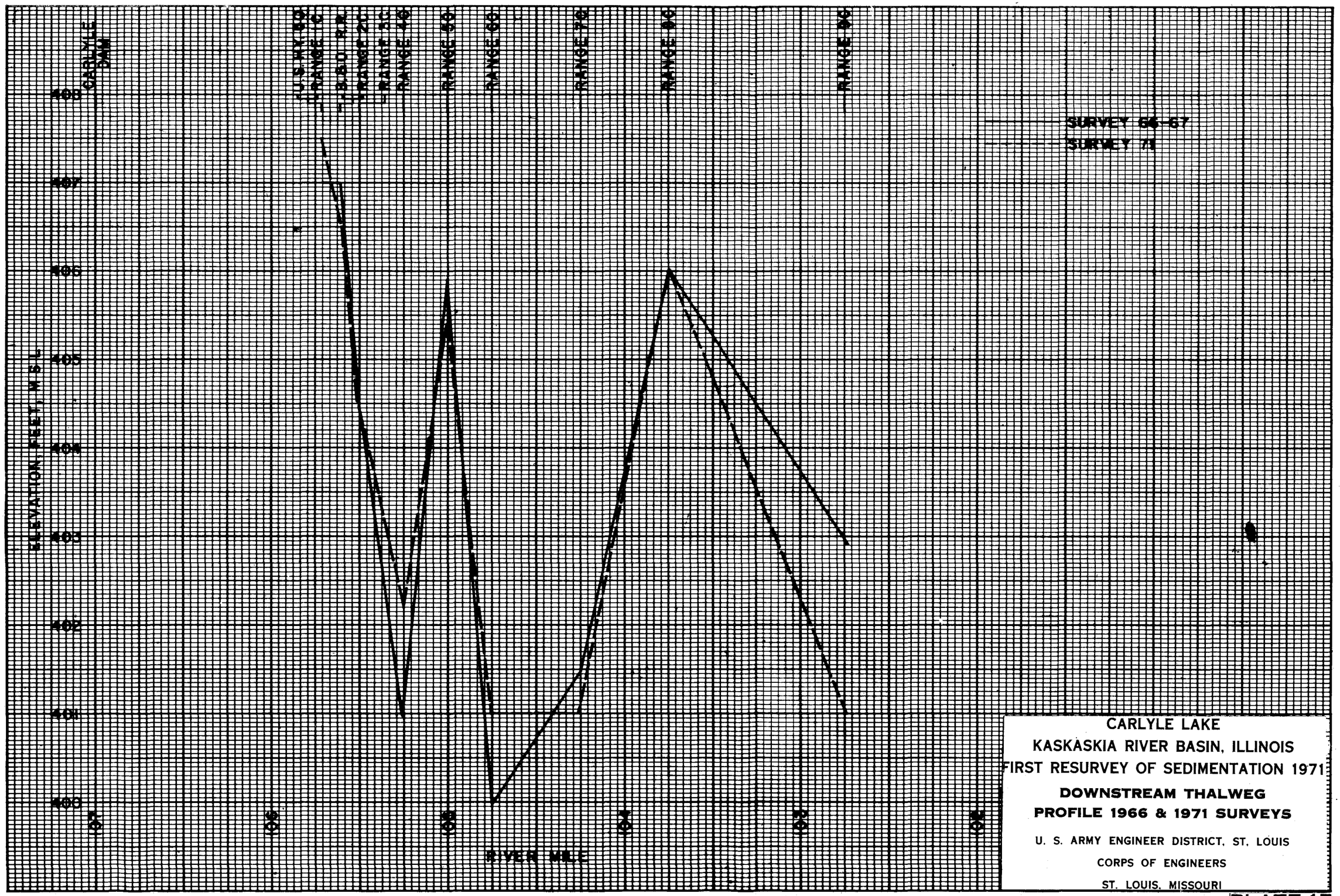
U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI



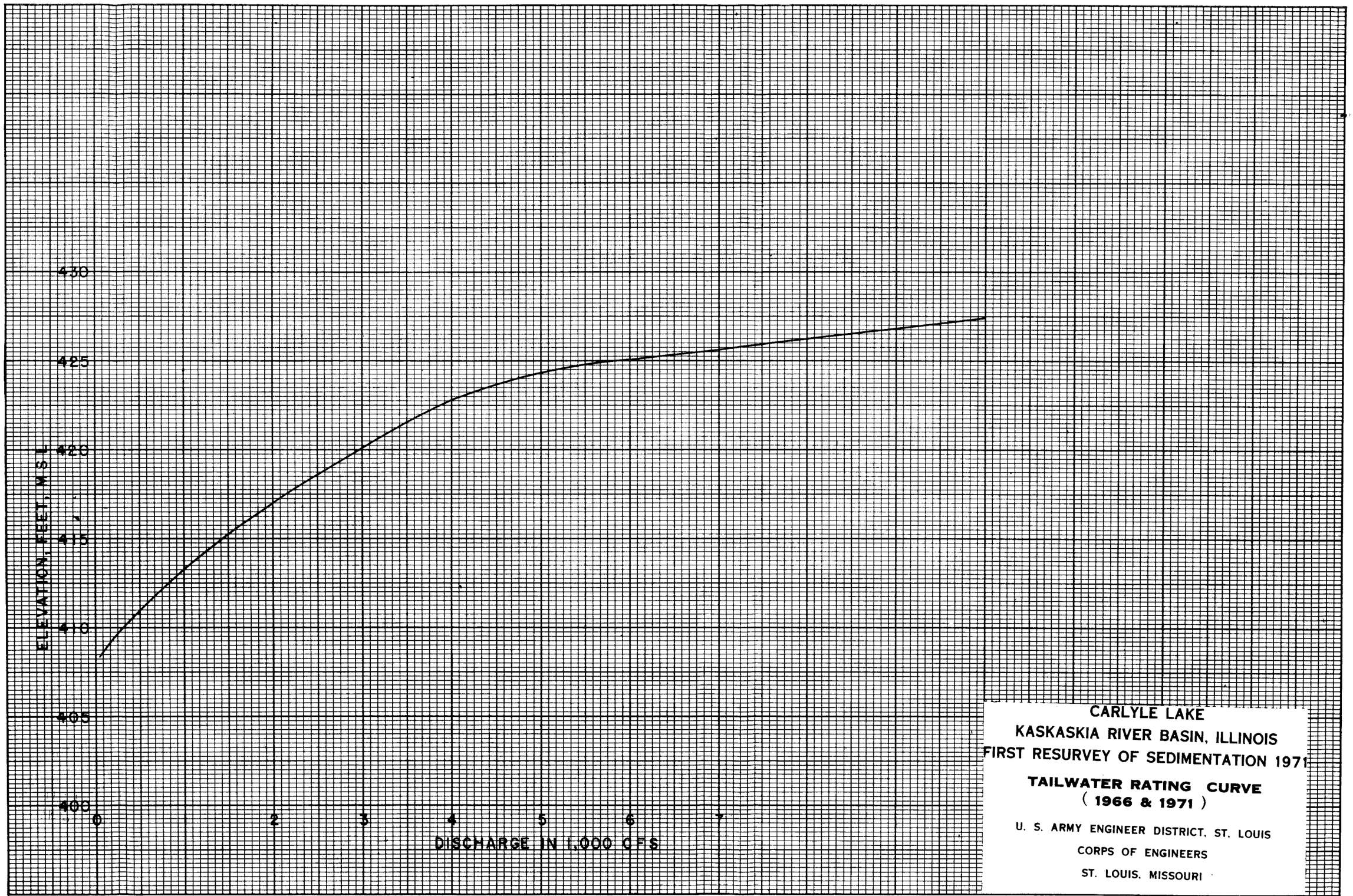
CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971

MAP, RETROGRESSION RANGES

U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI



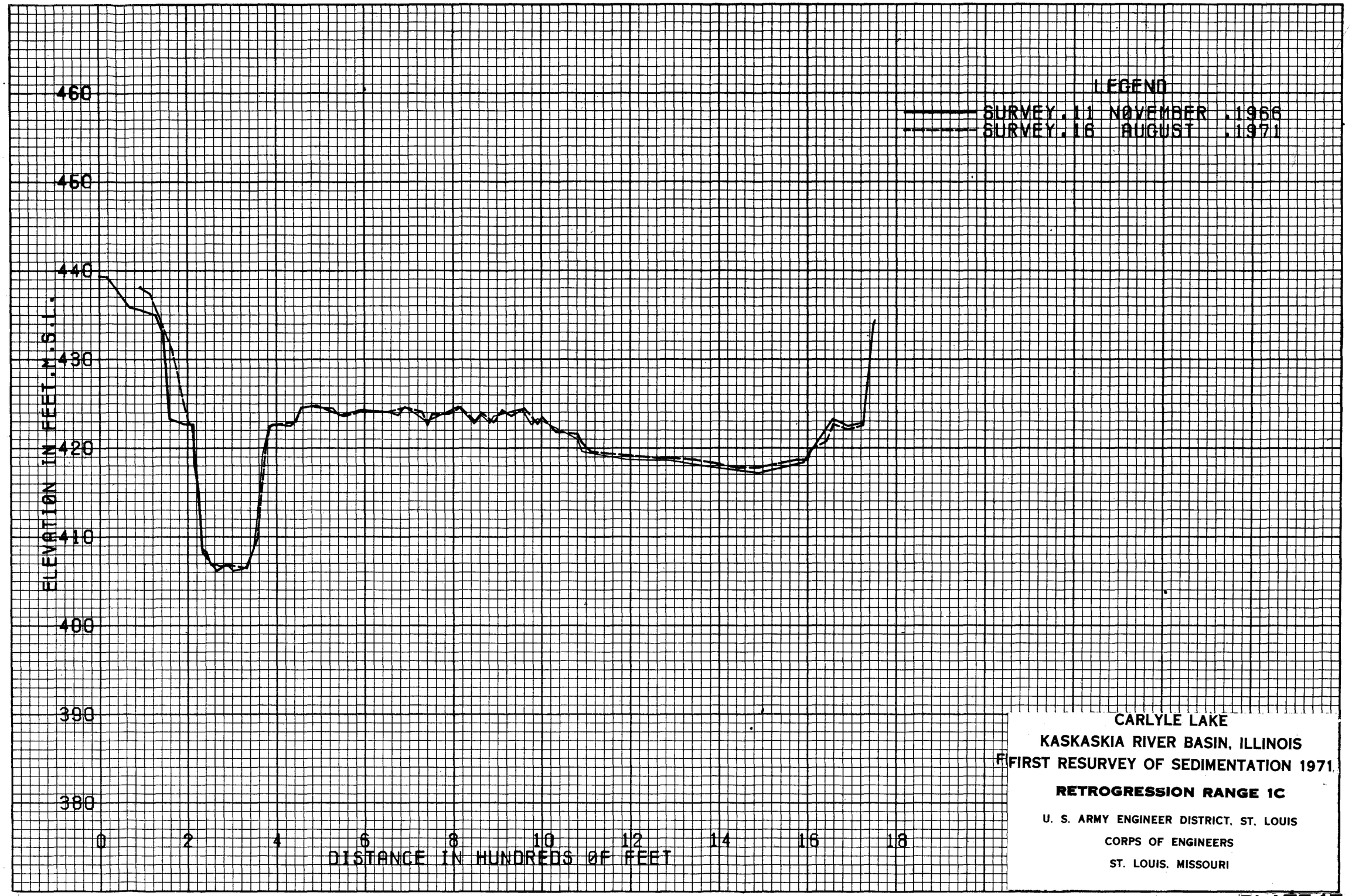
CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971
DOWNSTREAM THALWEG
PROFILE 1966 & 1971 SURVEYS
U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI



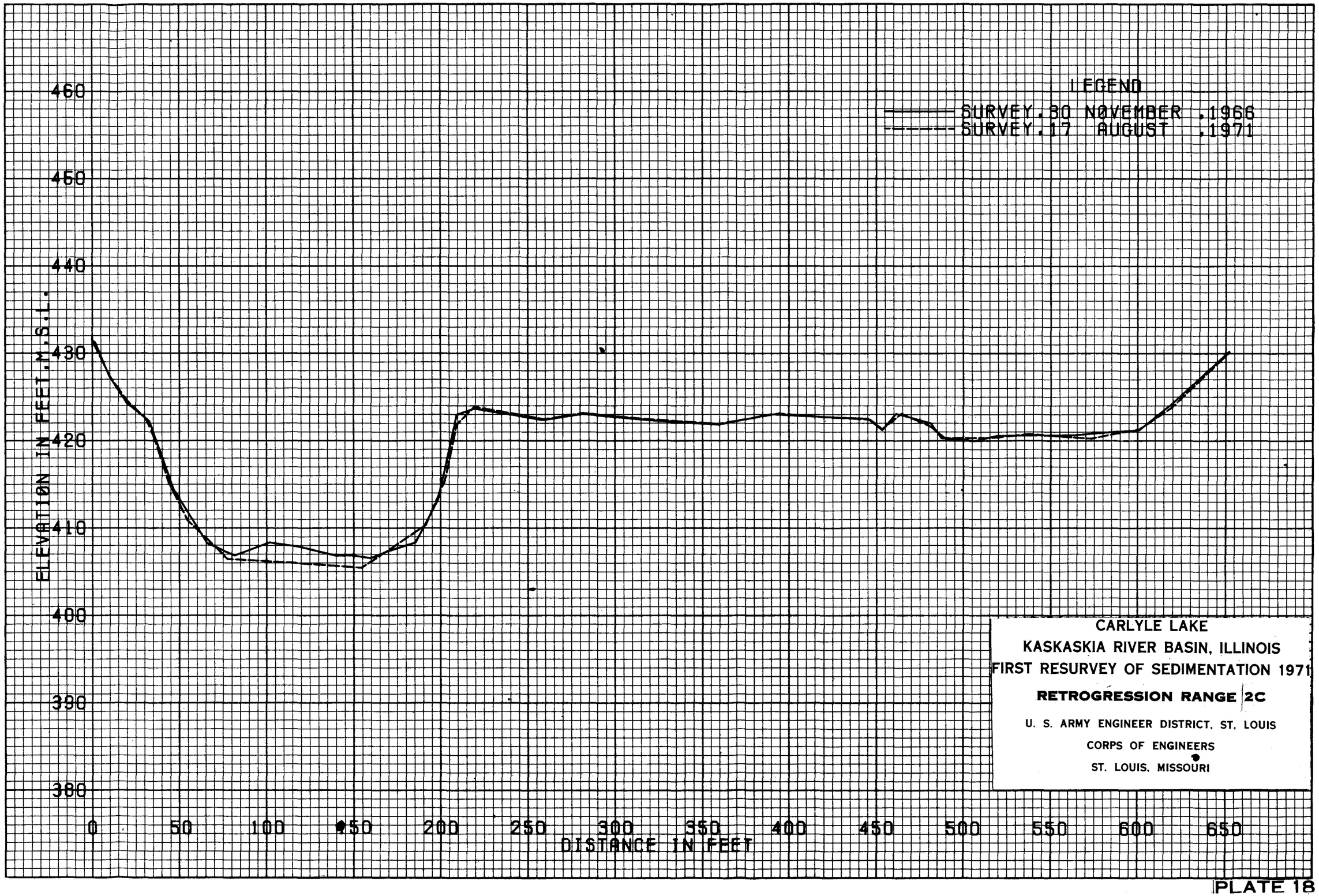
CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971

TAILWATER RATING CURVE
(1966 & 1971)

U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI



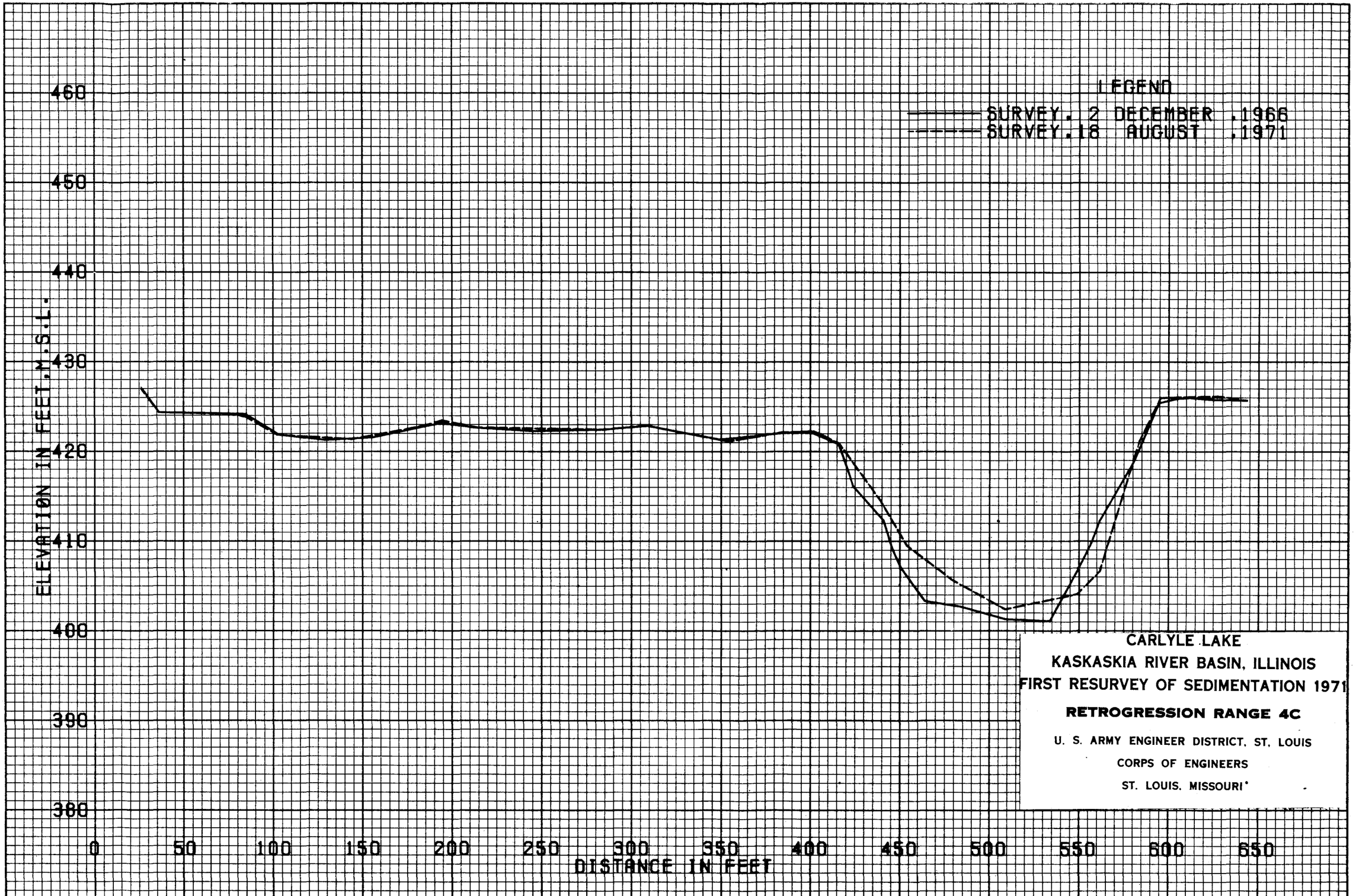
CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971
RETROGRESSION RANGE 1C
U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI



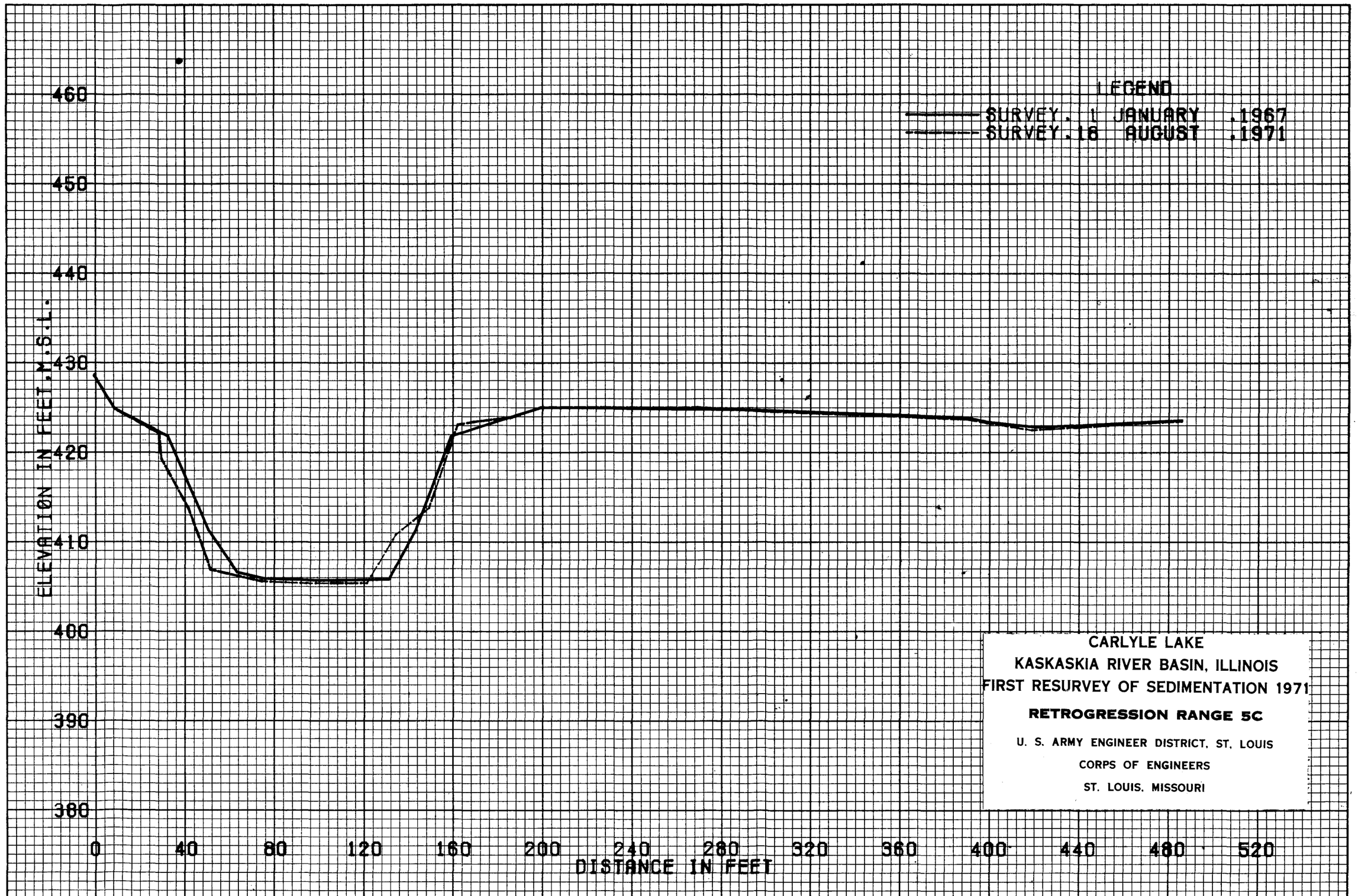
CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971
RETROGRESSION RANGE 2C
U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

PLATE 18

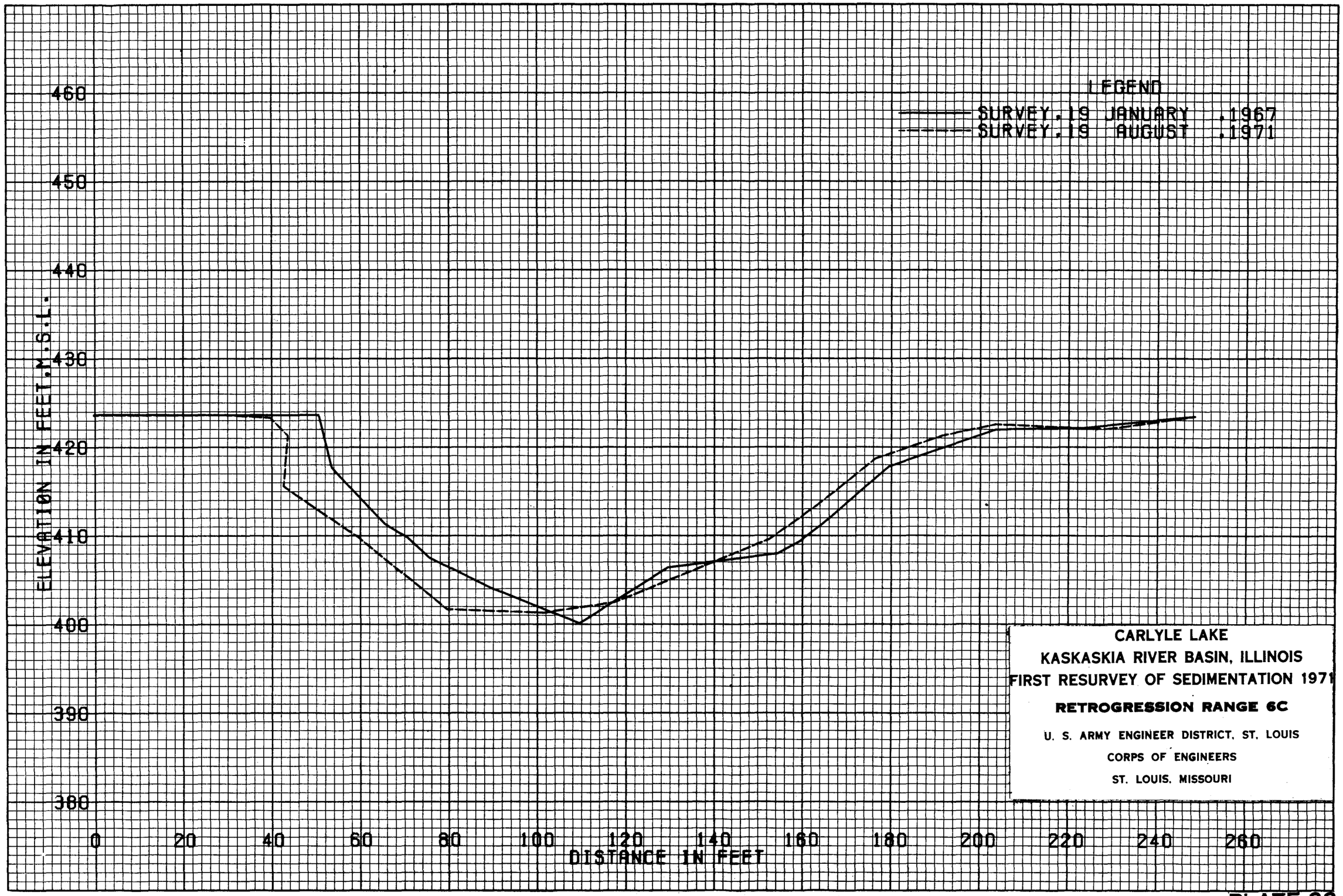
CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971
RETROGRESSION RANGE 3C
U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI



CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971
RETROGRESSION RANGE 4C
U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI



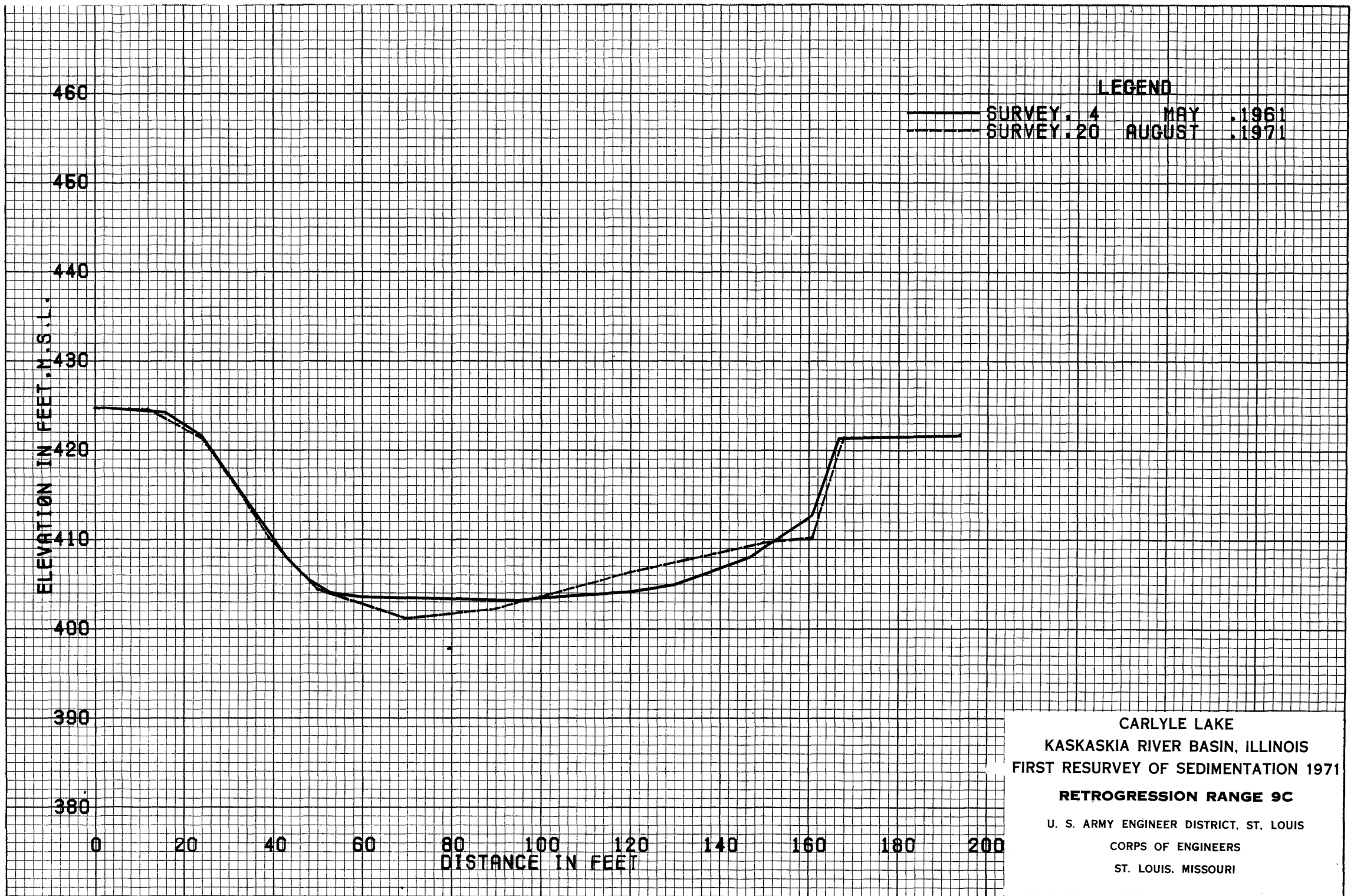
CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971
RETROGRESSION RANGE 5C
U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI



CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971
RETROGRESSION RANGE 6C
U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971
RETROGRESSION RANGE 7C
U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971
RETROGRESSION RANGE 8C
U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI



CARLYLE LAKE
KASKASKIA RIVER BASIN, ILLINOIS
FIRST RESURVEY OF SEDIMENTATION 1971

RETROGRESSION RANGE 9C

U. S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
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RESERVOIR SEDIMENT DATA SUMMARY

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

Carlyle Lake
NAME OF RESERVOIR

DATA SHEET NO.

DAM

1. OWNER Dept. of Army Corps of Eng.	2. STREAM Kaskaskia River	3. STATE Illinois
4. SEC 17-18 TWP. 2N RANGE 2W	5. NEAREST TOWN Carlyle, Ill.	6. COUNTY Clinton
7. STREAM BED ELEVATION 405.0	8. TOP OF DAM ELEVATION 472.0	9. SPILLWAY CREST ELEV. 425.0

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. MULTIPLE USE					2 Apr. 1
b. FLOOD CONTROL	462.5	57,500	700,000	983,000	(3) 1967
c. POWER					
d. WATER SUPPLY					16. DATE NORMAL OPER. BEGAN
e. IRRIGATION					
f. CONSERVATION	445.0	26,000	223,000	283,000	1 Aug
g. SEDIMENT					1970
h. INACTIVE	429.5	7,100	50,000	44,900	

17. LENGTH OF RESERVOIR at joint use pool 15.1 (4) MILES | AV. WIDTH OF RESERVOIR at joint use 2.5 MILES

WATERSHED

18. TOTAL DRAINAGE AREA ~2680 (4) SQ. MI.		22. MEAN ANNUAL PRECIPITATION 38.22 (34) INCHES
19. NET SEDIMENT CONTRIBUTING AREA 1650 SQ. MI.		23. MEAN ANNUAL RUNOFF 9.34 (34) INCHES
20. LENGTH 120 MILES	AV. WIDTH 30 MILES	24. MEAN ANNUAL RUNOFF 1,334,994 (34) AC.-FT.
21. MAX. ELEV. 725 msl	MIN. ELEV. 405 msl	25. CLIMATIC CLASSIFICATION humid

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.
April 1967				9	3,851	27,970	
August 1971	4.3	4.3	Range (D)	9	3,850	22,870	See 2

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
August 1971	36.9	1,533,058	1,881,729	8,846,120	1,533,058	8,846,120

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.-YEAR	a. TOTAL TO DATE	b. AV. ANNUAL	c. PER SQ. MI.-YEAR
August 1971	5100	1186	.718	5100	1186	.718

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. AN.	b. TOT. TO DATE	a. PERIOD	b. TOT. TO DATE
				.0008	.0052		

ENG FORM 1 MAR 63 1787 EDITION OF 1 SEP 62 MAY BE USED. (EM 1110-2-4000)

26. DATE OF SURVEY	43. DEPTH DESIGNATION RANGE IN FEET ABOVE, AND BELOW, CREST ELEVATION											
	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														
August 1971	9.4	3.8	14.8	18.8	17.9	16.8	11.9	1.8	1.9	2.9					

45. RANGE IN RESERVOIR OPERATION

WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW AC.-FT.	WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW AC.-FT.
1966	433.0	425.1	945,058				
1967	435.9	425.2	1,584,998				
1968	451.2	429.8	1,975,800				
1969	450.2	429.6	1,607,628				
1970	455.0	433.1	1,861,421				
1971	446.12	440.3	655,461				

46. ELEVATION-AREA-CAPACITY DATA

ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY
415	1,146	4600	450	32,397	419,932			
420	2,181	8,093	455	41,548	605,354			
425	3,851	22,872	460	52,398	839,427			
430	7,109	49,185	465	65,113	1,132,070			
435	12,115	96,971	470	84,360	1,497,230			
440	17,990	171,689						
445	24,583	277,909						

47. REMARKS AND REFERENCES

1. Beginning of storage April 1967.
2. Omitted because of effect of Lake Shelbyville on amount of sediment trapped at Carlyle Lake.
3. Date of initial impoundment.
4. Reference Master Regulation Manual Kaskaskia River Basin, Illinois Dept. of the Army, CE St. Louis District.

48. AGENCY MAKING SURVEY

49. AGENCY SUPPLYING DATA

50. DATE March 1973