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2 SUPPORTING DOCUMENTATION(U) CORPS OF ENGINEERS
BUFFALO NY BUFFALO DISTRICT 1986

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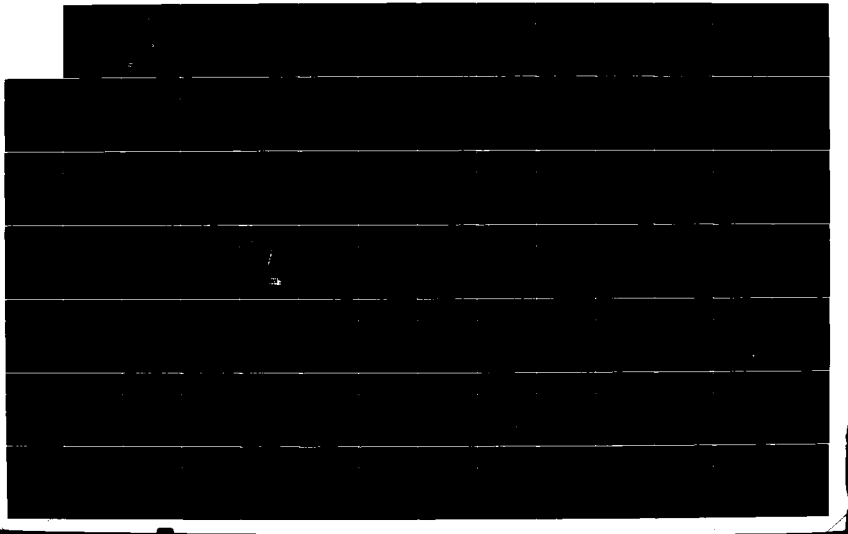

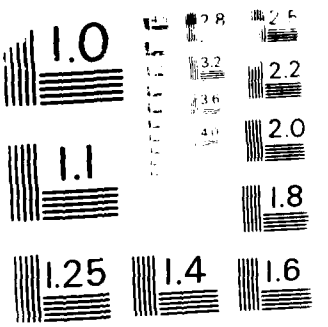
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Reconnaissance Report

(4)

Genesee River Basin Study

Volume 2
Supporting Documentation

US Army Corps
of Engineers
Buffalo District

August 1986
Revised
December 1986

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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Genesee River
Flood Control
Water Quality
Hydroelectric Power
Water Supply

20 ABSTRACT (Continue on reverse side if necessary and identify by block number)

In terms of existing and projected supply and demand, the basin has important needs in the areas of flood control, municipal and industrial water supply, and general outdoor and fish and wildlife recreation. Other important needs are supplemental irrigation, protection from streambank and agricultural land erosion, and hydroelectric power generation.

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As possible solutions to the basin water resource needs, 12 preliminary plans were formulated and assessed. The assessment indicated that four plans warranted further, detailed analysis in the feasibility study phase, whereas eight others warranted no further consideration because of lack of economic justification or failure to achieve the primary water resource needs considered.

Hydropower development opportunities are realistic in view of the interests expressed by non-Federal entities in economically viable hydroelectric power projects.

The Canaseraga Creek Valley has adequate protection from the more frequent or highly probable floods. This protection is provided by levees and other flood measures built by local farmers with Governmental assistance. However, residual damages along the valley are significantly meaningful to justify some form of additional protection. Therefore, a small scale local flood protection project will be incorporated, as a component, into those plans that will be studied further in the feasibility phase.

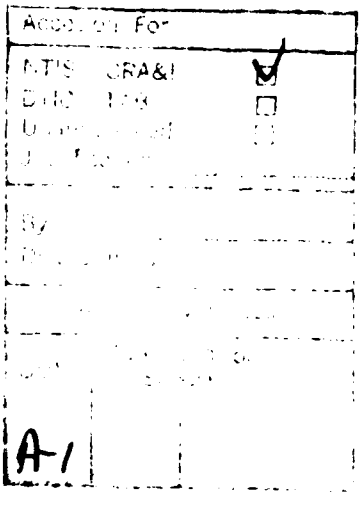
The authorized flood control projects for Spring Creek in Caledonia, New York, and Red Creek in Monroe County, New York, should be deauthorized. These projects are no longer economically viable because of increased costs, changed conditions, and/or lack of local support.

GENESEE RIVER BASIN STUDY
NEW YORK

RECONNAISSANCE REPORT

APPENDIX A

HYDROLOGY AND HYDRAULICS



U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207

GENESEE RIVER STUDY
RECONNAISSANCE REPORT
(August 1986)

APPENDIX A

HYDROLOGIC ENGINEERING, HYDROPOWER, FLOOD DAMAGES,
AND STREAMBANK EROSION

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd)

PLATES

GENESEE RIVER BASIN STUDY

APPENDIX A

A1 BASIN DESCRIPTION

A1.1 General.

The Genesee River rises in the Allegheny Mountains in Potter County, Pennsylvania, and flows north for about 157 miles to Rochester, New York, where it empties into Lake Ontario. The watershed is roughly elliptical in shape, with a north south major axis of approximately 100 miles, and a maximum width of 40 miles. The total basin area is 2,480 square miles, and can be found on Plate A1. The largest tributary of the Genesee River is Canaseraga Creek, with a drainage area of 337 square miles. The confluence of Canaseraga Creek with the Genesee River is about 4 miles downstream of the Corps of Engineers dam at Mount Morris. The topography of the southern portion of the basin, upstream of the Mount Morris Dam, is steep and rugged, while the northern portion downstream of Mount Morris is gently rolling plains. The Genesee River drops from about elevation 1,080 feet NGVD to 768 feet NGVD over the three waterfalls in Letchworth Park (just upstream of Mount Morris), flowing through deep gorges cut in the Portage geological formations in Letchworth Park. From Mount Morris downstream, Genesee River flows through alluvial plains in wide flat valleys that can be up to 3 miles in width. At Rochester, the river drops over three falls from elevation 481 feet NGVD to elevation 249 feet NGVD, and then empties into Lake Ontario. A profile of the Genesee River and its major tributaries is shown on Plate A2.

When the slope characteristics of the Genesee River are studied, the slopes contrast from a flashy, steep gradient stream to a sluggish, meandering river. The river from its source in Pennsylvania to the New York State boundary has a slope of approximately 102 feet/mile. For the next 25 miles, the slope is approximately 12 feet/mile, and in the 38 miles before the three waterfalls in Letchworth State Park, the slope is approximately 6 feet/mile. Through the 17 miles of Letchworth State Park, the river drops 317 feet. From Mount Morris to Rochester, the river drops at 0.8 feet/mile. The last 6 miles to Lake Ontario there is no slope.

The largest tributary of the Genesee River is Canaseraga Creek. Canaseraga Creek Watershed drains 337 square miles. Its confluence with the Genesee River is near Jones Bridge, just downstream of Mount Morris Dam. Canaseraga Creek resembles the Genesee River Basin, in that the reaches upstream of Dansville are steep and rugged, while downstream of Dansville, Canaseraga flows through a flat alluvial plain to the Genesee River. Above Dansville, the main stem has a slope of about 40 feet/mile, and below Dansville, Canaseraga Creek has a slope of about 3 feet/mile. The Canaseraga Creek basin is roughly square in shape, about 20 miles to a side. The main stem, which rises at about elevation 1,900 NGVD, has a length of 42 miles. Canaseraga Creek joins the Genesee River at elevation 548 feet NGVD.

Table A1 - Drainage Area, Genesee River Watershed

	Stream and Location	Drainage Area (sq. mi.)	Miles Above Mouth*
1.	Genesee River below Genesee, PA	84.4	157.3
2.	Genesee River at Shongo, NY	141	153.0
3.	Genesee River at Stannards, NY	178	145.4
4.	Genesee River above Dyke Creek at Wellsville, NY	216	141.5
5.	Dyke Creek at mouth at Wellsville, NY	72.6	-
6.	Genesee River at Scio, NY	308	136.3
7.	Vandermark Creek at mouth of Scio, NY	22.7	-
8.	Genesee River at Dam at Belmont, NY	384	130.3
9.	Phillips Creek at mouth at Belmont, NY	30.5	-
10.	Genesee River above Angelica Creek near Angelica, NY	489	122.3
11.	Angelica Creek at mouth	90.1	-
12.	Genesee River above mouth of Black Creek at Belfast, NY	600	118.4
13.	Black Creek at mouth at Belfast, NY	31.0	-
14.	Genesee River above Caneadea Creek at Caneadea, NY	667	112.7
15.	Caneadea Creek at mouth at Caneadea, NY	62.8	-
16.	Cold Creek at mouth at Fillmore, NY	40.9	-
17.	Rush Creek at mouth of Fillmore, NY	41.2	-
18.	Genesee River below mouth of Rush Cr. at Fillmore, NY	846	102.6
19.	Genesee River above mouth of Wiscoy Cr. at Rossburg, NY	854	99.3
20.	Wiscoy Creek at mouth at Rossburg, NY	112	-
21.	Genesee River at Portageville, NY	984	89.8
22.	Silver Lake Outlet at mouth near Mount Morris, NY	31.4	-
23.	Genesee River at Mount Morris Dam	1,080	69.3
24.	Genesee River above mouth of Canaseraga Creek	1,084	63.8
25.	Canaseraga Creek at Poag's Hole	89	-
26.	Canaseraga Creek near Dansville, NY	152	-
27.	Keshequa Creek at mouth at Sonyea, NY (tributary to Canaseraga Creek)	69.0	-
28.	Canaseraga Creek at mouth near Mount Morris, NY	337	-
29.	Genesee River near Fowlerville, NY	1,542	41.2
30.	Genesee River above mouth of Conesus Creek at Avon, NY	1,580	36.3
31.	Conesus Lake at Lakeville, NY	69.8	-
32.	Conesus Creek at mouth of Avon, NY	91.6	-
33.	Genesee River above mouth of Honeoye Cr. at Golah, NY	1,711	27.4
34.	Honeoye Lake at Honeoye, NY	41.0	-
35.	Hemlock Lake at Hemlock, NY	43.5	-
36.	Honeoye Creek below mouth of Hemlock Lake Outlet	150	-
37.	Honeoye Creek at Honeoye Falls, NY	196	-
38.	Honeoye Creek at Rush, NY	242	-
39.	Honeoye Creek a Golah, NY	267	-
40.	Genesee River above mouth of Oatka Cr. at Scottsville, NY	1,985	22.7
41.	Oatka Creek at mouth at Scottsville, NY	221	-
42.	Genesee River above mouth of Black Creek	2,210	14.9
43.	Black Creek at Churchville, NY	130	-
44.	Black Creek at mouth at Genesee Junction	201	-
45.	Genesee River at mouth at Rochester, NY	2,480	-

* Genesee River reaches only.

a. Hydropower benefits;

b. discharge-frequency curves;

c. stage-damage curves, and

d. flood reduction benefits.

The existing information that was used was gathered from file reports and 4 published reports. The published Reports are:

a. "Genesee River Basin Study," June 1969, Buffalo District

b. "Stannard Reservoir, New York, Letter Report; Post Flood Report on Effects of Agnes," 1 April 1974, Buffalo District;

c. "Phase I Report, Canaseraga Creek, New York, Local Protection Project," Sept 1974, prepared by Erdman and Anthony Associates, Consulting Engineers, for the Buffalo District; and

d. "Reservoir Regulation Manual, Mount Morris Dam and Reservoir," Buffalo District, September 1978.

A2 HISTORICAL FLOODS

Damaging floods on the Genesee Basin have occurred in all months of the year except August. Summer floods are, in general, localized in a part of the watershed and are usually the results of convectively usable air conditions. Winter and Spring floods are usually the result of frontal precipitation on saturated or frozen ground, or on melting snow cover, although floods have occurred from melting snow cover alone. Some of the larger floods are:

a. Flood of March 1865. The largest known peak discharge at Rochester, estimated at 54,000 cfs, was the result of a heavy snowfall, followed by a sudden thaw accompanied by warm rains. The capacity of the channel in Rochester at that time was less than 40,000 cfs; hence, at the flood crest an overflow in excess of 14,000 cfs flowed into the city, inundating most of the central portion and causing extensive damage. The flats from Rochester to Mount Morris were flooded, and the embankment of the New York Central Railroad near Avon was destroyed.

b. Flood of March 1875. This flood was caused by the spring break-up and warm rain. During the flood, an ice jam formed at the Clarissa Street bridge in Rochester and backwater inundated large areas of the city, causing extensive damage.

c. Flood of June 1889. As a result of general rains, all streams in western New York were in flood. Bridges were washed out at Wellsville, Belmont, Mount Morris, and Dansville, and agricultural interests in the Genesee and Canaseraga valley flats were severely damaged. Rochester escaped damage.

l. Flood of July 1935. This flood, caused by an extensive three-day rainstorm concentrated over south central New York, affected only the southeastern portion of the Genesee Basin. The precipitation stations in this portion of the basin, Alfred, Andover, Angelica, and Dansville, recorded totals for the 3-day rain ranging from 5.37 to 6.35 inches. No excessive rains were recorded by stations in other sections of the Genesee Basin. The peak discharges in the Genesee River were only 24,500 cfs at Jones Bridge and 18,600 cfs at Rochester, whereas the station near Dansville on Canaseraga Creek recorded a peak flow of 8,390 cfs. The principal damage areas were the argicultural lands in the Canaseraga valley, and the village of Wellsville on Dyke Creek. Damage in the Genesee flats was small and Rochester was not affected.

m. Flood of July 1942. Floods, confined principally to western Pennsylvania, were caused by very intense rainfall over a relatively short duration. Records for point rainfall for durations up to 24 hours were broken during this storm. On the Genesee Basin, damage was confined to the upper reaches in the vicinity of Wellsville. The rainfall at Alfred, Andover, and Angelica, for 17-18 July was 3.35, 4.10, and 4.05 inches, respectively. The records from automatic rainfall recorders indicate that most of the precipitation occurred during the evening of the 17th and the early morning of the 18th. Peak discharges of 11,200 cfs, 18,900 cfs, and 15,700 cfs were recorded at Scio, St. Helena, and Jones bridge, respectively.

n. Floods of March-April 1950. This period covers two peaks a week apart. The first was caused by snowmelt accompanied by light precipitation and produced a crest of 45,400 cfs at Jones Bridge on the 29th of March. The second crest, on 5 April, was the result of moderate rainfall on wet soil and produced a crest at Jones Bridge of 25,200 cfs.

o. Flood of November 1950. The heavy rain of 25 November caused high water in the upper basin, and Wellsville experienced severe flooding. The south side of the village was inundated and many families were taken from their homes in boats. Several sections of highway near Wellsville and Portageville were under water. In the lower basin, flooding was slight, although some flatlands were flooded and sections of highway near Geneseo were covered by water. Although the construction of Mount Morris Dam was not complete at this time, the dam was operated for flood control.

p. Flood of March 1956. This flood was of the type common in the Genesee River Basin, a combination of warm rain and snowmelt. This flood occurred after completion of Mount Morris Dam, and gives an example of the operation procedures used during a flood. Releases were reduced to about 300 cfs when the storm began, and then were increased to develop a flow of 12,000 cfs at the Jones Bridge gage, after the danger of downstream flooding had passed. Low-lying farmlands below Avon were flooded from local runoff, and there was some backwater flooding during the reservoir evacuation period. Part of this flooding was due to the fact that because of the protection provided by the dam, there has been some encroachment into the old flood plain. Also some banks had been breached by local farmers in order to drain their lands. The backwater flooding prompted reconnaissance of the lower basin, which established 10,500 cfs as a within-channel capacity in the vicinity of

t. Flood of February-March 1976. During the period 16-23 February, approximately 2.6 inches of rain fell over the upper basin. This rainfall augmented by about 2 inches of snowmelt runoff resulted in a peak reservoir elevation on 23 February of 727.6, or about 71 percent of available storage. During the period 1-6 March, approximately 2.5 inches of rain, including some snowmelt, caused the pool to again rise. On 6 March, the reservoir pool peaked at 744.1 feet, thus utilizing 85 percent of the total storage. Peak inflows to Mount Morris Reservoir during the February and March runoff events reached 32,500 cfs and 28,000 cfs, respectively. Although the peak inflows were not particularly impressive, the volume of water received caused the 6 March pool elevation to be the second highest of record, exceeded only by the flood from Hurricane Agnes.

Since the March 1976 floods, most of the flooding in the Genesee watershed has been limited to the Black and Oatka Creek watersheds (March 1978, March 1979, March 1984, December 1984 and January 1986). Heavy rains have caused flooding on the tributaries to the Genesee River around and south of Wellsville, New York, at various times since 1976.

A3 FLOOD PRONE AREAS

Flooding is experienced throughout the Genesee River watershed. Flooding occurs on Black Creek, Oatka Creek, Honeoye Creek, Conesus Lake, Honeoye Lake, Canaseraga Creek, Genesee River and Dyke. These are the major areas that experience flooding, and there are isolated incidents of flooding in areas other than listed above. The Genesee River was broken up into 15 damage reaches, which are described in Table A2. Table A3 gives the approximate channel capacities for each reach.

A4 GAGING STATIONS

A4.1 Stream and Lake Gage

There are numerous gage sites located throughout the Genesee River Basin. This report has been able to locate 51 active or discontinued gage sites in the Genesee Basin. Table A4 lists the active gages in the Genesee River Basin and Table A5 lists the discontinued gages in the basin. Table A6 has the maximum stage or discharge of record for the active gages. The location of the active recording gages can be found on Plate A4.

A4.2 Precipitation Gages

The aerial distribution of precipitation over the Genesee River Basin is represented by the total precipitation statons at Avon, Warsaw, Hemlock, Portageville, Dansville, Wiscoy, Rushford, Angelica, Wellsville 4 NNW, and Whitesville, and by the recording gages at Rochster Airport, Pavilion, East Bloomfield, Mount Morris Dam, Wellsville, and Raymond. The temporal distribution of rainall is represented by the recording gages. All of the precipitation gages are in New York State except for the gage at Raymond, Pennsylvania. The loction of these gates can be found on Plate A5.

Table A2 - Damage Reaches of the Genesee River Basin (Cont'd)

Reach	River Mile	Index Point Location	Initial Damage Stage in Feet (NGVD Datum)	Limit of Reach
Belvidere 9	120.0 to 125.1	At the upstream side of New York State Route 408, bridge over the Genesee River, mile 123.0	1320.0	From 6,300 feet upstream of Transit bridge to a section 6,800 feet downstream of NYS Route 244 in Belmont
Belmont 10	123.1 to 131.0	400 feet upstream or New York State Route 244, mile 126.7.	1366.0	From 6,800 feet downstream of New York State Route 244 to 3,300 feet downstream of the bridge in Scio
Scio 11	131.0 to 136.0	At the gage site at Scio, mile 132.8	1446.5	From 3,300 feet downstream of the bridge in Scio to 1,500 feet downstream of New York State Route 17
Wellsville 12	136.0 to 138.8	(2)	(2)	From 1,500 feet downstream of New York State Route 17 to Weidrick Road
Stannards Corners 13	138.8 to 140.8	3,000 feet upstream of Weidrick Road, mile 139.4	1511.5	From Weidrick Road to Hanks Road
Shongo 14	140.8 to 148.0	1,600 feet upstream of Hanks Road, mile 141.1	1529.1	From Hanks Road to the New York-Pennsylvania State line

(1) This reach includes the area known as Letchworth State Park and is mainly a deep gorge that contains Mount Morris Lake.

(2) This reach lies entirely within the village of Wellsville and has a completed flood control project.

Table A3 - Channel Capacities

Channel Capacity	cfs
Reach 1	33,000
Reach 2	14,000
Reach 3	11,000
Reach 4	12,000
Reach 5	-
Reach 6	24,000
Reach 7	14,000
Reach 8	9,000
Reach 9	6,000
Reach 10	11,000
Reach 11	5,000
Reach 12, G-1	4,000
Reach 12, G-2	9,000
Reach 12, G-3	20,000
Reach 12, G-4	21,000
Reach 12, G-5A	14,000
Reach 12, G-5B	14,000
Reach 12, G-6	14,000
Reach 13	5,000
Reach 14	3,000

Table A5 - Discontinued Gages

	Gage	Gage #	Type	Drainage Area (sq. mi.)	First Installed	# of Years of Record
1.	Quig Hollow Brook near Andover, NY	04220450	Crest-Stage	4.2	1965	7
2.	Dyke Creek near Andover, NY	04220470	Recording	38.0	Feb 1964	4
3.	Dyke Cr. at Wellsville, NY	04220500	Crest-Stage	72.1	1956	10
4.	Genesee River at Scio, NY	04221500	Recording	308.0	Jun 1916	56
5.	Van Campen Creek at Friendship, NY	04221600	Recording	45.9	1964	5
6.	Angelica Cr. at Transit Bridge, NY	04221720	Recording	86.7	Feb 1964	5
7.	Genesee River at Transit Road Bridge near Angelica, NY	04221725	Crest-Stage	579.0	1975	2
8.	Genesee R. at Belfast, NY	04221820	Recording	644.0	Feb 1964	4
9.	Caneadea Creek at Caneadea, NY	04222000	Recording	62.0	Jul 1949	19
10.	East Koy Creek at East Koy, NY	04222900	Recording	46.5	Jan 1964	5
11.	Canaseraga Creek at Canaseraga, NY	04224650	Recording	58.4	Jan 1964	6
12.	Sugar Creek near Canaseraga, NY	04224740	Crest-Stage	16.9	1975	3
13.	Stony Brook at Stony Brook State Park, NY	04224848	Crest-Stage	21.4	1975	2
14.	Mill Creek at Dansville, NY	04224978	Crest-Stage	35.9	1977	1
15.	Canaseraga Creek near Dansville, NY	04225000	Recording	152.0	Oct 1917	61
16.	Canaseraga Creek at Groveland, NY	04225500	Crest-Stage	180.00	1917	14
17.	Bradner Creek near Dansville, NY	04225600	Crest-Stage	9.7	1976	1
18.	Keshequa Creek at Nunda, NY	04225915	Crest-Stage	32.7	1975	3
19.	Keshequa Creek at Tuscarora, NY	04225950	Crest-Stage	58.5	1976	2
20.	Keshequa Creek at Craig Colony, at Sonyea, NY	04226000	Recording	68.3	Mar 1911	19
21.	Conesus Creek near Lakeville, NY	04228000	Recording	72.0	Dec 1920	15
22.	Little Conesus Creek near South Lima, NY	04228870	Crest-Stage	7.4	1975	2
23.	Little Conesus Creek near East Avon, NY	04228380	Crest-Stage	8.0	1975	2
24.	Springwater Creek at Springwater, NY	04228900	Crest-Stage	10.1	1964	8
25.	Oatka Cr. at Rock Glen, NY	04230320	Crest-Stage	14.5	1975	2
26.	Oatka Cr. at Pearl Cr., NY	04230400	Crest-Stage	78.4	1975	2
27.	Pearl Cr. at Pearl Cr., NY	04230410	Crest-Stage	10.8	1975	3
28.	Oatka Creek near Pavilion Center, NY	04230423	Crest-Stage	110.0	1975	3
29.	Mad Creek near LeRoy, NY	04230470	Crest-Stage	10.2	1975	2
30.	Genesee River below Erie Canal at Rochester, NY	04231500	Recording	2,457	1904	15

A5 FUTURE FLOODS

Floods of the same or larger magnitude as those that have previously occurred in the past could also occur in the future. Larger floods have been experienced in the past on streams with characteristics similar to those found in the study area. Combinations of rainfall and runoff to those watershed causing these floods could also occur in the study area.

A6 FLOOD PROBABILITIES

A6.1 Existing Conditions.

The discharge-frequency curves for the stream gages located at Genesee River at Wellsville (04221000), Genesee River at Portageville (04223000), Canaseraga Creek above Dansville (04224775), Genesee River at Avon (04228500), Genesee River at Jones Bridge and Genesee River at Rochester, New York (04232000) were updated using Bulletin 17B guidelines and discharge data to WY 1984. These curves can be found on Figures A1 through A6. The discharge values used for the frequency analysis can be found on Table A7. These discharge frequency curves were used to calculate discharge frequency curves for each damage reach on Genesee River and Canaseraga Creek. These curves were calculated using the HEC's microcomputer version of HECWRC (flood flow frequency), dated 14 June 1985.

The Bulletin 17B discharge-frequency curves were adapted to the rest of the damage reaches by using the equation $Q_2/Q_1 = (A_2/A_1)$ EXP .9 developed for the Irondequoit Creek Study (July 1981). This equation can be used to move discharge frequency curves upstream and downstream from a gages site as long as the drainage area at the ungaged site is within these limits: $A_2 > .5A_1$ and $A_2 < 1.5A_1$. A_2 is the drainage area at the ungaged site, and A_1 is the drainage area at the gaged site. Q_2 is the discharge at the ungaged site and Q_1 is the discharge at the gaged site.

The discharge frequency curve for the gage at Wellsville was used to develop discharge-frequency curves at the index points for the damages reaches of Belmont, Scio, Wellsville (Reach A), Wellsville (Reach B), Stannards Corners, and Shongo. The discharge-frequency curve for the gage at Portageville was used to develop discharge frequency curves at the index points for the damages reaches of Portageville, Fillmore, Belfast, and Belvidere. The discharge-frequency curve for the gage on Canaseraga Creek was used for the damage reaches in Dansville. The discharge-frequency curve for the gage at Avon was used for the index point of the damage reach of Avon. The discharge-frequency curve for Genesee River at Jones Bridge was used to develop the discharge-frequency curve at the index point for the damage reach of Geneseo. The discharge-frequency curve for Genesee River at Rochester was used to develop the discharge-frequency curves at the index points for the damage reaches of Rochester and Chili-Henrietta. Table A8 lists the parameters used in determining the discharge-frequency curves at the index point. Tables A9 and A10 list the discharge-frequency curves at the index points.

Table A7 - Peak Discharge Values Used in Frequency Analysis (Cont'd)

Water Year	Wellsville	Portageville	Canaseraga	Jones Bridge	Avon	Rochester
1955	6,730	20,700	3,990	12,800	-	19,100
1956	16,900	43,300	4,500	11,900	15,600	24,300
1957	8,240	19,700	2,970	11,600	12,400	17,000
1958	7,950	19,300	2,910	10,700	10,800	14,900
1959	19,500	37,600	6,000	12,100	9,720	17,700
1960	12,800	27,800	5,170	10,400	9,820	25,800
1961	14,400	30,200	8,230	9,220	9,620	15,400
1962	3,590	12,000	1,570	9,800	8,130	11,900
1963	6,990	24,500	2,770	10,500	10,200	21,500
1964	19,200	39,400	4,370	11,000	12,400	16,600
1965	3,280	11,500	1,440	8,540	8,060	19,300
1966	5,930	14,900	2,950	8,360	8,090	13,900
1967	7,180	47,300	4,510	7,310	8,200	11,200
1968	6,160	17,900	1,750	8,600	7,710	12,500
1969	4,360	13,600	-	8,900	8,140	16,600
1970	5,820	17,800	-	7,490	6,980	13,400
1971	7,840	18,600	2,920	8,380	9,440	17,800
1972	41,000	90,000	9,600	17,800	16,500	29,600
1973	9,200	35,900	3,370	6,920	11,500	18,000
1974	5,210	15,700	2,460	8,040	8,200	15,300
1975	7,360	25,300	2,390	7,900	9,260	18,000
1976	8,100	28,600	3,800	9,980	10,200	22,400
1977	8,020	25,100	-	10,400	11,500	17,500
1978	6,600	24,600	-	10,300	10,400	17,100
1979	7,320	23,700	-	9,500	11,100	21,700
1980	5,540	14,900	-	8,620	8,930	24,300
1981	5,920	22,300	-	9,500	9,200	20,300
1982	15,800	24,000	-	10,300	10,200	23,200
1983	3,220	10,700	-	9,240	8,880	13,800
1984	9,680	38,700	-	10,500	10,700	28,200

NOTE: Discharges are in cfs.

Table A8 - Parameters

Reach	Reach Name	Gage Used	Drainage Area at Gage	Drainage Area at Site	Factor
Reach 1	Rochester	Rochester	2467	2467	1.00
Reach 2	Chili-Henrietta	Rochester	2467	2411	0.980
Reach 3	Avon	Avon	1673	1978	1.163
Reach 4	Geneseo	Jones Bridge	1424	1424	1.00
Reach 5	Mt. Morris	-	-	-	-
Reach 6	Portageville	Portageville	984	984	1.00
Reach 7	Fillmore	Portageville	984	726	.761
Reach 8	Belfast	Portageville	984	641	.680
Reach 9	Belvidere	Portageville	984	483	.527
Reach 10	Belmont	Wellsville	288	418	1.398
Reach 11	Scio	Wellsville	288	309	1.065
Reach 12 (G-1)	Wellsville	Wellsville	288	288	1.000
Reach 12 (G-2)	Wellsville	Wellsville	288	288	1.000
Reach 12 (G-3)	Wellsville	Wellsville	288	288	1.000
Reach 12 (G-4)	Wellsville	Wellsville	288	288	1.000
Reach 12 (G-5A)	Wellsville	Wellsville	288	216	.772
Reach 12 (G-5B)	Wellsville	Wellsville	288	216	.772
Reach 12 (G-6)	Wellsville	Wellsville	288	216	.772
Reach 13	Stannards Corners	Wellsville	288	212	.759
Reach 14	Shongo	Wellsville	288	179	.652

The discharge-frequency curves for Reach 1 through 4 reflects the regulation of flows by Mount Morris Dam and Reservoir. The discharge-frequency curve for Wellsville-Reach A was used for reachs G-1 through G-4 in Wellsville, and the discharge-frequency for Wellsville-Reach B was used for Reachs G-5A, G-5B, and G-6 in Wellsville. The discharge-frequency curves for Canaseraga Creek will be discussed in a separate section.

Table 49 - Discharge-Frequency Curves

Discharges in CFS

Expected Probability In %	Rochester	Chili-Henrietta	Avon	Geneseo	Portageville	Filmore	Belfast	Belvidere
0.2	40,200	39,400	24,400	20,600	90,300	68,700	61,400	47,600
0.5	36,400	35,700	22,000	18,600	76,000	57,800	51,700	40,100
1.0	33,600	32,900	20,200	17,200	66,200	50,400	45,000	34,900
2.0	31,000	30,400	18,600	15,800	57,300	43,600	39,000	30,200
4.0	28,400	27,800	17,100	14,500	49,100	37,400	33,400	25,900
10.0	24,900	24,400	14,900	12,900	39,100	29,800	26,600	20,600
20.0	22,200	21,700	13,600	11,600	31,900	24,300	21,700	16,800
50.0	17,900	17,500	11,300	9,720	22,300	17,000	15,200	11,800
80.0	14,600	14,300	9,600	8,290	16,000	12,200	10,900	8,400
90.0	13,100	12,800	8,900	7,670	13,600	10,400	9,200	7,200
95.0	12,000	11,800	8,400	7,220	11,900	9,100	8,100	6,300
99.0	10,000	9,800	7,500	6,470	9,500	7,200	6,400	5,000

Portageville Dam and Reservoir, will see any change in the discharge-frequency curves. The improved condition discharge-frequency curves can be found on Tables A11 and A12.

Table A11 - Discharge-Frequency Curves (Improved Conditions)

Expected Probability In %	Discharges in CFS					
	Delmont	Scio	Wellsville (Reach A)	Wellsville (Reach B)	Stannards Corners	Shongo
0.2	7,000	5,300	5,000	3,900	3,800	30,700
0.5	5,900	4,500	4,200	3,300	3,200	24,200
1.0	5,600	4,300	4,000	3,100	3,000	20,000
2.0	5,600	4,300	4,000	3,100	3,000	16,400
4.0	5,600	4,300	4,000	3,100	3,000	13,000
10.0	5,600	4,300	4,000	3,100	3,000	9,800
20.0	5,600	4,300	4,000	3,100	3,000	7,500
50.0	5,600	4,300	4,000	3,100	3,000	4,700
80.0	5,600	4,300	4,000	3,100	3,000	3,100
90.0	5,500	4,200	3,900	3,020	3,000	2,500
95.0	4,700	3,600	3,300	2,580	2,540	2,200
99.0	3,600	2,705	2,500	1,960	1,930	1,700

Table A12 - Discharge-Frequency Curves (Improved Conditions)

Expected Probability In %	Discharges In CFS							
	Rochester*	Chili-Henrietta*	Avon*	Geneseo*	Portageville	Filmore	Belfast	Belvidere
0.2	34,000	33,000	17,900	13,100	62,000	47,100	42,200	32,700
0.5	30,000	29,400	16,000	12,200	49,000	37,200	33,320	25,800
1.0	28,000	27,400	14,600	11,500	41,000	31,100	27,880	21,600
2.0	25,000	24,500	13,600	10,800	33,000	25,100	22,400	17,400
4.0	23,000	22,500	12,600	10,100	26,500	20,100	18,000	14,000
10.0	20,000	19,600	11,000	8,900	19,000	14,400	12,900	10,000
20.0	18,000	17,600	10,100	8,000	15,000	11,400	10,200	7,900
50.0	14,200	13,900	8,800	7,200	10,000	7,600	6,800	5,270
80.0	14,200	13,900	8,800	7,200	10,000	7,600	6,800	5,270
90.0	13,100	12,800	8,800	7,200	10,000	7,600	6,800	5,270
95.0	12,000	11,800	8,400	7,200	10,000	7,600	6,800	5,270
99.0	10,000	9,800	7,500	6,500	9,500	7,200	6,400	5,000

* NOTE: To be used with Alternative 17 only.

A7 DAMS AND RESERVOIRS

Various combinations of dams and reservoirs (scenarios) were analysis to develop hydropower and reduce flood damages. The four dams and reservoirs that were analyzed are Stannards Dam and Reservoir, Portage Dam and Reservoir, Poag's Hole Dam and Reservoir, and Mount Morris Dam and Reservoir. Stannards, Portage and Poag's Hole are proposed reservoirs first analyzed in the June 1969 "Genesee River Basin Study." The physical characteristics and operating policies of Stannards, Portage and Poag's Hole do not vary within the scenarios, while the physical characteristics and/or operating policies can change for Mount Morris, depending upon the scenario. The characteristics of Stannards, Portage and Poag's Hole Dams and Reservoirs can be found on Table A13 through A15, and for the existing Mount Morris on Table A16. Changes in the characteristics for Mount Morris for the applicable scenarios can be found on Table A17. A description of the scenarios appears in Section A9. The location of the four dams can be found on Plate A6. The plan view of Stannards Dam and Reservoir can be found on Plate A7, for Portage Dam and Reservoir on Plate A8, for Poag's Hole Dam and Reservoir on Plate A9, and for Mount Morris Dam and Reservoir on Plate A10.

Table A13 - Stannards Dam and Reservoir

	Dam Data	
1	Elevation in feet NGVD of top of dam in feet NGVD	1,630
2	Top width in feet	20
3	Height above stream bed in feet	90
4	Length in feet	2,300
	Spillway Data	
5	Number of gates	4
6	Size of gates in feet	47.5 by 27
7	Elevation of top of gates in feet NGVD	1,620
8	Crest of spillway elevation in feety NGVD	1,593
9	Effective Length of Spillway in feet	190
10	Maximum design head on crest in feet	32
11	Design discharge in CFS	116,000
	Outlet Works Data	
12	Number of pipes	5
13	Size of each pipe in sq. ft.	48
	Reservoir Data	
14	Spillway design pool elevation in feet NGVD	1,625.5
15	Maximum topography in feet NGVD	1,630.0
16	Conservation pool in feet NGVD	1,593
17	Flood control pool in feet NGVD	1,620

Table A13 - Stannards Dam and Reservoir (Cont'd)

	Reservoir Data (Cont'd)	
18:	Size of pool at maximum water surface in acres	2,440
19:	Size of conservation pool in acres	1,550
20:	Size of flood control pool in acres	2,330
21:	Channel elevation at toe of dam in feet NGVD	1,531
22:	Conservation storage in acre-ft.	39,500
23:	Flood Control storage in acre-ft.	54,000
24:	Flood Control storage in inches of runoff	5.7
25:	Dead storage in acre-ft.	2,500
	Hydropower Data	
26:	Maximum hydropower head in feet	80
27:	Minimum hydropower head in feet	48
28:	Head used in Hydur in feet	64
29:	Minimum flow in CFS	35

Table A14 - Portage Dam and Reservoir

	Dam Data	
1	Elevation in feet NGVD of top of dam in feet NGVD	1,200
2	Top width in feet	45
3	Height above stream bed in feet	130
4	Length in feet	745
	Spillway Data	
5	Number of gates	9
6	Size of gates in feet	48 by 30
7	Elevation of top of gates in feet NGVD	1,190
8	Crest of spillway elevation in feety NGVD	1,160
9	Effective Length of Spillway in feet	430
10	Maximum design head on crest in feet	36
11	Design discharge in CFS	310,000
	Outlet Works Data	
12	Number of pipes	9
13	Size of each pipe in sq. ft.	45
	Reservoir Data	
14	Spillway design pool elevation in feet NGVD	1,196
15	Maximum topography in feet NGVD	1,200
16	Conservation pool in feet NGVD	1,160
17	Flood control pool in feet NGVD	1,190
18	Size of pool at maximum water surface in acres	7,000
19	Size of conservation pool in acres	4,100
20	Size of flood control pool in acres	6,400
21	Channel elevation at toe of dam in feet NGVD	1,085
22	Conservation storage in acre-ft.	123,000
23	Flood Control storage in acre-ft.	161,000
24	Flood Control storage in inches of runoff	3.1
25	Dead storage in acre-ft.	32,000
	Hydropower Data	
26	Maximum hydropower head in feet	463[1]
27	Minimum hydropower head in feet	433[2]
28	Head used in Hydur in feet	448[3]
29	Minimum flow in CFS	170

1. For scenario with power plant at the base of the lower falls, for power plant at base of dam, this value is 75 feet.
2. For scenario with power plant at the base of the lower falls, for power plant at base of dam, this value is 45 feet.
3. For scenario with power plant at the base of the lower falls, for power plant at the base of the dam, this value is 60 feet.

Table A15 - Poag's Hole Dam and Reservoir

	Dam Data	
1	Elevation in feet NGVD of top of dam in feet NGVD	1,000
2	Top width in feet	20
3	Height above stream bed in feet	210
4	Length in feet	1,700
	Spillway Data	
5	Number of gates	5
6	Size of gates in feet	60 by 18
7	Elevation of top of gates in feet NGVD	988
8	Crest of spillway elevation in feety NGVD	970
9	Effective Length of Spillway in feet	300
10	Maximum design head on crest in feet	24
11	Design discharge in CFS	117,000
	Outlet Works Data	
12	Number of pipes	2
13	Size of each pipe in sq. ft.	50
	Reservoir Data	
14	Spillway design pool elevation in feet NGVD	994
15	Maximum topography in feet NGVD	1,120
16	Conservation pool in feet NGVD	932
17	Flood control pool in feet NGVD	988
18	Size of pool at maximum water surface in acres	670
19	Size of conservation pool in acres	375
20	Size of flood control pool in acres	625
21	Channel elevation at toe of dam in feet NGVD	776
22	Conservation storage in acre-ft.	26,000
23	Flood Control storage in acre-ft.	30,000
24	Flood Control storage in inches of runoff	6.3
25	Dead storage in acre-ft.	3,000
	Hydropower Data	
26	Maximum hydropower head in feet	193
27	Minimum hydropower head in feet	116
28	Head used in Hydur in feet	155
29	Minimum flow in CFS	10

Table A16 - Mount Morris Dam and Reservoir

	Dam Data	
1	Elevation of top of dam in feet NGVD	790
2	Top width in feet	20
3	Height above stream bed in feet	215
4	Length in feet	1,028
	Spillway Data	
5	Number of gates	-
6	Size of gates in feet	-
7	Elevation of top of gates in feet NGVD	-
8	Crest of spillway elevation in feet NGVD	760
9	Effective Length of Spillway in feet	550
10	Maximum design head on crest in feet	28
11	Design discharge in CFS	320,000
	Outlet Works Data	
12	Number of pipes	9
13	Size of each pipe in sq. ft.	35
	Reservoir Data	
14	Spillway design pool elevation in feet NGVD	788
15	Maximum topography in feet NGVD	-
16	Conservation pool in feet NGVD	-
17	Flood control pool in feet NGVD	760
18	Size of pool at maximum water surface in acres	3,680
19	Size of conservation pool in acres	-
20	Size of flood control pool in acres	3,300
21	Channel elevation at toe of dam in feet NGVD	575
22	Conservation storage in acre-ft.	-
23	Flood Control storage in acre-ft.	301,000
24	Flood Control storage in inches of runoff	5.24
25	Dead storage in acre-ft.	610

Table A17 - Changes in Mount Morris Characteristics

Scenario D3	
Conservation pool elevation in feet NGVD	730
Size of conservation pool in acres	2,634
Conservation storage in acre-ft.	245,600
Flood Control storage in acre-ft.	56,000
Flood Control storage in inches of runoff	0.97
Head used in HYDUR	135
Scenario D4	
Conservation pool elevation in feet	697
Size of conservation pool in acres	2,300
Conservation storage in acre-ft.	161,000
Flood Control storage in acre-ft.	140,600
Flood Control storage in inches of runoff	2.44
Head used in HYDUR in feet	100
Scenario D5	
Conservation pool elevation in feet NGVD	720
Size of conservation pool in acres	2,514
Conservation storage in acre-ft.	215,000
Flood Control storage in acre-ft.	86,600
Flood Control Storage in inches of runoff	1.50
Head used in HYDUR in feet	126
Scenario D6	
Elevation of top of dam in feet NGVD	890
Height above stream bed in feet	315
Length of dam in feet	1,400
Crest of spillway elevation in feet NGVD	860
Spillway design pool elevation in feet NGVD	886
Conservation pool elevation in feet NGVD	768.5
Flood control pool elevation in feet NGVD	860
Size of pool at maximum water surface in acres	4,780
Size of conservation pool in acres	3,971
Size of flood control pool in acres	4,360
Conservation storage ir acre-ft.	328,000
Flood Control storage in acre-ft.	301,600
Flood Control storage in inches of runoff	5.24
Head used in HYDUR in feet	150

Table A17 - Changes in Mount Morris Characteristics (Cont'd)

Scenario D7	
Elevation of top of dam in feet NGVD	805
Height above stream bed in feet	230
Length of dam in feet	1,028
Crest of spillway elevation in feet NGVD	775
Spillway design pool elevation in feet NGVD	803
Conservation pool elevation in feet NGVD	652.1
Flood control pool elevation in feet NGVD	775
Size of pool at maximum water surface in acres	3,660
Size of conservation pool in acres	1,656
Size of flood control pool in acres	3,269
Conservation storage in acre-ft.	47,500
Head used in HYDUR in feet	60
Scenario D8	
Elevation of top of dam in feet NGVD	817
Height above stream bed in feet	242
Length of dam in feet	1,030
Crest of spillway elevation in feet NGVD	787
Spillway design pool elevation in feet NGVD	815
Conservation pool elevation in feet NGVD	683
Flood control pool elevation in feet NGVD	787
Size of pool at maximum water surface in acres	3,828
Size of conservation pool in acres	2,141
Size of flood control pool in acres	3,436
Conservation storage in acre-ft.	104,400
Head used in HYDUR in feet	90
Scenario D9	
Elevation of top of dam in feet NGVD	817
Height above stream bed in feet	242
Length of dam in feet	1,030
Crest of spillway elevation in feet NGVD	787
Spillway design pool elevation in feet NGVD	815
Conservation pool elevation in feet NGVD	765.7
Flood control pool elevation in feet NGVD	787
Size of pool at maximum water surface in acres	3,828
Size of conservation pool in acres	3,142
Size of flood control pool in acres	3,436
Conservation storage in acre-ft.	319,400
Flood Control storage in acre-ft.	86,600
Flood Control storage in inches of runoff	1.50
Head used in HYDUR in feet	170

Table A17 - Changes in Mount Morris Characteristics (Cont'd)

Scenario D10	
Elevation of top of dam in feet NGVD	817
Height above stream bed in feet	242
Length of dam in feet	1,030
Crest of spillway elevation in feet NGVD	787
Spillway design pool elevation in feet NGVD	815
Flood control pool elevation in feet NGVD	787
Size of pool at maximum water surface in acres	3,828
Size of flood control pool in acres	3,436
Flood Control storage in acre-ft.	406,000
Flood Control storage in inches of runoff	7.05
Head used in HYDUR in feet	36
Scenario D11	
Conservation pool elevation in feet NGVD	645
Size of conservation pool in acres	1,455
Conservation storage in acre-ft.	54,000
Flood Control storage in acre-ft.	247,600
Flood Control storage in inches of runoff	4.30
Head used in HYDUR	50
Scenario D12	
Conservation pool elevation in feet NGVD	630
Size of conservation pool in acres	1,007
Conservation storage in acre-ft.	30,000
Flood Control storage in acre-ft.	271,600
Flood Control Storage in inches of runoff	4.72
Head used in HYDUR	36

A8 FLOOD DAMAGES

The flood damages for each of the reaches described on Table A2 were updated using the discharge-frequencies developed for this report (Section A6). The stage-damages curves and stage-discharge curves from the 1 April 1974 Report "Post Flood Report on Effects of Agnes, Stannards Reservoir, NY" were used in the damage calculations. The expected average annual flood damages calculated using these curves are on June 1972 price levels, and were updated to current price levels. The method used to update the expected average annual flood damages can be found in Appendix B, Economics. The expected average annual damages for existing and improved conditions, under both June 1972 and current price levels, can be found on Table A18. The flood damages include agriculture damages, commercial damages, and residential damages. The stage-damage and rating curve for each damage reach used to calculate the expected average annual damages, can be found on Figures A7 through A25.

Table A18 - Expected Average Annual Damages

Reach	Name	Existing		Improved	
		June 1972	Current	June 1972	Current
1	Rochester	0.0	0.0	0.0	0.0
2	Chili-Henrietta	153.88	358.3	44.26	100.5
3	Avon	31.74	68.0	3.11	6.6
4	Geneseo	49.35	103.0	0.10	0.0
5	Mt. Morris	0.0	0.0	0.0	0.0
6	Portageville	16.33	19.4	1.67	1.7
7	Fillmore	42.36	65.6	4.81	7.3
8	Belfast	35.98	63.9	4.83	8.3
9	Belvidere	10.50	15.4	2.00	2.9
10	Belmont	18.78	40.4	0.0	0.0
11	Scio	39.12	77.2	0.01	0.0
12	Wellsville (G-1)	19.79	46.7	0.02	.10
12	Wellsville (G-2)	0.98	2.4	0.0	0.0
12	Wellsville (G-3)	28.37	69.8	0.0	0.0
12	Wellsville (G-4)	10.20	23.5	0.0	0.0
12	Wellsville (G-5A)	7.29	17.9	0.0	0.0
12	Wellsville (G-5B)	.53	1.3	0.0	0.0
12	Wellsville (G-6)	100.89	250.2	0.0	0.0
13	Stannards Corners	13.80	29.6	0.01	0.0
14	Shongo	8.14	16.8	8.14	16.8
	TOTAL	588.03	1270.4	68.96	144.20

Damages are in 1000's of U.S. Dollars

The expected average annual flood damages were calculated using the Hydrologic Engineering Center's computer program EAD, the 1 August 1984 microcomputer version (761-X6-L7580). The existing expected average annual damages were calculated using the existing discharge-frequency curves discussed in Section A6.1, while the improved expected average annual damages were calculated using the improved discharge-frequency curves discussed in Section A6.2. The decrease in expected average annual damages for the improved condtion for Reaches 6 through 13 are due to the operation of the proposed Stannards Dam and Reservoir. The decrease in expected average annual damages for Reaches 2 through 4 are due to the increased flood control storage at Mount Morris (scenario D10, as discussed in Section A9).

A disucssion of the different scenarios follows in Section A9.

A9 RESERVOIR SCENARIOS

In the initial phases of this study, 16 scenarios (or alternatives) were developed. After an initial screening of these 16 scenarios, 8 scenarios dropped out of contention. The remaining 8 scenarios were added to the no action plan to be evaluated more closely. These 8 scenarios and the no action plan became part of the 12 plans that are identified on Table 5.1 of the main report. The 16 scenarios are:

a. Scenario A: The proposed dam and reservoir at Stannards, whose physical characteristics can be found on Table A13. This is a multipurpose reservoir, with hydropower development as described in Section A10. HYDROPOWER. The proposed Stannards Dam and Reservoir would reduce flood damages on Reaches 6 through 13;

b. Scenario B1: The proposed dam and reservoir at Portage, whose physical characteristics can be found on Table A14. The Portage site is a multipurpose reservoir, with the proposed location of the hydropower plant at the base of the Lower Falls in Letchworth State Park. The hydropower development of this scenario can be found in Section A10. This propose dam and reservoir would not reduce downstream damages, but allows flood control storage at Mount Morris Dam and Reservoir to be converted to conservation storage;

c. Scenario B2: Same as Scenario B1, but the proposed hydropower plant is located at the base of the dam, instead of at the base of the Lower Falls;

d. Scenario C: The proposed dam and reservoir at Poag's Hole, whose physical characteristics can be found on Table A15. This is a multipurpose reservoir, with hydropower development as described in Section A10. The propose dam and reservoir at Poag's Hole would reduce damages on the Canaseraga Reaches downstream from the dam. The reduction in flood damages for Canaseraga Creek can be found in Section A11;

e. Scenario D1: Re-regulation of Mount Morris Dam and Reservoir;

f. Scenario D2: Adds a run-of-the-river hydropower plant at the base of the Mount Morris Dam and Reservoir. Additional information on the hydropower development can be found in Section A10;

g. Scenario D3: A reservoir system consisting of Stannards, Portage, Poag's Hole and Mount Morris. A portion of the flood control pool at Mount Morris, equal to the combined flood control pools of the other three reservoirs, was converted to conservation storage. The conservation storage at Mount Morris will be used to generate hydropower. For this scenario, Stannards Dam and Reservoir remains as described in Scenario A, Portage Dam and Reservoir remains as described in Scenario B1, and Poag's Hole remains as described in Scenario C. Mount Morris Dam and Reservoir is described on Table A16, with changes to Table A16 for this scenario found on Table A17. The information on hydropower generation can be found in Section A10;

h. Scenario D4: A reservoir system consisting of Portage Dam and Reservoir and Mount Morris Dam and Reservoir. A portion of the flood control pool at Mount Morris, equal to the flood control pool for Portage, was converted to conservation storage to be used for hydropower generation. For this scenario, Portage Dam and Reservoir remains as described in Scenario B1. Mount Morris Dam and Reservoir is described on Table A16, with changes to Table A16 for this scenario found on Table A17. The information on hydropower generation can be found in Section A10;

i. Scenario D5: A reservoir system consisting of the Stannards Dam and Reservoir, Portage Dam and Reservoir, and Mount Morris Dam and Reservoir. A portion of the flood control pool for Mount Morris, equal to the sum of the flood control pools for Stannards and Portage, was converted to conservation storage to be used for hydropower generation. For this scenario, Stannards remains as described in Scenario A, Portage remains as described in Scenario B1. Mount Morris is described on Table A16, with changes to Table A16 for the scenario found on Table A17. Information on hydropower generation can be found in Section A10;

j. Scenario D6: Construction of a new dam at Mount Morris, 100 feet higher than the present dam. The increase in storage will become conservation storage to be used for hydropower generation. The description of Mount Morris can be found on Table A16, with changes to Table A16 for this scenario found on Table A17. Information on hydropower generation can be found in Section A10;

k. Scenario D7: Mount Morris dam will be raised 15 feet. The increase in storage will be used for hydropower generation. The description of Mount Morris can be found on Table A16, with changes to Table A16 for this scenario found on Table A17. Information on hydropower generation can be found in Section A10;

l. Scenario D8: Mount Morris Dam will be raised 27 feet. The increase in storage will be used for hydropower generation. The description of Mount Morris can be found on Table A16, with changes to Table A16 for this scenario found on Table A17. Information on hydropower generation can be found in Section A10;

m. Scenario D9: A system of reservoirs consisting of Stannards Dam and Reservoir, Portage Dam and Reservoir, and a modified Mount Morris Dam and

Reservoir. Mount Morris Dam is raised 27 feet, with the addition storage to be used for hydropower generation. In addition, a portion of the flood control pool at Mount Morris, equal to the sum of the flood control pool at Stannards and Portage, will be converted to conservation storage to be used for hydropower generation. Stannards remains the same as described in Scenario A, and Portage remins the same as described in Scenario B1. The description of Mount Morris can be found on Table A16, with changes to Table A16 due to this scenario can be found on Table A17. Information on hydropoer generation can be found in Section A10;

n. Scenario D10: Mount Morris Dam will be raised 27 feet. All the increase in storage will be used for downstream flood control. A run of the river hydropower plant will be built at the base of the dam. The description of Mount Morris can be found on Table A16, with changes to Table A16 due to this scenario can be found on Table A17. Information on hydropower generation can be found in Section A10;

o. Scenario D11: A system of reservoirs comprised of Stannards and Mount Morris. A portion of the flood control pool at Mount Morris, equal to the flood control pool at Stannards, was converted to conservation storage to be used to generate hydropower. Stanndards remains the same as described in Scenario A. The description of Mount Morris can be found on Table A16, with changes to Table A16 due to this scenario found on Table A17. Information on hydropower can be found in Section A10; and

p. Scenario D12: A systems of reservoirs comprised of Poag's Hole Dam and Reservoir and Mount Morris. A portion of the flood control pool at Mount Morris, equal to the flood control pool at Poag's Hole, was converted to conservation storage to be used to generate hydropower. Poag's Hole remains the same as described in Scenario C. The description of Mount Morris can be found on Table A16, with changes to Table A16 due to this scenario found on Table A17. Information on hydropower can be found in Section A10.

The elevation of the 16 scenarios during the initial screening can be found on Table 4.1 of the main report. The 8 scenarios that did not pass the initial screening are A, B1, B2, C, D2, D6, D10, and D11. The scenarios that pass the the initial screening, with the identifying PLANS in parenthesis, are:

a. D1 (PLAN 1)
b. D3 (PLAN 3)
c. D4 (PLAN 4)
d. D5 (PLAN 5)
e. D7 (PLAN 7)
f. D8 (PLAN 8)
g. D9 (PLAN 9)
h. D12 (PLAN 10)

Three additional plans were formulated using components of Scenario A and D7; A, D8, and D9; and modifying Scenario D11. The description of these plans can be found in the main text.

A10 HYDROPOWER

Using the HYDUR computer program developed by the Hydrologic Engineering Center (dated February 1982), the hydropower potential of each of the Scenarios were analyzed. HYDUR uses flow durations curves to analyze hydropwer potential. The flow duration curve for Canaseraga Creek near Dansville gage (04225000), drainage area = 152 sq. mi., was used for the hydropower analysis at the propose Poag's Hole, drainage area = 89 sq. mi. The flow duration curve from the Genesee River at Wellsville (04221000) gage, drainage area = 288 sq. mi., was used to analyze the hydropower potential of the proposed Stannards Dam and Reservoir, drainage area = 178 sq. mi. The flow duration curve for the Genesee River at Portageville (04223000) gage drainage are = 984 sq. mi., was used to analyze the hydropower potentials at both the propose Portage Dam and Reservoir, drainage area 984 sq. mi., and the existing Mount Morris Dam and Reservoir, drainage area = 1,080 sq. mi.

Since the drainage areas at the dam sites are not always the drainage area at the gages, the flow duration curves were adjusted to each dam sites by using the method of moving discharge upstream and downstream discussed in Section A6.1. The flow duration curves at the three gages can be found on Figures A26 through A28.

The results of hydropower analysis for each scenario can be found on Table A19.

Table A19 - Hydropower Analysis

Scenarios	Installed Capacity (KW)	Annual Firm Energy (MWH)	Annual Energy Generated (MWH)	Improvements
A Stannards	2,700	4,540	11,090	1 Tube Turbine
B1 Portage	66,000	81,720	289,295	10 Tube Turbine
B2 Portage	7,000	10,940	35,670	1 Tube Turbine
C Poag's Hole	1,100	5,090	7,910	1 Francis Turbine
D2 Mount Morris	3,000	0.0	11,530	1 Francis Turbine
D3 Mount Morris	100,000	81,720	320,000	10 Tube Turbine
Stannards	2,700	4,540	11,090	1 Tube Turbine
Portage	66,000	81,720	289,295	10 Tube Turbines
Poag's Hole	1,100	5,090	7,910	1 Francis Turbine
D4 Mount Morris	100,000	41,830	71,370	1 Tube Turbine
Portage	66,000	81,720	289,295	10 Tube Turbines

Table A19 - Hydropower Analysis (Cont'd)

Scenarios	Installed Capacity (KW)	Annual Firm Energy (MWH)	Annual Energy Generated (MWH)	Improvements
D5 Mount Morris	22,000	57,440	100,010	1 Tube Turbine
Portage	66,000	81,720	289,295	10 Tube Turbines
Stannards	2,700	4,540	11,090	1 Tube Turbine
D6 Mount Morris	30,000	60,780	119,200	3 Tube Turbines
D7 Mount Morris	6,500	0.0	34,360	1 Tube Turbine
D8 Mount Morris	8,300	21,460	51,760	1 Tube Turbine
D9 Mount Morris	30,000	87,530	134,633	10 Small Kaplan
Portage	66,000	81,720	289,295	10 Tube Turbines
Stannards	2,700	4,540	11,090	1 Tube Turbine
D10 Mount Morris	4,700	0.0	19,680	1 Francis Turbine
D11 Mount Morris	7,000	0.0	32,130	1 Tube Turbine
Stannards	2,700	4,540	11,090	1 Tube Turbine

The hydropower analysis results are very preliminary, and will need to be analyzed in more detail in next phase of study. The results were taken directly from the HYDUR output, without regard to the implications of the results. For example, instead of 1 2700 KW Tube Turbine, you might want 3 1,400 KW Tube Turbines using 2 to generate power, and 1 as a back up.

A11. CANASERAGA CREEK

A Phase I Report for a local protection project at Canaseraga Creek was completed in October 1973. This report recommended that a Phase II Study be conducted to include a more detailed study of selected alternatives with benefit/cost ratios close to unity. The Canaseraga Watershed can be found on Plate A11.

Under this study, the area below Dansville along Canaseraga Creek was divided into eight reaches for damage analysis. Since the time the Phase I Report was completed, much work has been done in these reaches to alleviate flooding of farmland from Canaseraga Creek, Bradner Creek, and the State Canal. This work consists of various levees and a gate and pump station to prevent high water on Canaseraga Creek from backing up into Bradner Creek and the State Canal. These measures have reduced the damages sustained by farmers in the area to such an extent that the benefits realized by additional measures would not justify the costs incurred. In addition, a significant source of benefits under the alternatives recommended for further study in the Phase I Report was from ponding areas, which are not acceptable to the local people due to the value of the land when under crop production.

However, residual damages in the valley remain relatively high. Total agricultural inundation damages at May 1986 price levels were estimated at $414,746. These damages may justify some type of local flood protection project. A study to formulate such a local plan may be undertaken in the feasibility phase of this current study.

This study updated the expected average annual damages for the eight reaches below Dansville. The description of each reach can be found on Table A20. Reaches 1, 6, and 7 have flood control works that provide an estimated 5 years protection. Reach 5 has 100-year protection (estimated). The stage-frequency curves obtained partially from the Flood Insurance Studies of town of Groveland, Livingston County (June 1978) and the rest from the August 1973 Summary Report "Tropical Storm Agnes, June 1972," for the Genesee River Basin, were adjusted accordingly.

Stage-damage curves from the Agnes summary report were used in the EAD computer program to calculate the expected average annual damages for the eight damage reaches downstream from Dansville. The residual average annual flood damages left with Poag's Hole on line, were also calculated. It was assumed that only the reaches on the main stem of Canaseraga Creek would experience a reduction in flooding due to the proposed Poag's Hole Reservoir. These are reaches 1, 2, and 5. Reaches 3, 4, 6, and 7 will experience some flood reduction due to Poag's Hole, but this reduction could not be calculated at this level of study. The reaches and their damages are:

	Existing $	Improved $
Reach 1	15,300	3,600
Reach 2	6,000	1,500
Reach 3	800	800
Reach 4	9,300	9,300
Reach 5	1,200	0
Reach 6	3,200	3,200
Reach 7	900	900
Reach 8	121,600	121,600
Total	158,400	140,900

(January 1967 dollars)

The expected average annual flood damages for the damage reach in Dansville, New York, were updated using the updated discharge-frequency curve for Canaseraga Creek above Dansville (04224775), Figure A3, the computer program EAD, and the stage-damage and rating curves from the December 1980 Phase II Report for Dansville, New York. The flood damages for both the existing condition and improved condition (Poag's Hole) are:

Existing Expected Average Annual Flood Damages
(March 1979 dollars)

	$
Residential	2,340
Commercial	54,480
Total	56,820

Improved Expected Average Annual Flood Damages
(March 1979 dollars)

	$
Residential	0.0
Commercial	0.0
Total	0.0

Information on the Poag's Hole Dam and Reservoir can be found in Section A7. A discussion on how these values were raised to current values is in Appendix B, Economics. The discharge-frequency curve for Canaseraga Creek is discussed in Section A6.1.

Table A20 - Canaseraga Creek Damage Reaches

Reach No.	Location of Index Point	Initial Damaging Stage Feet	Description of Reach
1	On Canaseraga Creek 1,600 feet downstream of the confluence with Keshequa Creek	555.0	An irregular shaped area with the downstream limit at State Route 408 and the upstream limit at the proposed retention structure at Station 213.00.
2	On Canaseraga Creek 1,400 feet downstream of the confluence with Keshequa Creek	559.0	A triangular shaped area bounded on the west by the Erie-Lackawanna RR embankment, on the east by State Route 63 and on the south by the proposed retention structure at Station 213.00.
3	100 feet downstream of Pioneer Road and 15,000 feet east of State Route 36.	569.0	A trapezoidal area bounded on the east by the Erie-Lackawanna RR, on the north by Keshequa Creek, and on the south by Pioneer Road.
4	100 feet downstream of State Route 258 on State Canal	567.0	A trapezoidal area bounded on the east by the Erie-Lackawanna RR, on the north by Pioneer Road and on the south by State Route 258.
5	On Canaseraga Creek approximately 3,500 feet north of Everman Road Bridge and 50 feet upstream of an existing farm bridge.	584.0	The area to the east of the Dansville & Mount Morris RR from State Route 258 upstream to White Bridge.
6	100 feet upstream of State Route 258 on State Canal.	565.0	A trapezoidal area bounded on east by the D&M Mo. RR, on the north by State Route 258, and on the south by a line perpendicular to the railroad 9,100 feet south of the junction of State Route 258 and the railroad.

Table A20 - Canaseraga Creek Damage Reaches (Cont'd)

Reach No.	Location of Index Point	Initial Damaging Stage Feet	Description of Reach
7	7,200 feet downstream of Everman Road on State Canal.	569.0	The area to the west of the D&M Mo. RR bounded on the north by the southern limit of Reach 6 and on the south by Everman Road.
8	On Bradner Creek, 100 feet upstream of Everman Road.	583.0	The area to the west of the D&M Mo. RR bounded on the north by Everman Road and on the south by the right bank of Canaseraga Creek.

A12. GENESEE RIVER STREAMBANK EROSION

The Genesee River through Rochester is within a rock-lined gorge which cuts the Niagara escarpment, while upstream it is contained by urbanization of the flood plain. Bank erosion in this area is insignificant, but the Genesee occasionally erodes the soft, underlying Rochester Shale causing localized rock falls of the Lockport Dolomite cap rock.

Between Rochester and Mt. Morris, the Genesee becomes sinuous and flows over a broad flood plain of till, alluvium, and lacustrine-silt deposits. The meander shape and erosion activity is strongly controlled by the type of surficial material. Dynamic erosion of valuable agricultural land in the area of Avon and south of Geneseo has resulted in fairly rapid bank migration and the presence of numerous oxbows and cutoffs. The surficial material of those two areas is lacustrine silts.

Letchworth State Park follows the river from Mt. Morris to Portageville. In that reach, the river is confined to a deep, narrow 21.2-mile long shale gorge as it passes over the Portage escarpment. The Federal Mt. Morris Dam and a series of three waterfalls are located within the park. Although the river does redistribute alluvium deposits within the gorge, bank erosion is considered to be insignificant in this reach.

From Portageville to Wellsville, the Genesee River follows a sinuous course through a high-walled but wide valley. The bedrock walls of the valley are covered with varying thickness of till. In a few places, the river's course takes it close to the valley walls resulting in the erosion of high till bluffs. However, for the most part, erosion is frequently confined to 5 to 20-foot high alluvium banks on the outside meander bend.

Through Wellsville, the Genesee is confined by bank structures (sheet pile, concrete, riprap, and earthen levees) placed as part of the Federal flood control project and by various State projects. South of Wellsville, the Genesee River becomes a small, very sinuous creek with low, marshy banks, heavy vegetation, with only a moderate degree of erosion.

Channel gradients from Wellsville to Rochester are presented in Table A21.

Table A21 - Channel Gradients

Reach	Gradient (ft/mile)
Wellsville	
	12.23
Expressway	
	6.86
Fort Hill	
	3.0
Portageville	
	24.95
Mt. Morris	
	6.5
Canaseraga Junction	
	1.5
Geneseo	
	0.75
Avon	
	0.48
Rochester	

For the purposes of the streambank erosion analysis, the Genesee River was divided into 11 reaches as follows:

Reach 1 - Lake Ontario to confluence with Honeoye Creek.

Reach 2 - Confluence with Honeoye Creek to upstream of Avon (near Fowlerville Road Bridge.

Reach 3 - Upstream of Avon to Route 63 (Geneseo).

Reach 4 - Route 63 to Mt. Morris Dam.

Reach 5 - Mt. Morris Dam to Portageville gaging station (gorge area).

Reach 6 - Portageville gaging station to Fillmore Road.

Reach 7 - Fillmore Road to Caneadea.

Reach 8 - Caneadea to Transit Bridge.

Reach 9 - Transit Bridge to confluence with VanCampen Creek (Belvidere).

Reach 10 - Confluence with VanCampen Creek to Wellsville (Dyke Creek).

Reach 11 - Wellsville (Dyke Creek) to source (Pennsylvania).

The river centerline migration was traced from aerial photographs. Reaches 3 and 4 were analyzed at 5 different years; 1938, 1954, 1963, 1974, and 1982. Reaches 6 through 11 were analyzed at 2 years, 1964 and 1983. These were plotted on quadrangle sheets and are shown on Plates A12 through A29. There were no significant changes in river centerline in Reaches 1 and 2; therefore, these were not plotted.

Loss of land due to streambank erosion is summarized in Table A22. The methodology is described by column as follows:

1. Reach Number - described in Table A22.

2. Reach Length (feet) - measured on maps.

3. Total Bank Length (feet) - column (2) times two banks per reach.

4. Length of Eroding Bank (feet) - estimated from field surveys and map and photo analysis.

5. Percent Eroding Bank - Column (4) - Column (3).

6. Weighted Rate of Erosion (foot/year) - The length of each meander of erosion site was estimated in the field or from maps and aerial photos. The rates of erosion were estimated based on the river centerline migration over the years of photo analysis. The eroding length for each site was then multiplied by the rate at that site and then divided by the total eroding length for the reach in order to obtain a weighted rate of erosion for each site. These weighted rates for each site were then A-2 to obtain a weighted rate of erosion for the entire reach.

7. Loss of Land (acre/year) - Column (2) X Column (4) - 43,560 ft^2/acre.

8. Percent Farmland along Banks - estimated from field surveys and quad sheets.

9. Loss of Farmland (acre/year) - Column (8) X Column (7).

Various and significant stabilization procedures would be necessary to control the erosion problems along the Genesee River. These procedures would range from simple treatment, consisting of reestablishment of native trees and grasses, to armoring which involves placement of stone riprap along the banks. The benefits of protection are minimal since the value of the acreage saved is small when compared to the costs of remedial measures. The acreage that would be protected by reservoir plans is also minimal resulting in a benefit/cost ratio significantly less than unity as shown in the Economic Appendix.

Table A22 - Annual Loss of Land Due to Streambank Erosion along the Genesee River

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Reach Number	Reach Length (feet)	Total Bank Length (feet)	Length of Eroding Bank (feet)	Percent Eroding Bank	Weighted Rate of Erosion (ft/yr)	Loss of Land (ac/yr)	Percent Farmland along Banks	Loss of Farmlands (ac/yr)
1	140,400	280,800	Negligible	-	-	-	-	-
2	65,500	131,000	8,000	6	6.0	1.1	-	-
3	71,300	142,600	16,000	11	6.0	2.2	-	-
4	68,600	137,200	30,700	22	12.0	8.5	90	7.7
5	111,900	223,800	Negligible	-	-	-	-	-
6	70,200	140,400	37,300	27	9.7	8.3	30	2.5
7	44,900	89,800	24,000	27	11.9	6.6	50	3.3
8	52,800	105,600	30,700	29	14.4	10.1	50	5.1
9	31,150	62,300	23,000	37	11.6	6.1	20	1.2
10	70,200	140,400	24,400	17	17.5	9.8	20	2.0
11	99,300	198,600	26,000	13	6.0	3.6	10	0.4
Total	826,250	1,652,500	220,100			56.3		22.2

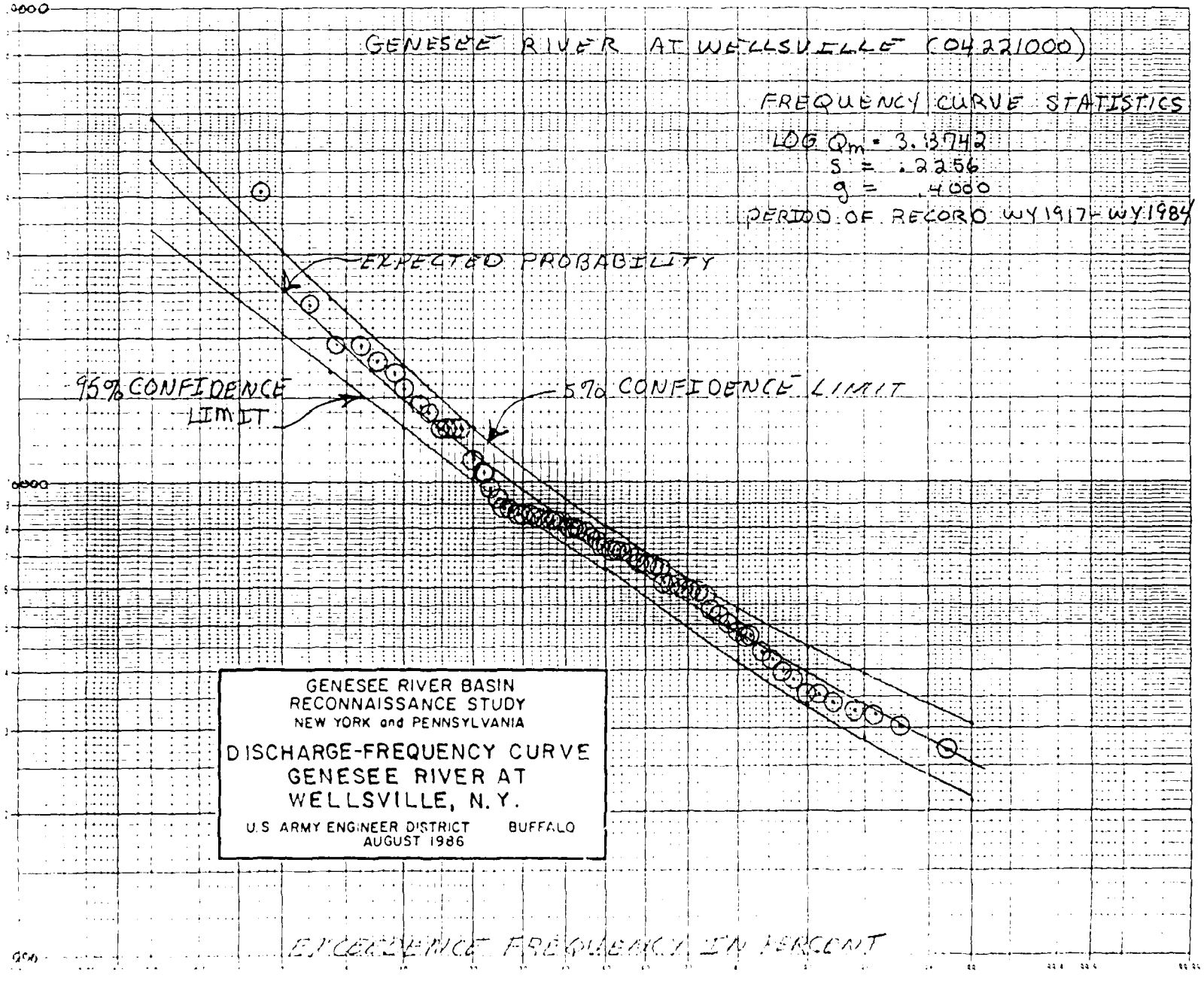

GENESEE RIVER AT WELLSVILLE (04221000)
FREQUENCY CURVE STATISTICS
LOG Qm = 3.13743
S = .2256
g = .4000
PERIOD OF RECORD WY1917-WY1984
EXPECTED PROBABILITY
95% CONFIDENCE LIMIT
5% CONFIDENCE LIMIT
GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA
DISCHARGE-FREQUENCY CURVE
GENESEE RIVER AT
WELLSVILLE, N.Y.
U.S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986
DISCHARGE IN CFS
EXCEEDENCE FREQUENCY IN PERCENT

FIGURE A1

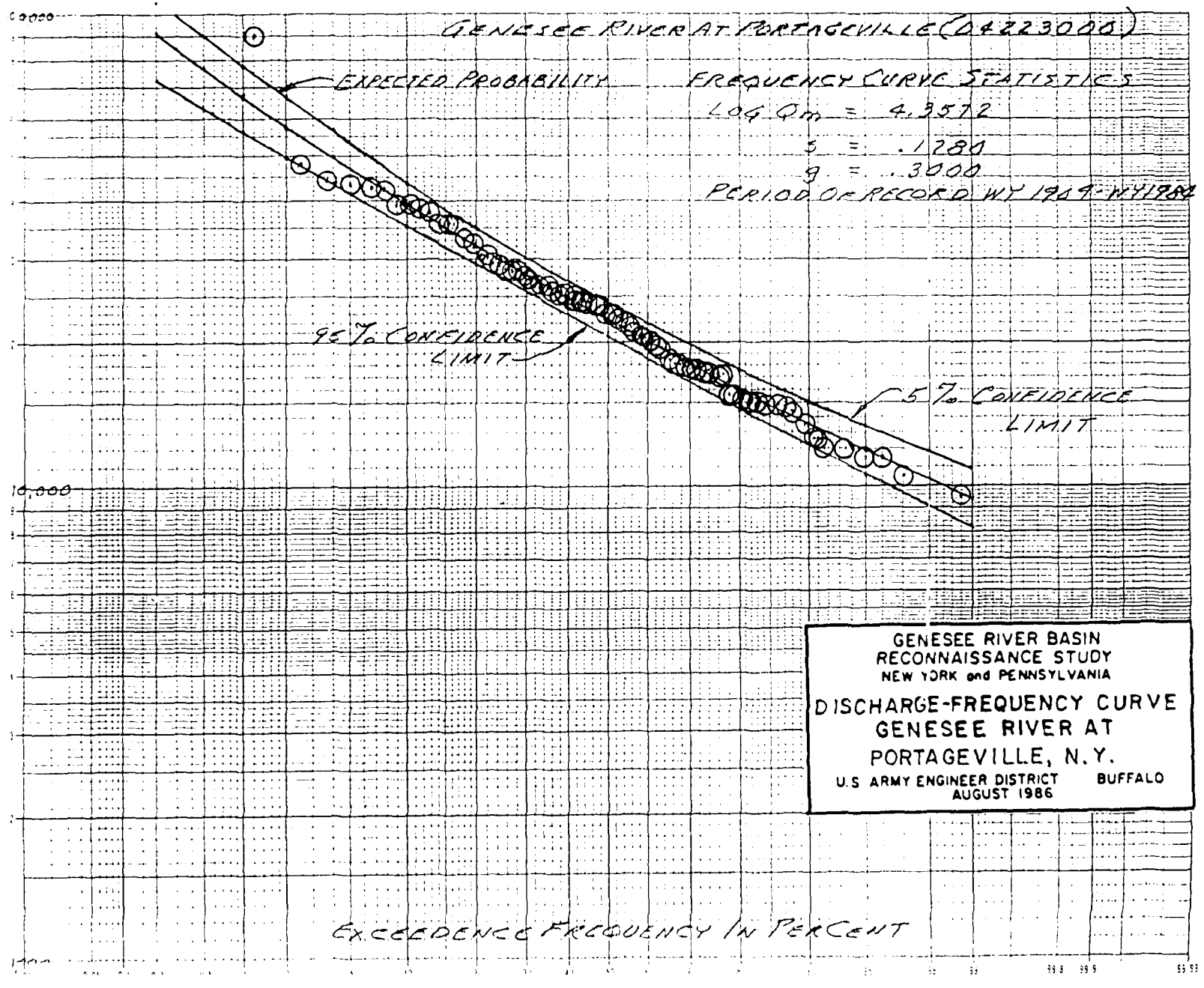

GENESEE RIVER AT PORTAGEVILLE (04223000)
EXPECTED PROBABILITY
FREQUENCY CURVE STATISTICS
Log Qm = 4.3572
s = .1280
g = .3000
PERIOD OF RECORD WY 1929-WY1982
95 % CONFIDENCE LIMIT
5 % CONFIDENCE LIMIT
10,000
DISCHARGE IN C.F.S.
EXCEEDENCE FREQUENCY IN PERCENT
GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA
DISCHARGE-FREQUENCY CURVE
GENESEE RIVER AT
PORTAGEVILLE, N.Y.
U.S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

FIGURE A2

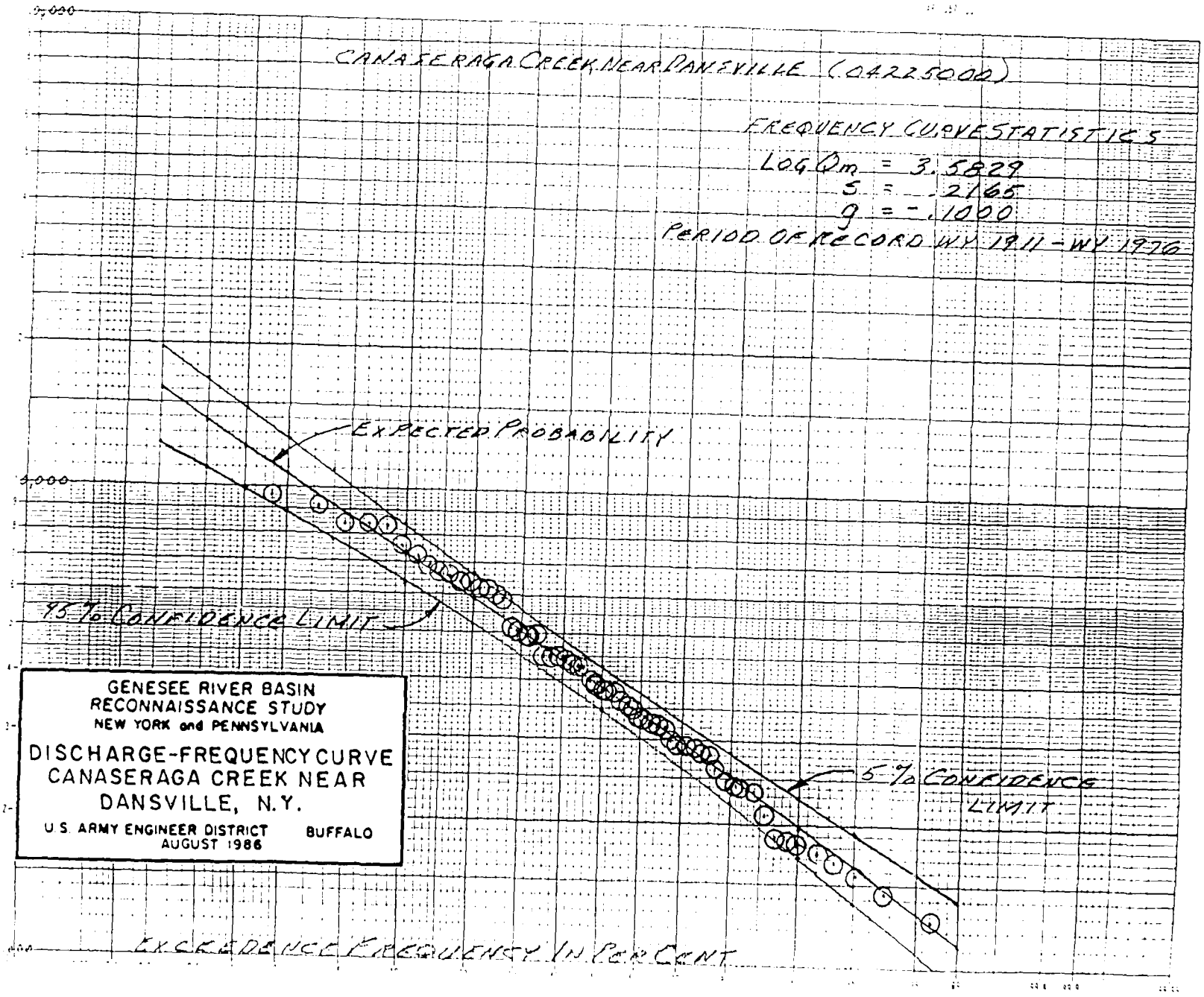
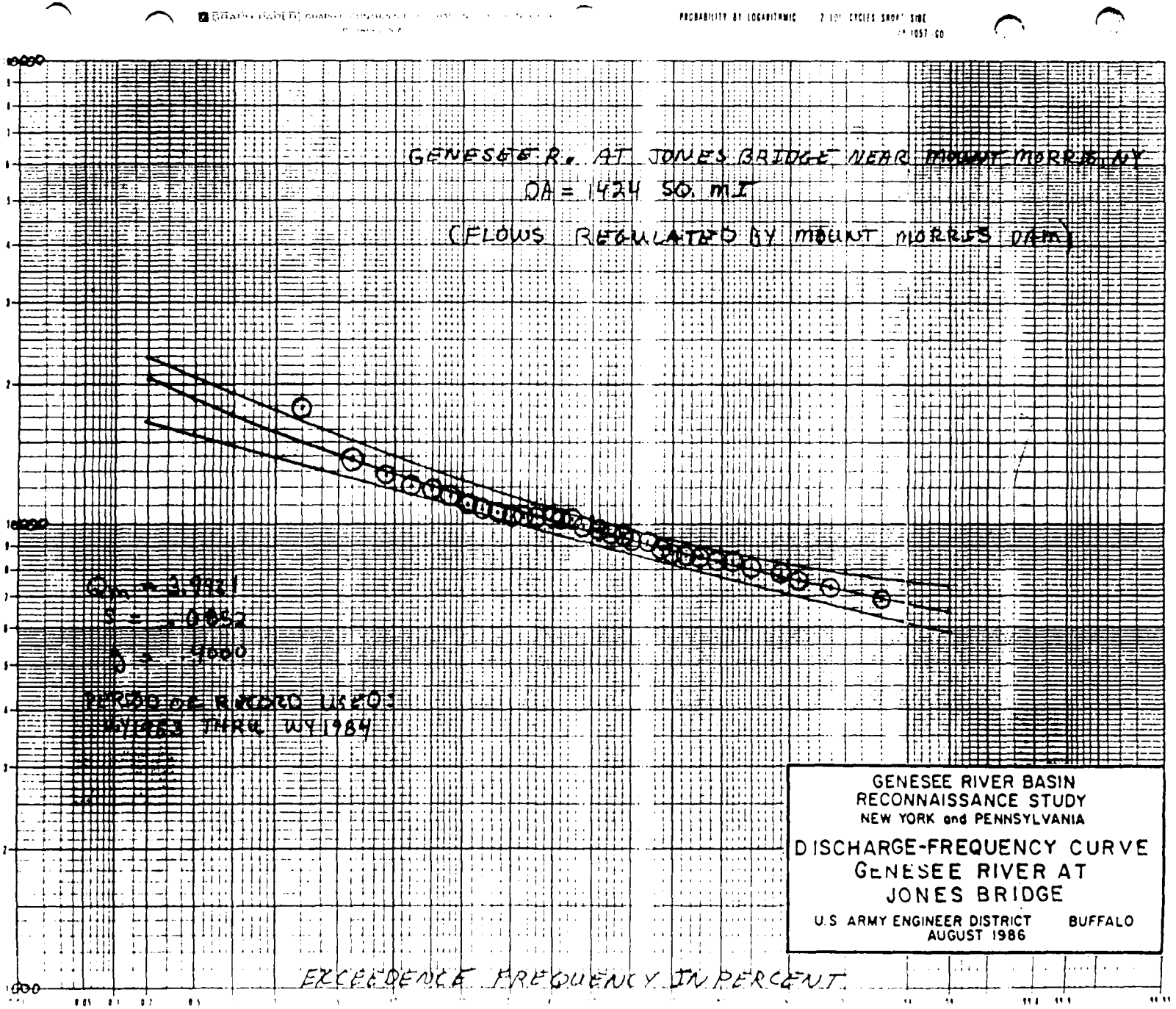

CANASERAGA CREEK NEAR DANSVILLE (04225000)
FREQUENCY CURVE STATISTICS
Log Qm = 3.5829
S = .2165
g = -.1000
PERIOD OF RECORD WY 1911 - WY 1976
EXPECTED PROBABILITY
95% CONFIDENCE LIMIT
5% CONFIDENCE LIMIT
EXCEEDENCE FREQUENCY IN PER CENT
DISCHARGE IN CFS
GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA
DISCHARGE-FREQUENCY CURVE
CANASERAGA CREEK NEAR
DANSVILLE, N.Y.
U.S. ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

FIGURE A 3



DISCHARGE IN CFS

A50

FIGURE A 4

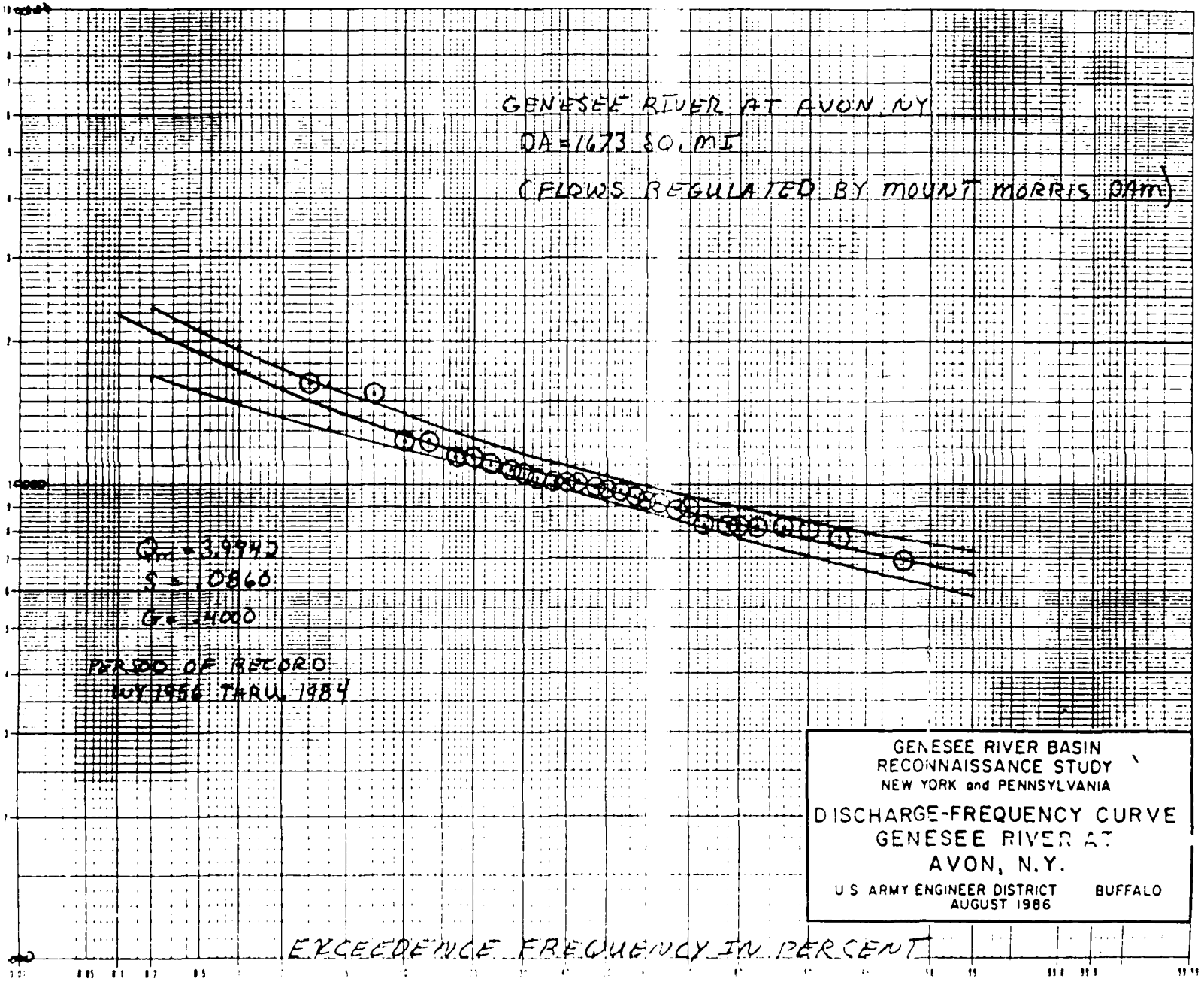
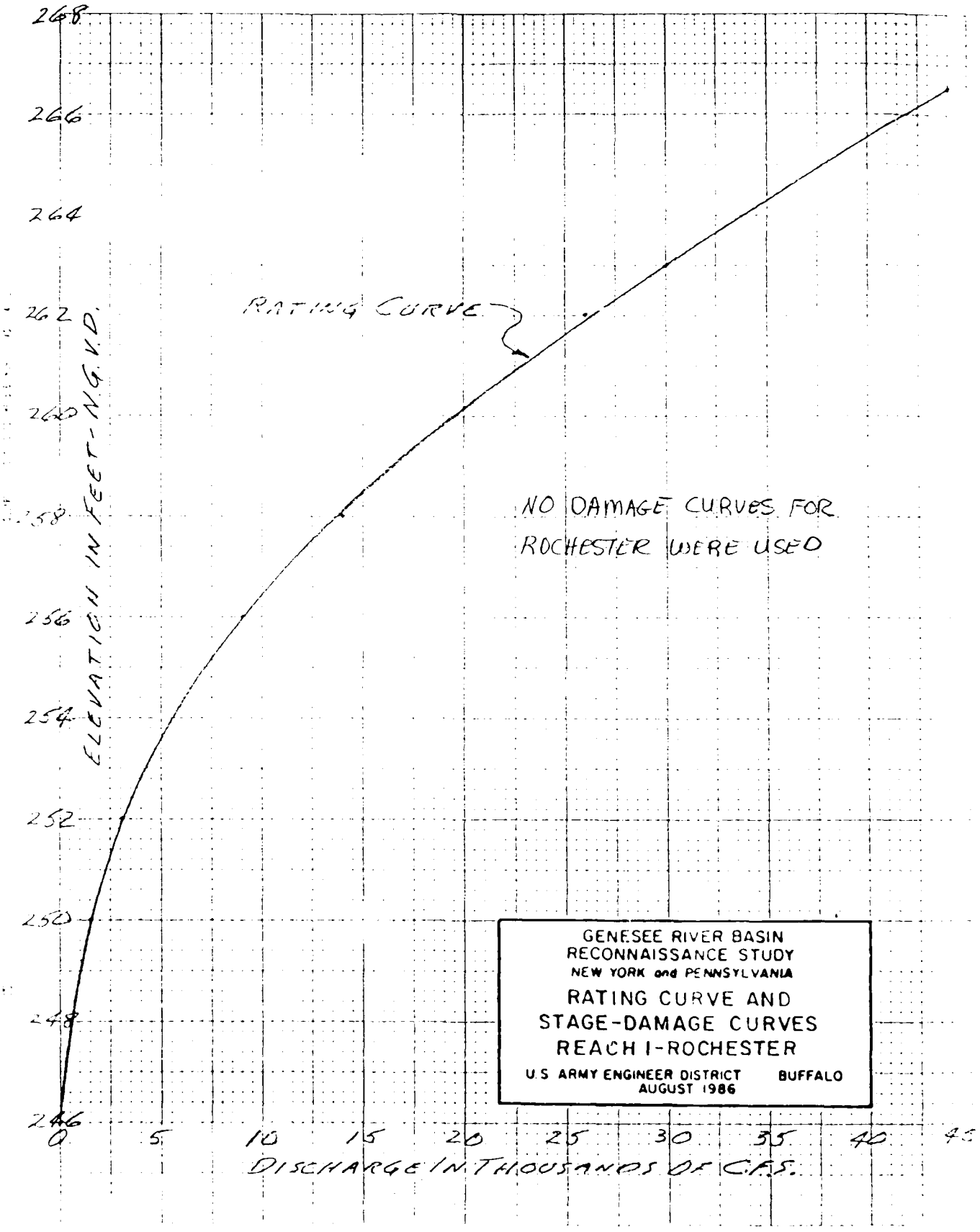


FIGURE A 5

A51

ROCHESTER



GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA

RATING CURVE AND
STAGE-DAMAGE CURVES
REACH I-ROCHESTER

U.S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

FIGURE A7

CHILI

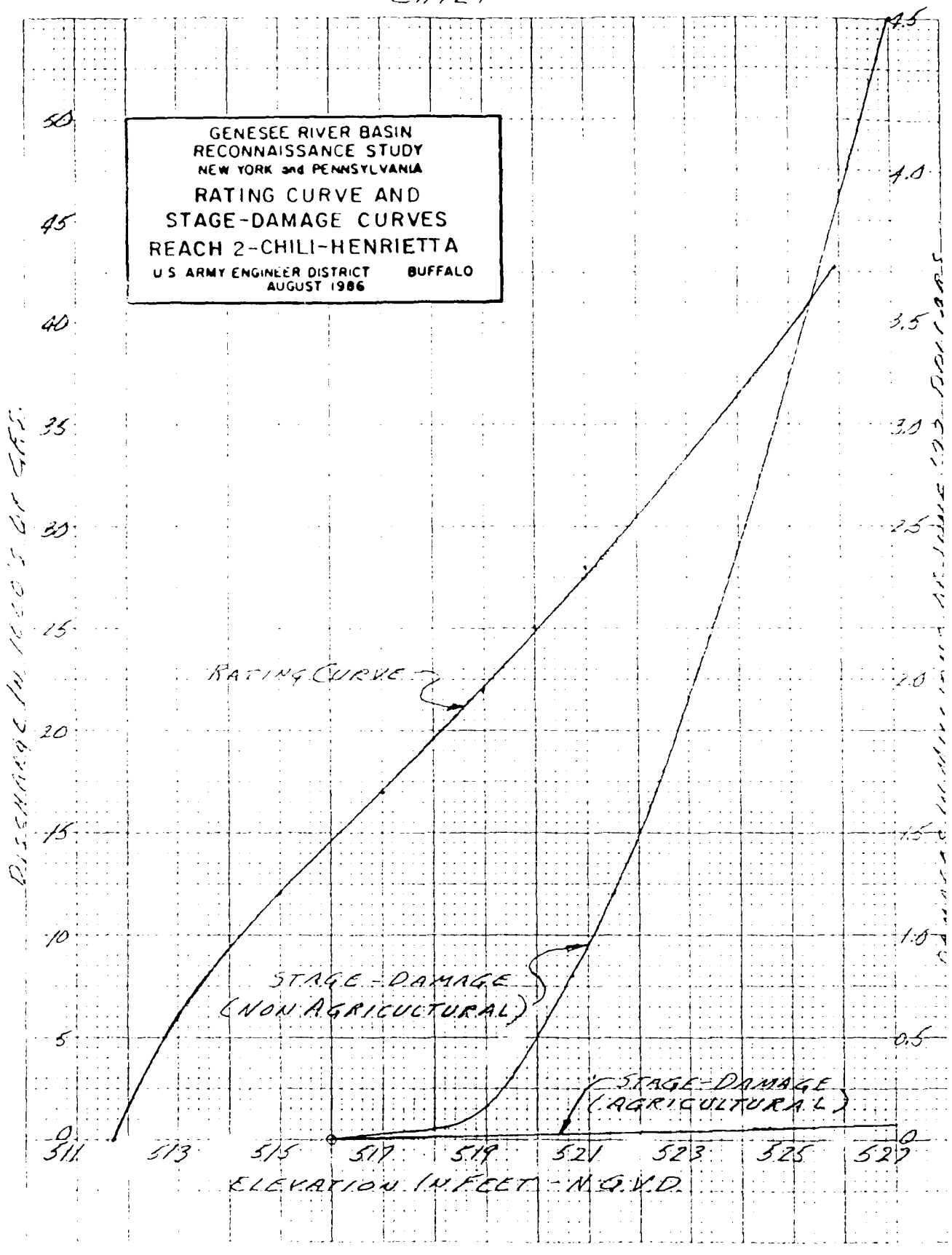


FIGURE A 8

AVON

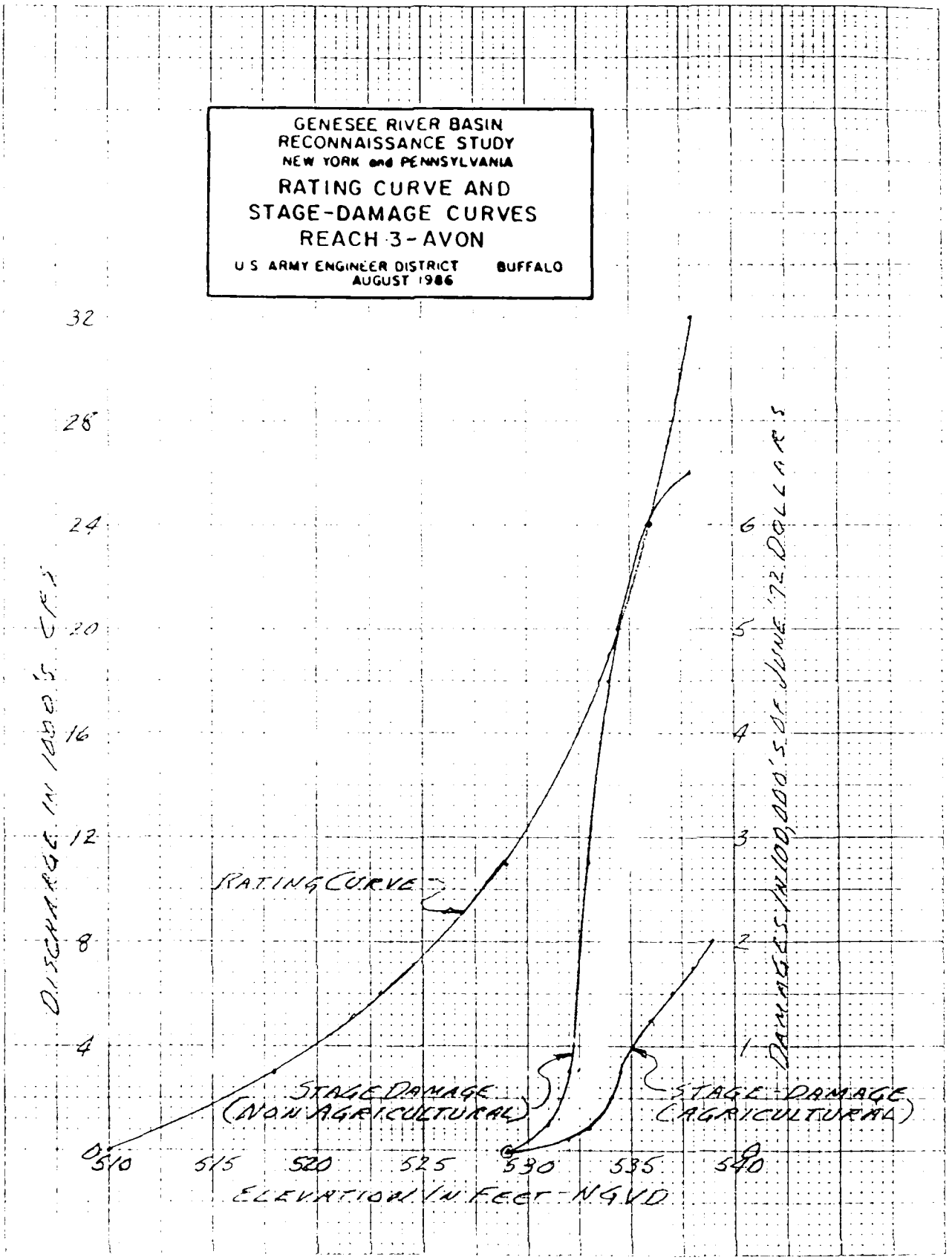


FIGURE A 9

GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA

RATING CURVE AND
STAGE-DAMAGE CURVES
REACH 4 - GENESEO

U S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

GENESEO

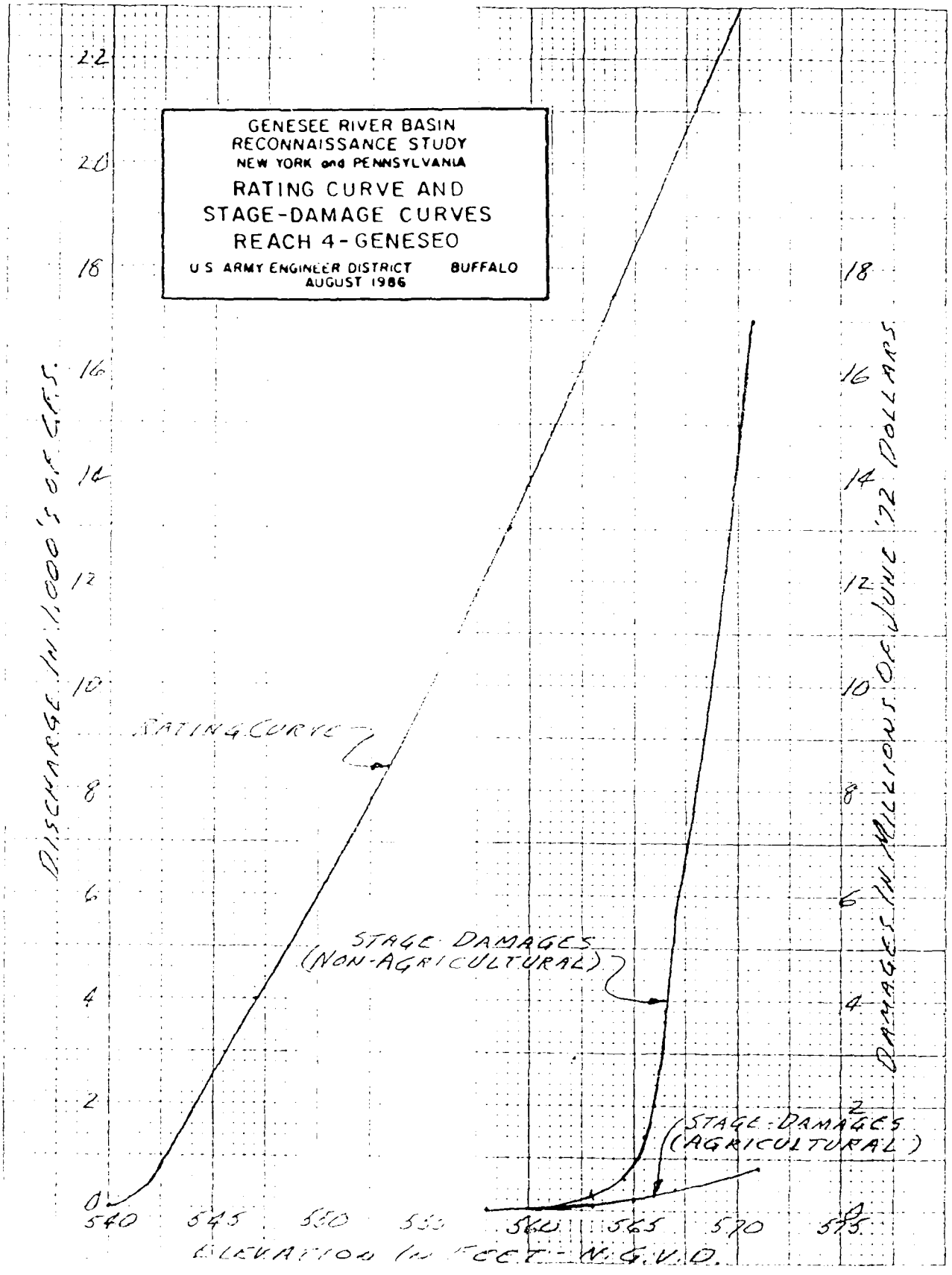


FIGURE A 10

PORTAGEVILLE

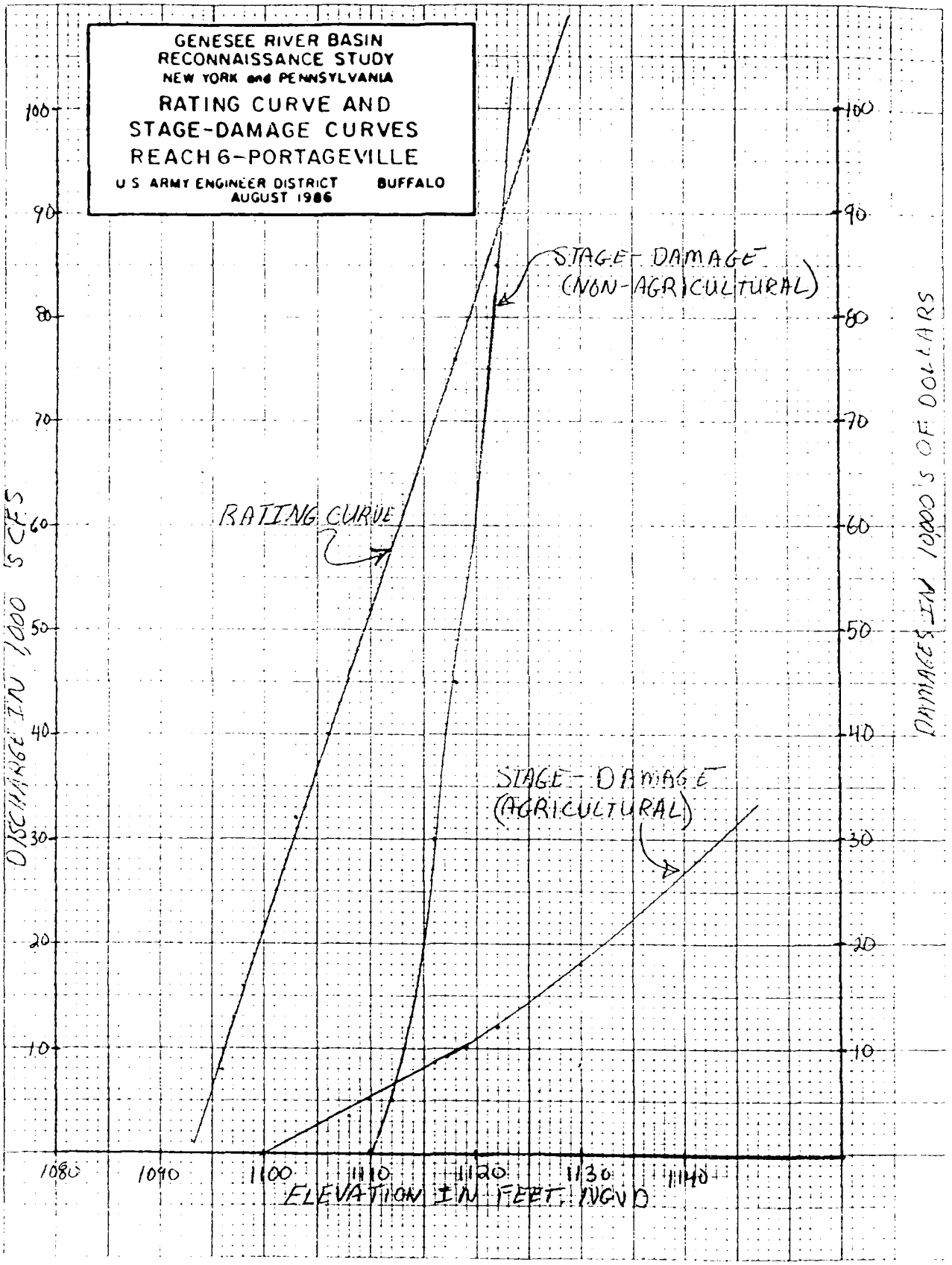


FIGURE A1

FILLMORE

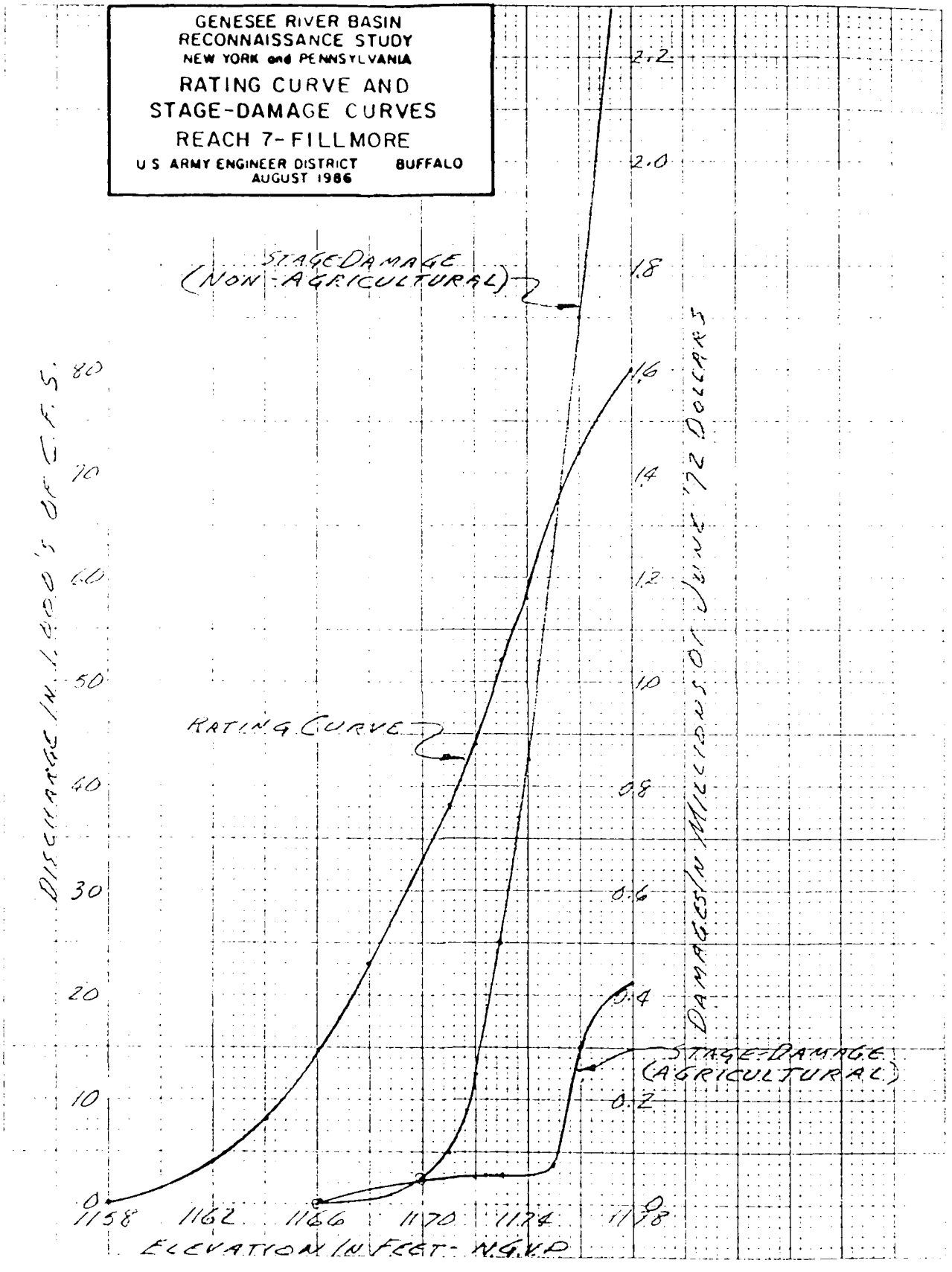


FIGURE A12

BELFAST

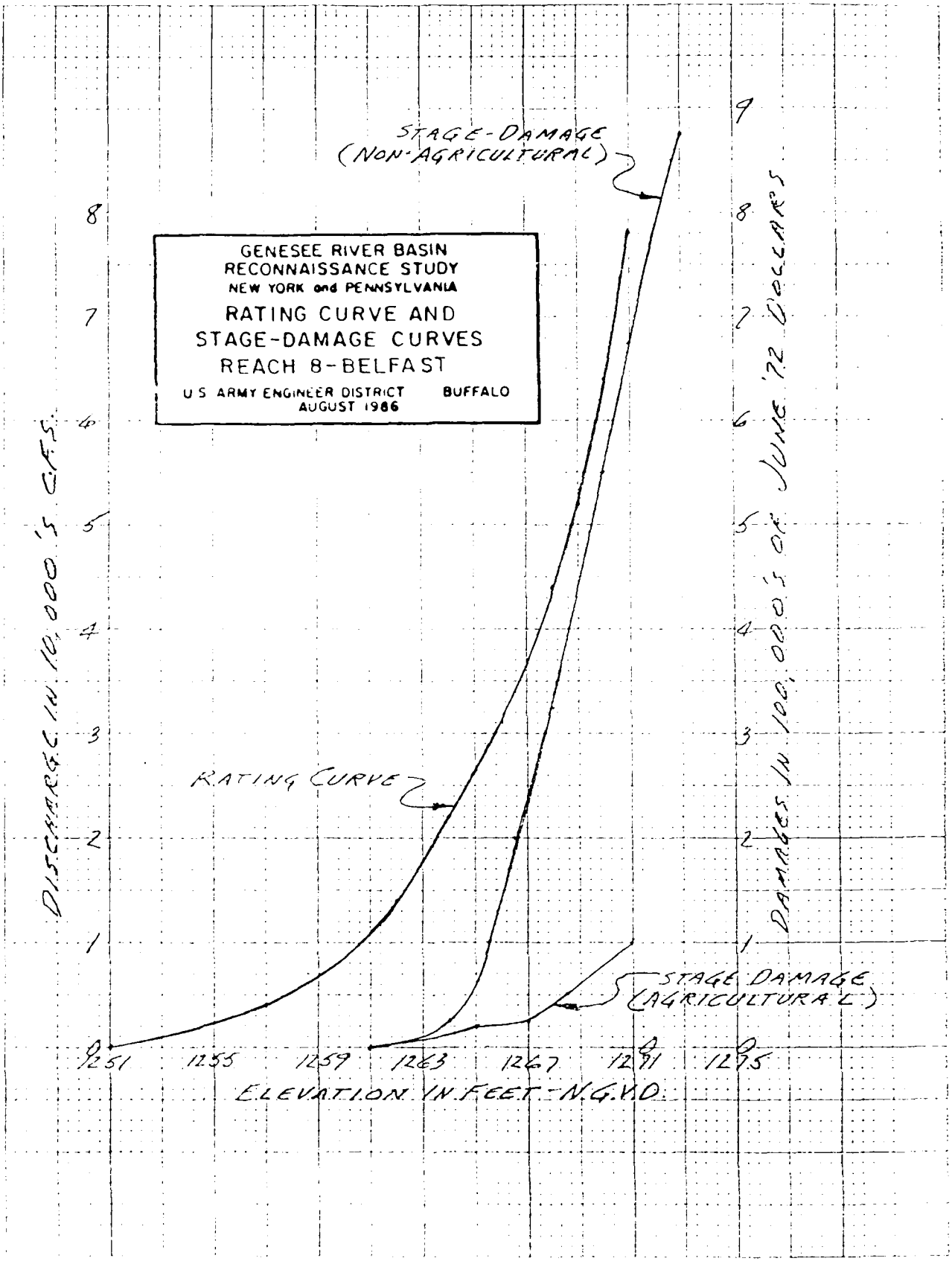


FIGURE A13

BELVIDERE

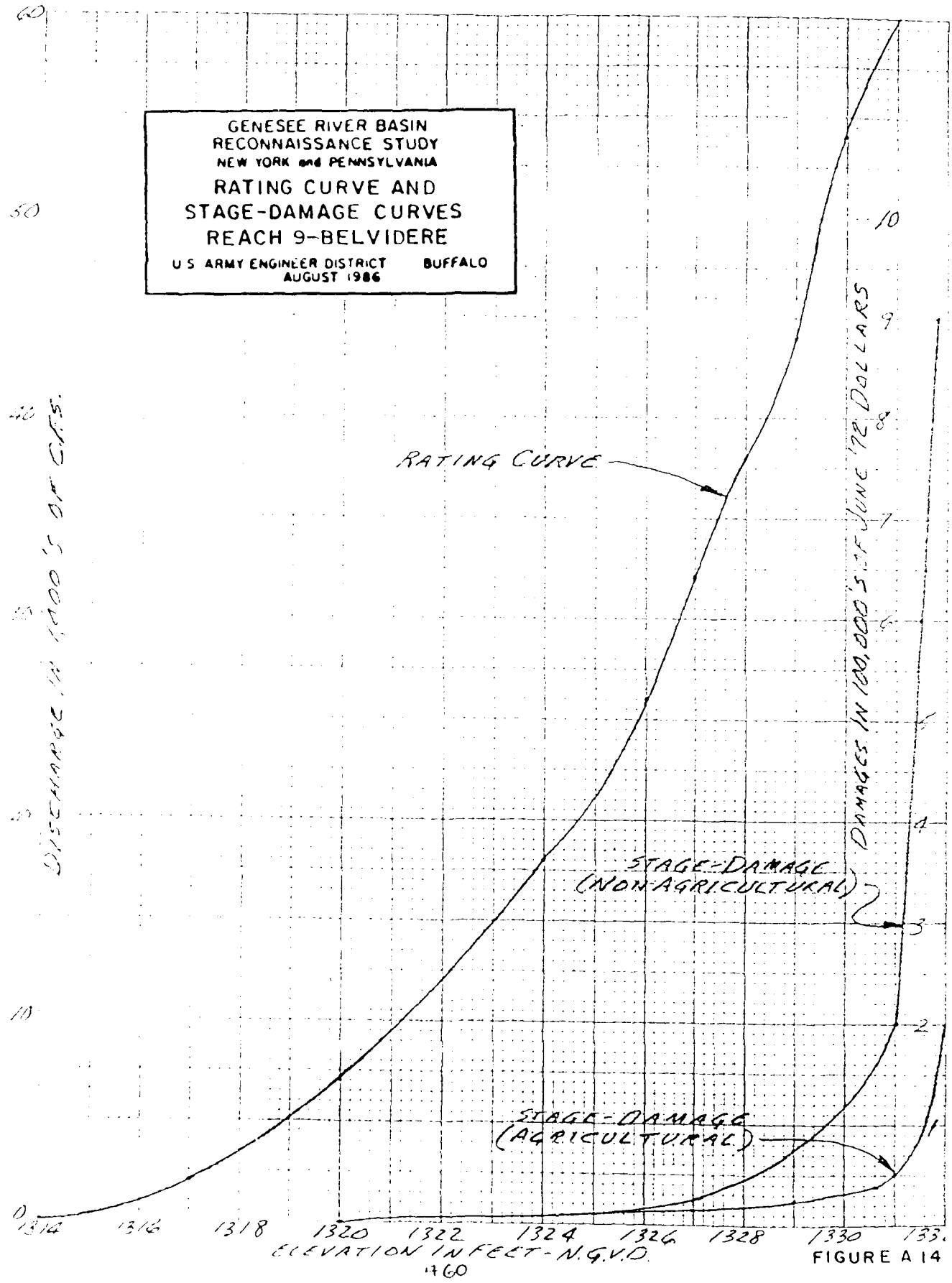


FIGURE A 14

BELMONT

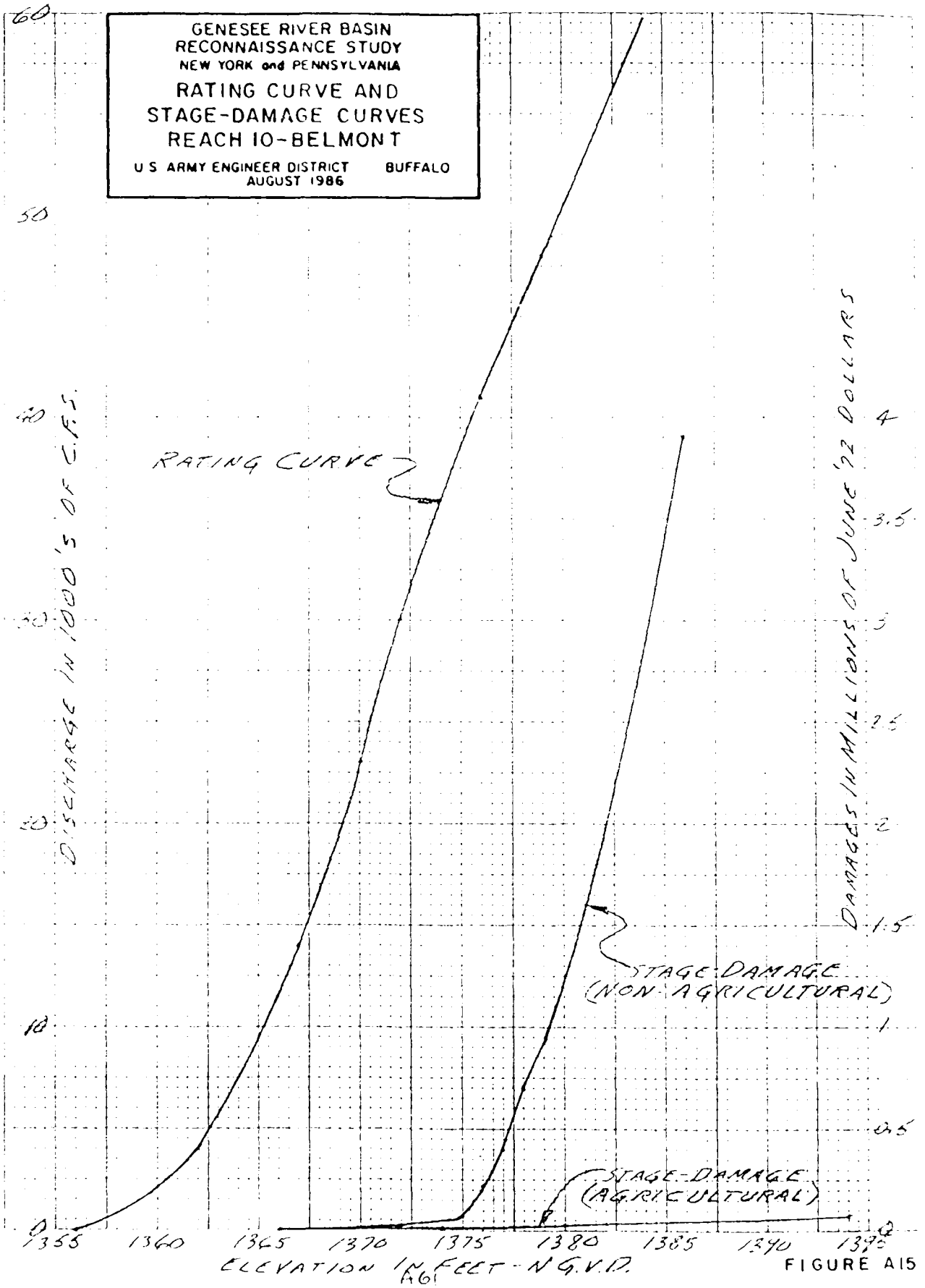


FIGURE A15

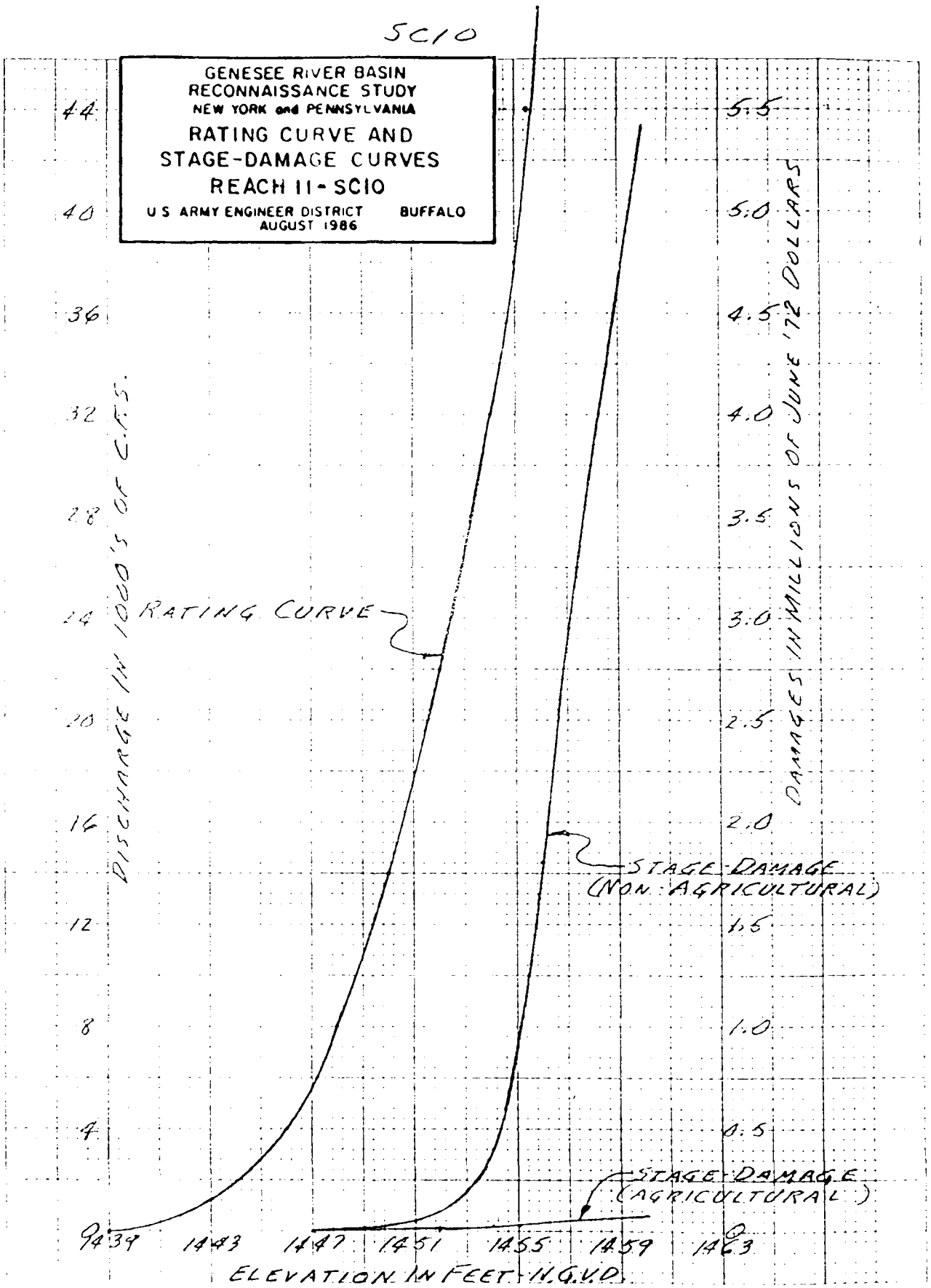

SC10
GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA
RATING CURVE AND
STAGE-DAMAGE CURVES
REACH 11 - SC10
U S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986
DISCHARGE IN 1000's OF C.F.S.
DAMAGES IN MILLIONS OF JUNE '72 DOLLARS
RATING CURVE
STAGE-DAMAGE (NON-AGRICULTURAL)
STAGE-DAMAGE (AGRICULTURAL)
ELEVATION IN FEET N.G.V.D.
44
40
36
32
28
24
20
16
12
8
4
0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
1439
1443
1447
1451
1455
1459
1463

FIGURE A16

WELLSVILLE (G-1)

GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA

RATING CURVE AND
STAGE-DAMAGE CURVES
REACH 12-(G-1)-WELLSVILLE

U.S. ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

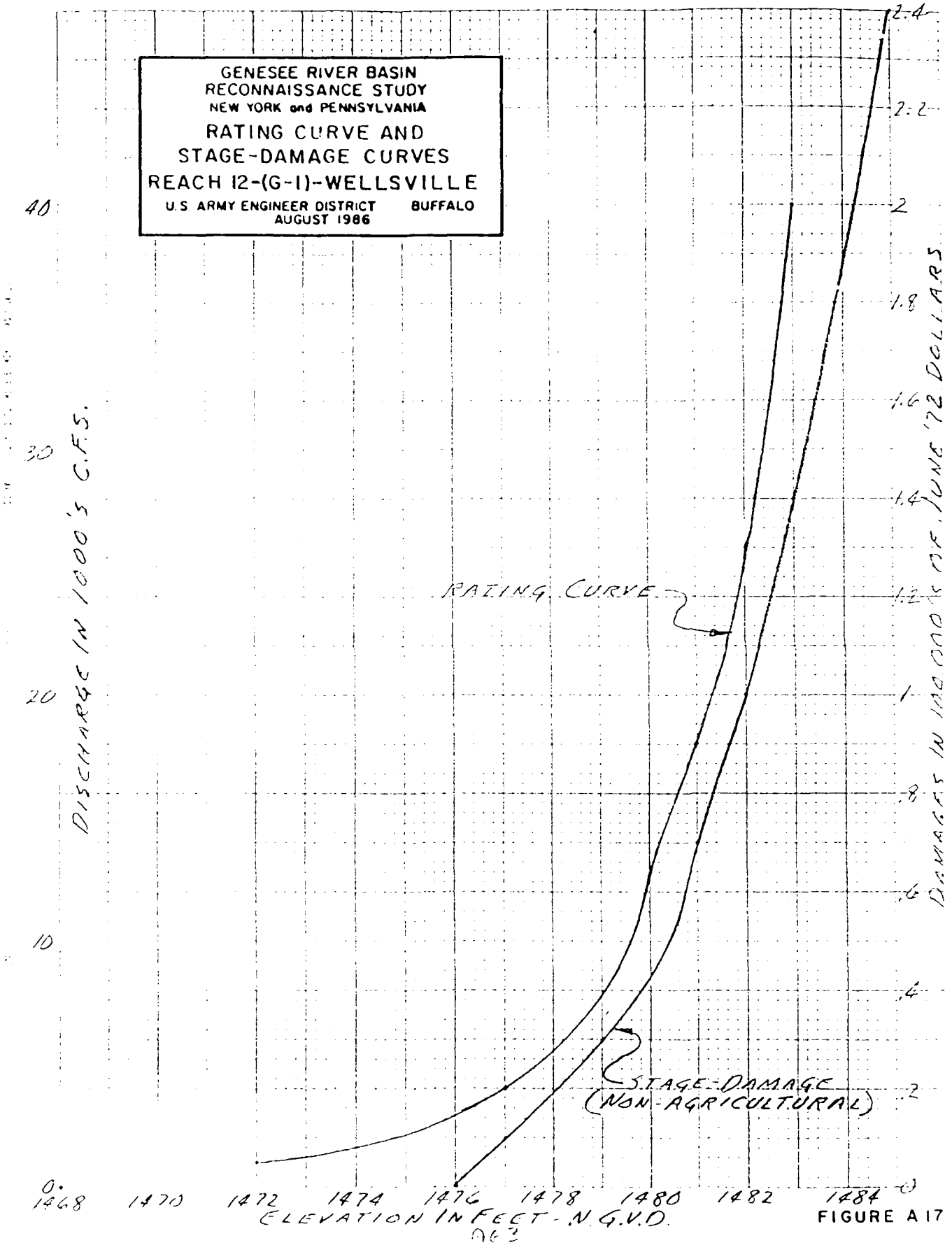


FIGURE A17

WELLSVILLE (G-2)

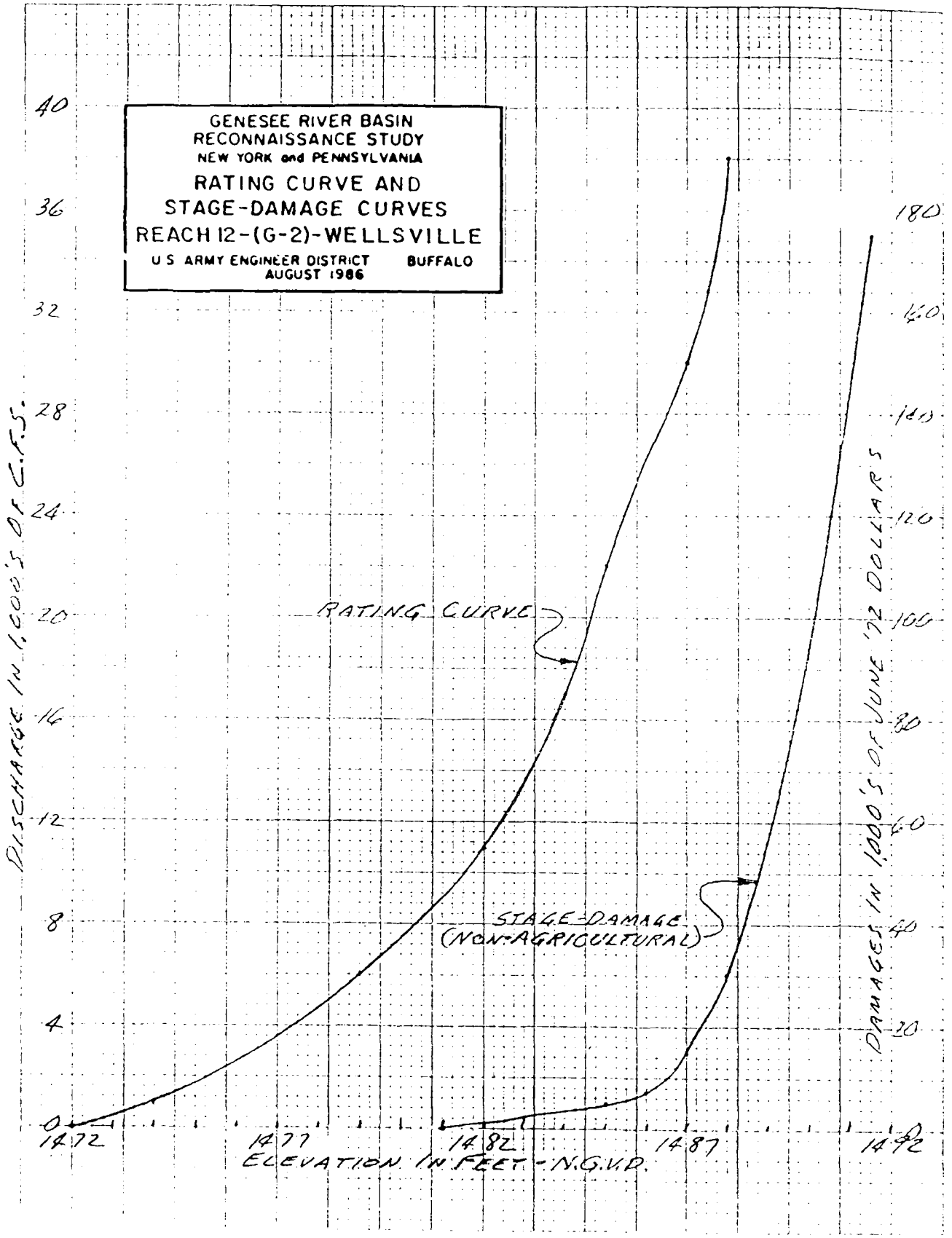


FIGURE A 18

WELLSVILLE (G-3)

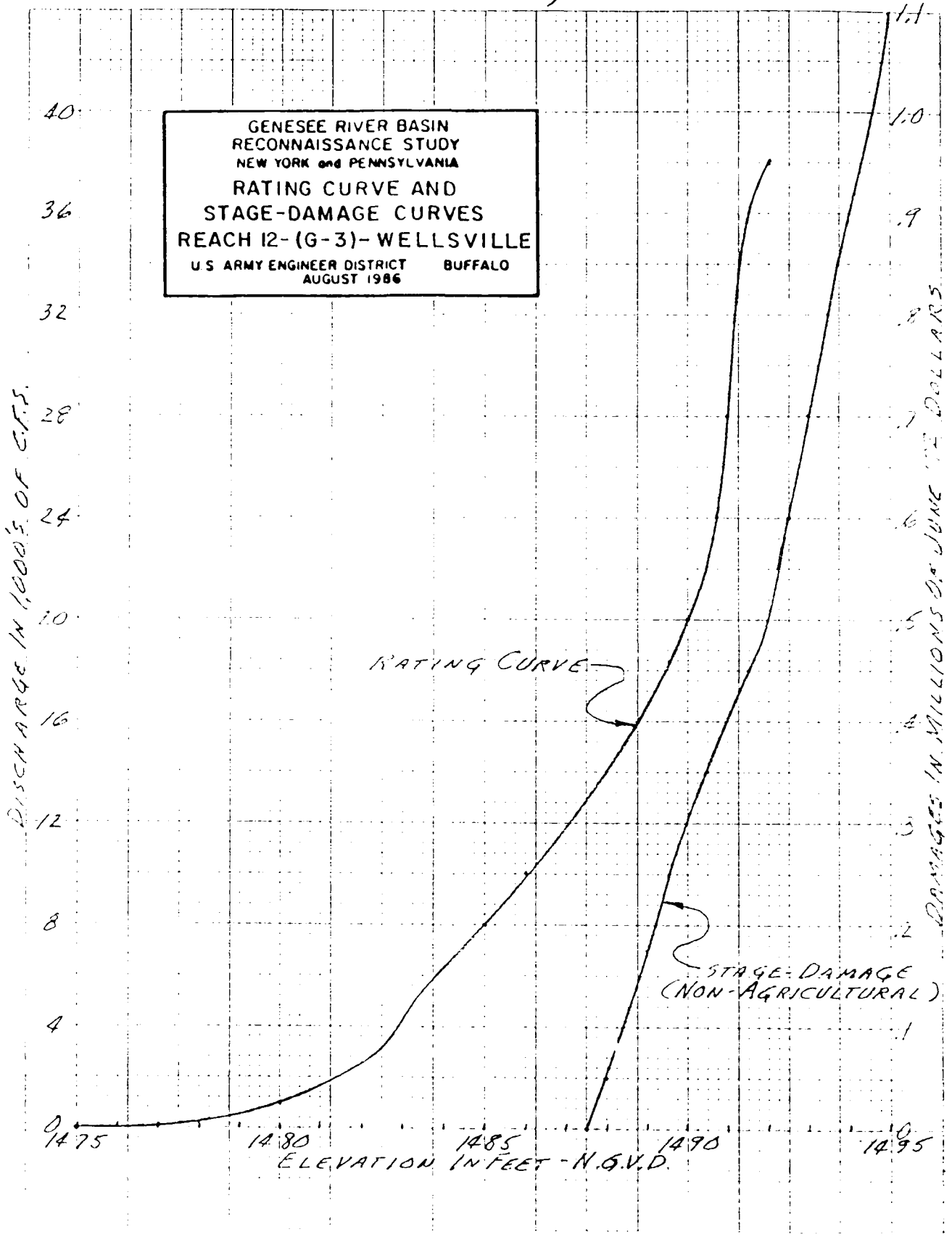


FIGURE A19

WELLSVILLE (G-4)

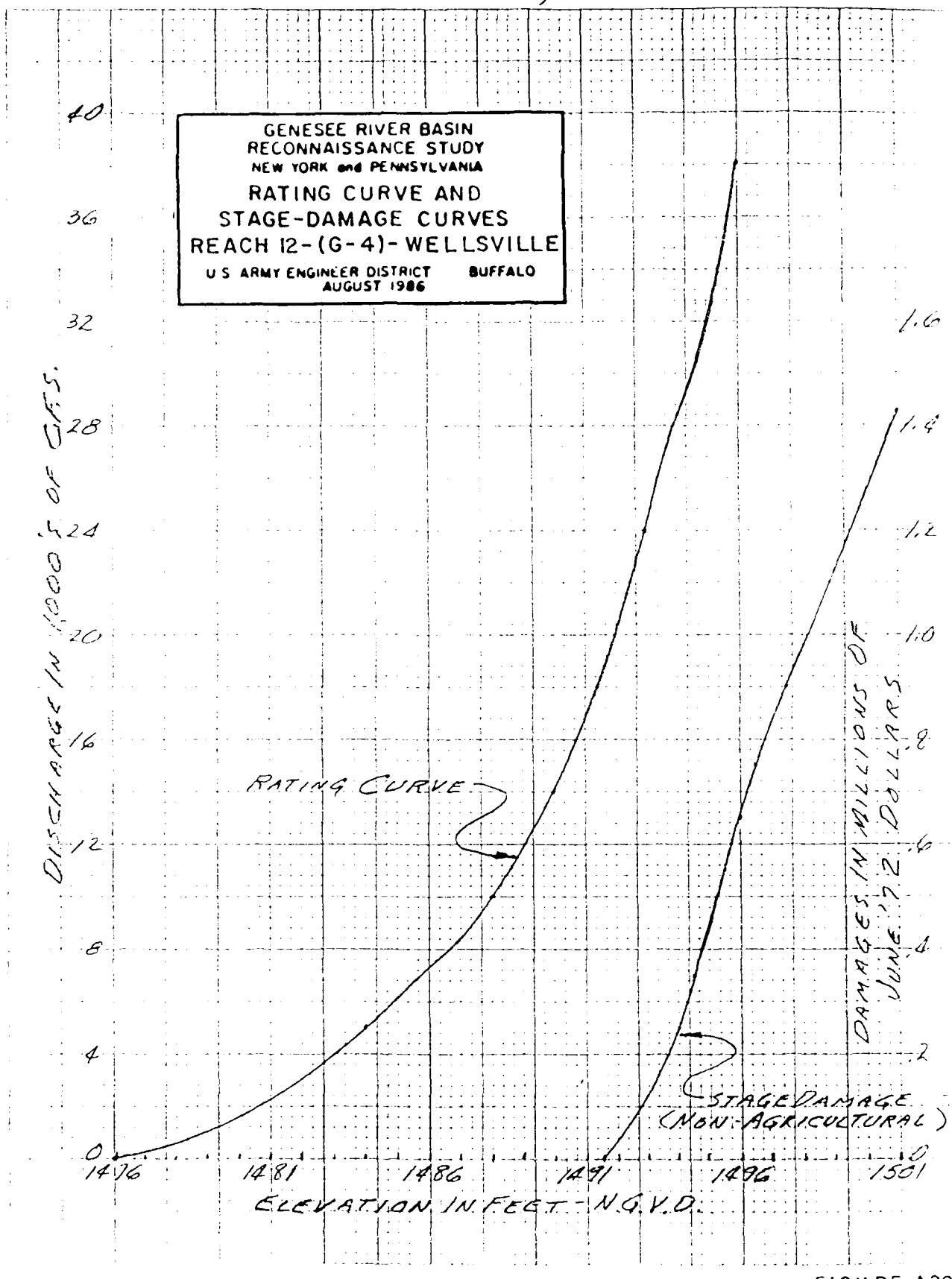


FIGURE A20

WELLSVILLE (G-5A)

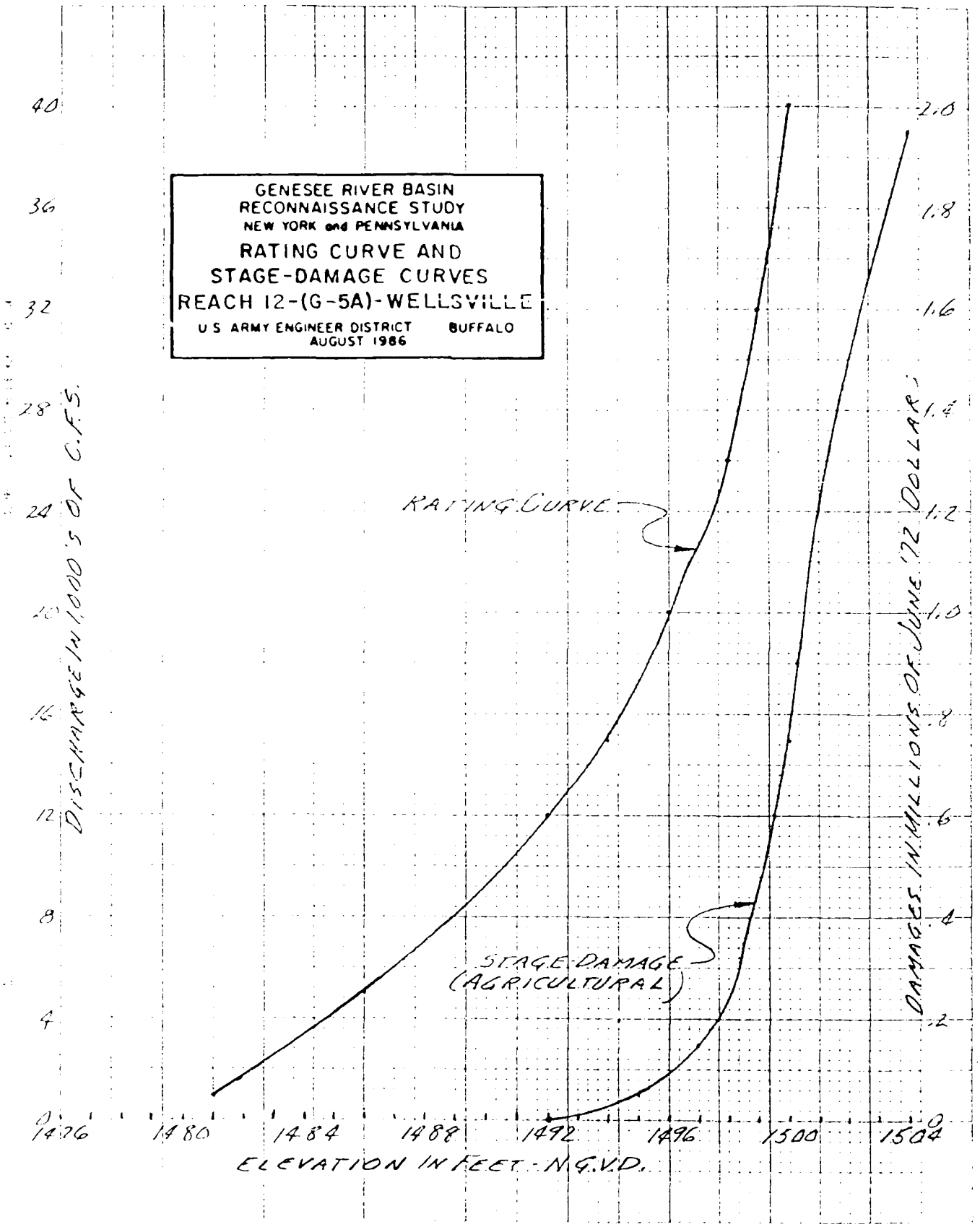


FIGURE A21

WELLSVILLE (5B)

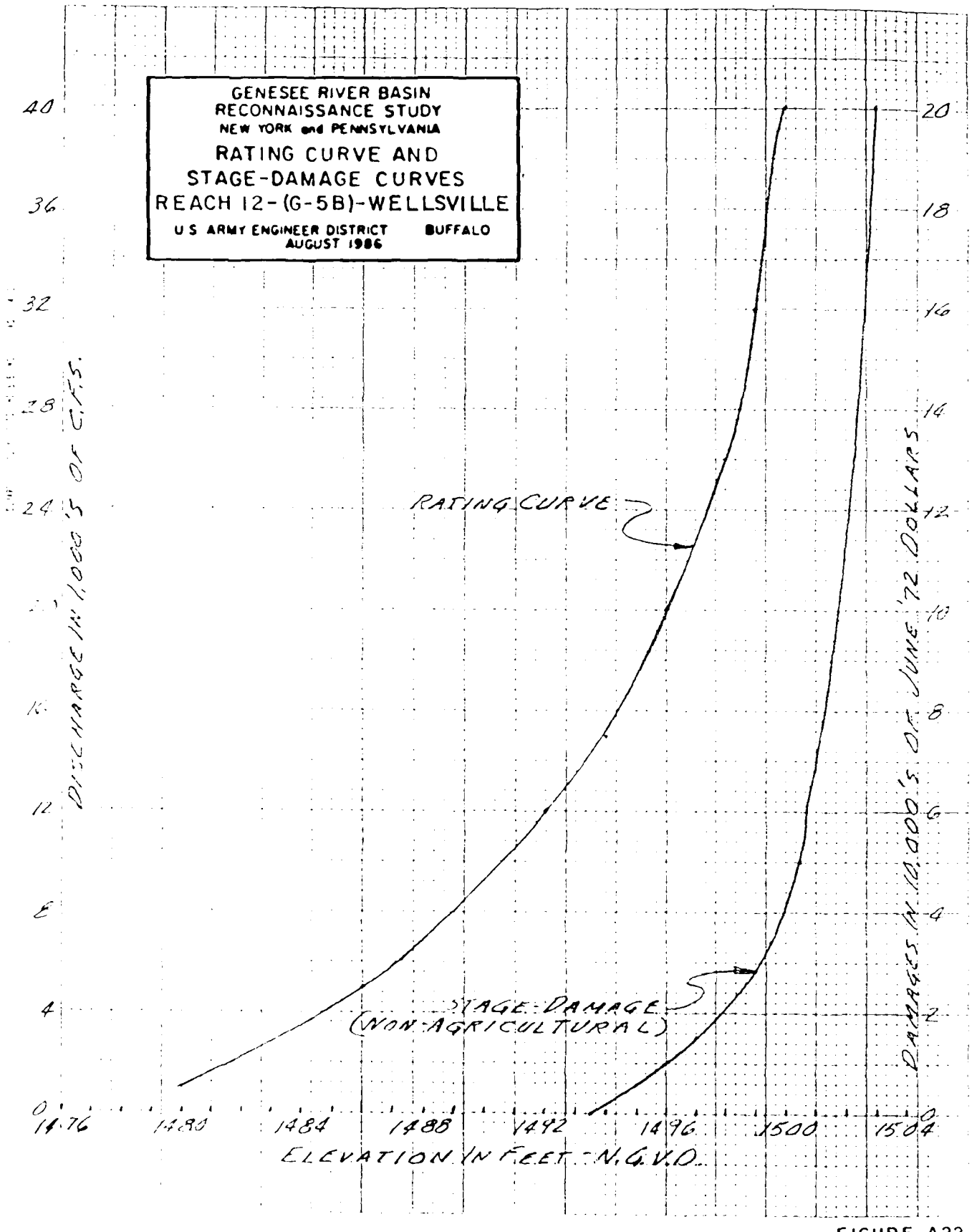


FIGURE A22

WELLSVILLE (6)

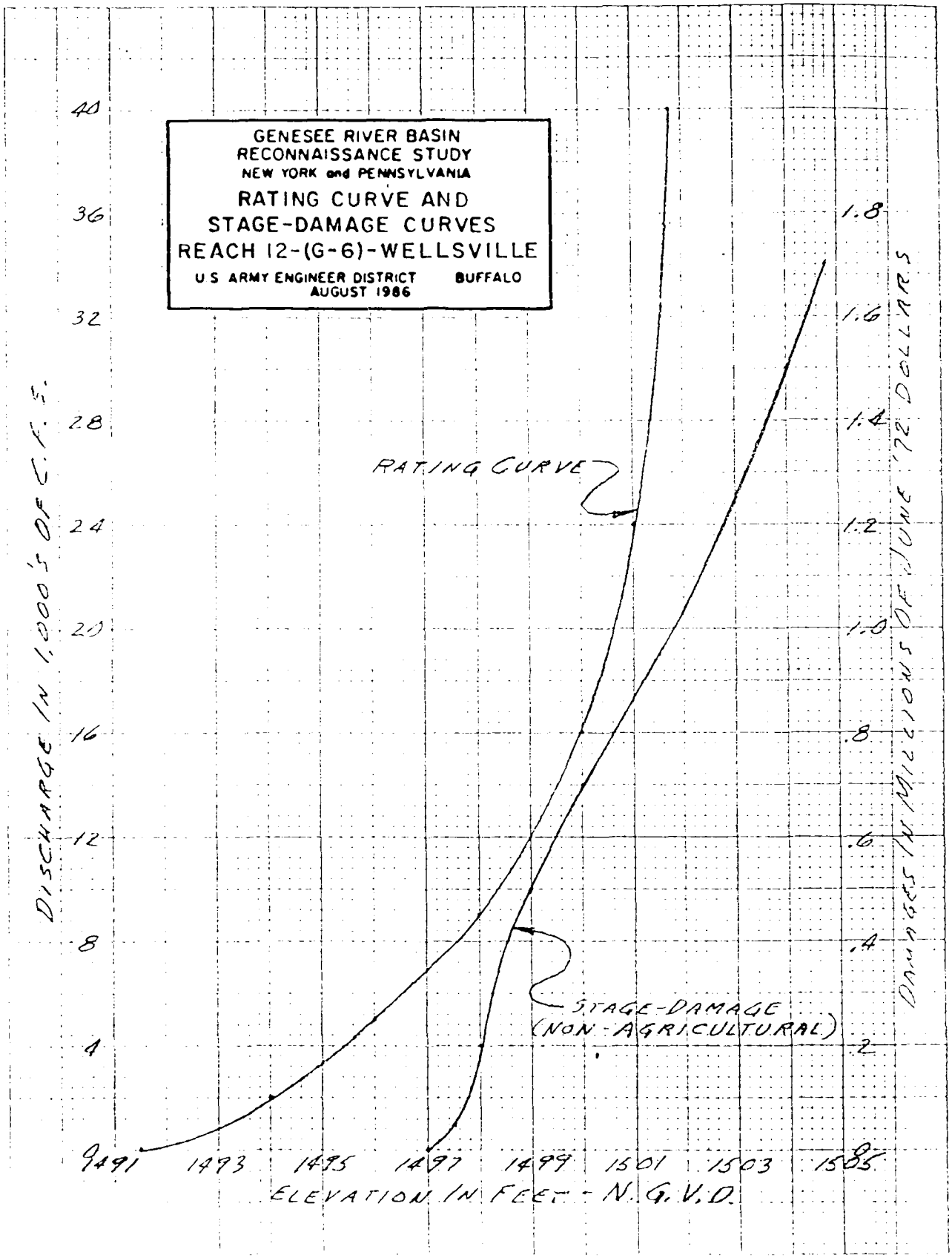


FIGURE A23

STANNARD'S CORNERS

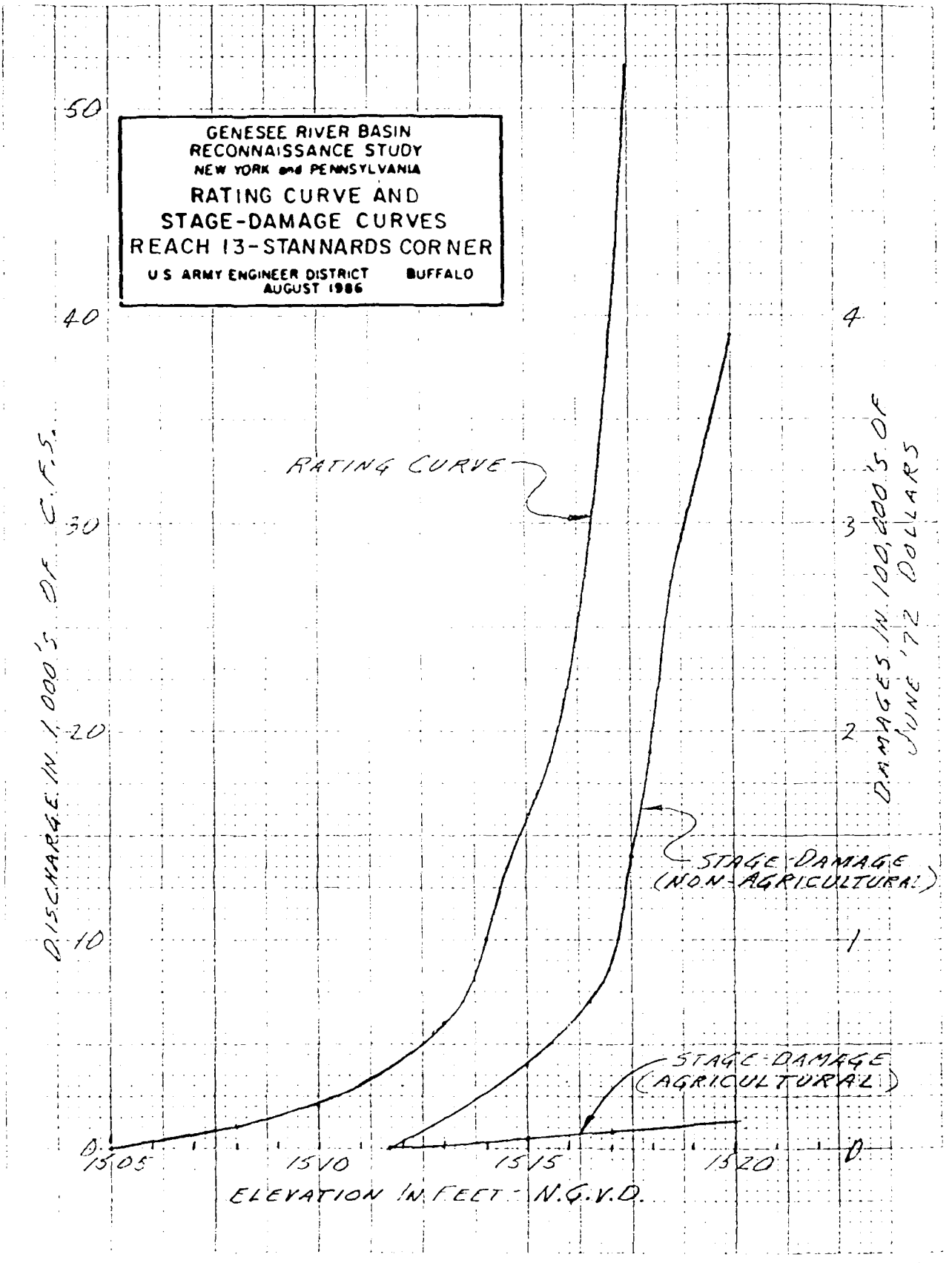


FIGURE A24

SHONGO

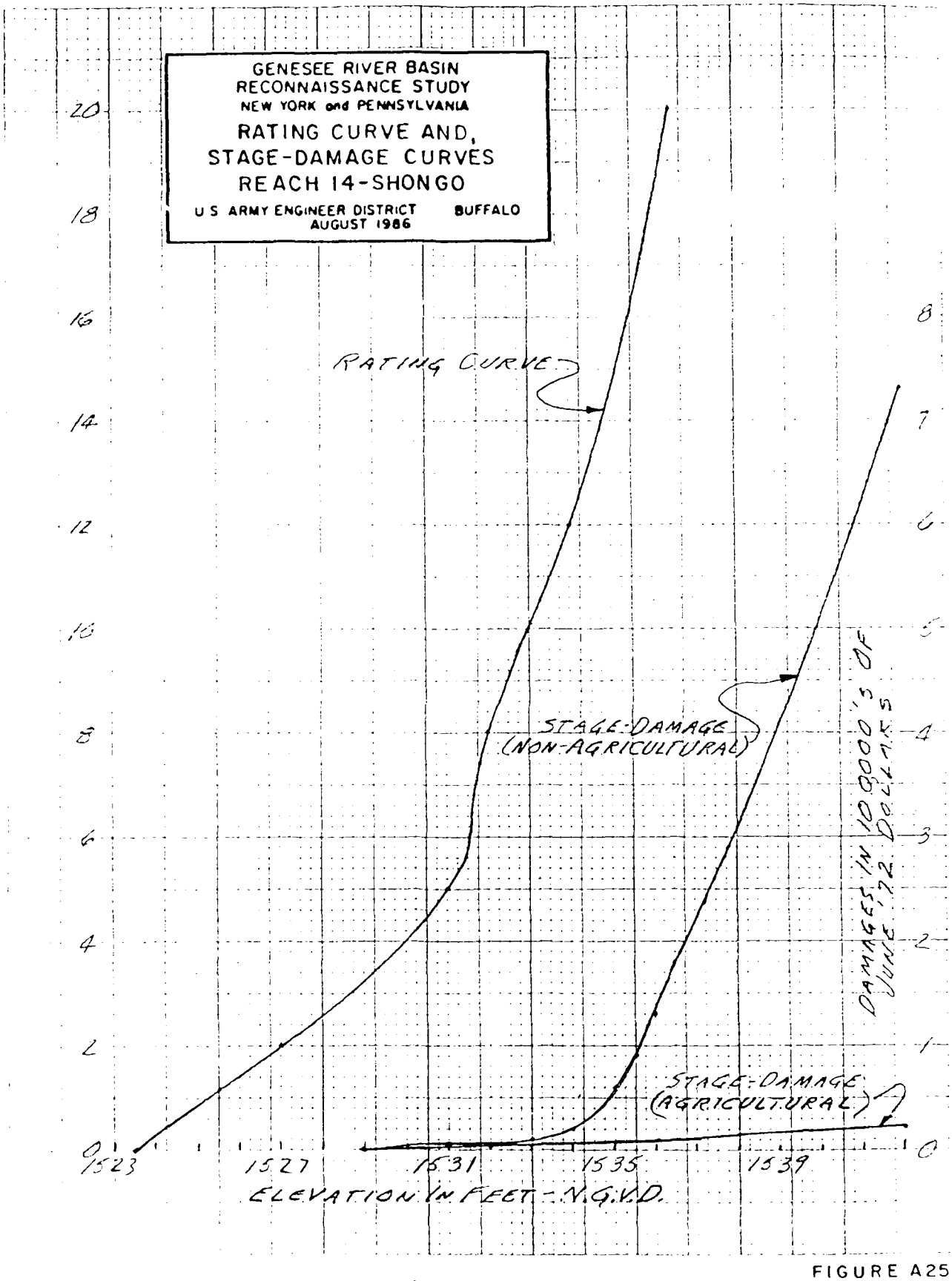


FIGURE A25

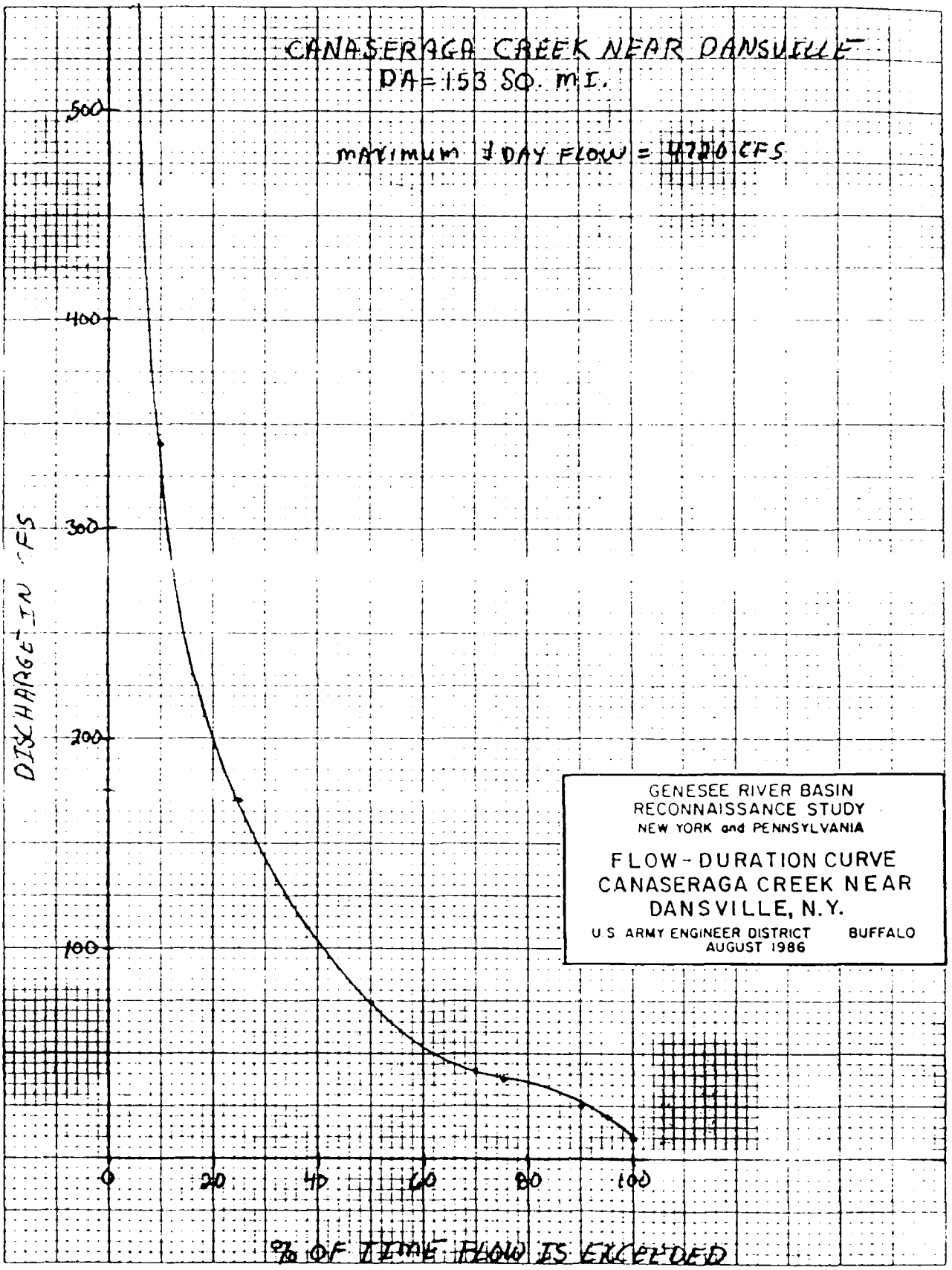

CANASERAGA CREEK NEAR DANSVILLE
DA=153 SQ. MI.
MAXIMUM 1 DAY FLOW = 4720 CFS
500
400
300
200
100
0
20
40
60
80
100
DISCHARGE IN CFS
% OF TIME FLOW IS EXCEEDED
GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA
FLOW-DURATION CURVE
CANASERAGA CREEK NEAR
DANSVILLE, N.Y.
U S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

FIGURE A26

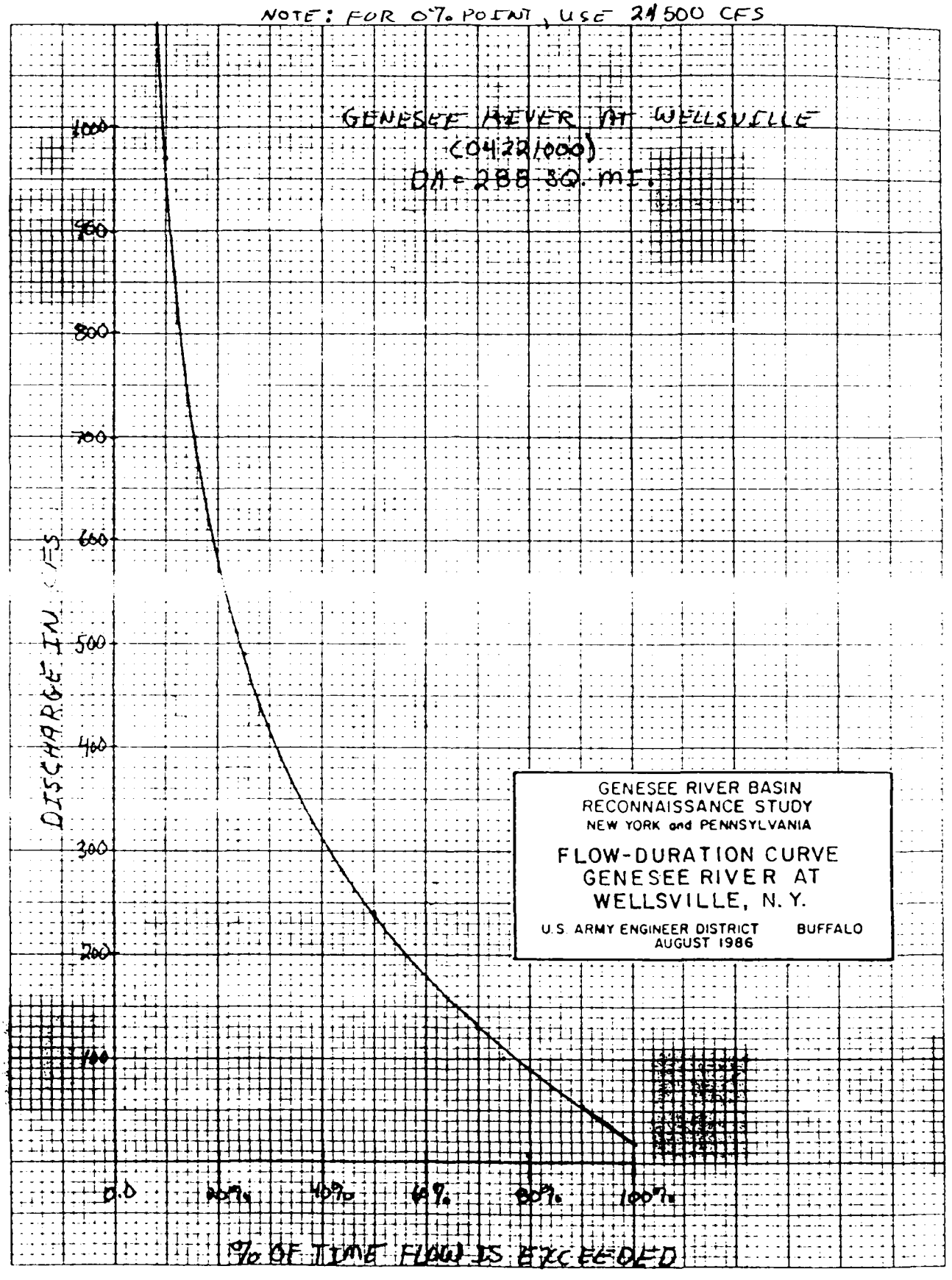

NOTE: FOR 0% POINT, USE 21500 CFS
GENESEE RIVER AT WELLSVILLE
(04221000)
DA = 288 SQ. MI.
1000
900
800
700
600
500
400
300
200
100
0.0
DISCHARGE IN CFS
20%
40%
60%
80%
100%
% OF TIME FLOW IS EXCEEDED
GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA
FLOW-DURATION CURVE
GENESEE RIVER AT
WELLSVILLE, N. Y.
U.S. ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

FIGURE A27

NOTE: FOR 0% USE DISCHARGE VALUE OF 72000 CFS

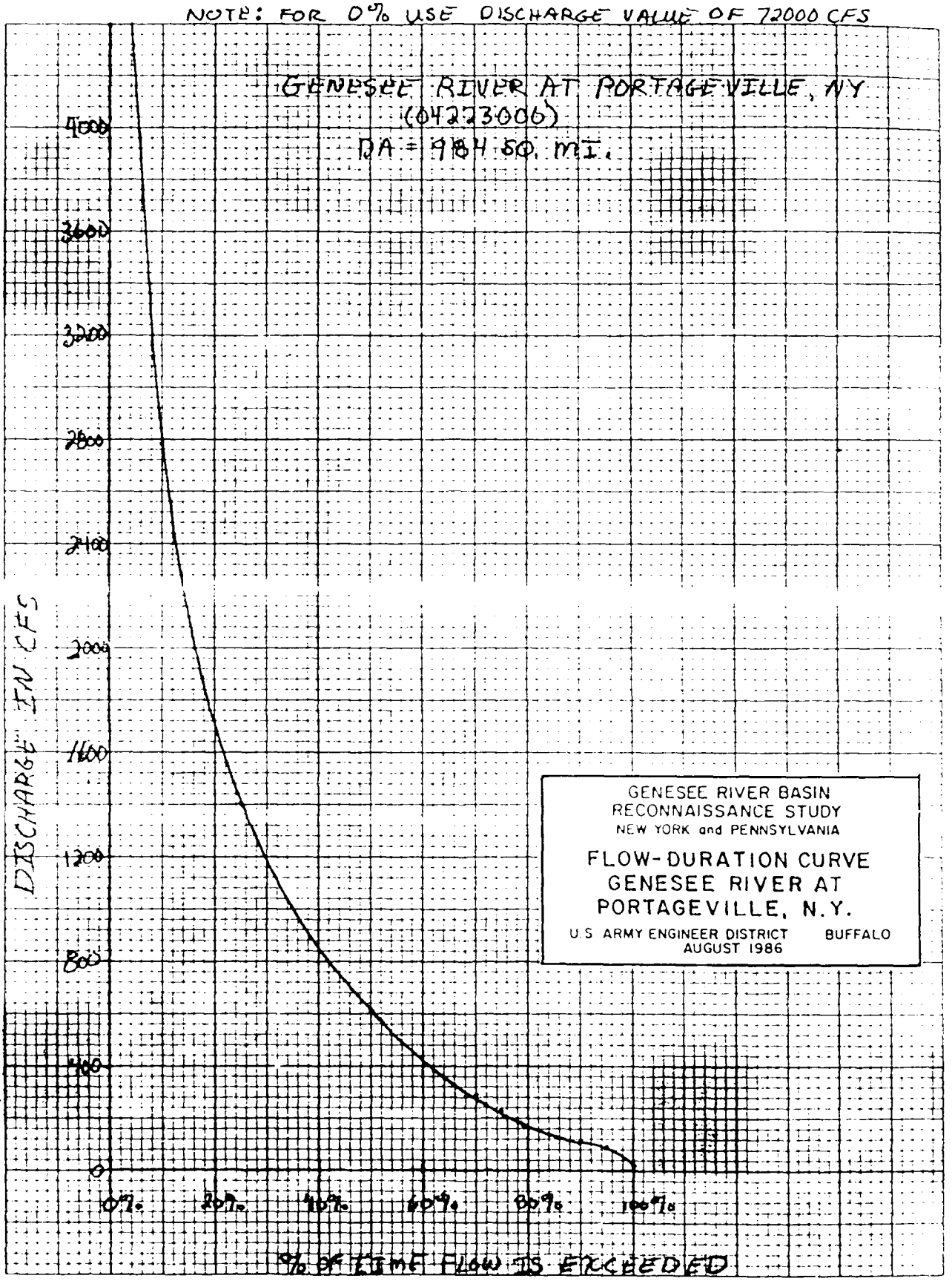
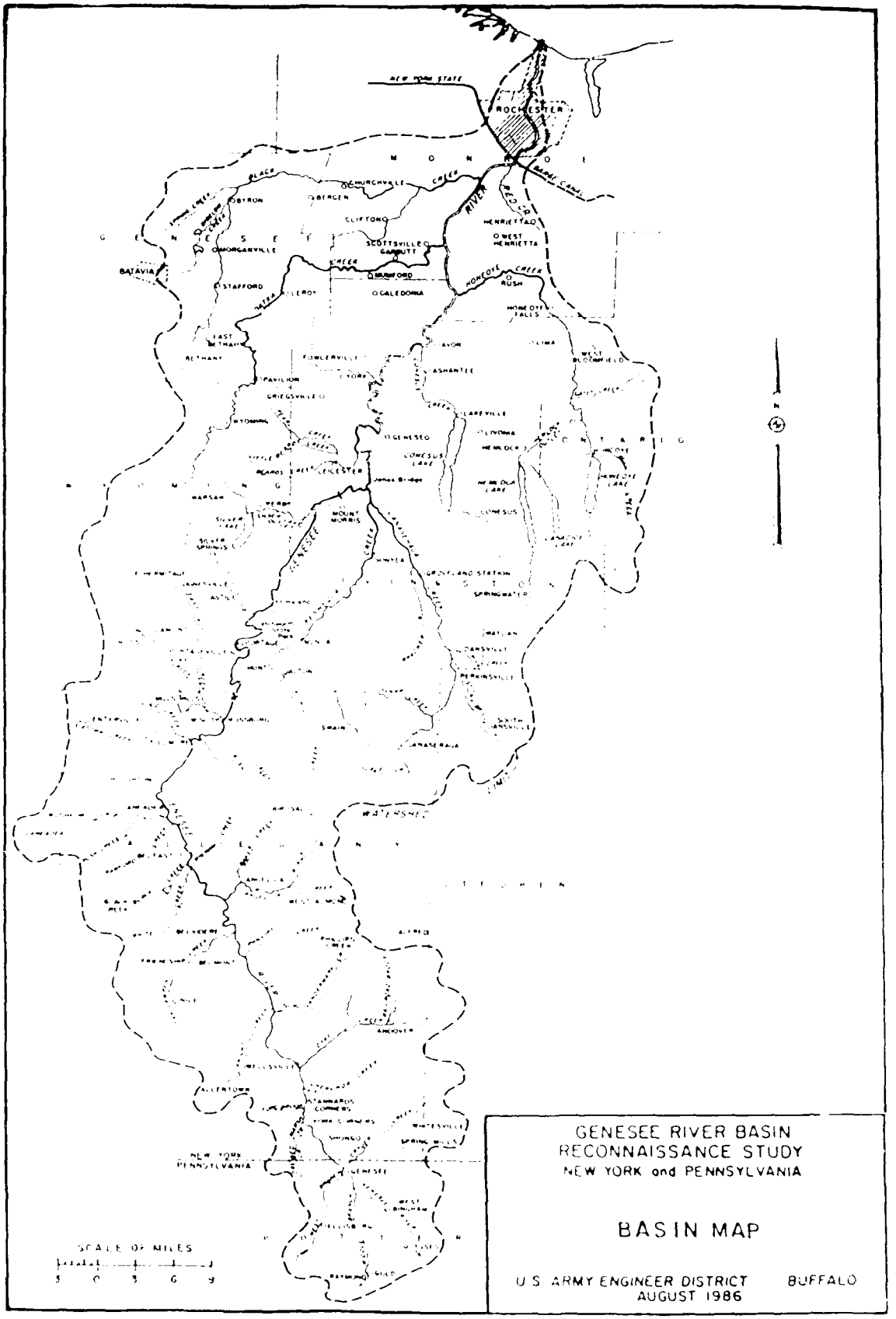


FIGURE A28



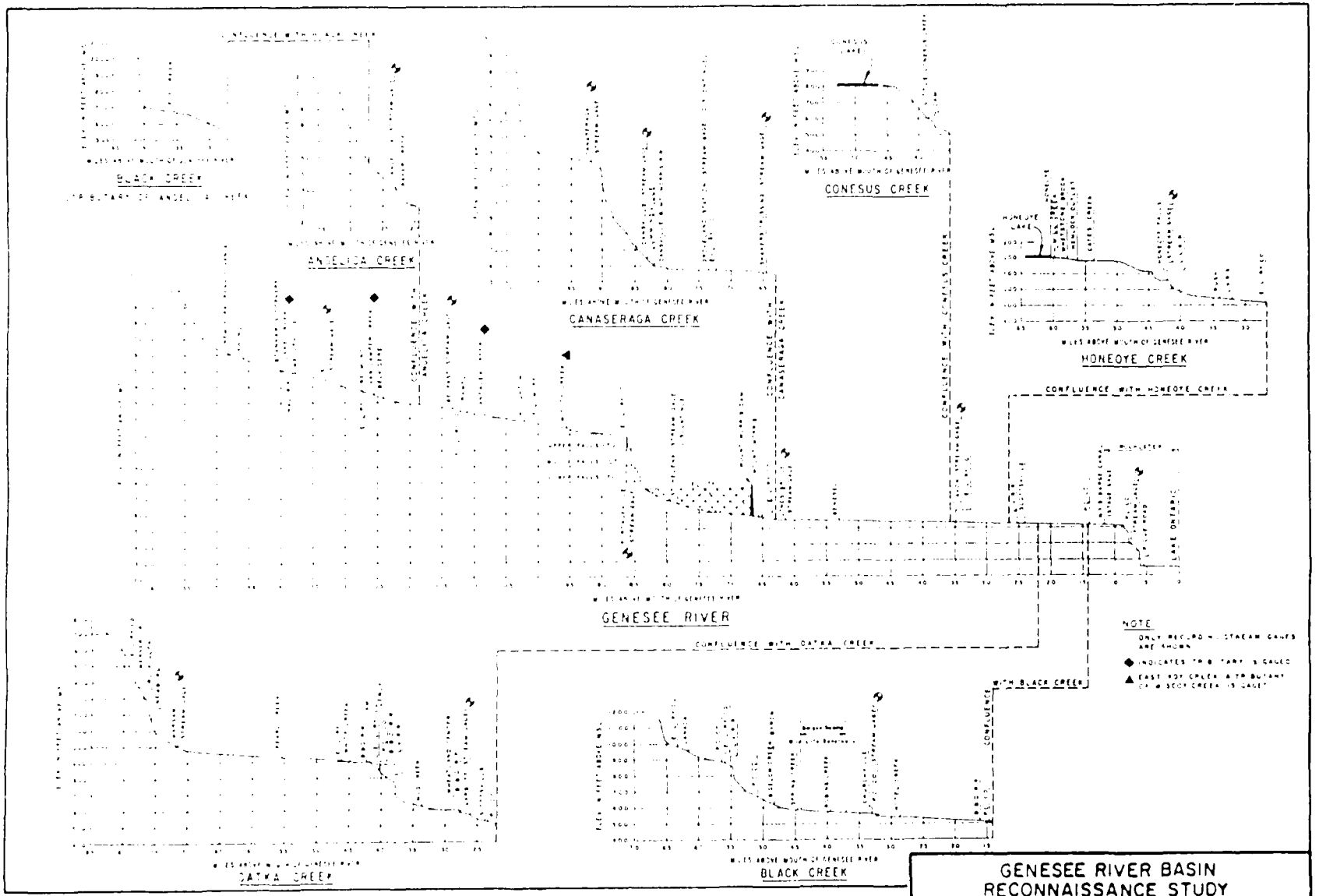
GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA

BASIN MAP

U S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

A15

PLATE A1



GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA

PROFILES OF GENESEE RIVER
AND PRINCIPAL TRIBUTARIES

U S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

PLATE A-

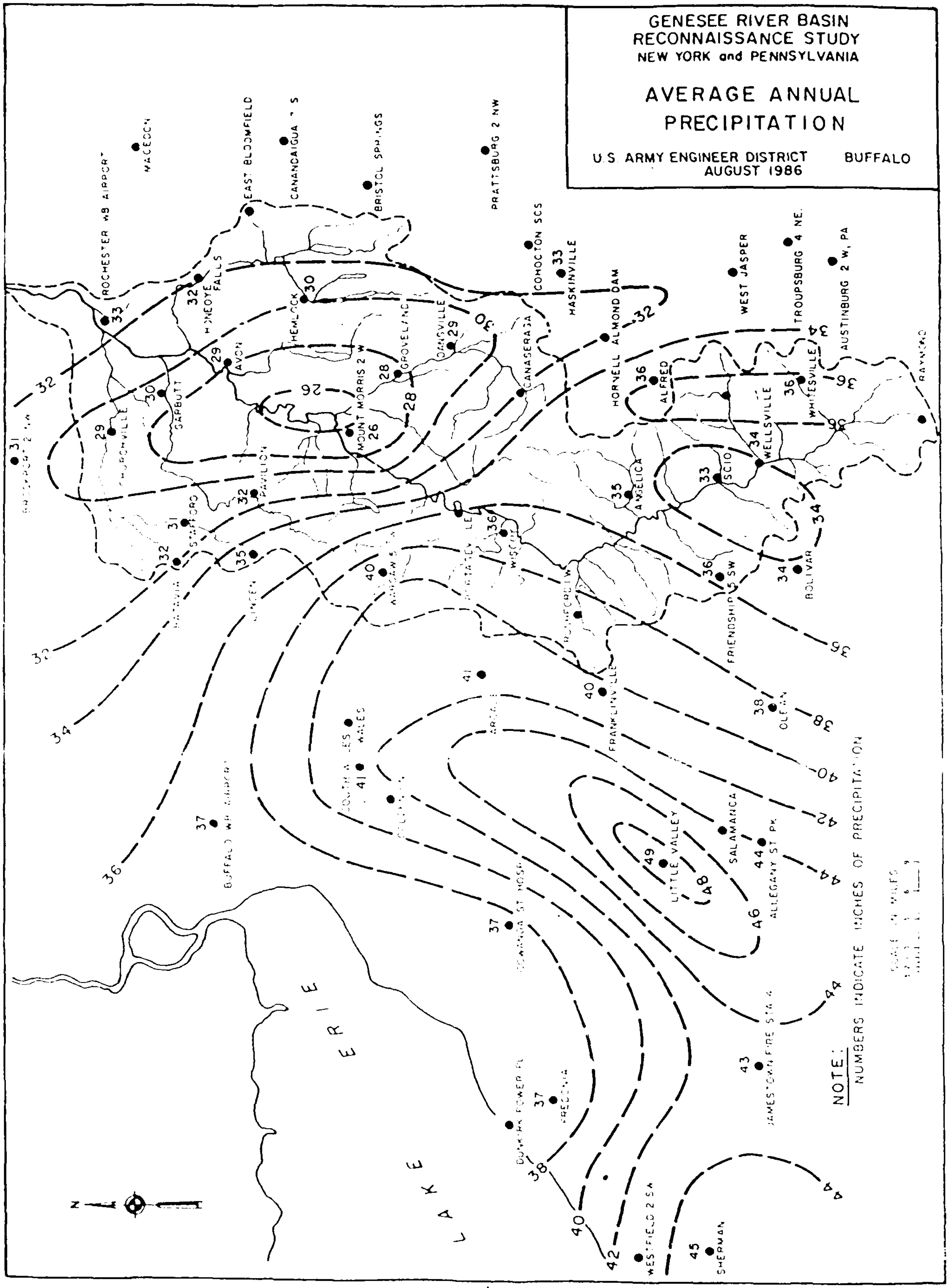
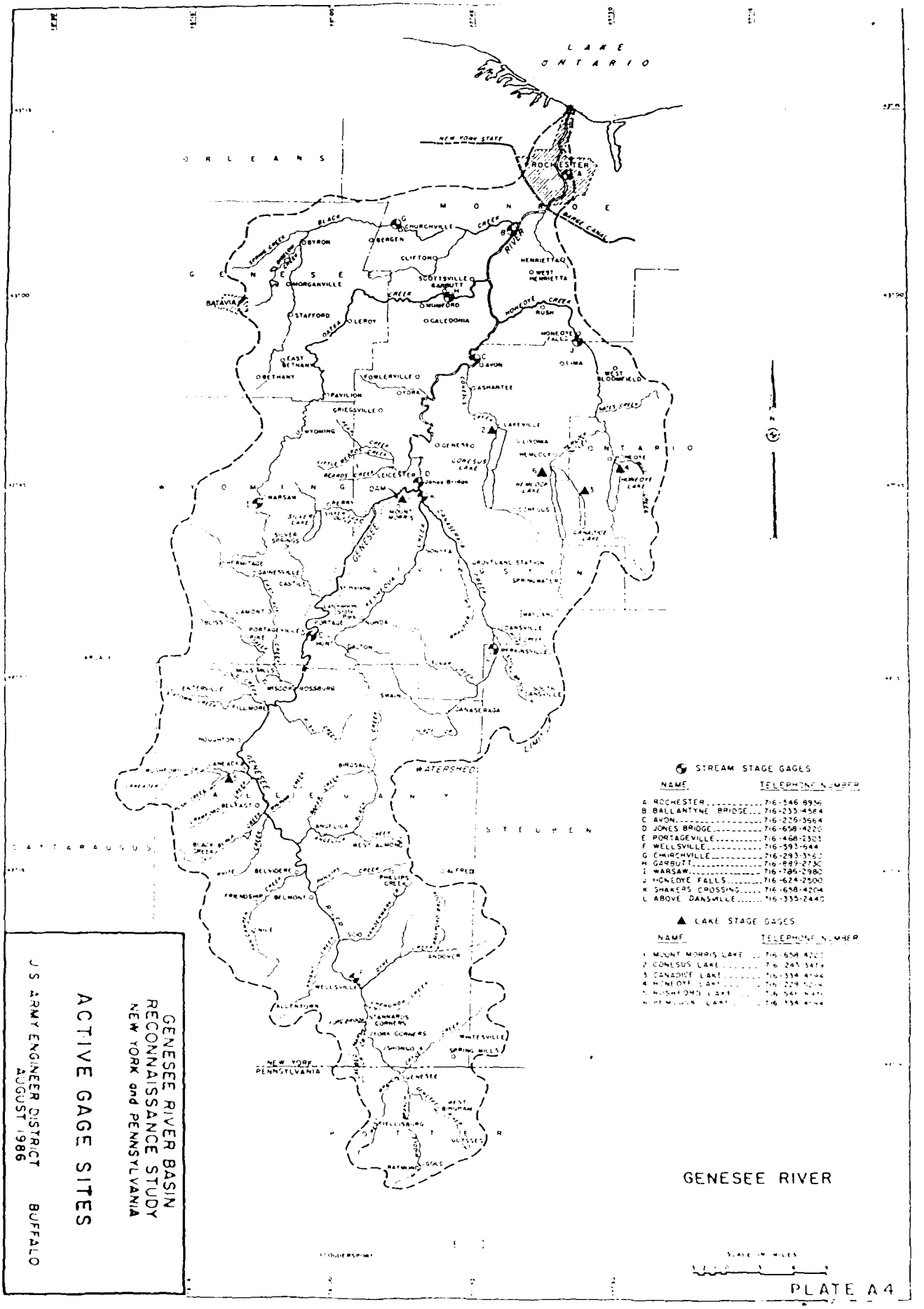

GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA
AVERAGE ANNUAL
PRECIPITATION
U.S. ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986
NOTE:
NUMBERS INDICATE INCHES OF PRECIPITATION
LAKE ERIE
ROCHESTER WB AIRPORT
HONEOYE FALLS
EAST BLOOMFIELD
BRISTOL SPRINGS
PRATTSBURG 2 NW
COHOCTON SCS
HASKINVILLE
HEMLOCK
AVON
GROVELAND
DANSVILLE
CANASERAGA
MOUNT MORRIS 2 W
HORNELL ALMOND DAM
WEST JASPER
TROUPSBURG 4 NE.
AUSTINBURG 2 W, PA
ALFRED
WHITESVILLE
WELLSVILLE
SCIO
ANGELICA
BOLIVAR
FRIENDSHIP 5 SW
PAVILION
STAFFORD
FRANKLINVILLE
OLEAN
SALAMANCA
ALLEGANY ST PK
LITTLE VALLEY
BUFFALO WB AIRPORT
JAMESTOWN FIRE STA 4
WESTFIELD 2 SW
SHERMAN

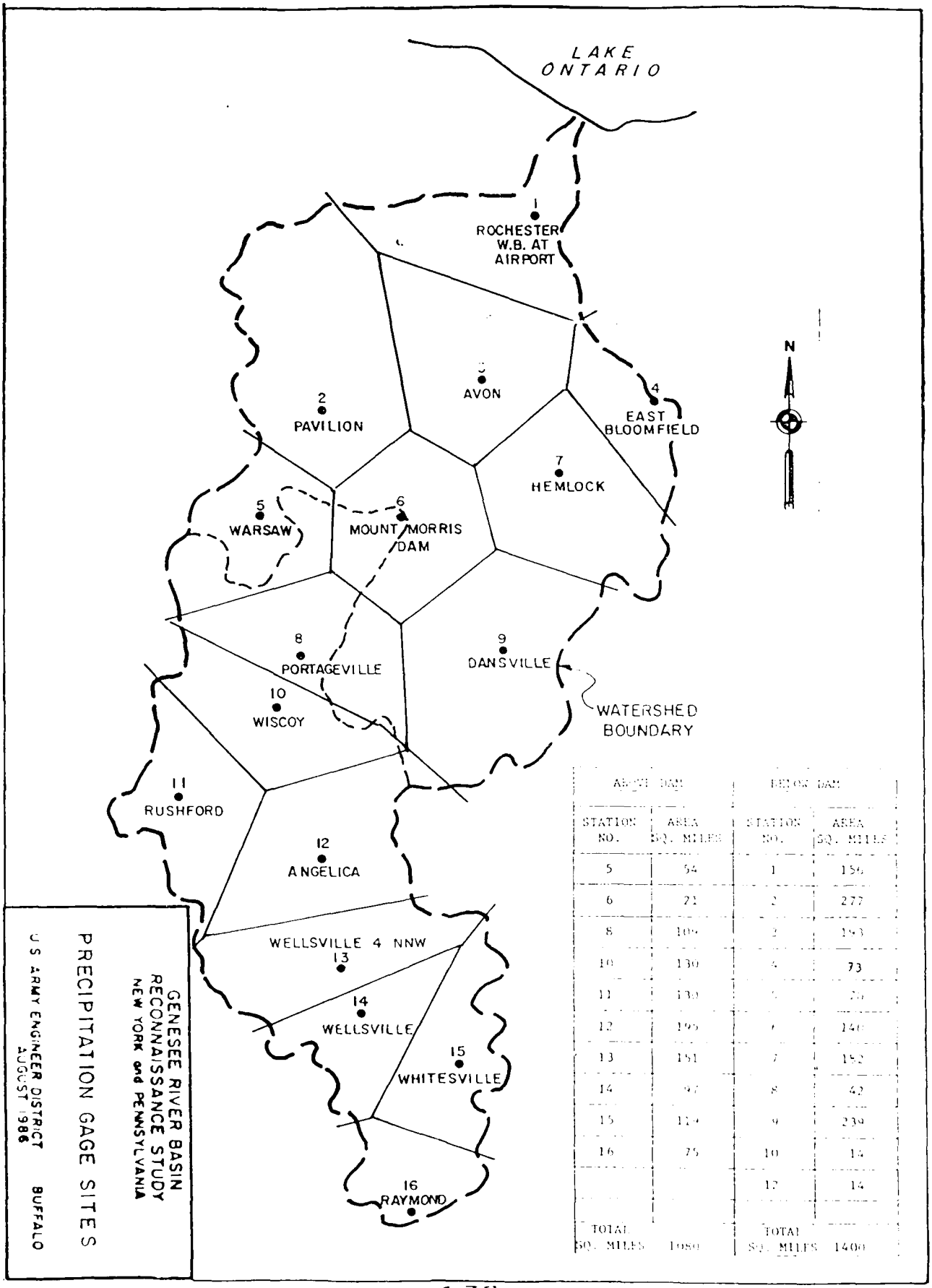
PLATE A3



GENESEE RIVER BASIN RECONNAISSANCE STUDY NEW YORK and PENNSYLVANIA

ACTIVE GAGE SITES

U S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986



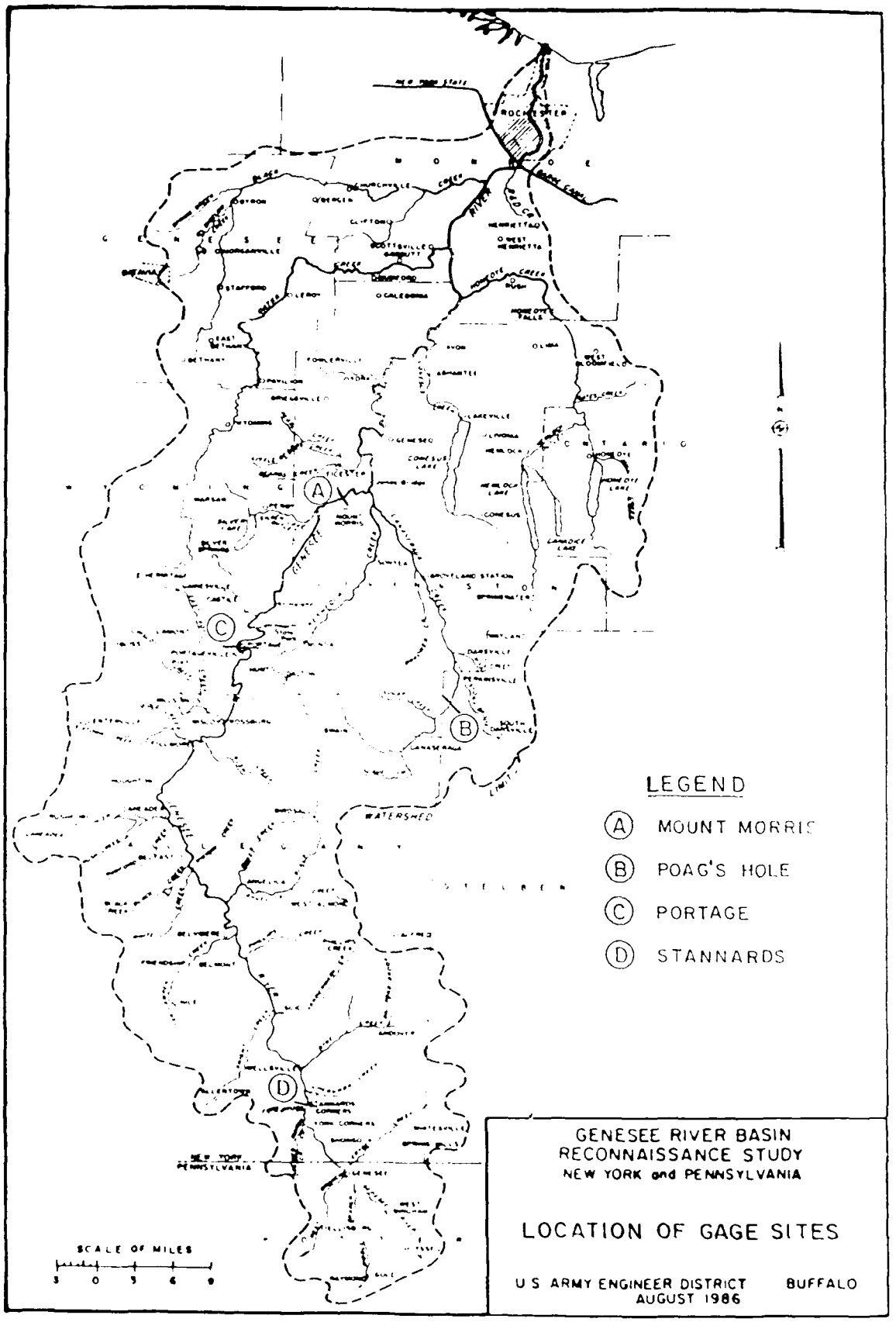
ABOVE DAM		BELOW DAM	
STATION NO.	AREA SQ. MILES	STATION NO.	AREA SQ. MILES
5	94	1	156
6	21	2	277
8	109	3	193
10	130	4	73
11	130	5	20
12	195	6	140
13	151	7	192
14	97	8	42
15	124	9	239
16	75	10	14
		12	14
TOTAL SQ. MILES	1080	TOTAL SQ. MILES	1400

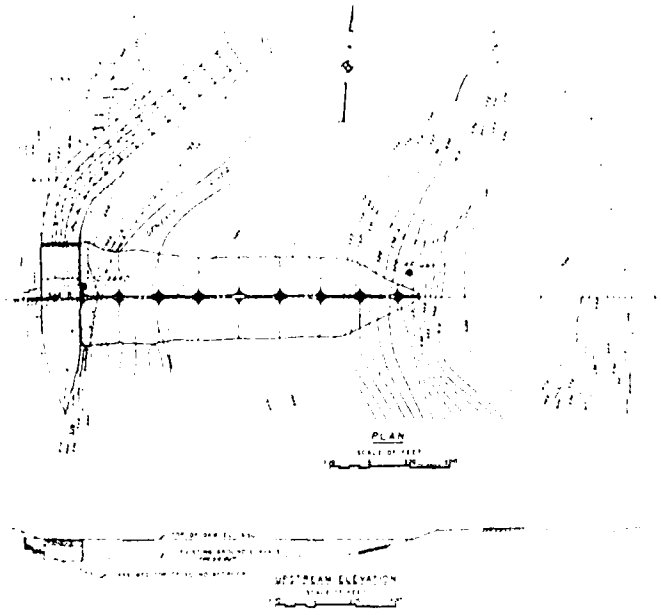
GENESEE RIVER BASIN RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA

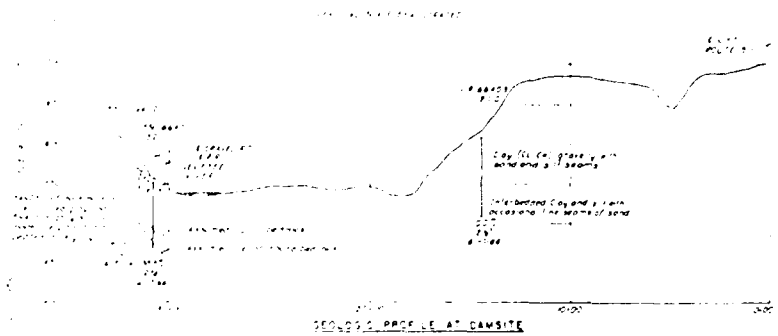
PRECIPITATION GAGE SITES

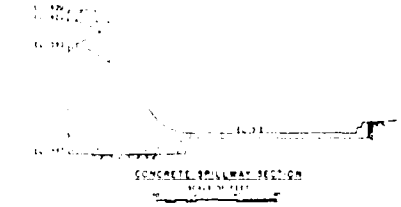
U.S. ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

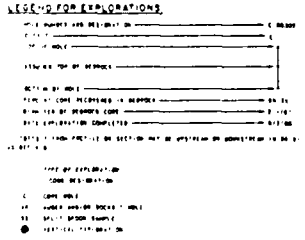
PLATE A5

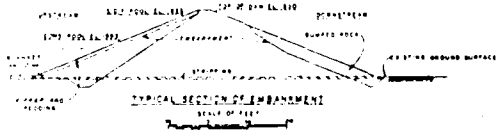

LEGEND
(A) MOUNT MORRIS
(B) POAG'S HOLE
(C) PORTAGE
(D) STANNARDS
WATERSHED
SCALE OF MILES
3 0 3 6 9
GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA
LOCATION OF GAGE SITES
U S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986











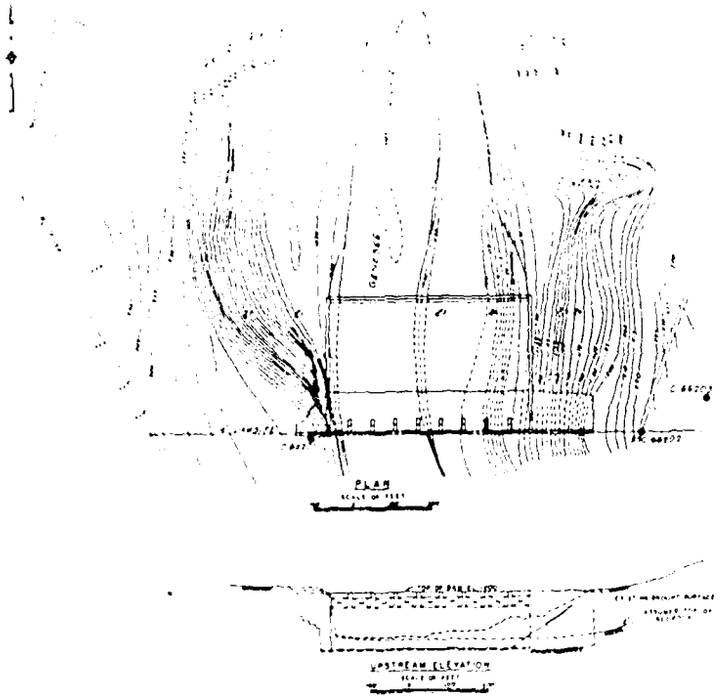
GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA

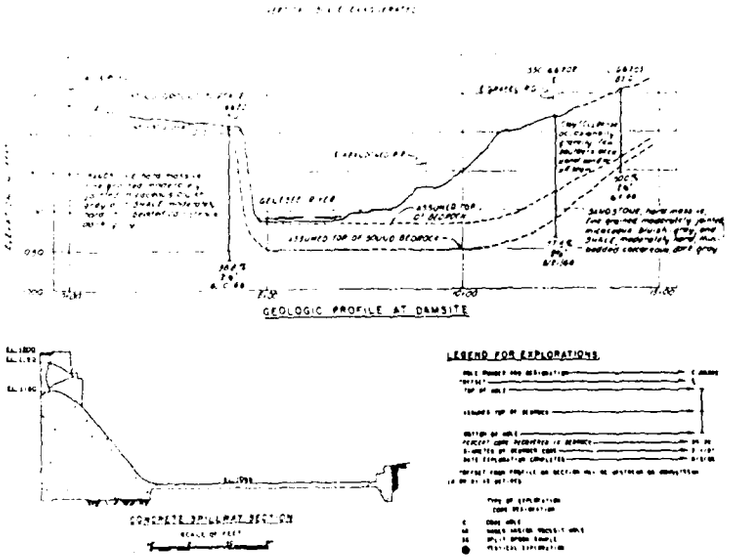
PLAN VIEW OF STANNARDS

U S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

PLATE A-1

PLATE A-2





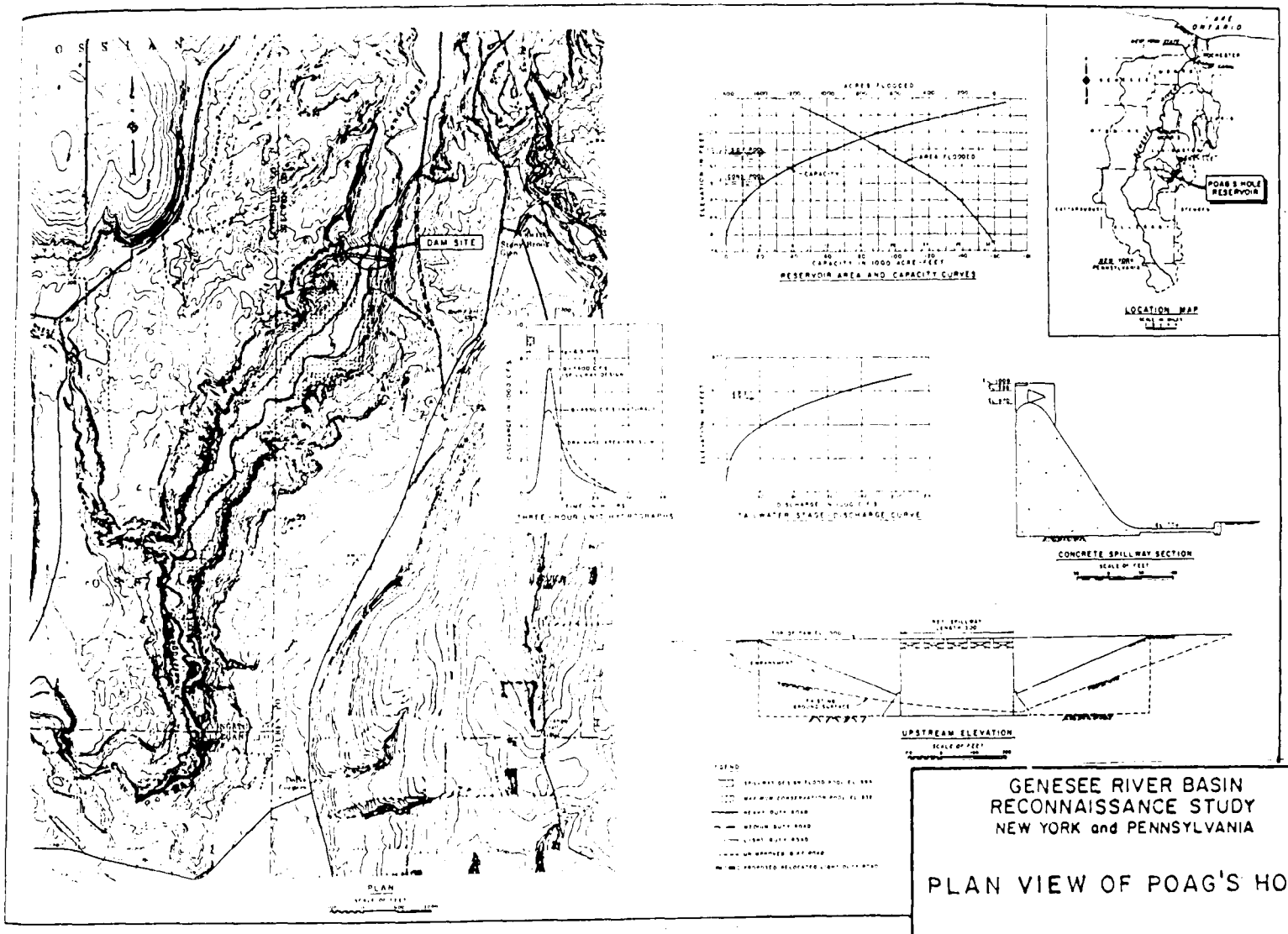
GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA

PLAN VIEW OF PORTAGE

U S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

PLATE A8

PLATE A8

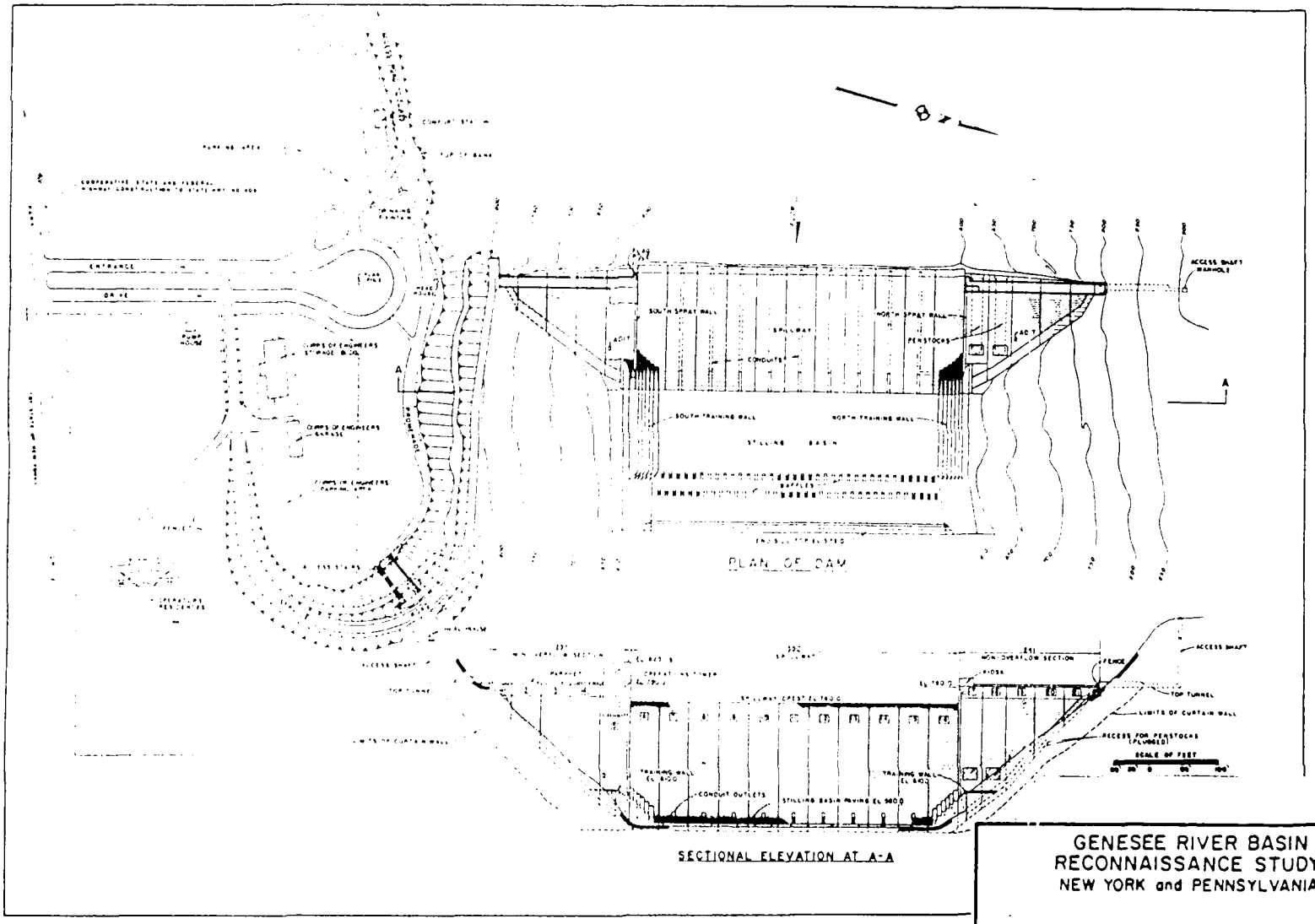


GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA

PLAN VIEW OF POAG'S HOLE

U S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

PLATE A9

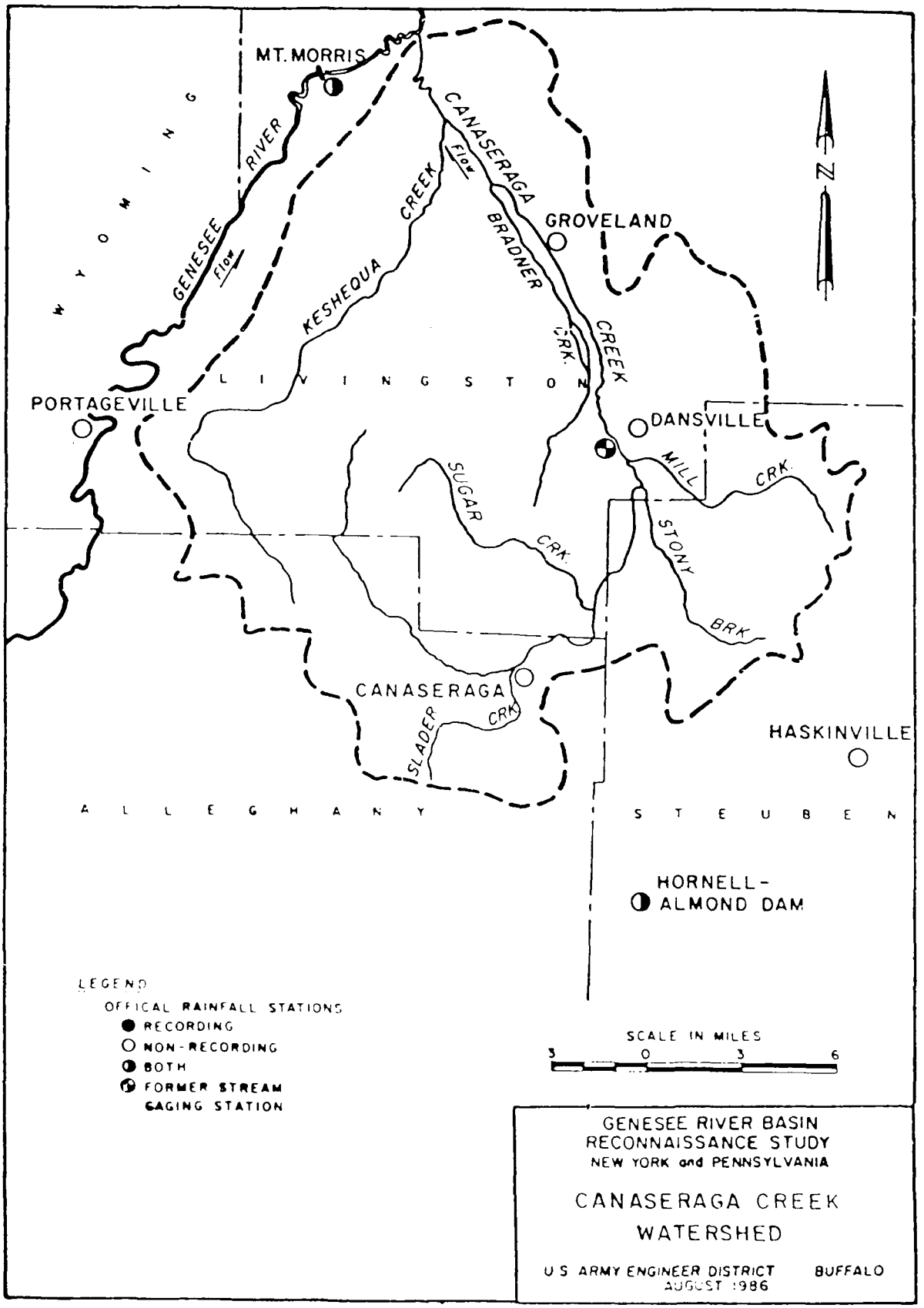


GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA

PLAN VIEW OF MOUNT MORRIS

U.S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

PLATE A10



GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA

CANASERAGA CREEK
WATERSHED

U S ARMY ENGINEER DISTRICT BUFFALO
AUGUST 1986

PLATE A11

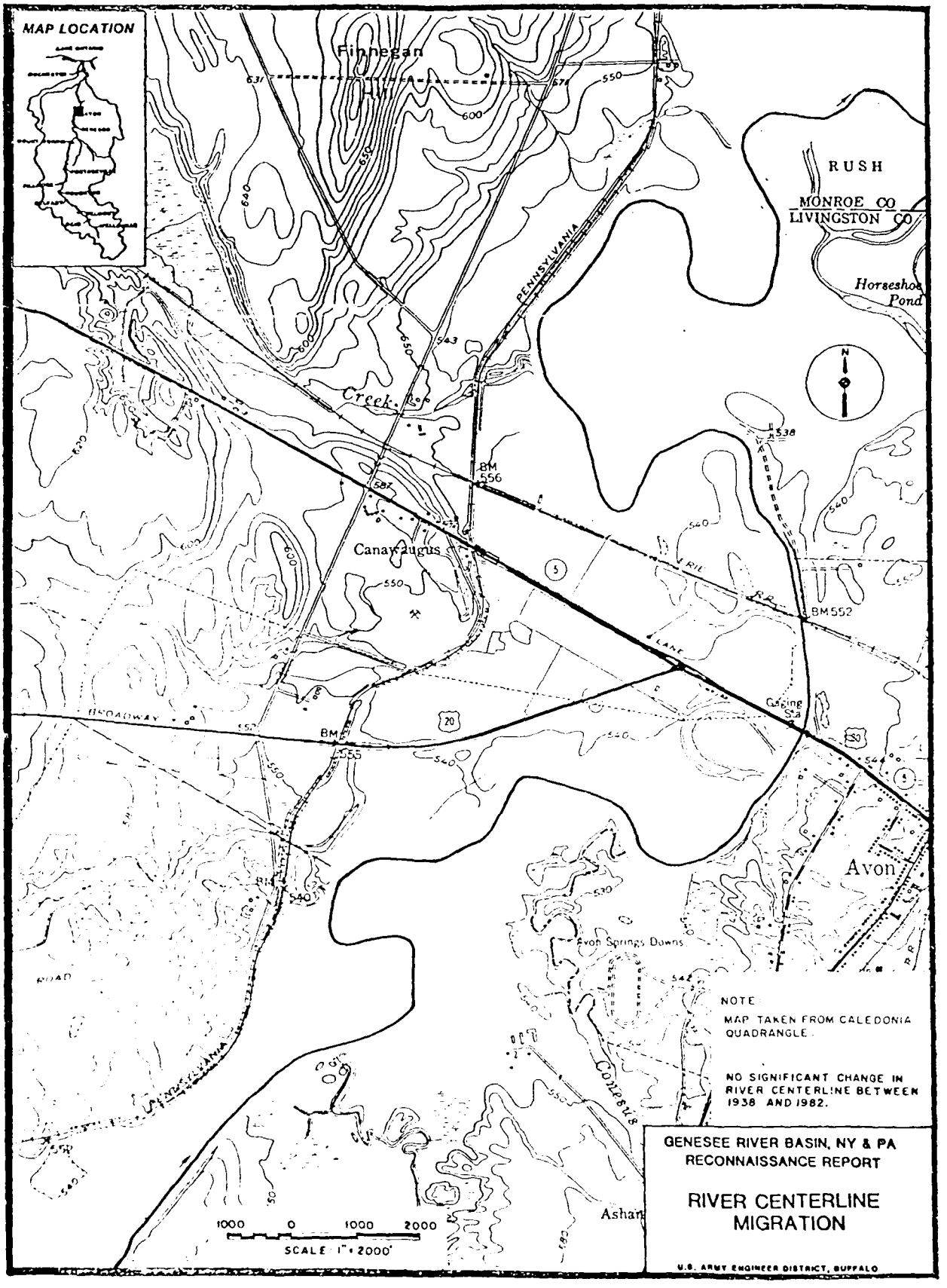

MAP LOCATION
Finnegan
RUSH
MONROE CO
LIVINGSTON CO
Horseshoe Pond
PENNSYLVANIA
Creek
BM 556
Canaseraga
BM552
LANE
BROADWAY
BM555
Avon
Avon Springs Downs
ROAD
Ashan
1000 0 1000 2000
SCALE 1" = 2000'
NOTE
MAP TAKEN FROM CALEDONIA QUADRANGLE.
NO SIGNIFICANT CHANGE IN RIVER CENTERLINE BETWEEN 1938 AND 1982.
GENESEE RIVER BASIN, NY & PA
RECONNAISSANCE REPORT
RIVER CENTERLINE MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A12

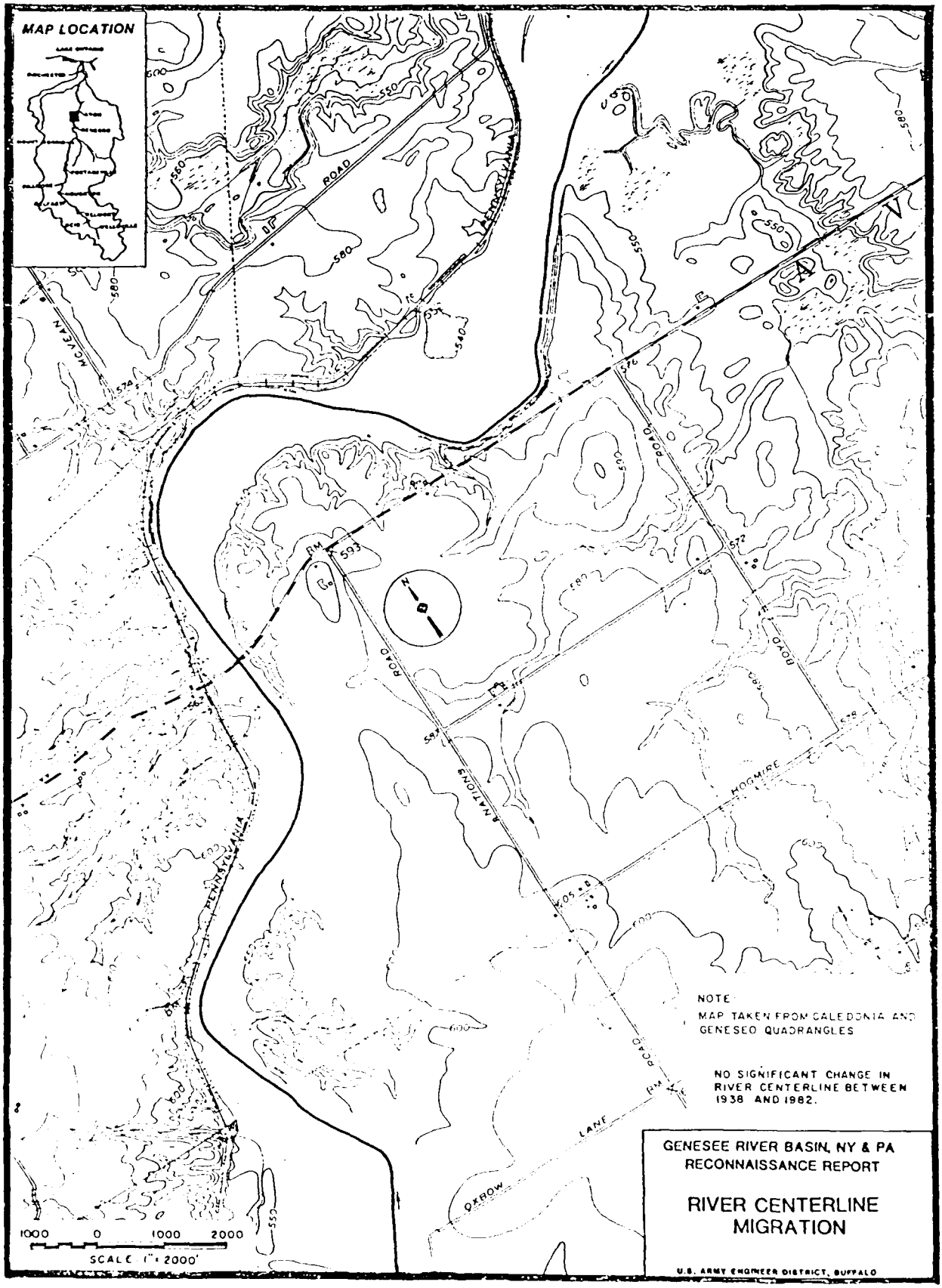

MAP LOCATION
NOTE:
MAP TAKEN FROM CALEDONIA AND GENESEO QUADRANGLES
NO SIGNIFICANT CHANGE IN RIVER CENTERLINE BETWEEN 1938 AND 1982.
GENESEE RIVER BASIN, NY & PA
RECONNAISSANCE REPORT
RIVER CENTERLINE MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1000 0 1000 2000
SCALE 1" = 2000'
PENNSYLVANIA
NEW YORK
ROAD
HOGMIRE
OXBOW
LANE

PLATE A13

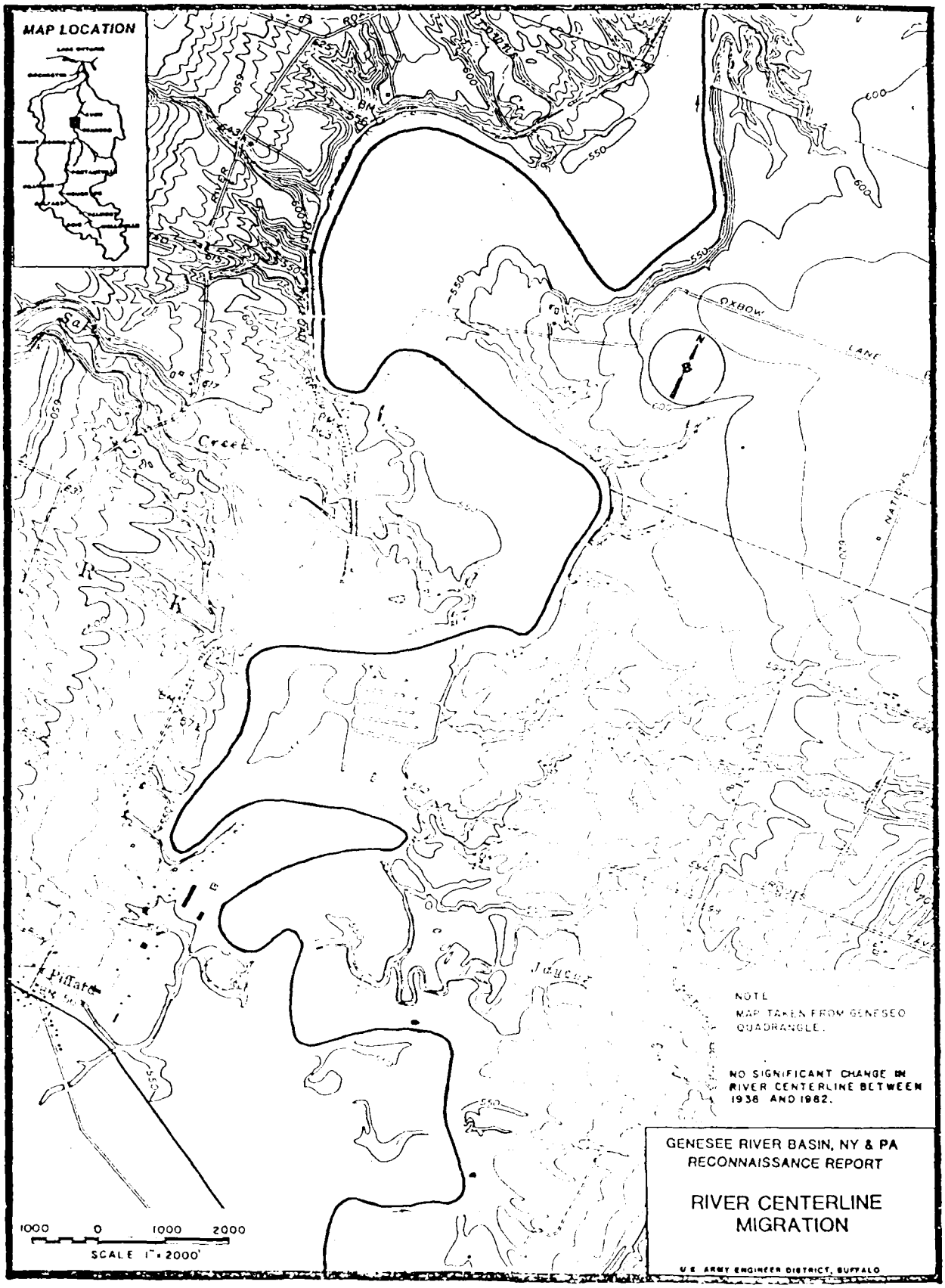

MAP LOCATION
OXBOW
LANE
Creek
NATIONS
Pittard
Jaquay
NOTE
MAP TAKEN FROM GENESEO QUADRANGLE.
NO SIGNIFICANT CHANGE IN RIVER CENTERLINE BETWEEN 1938 AND 1982.
1000 0 1000 2000
SCALE 1" = 2000'
GENESEE RIVER BASIN, NY & PA
RECONNAISSANCE REPORT
RIVER CENTERLINE MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A 14

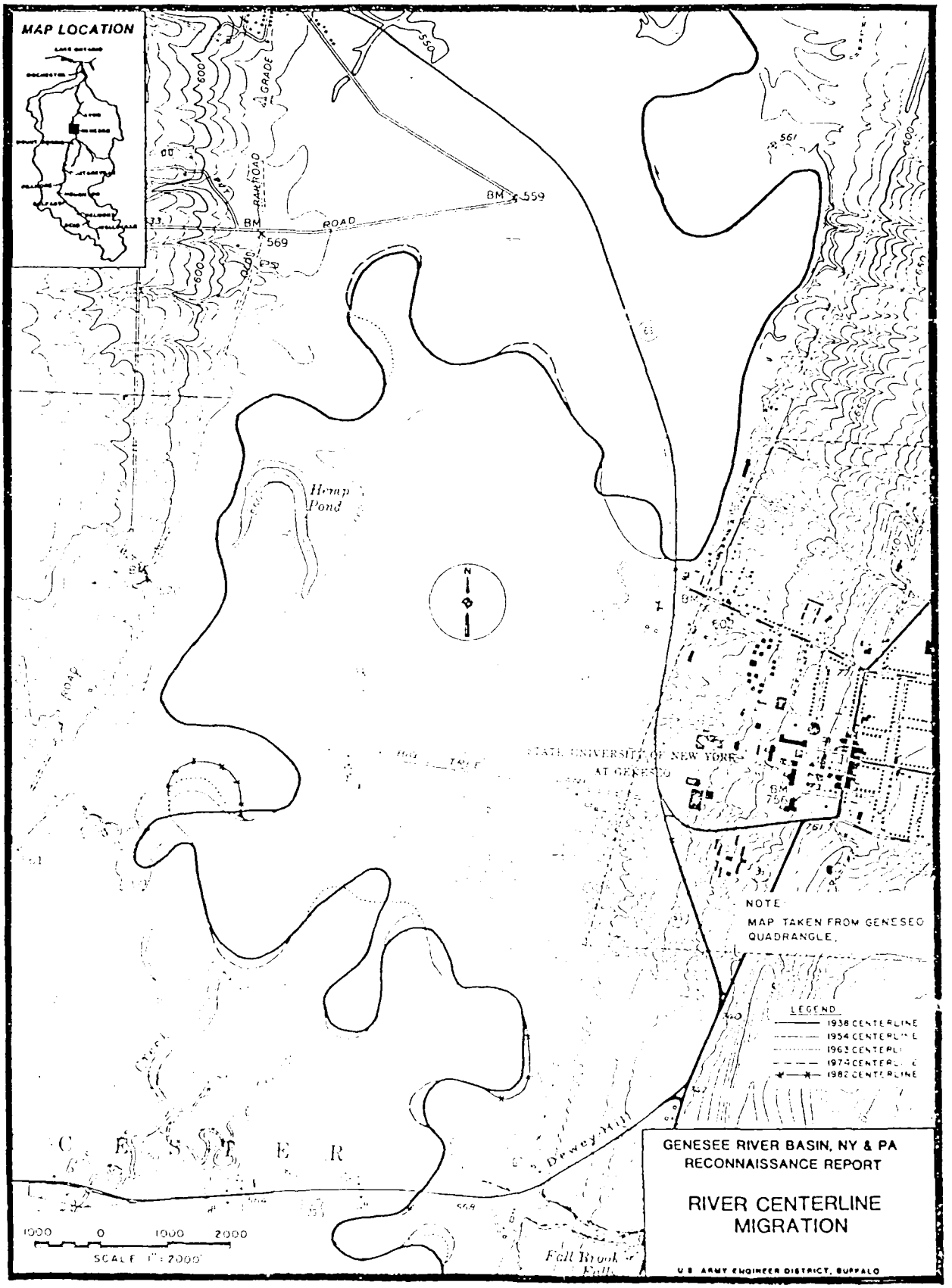

MAP LOCATION
BM 559
BM 569
ROAD
RAILROAD
GRADE
Hemp Pond
STATE UNIVERSITY OF NEW YORK AT GENESEO
BM 756
NOTE
MAP TAKEN FROM GENESEO QUADRANGLE.
LEGEND
1938 CENTERLINE
1954 CENTERLINE
1963 CENTERLINE
1975 CENTERLINE
1982 CENTERLINE
GENESEE RIVER BASIN, NY & PA
RECONNAISSANCE REPORT
RIVER CENTERLINE MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1000 0 1000 2000
SCALE 1" = 2000'

PLATE A 15

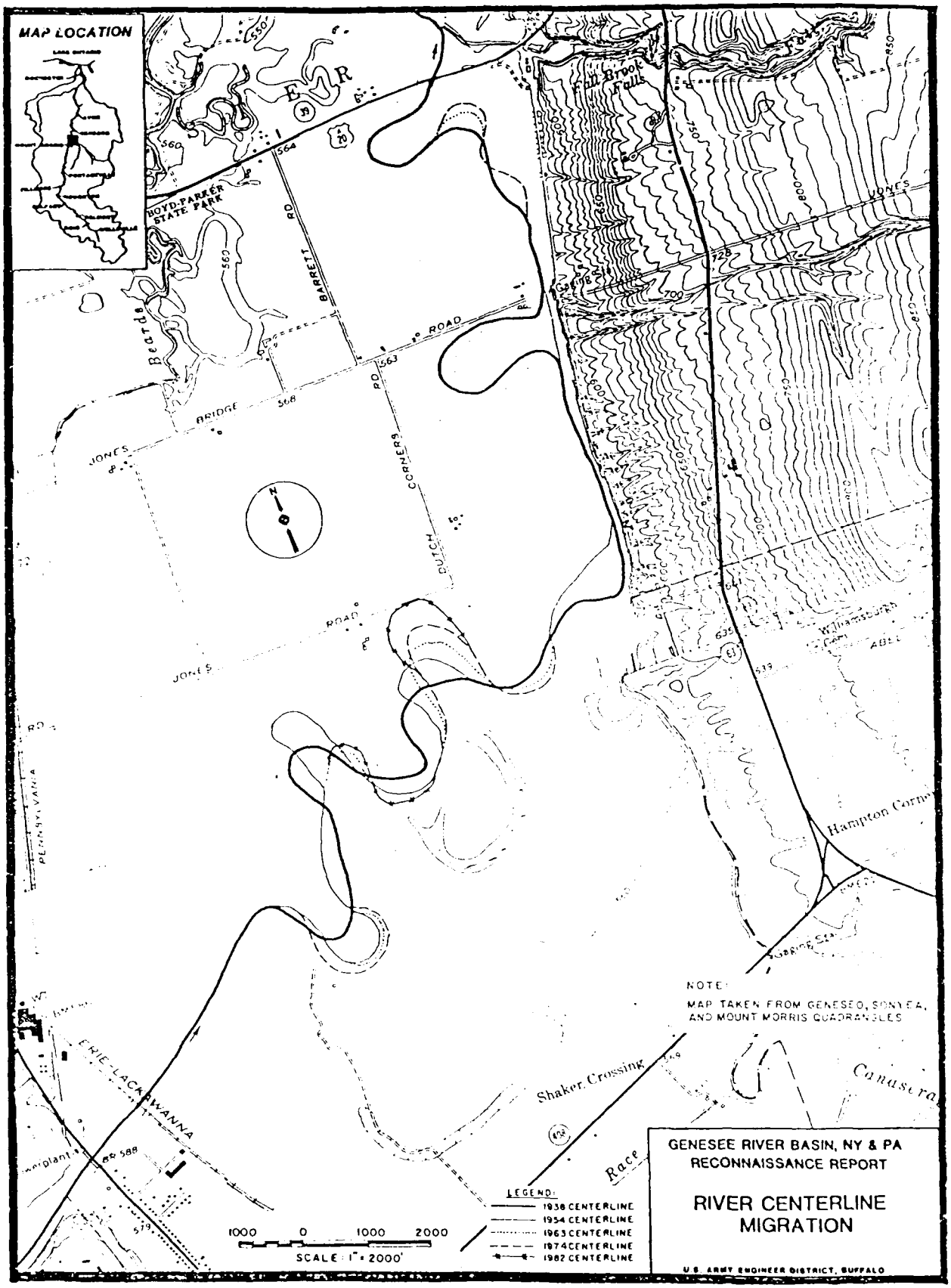

MAP LOCATION
BOYD-PARKER STATE PARK
BARRETT RD
JONES BRIDGE RD
DUTCH CORNERS ROAD
JONES ROAD
Fall Brook Falls
Hampton Corners
Shaker Crossing
Canaseraga
ERIE-LACKAWANNA
PENNSYLVANIA
NOTE:
MAP TAKEN FROM GENESEO, SONYEA, AND MOUNT MORRIS QUADRANGLES
LEGEND:
1938 CENTERLINE
1954 CENTERLINE
1963 CENTERLINE
1974 CENTERLINE
1982 CENTERLINE
1000 0 1000 2000
SCALE: 1" = 2000'
GENESEE RIVER BASIN, NY & PA
RECONNAISSANCE REPORT
RIVER CENTERLINE MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A 16

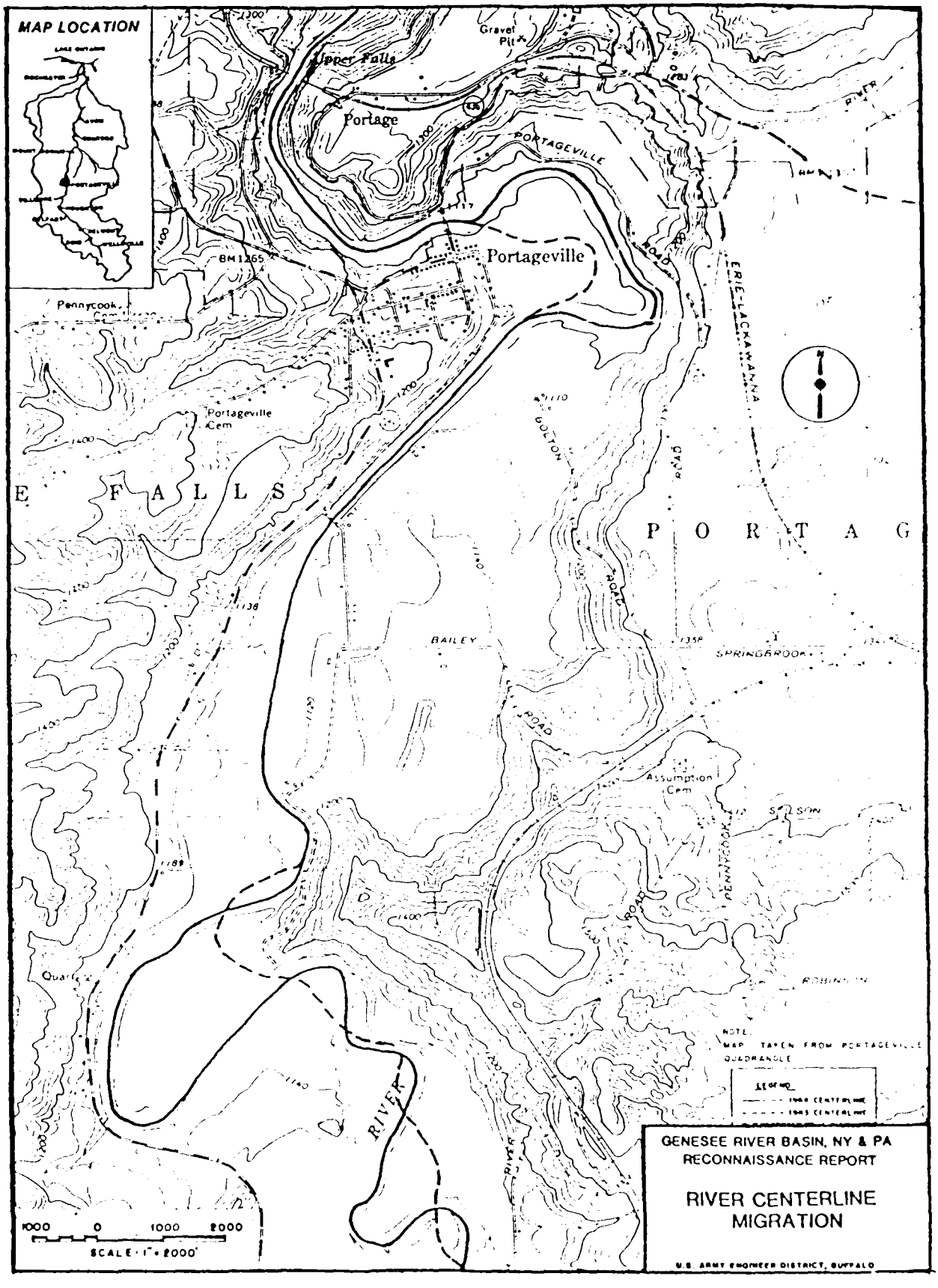

MAP LOCATION
Upper Falls
Gravel Pit
Portage
PORTAGEVILLE
Portageville
BM 1265
Pennycook Cem
Portageville Cem
ERIE-LACKAWANNA
BOULTON
ROAD
E F A L L S
P O R T A G
BAILEY
SPRINGBROOK
Assumption Cem
RAILROAD
Quarry
RIVER
NOTE:
MAP TAKEN FROM PORTAGEVILLE QUADRANGLE
1000 0 1000 2000
SCALE 1" = 2000'
GENESEE RIVER BASIN, NY & PA
RECONNAISSANCE REPORT
RIVER CENTERLINE MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A 17

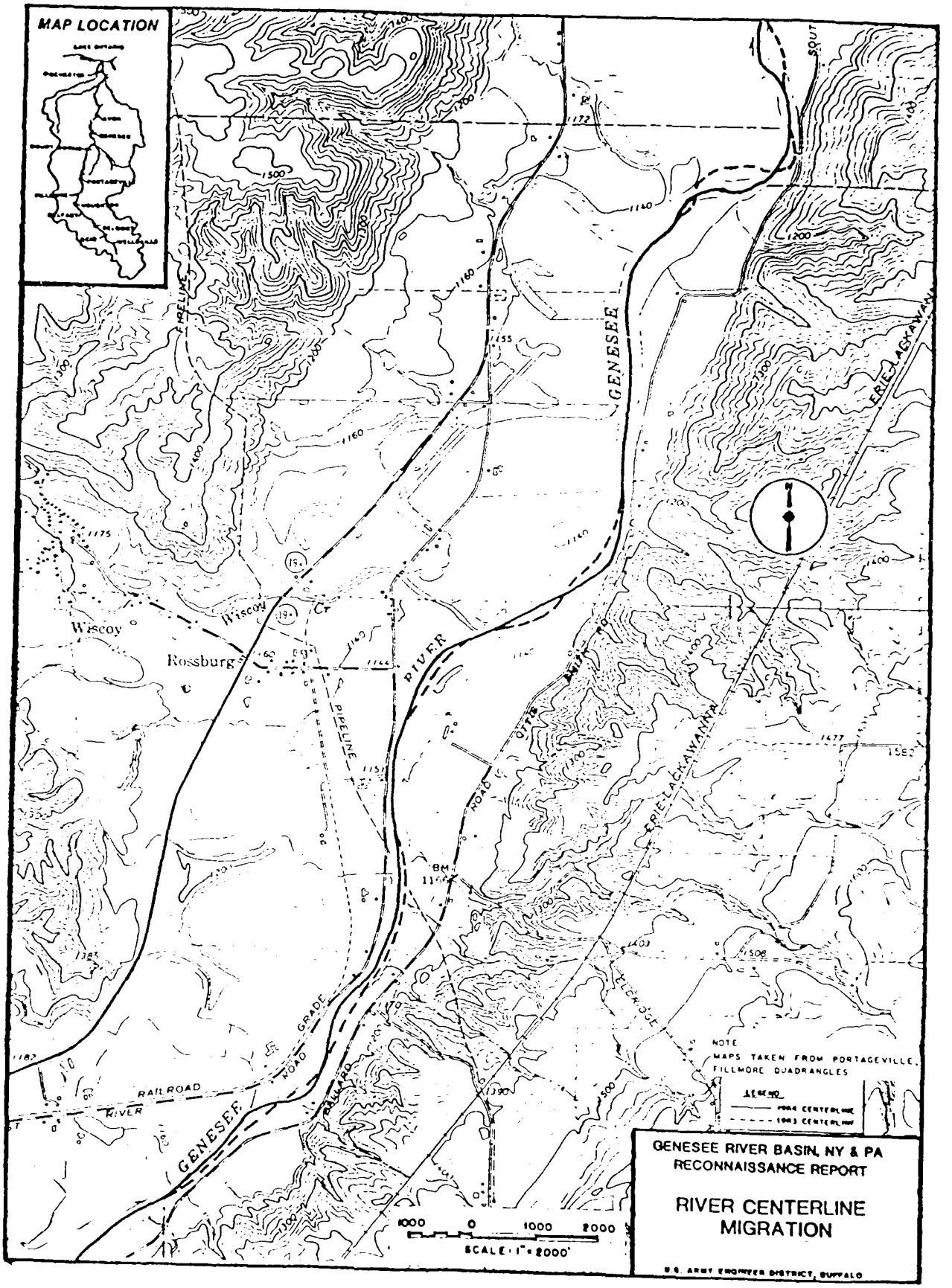

MAP LOCATION
GENESEE
ERIE-LACKAWANNA
Wiscoy
Rossburg
Wiscoy Cr
PIPELINE
OTTO ROAD
RAILROAD
GRADE ROAD
GENESEE RIVER
NOTE
MAPS TAKEN FROM PORTAGEVILLE, FILLMORE QUADRANGLES
1000 0 1000 2000
SCALE: 1" = 2000'
GENESEE RIVER BASIN, NY & PA
RECONNAISSANCE REPORT
RIVER CENTERLINE MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A 18

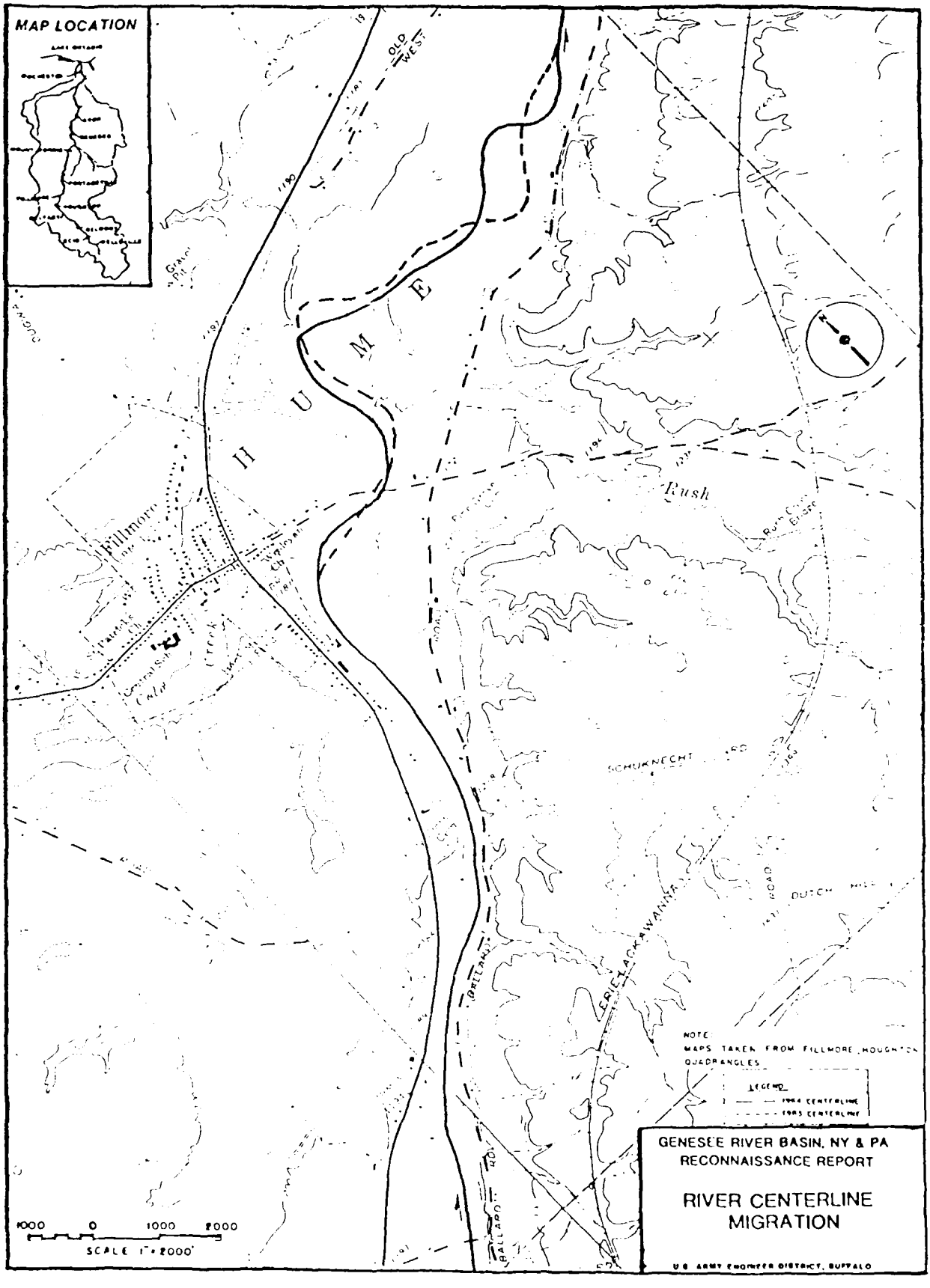
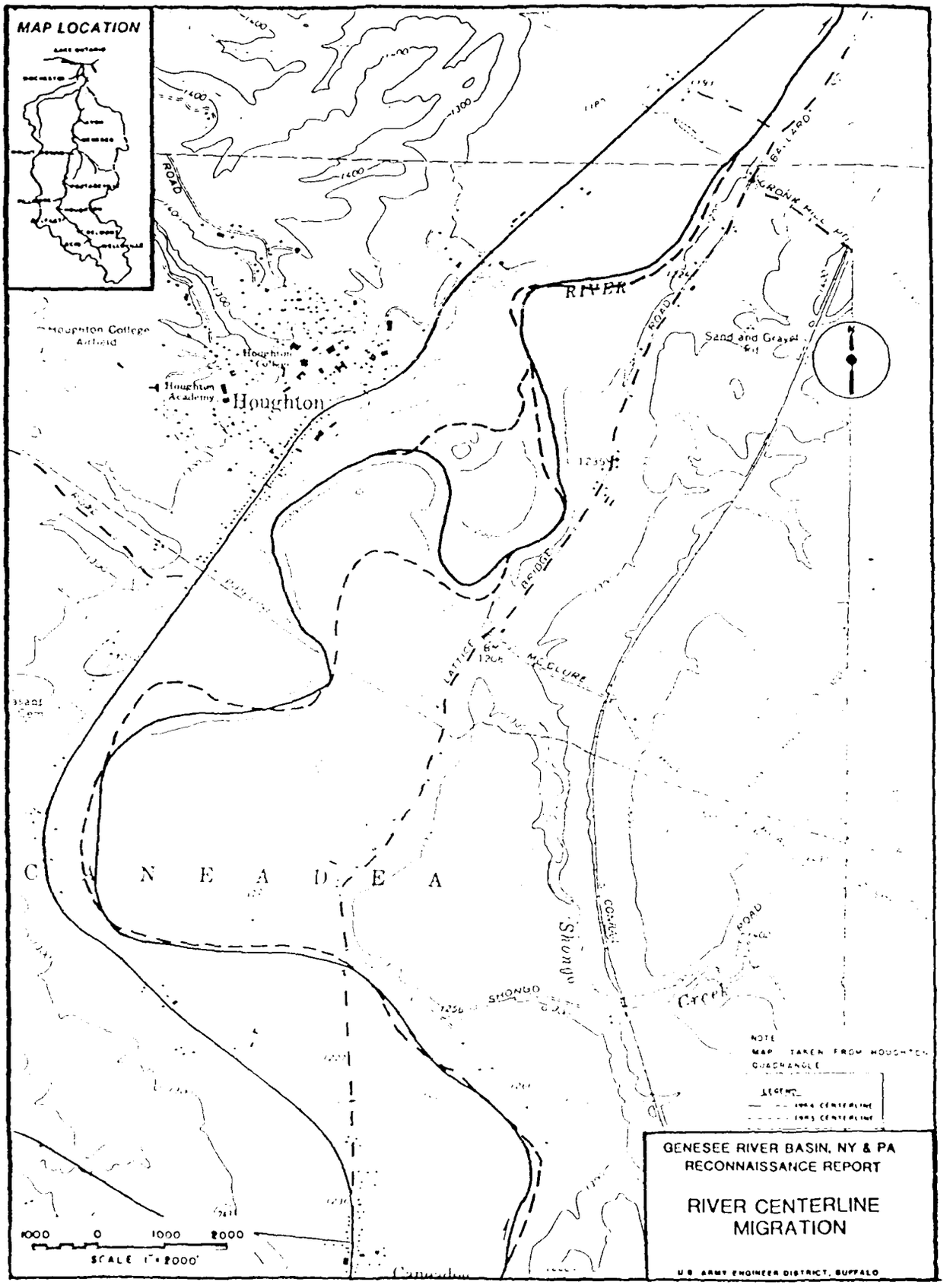

MAP LOCATION
OLD WEST
H U M E
Fillmore
Rush
SCHUYNECHT
ERIE-LACKAWANNA
DUTCH HILL ROAD
BALLARD ROAD
NOTE
MAPS TAKEN FROM FILLMORE, HOUGHTON QUADRANGLES
LEGEND
1964 CENTERLINE
1985 CENTERLINE
1000 0 1000 2000
SCALE 1" = 2000'
GENESEE RIVER BASIN, NY & PA
RECONNAISSANCE REPORT
RIVER CENTERLINE MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A 19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Houghton
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ROAD
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CONESUS
Stongo
Creek
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1985 CENTERLINE
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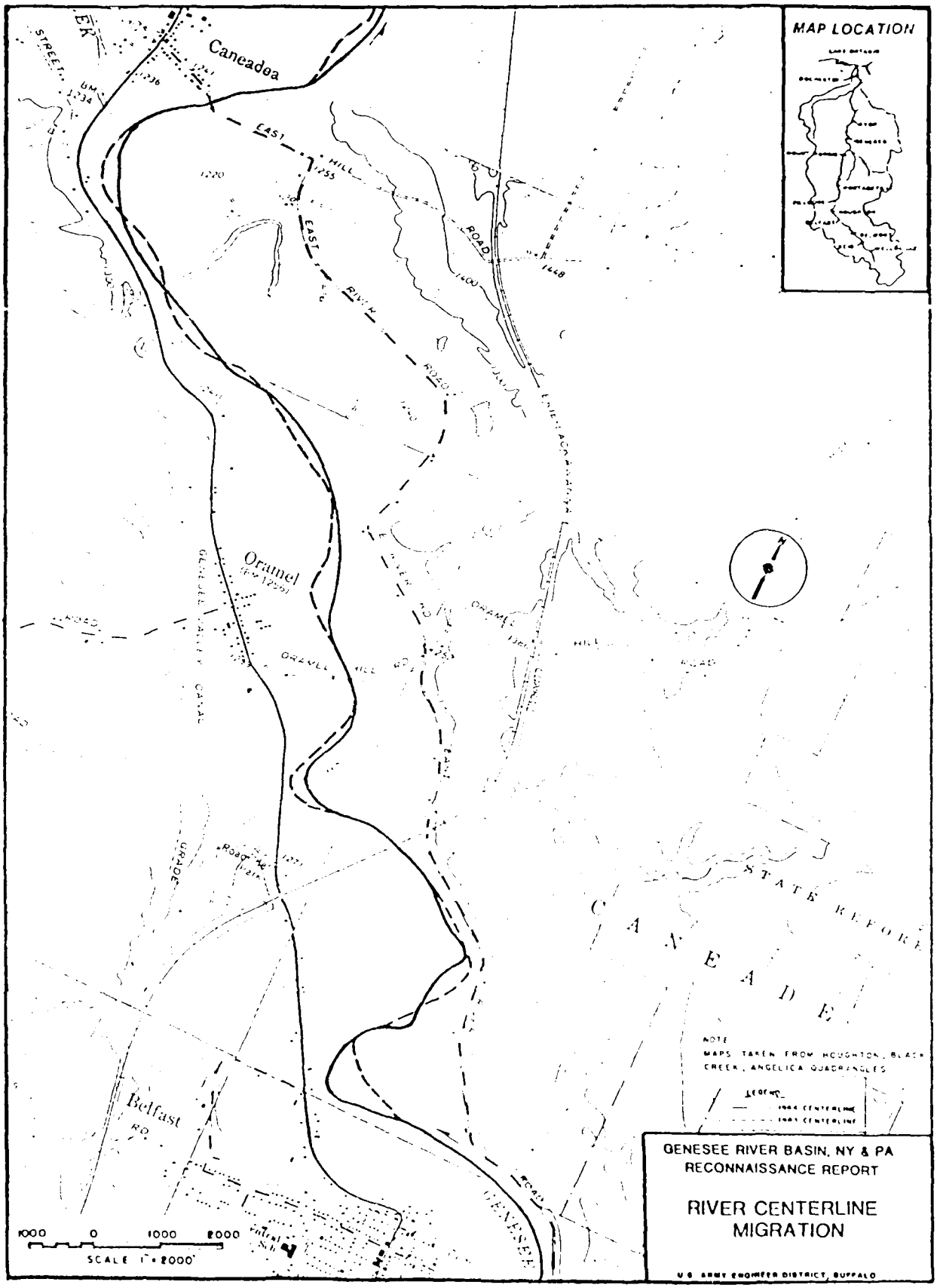
GENESEE RIVER BASIN, NY & PA
RECONNAISSANCE REPORT
RIVER CENTERLINE MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A 20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STATE REFORE
CANEADE
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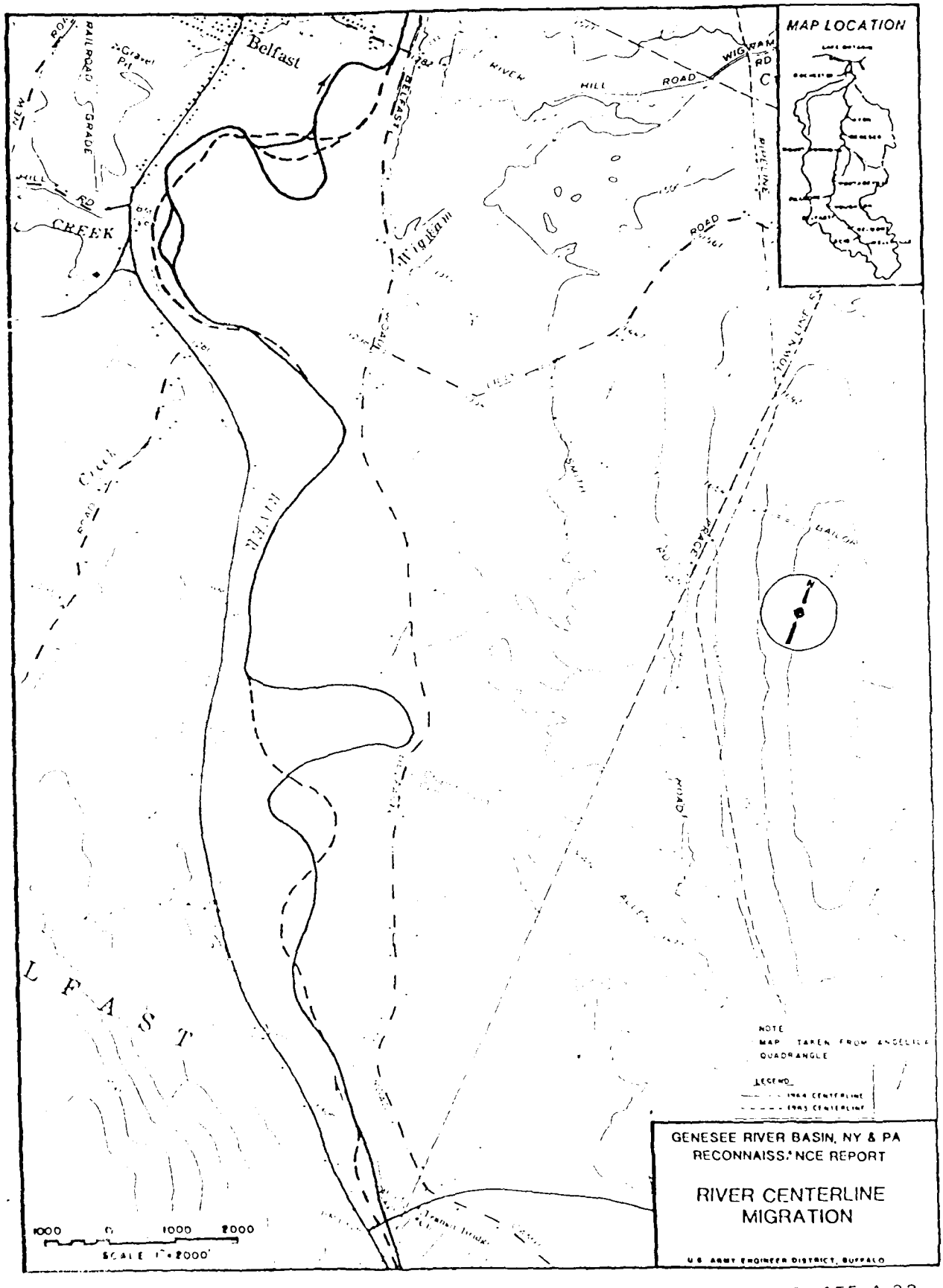
GENESEE RIVER BASIN, NY & PA
RECONNAISSANCE REPORT
RIVER CENTERLINE MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A 21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CREEK
ROAD
HILL
RAILROAD GRADE
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RECONNAISSANCE REPORT
RIVER CENTERLINE
MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO
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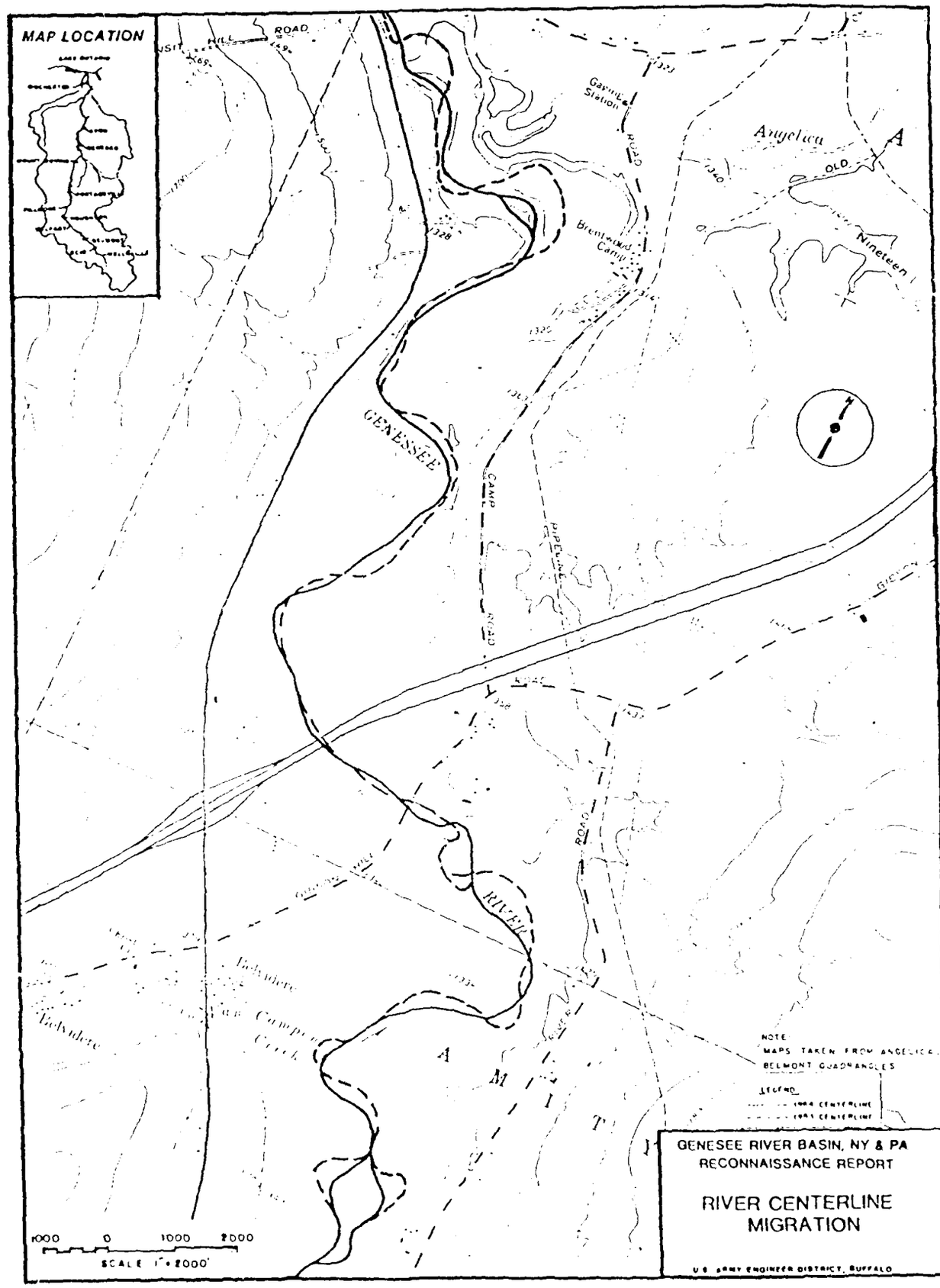
NOTE
MAP TAKEN FROM ANGELICA
QUADRANGLE
LEGEND

PLATE A 22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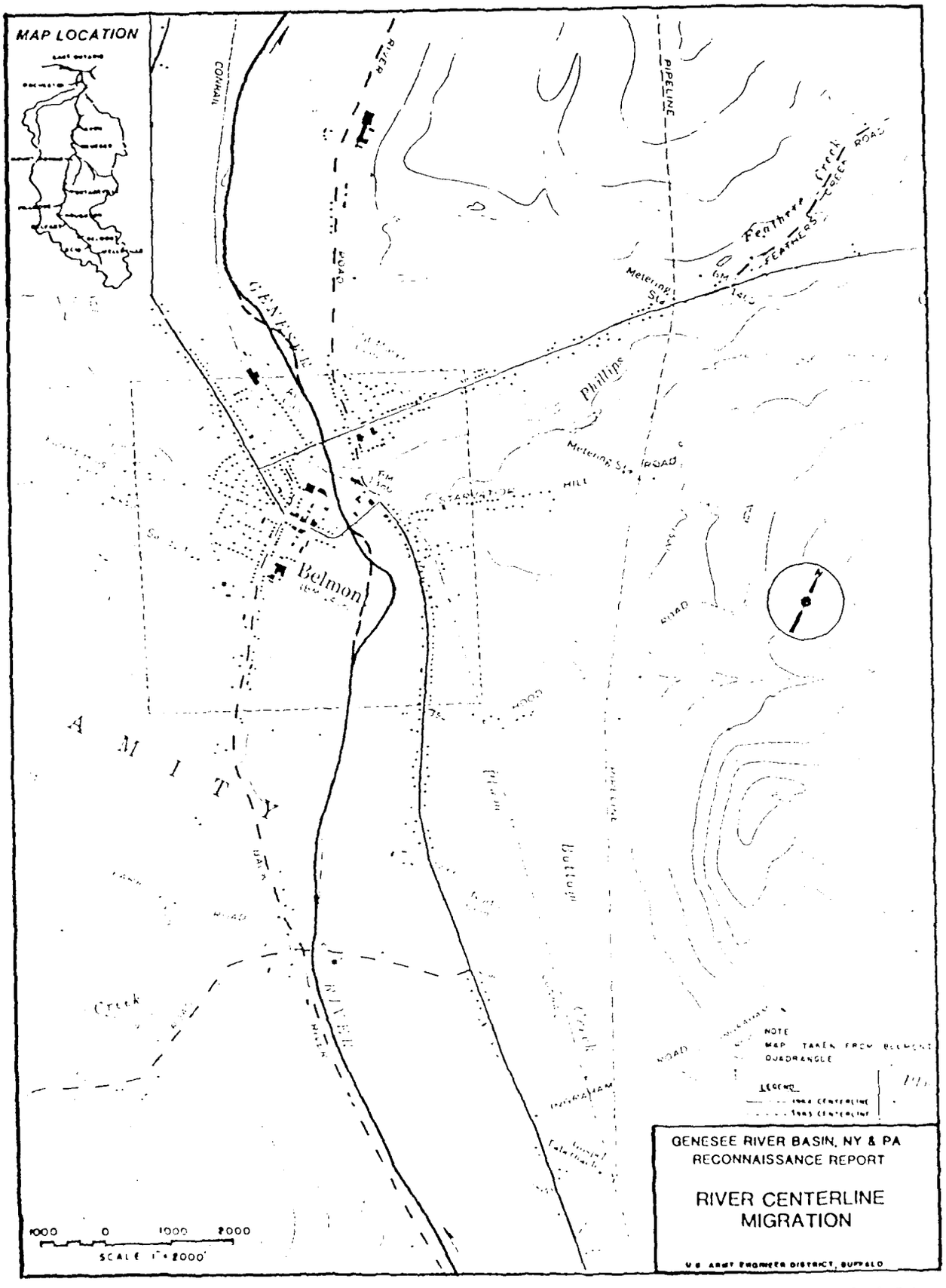
RECONNAISSANCE REPORT
RIVER CENTERLINE MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A 23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Creek
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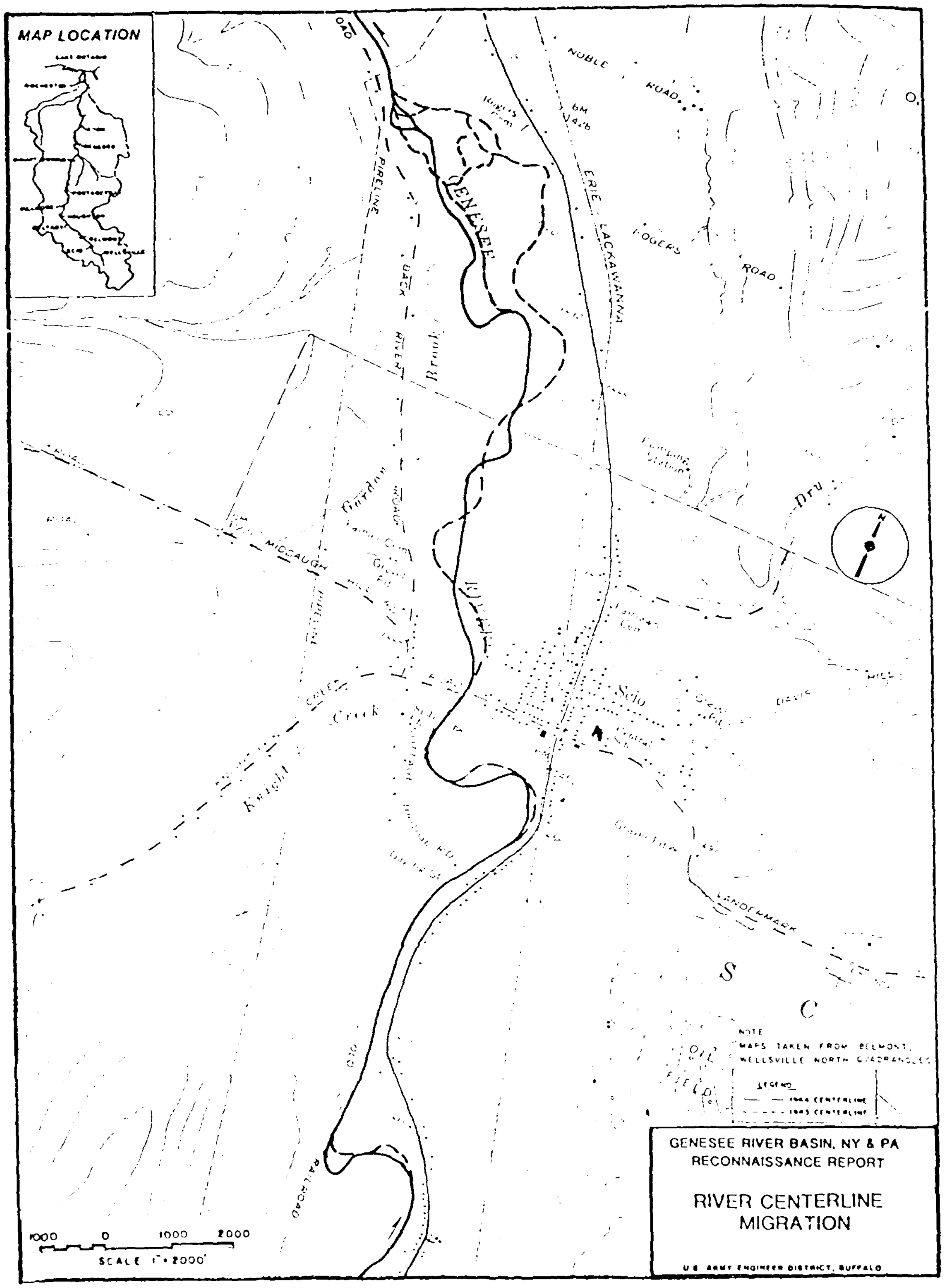
GENESEE RIVER BASIN, NY & PA
RECONNAISSANCE REPORT
RIVER CENTERLINE
MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A 24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ROGERS ROAD
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GENESEE
RIVER
PIPELINE
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Gordon
MIDCAUGH
Creek
Knight
Scio
VANDERMARK
NOTE
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LEGEND
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1983 CENTERLINE
RAILROAD
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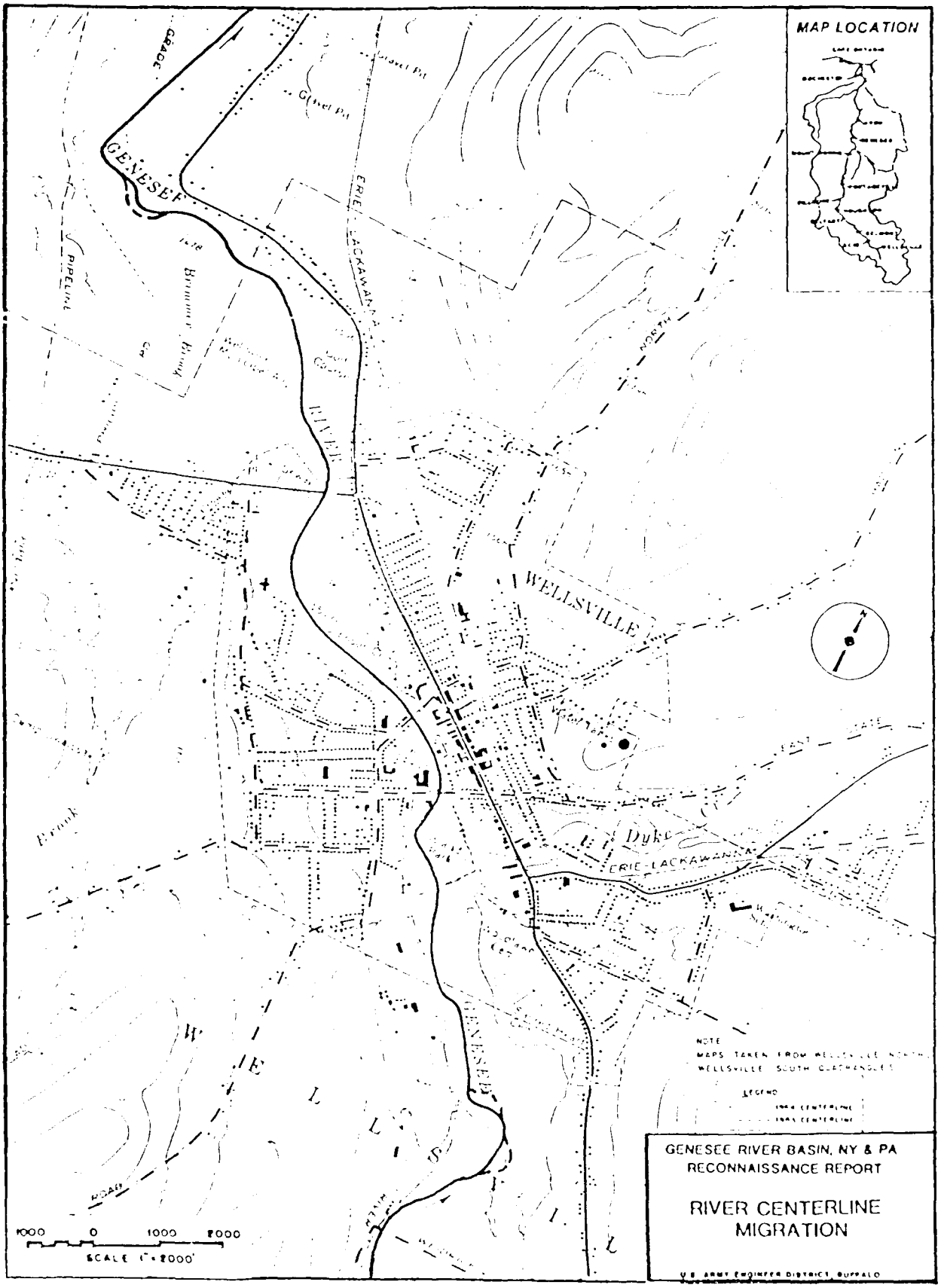
GENESEE RIVER BASIN, NY & PA
RECONNAISSANCE REPORT
RIVER CENTERLINE MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A 25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RIVER
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WELLSVILLE SOUTH QUADRANGLES
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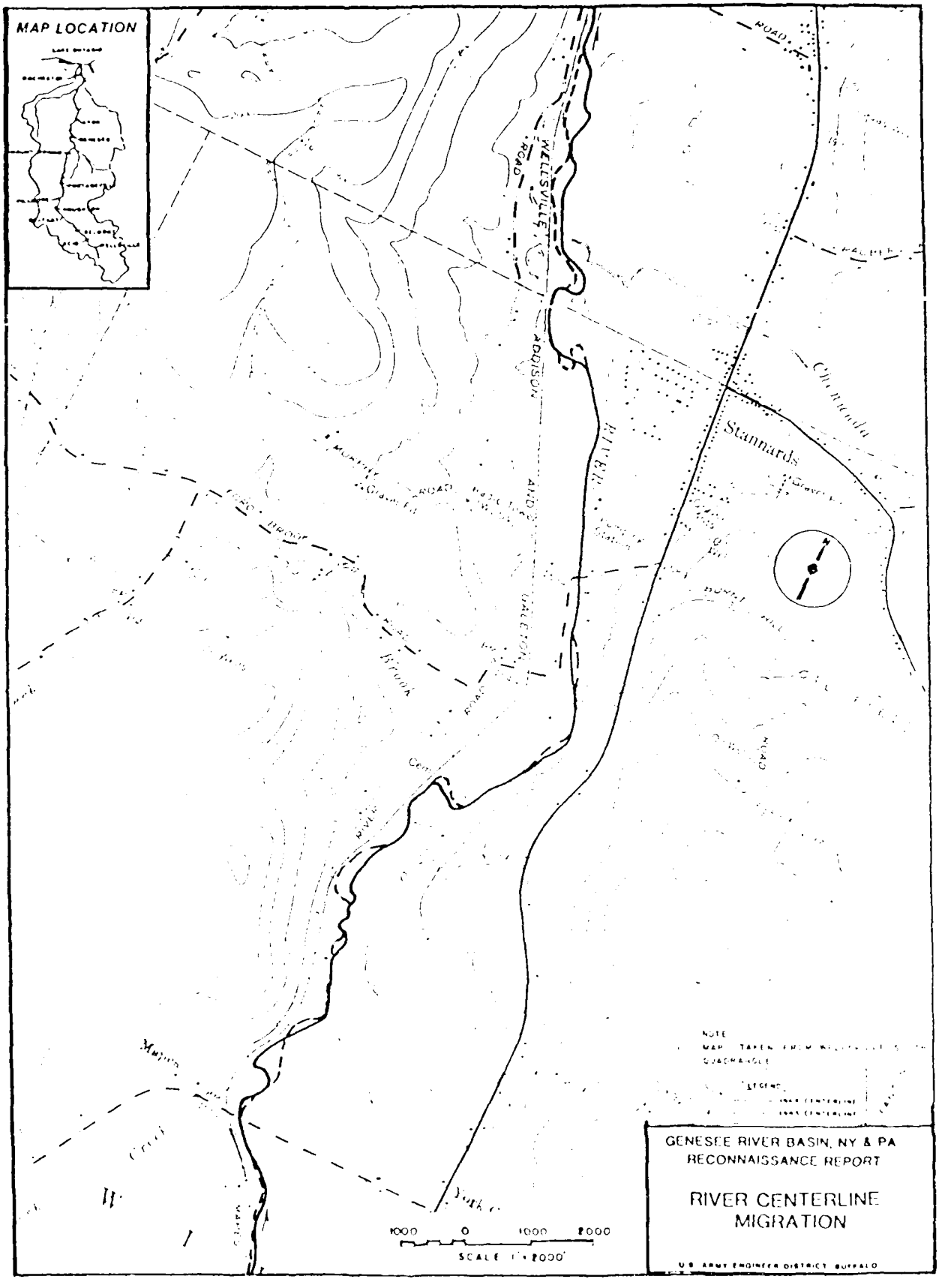
RECONNAISSANCE REPORT
RIVER CENTERLINE
MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A-26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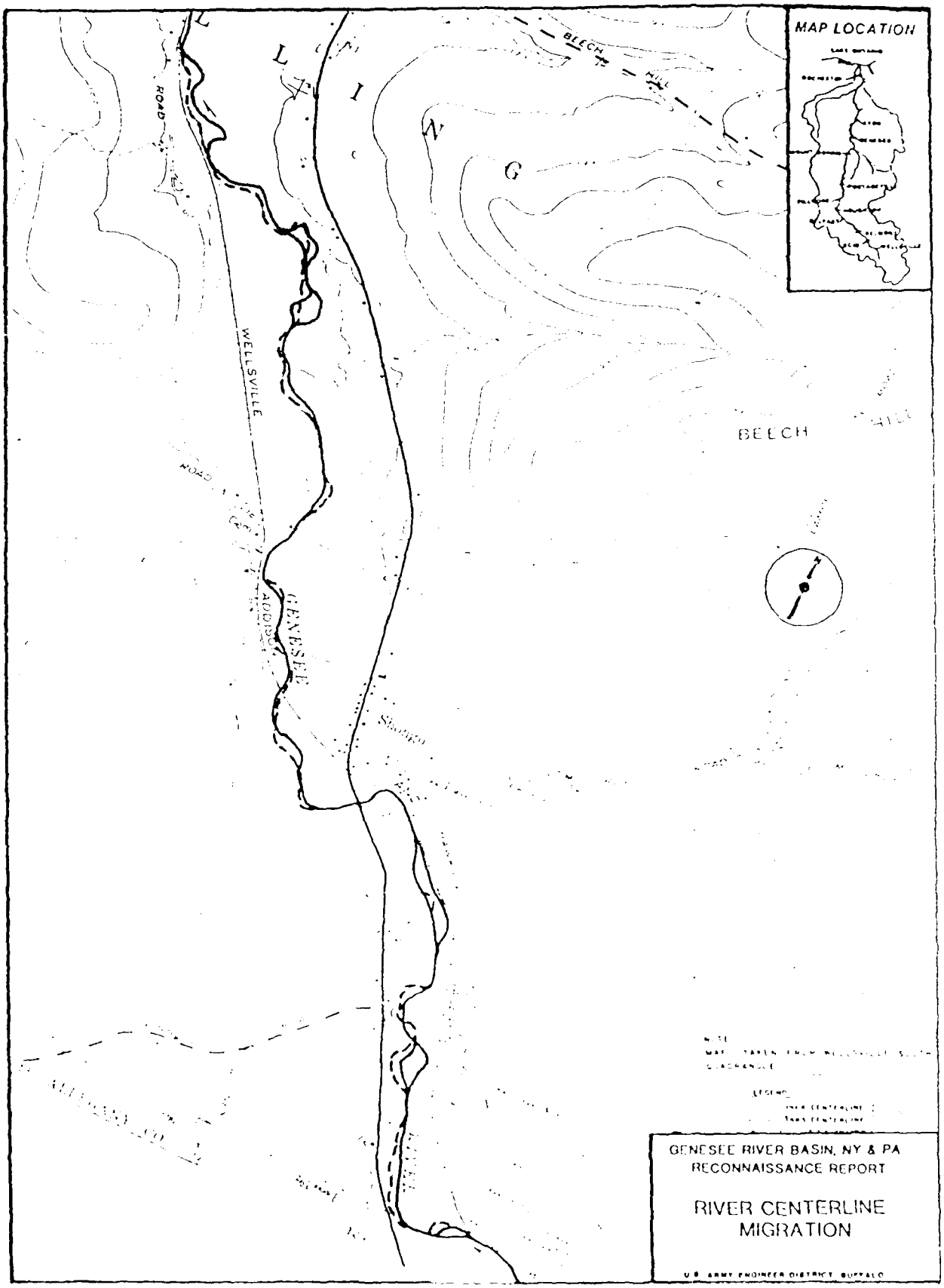
RECONNAISSANCE REPORT
RIVER CENTERLINE
MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A 22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BEECH
WELLSVILLE
ROAD
GENESEE
ADDISON
Shongo
BEECH HILL
GENESEE RIVER BASIN, NY & PA
RECONNAISSANCE REPORT
RIVER CENTERLINE
MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A 28

AD-A190 139 GENESEE RIVER BASIN STUDY; RECONNAISSANCE REPORT VOLUME 2/3
2 SUPPORTING DOCUMENTATION(U) CORPS OF ENGINEERS
BUFFALO NY BUFFALO DISTRICT 1986

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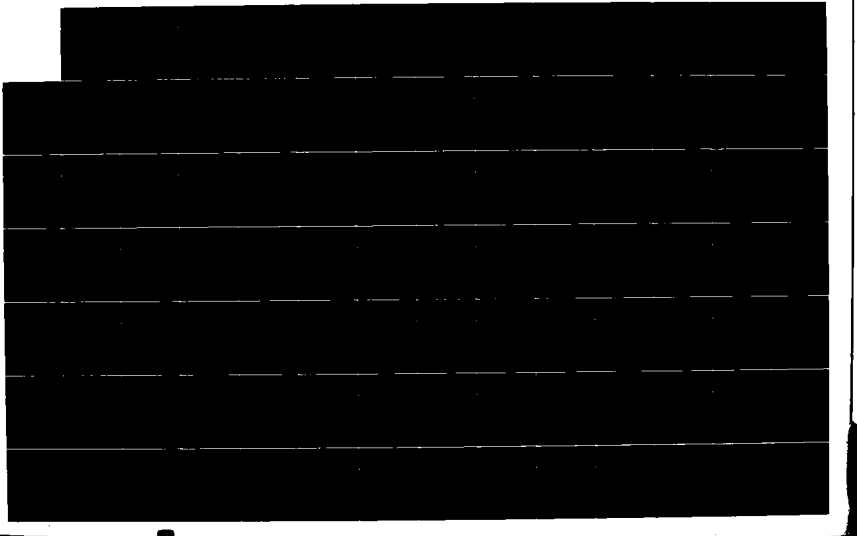

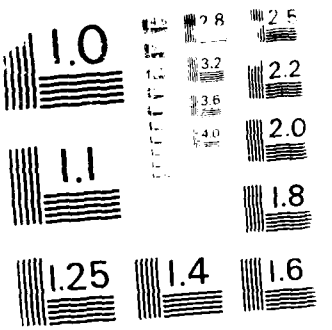
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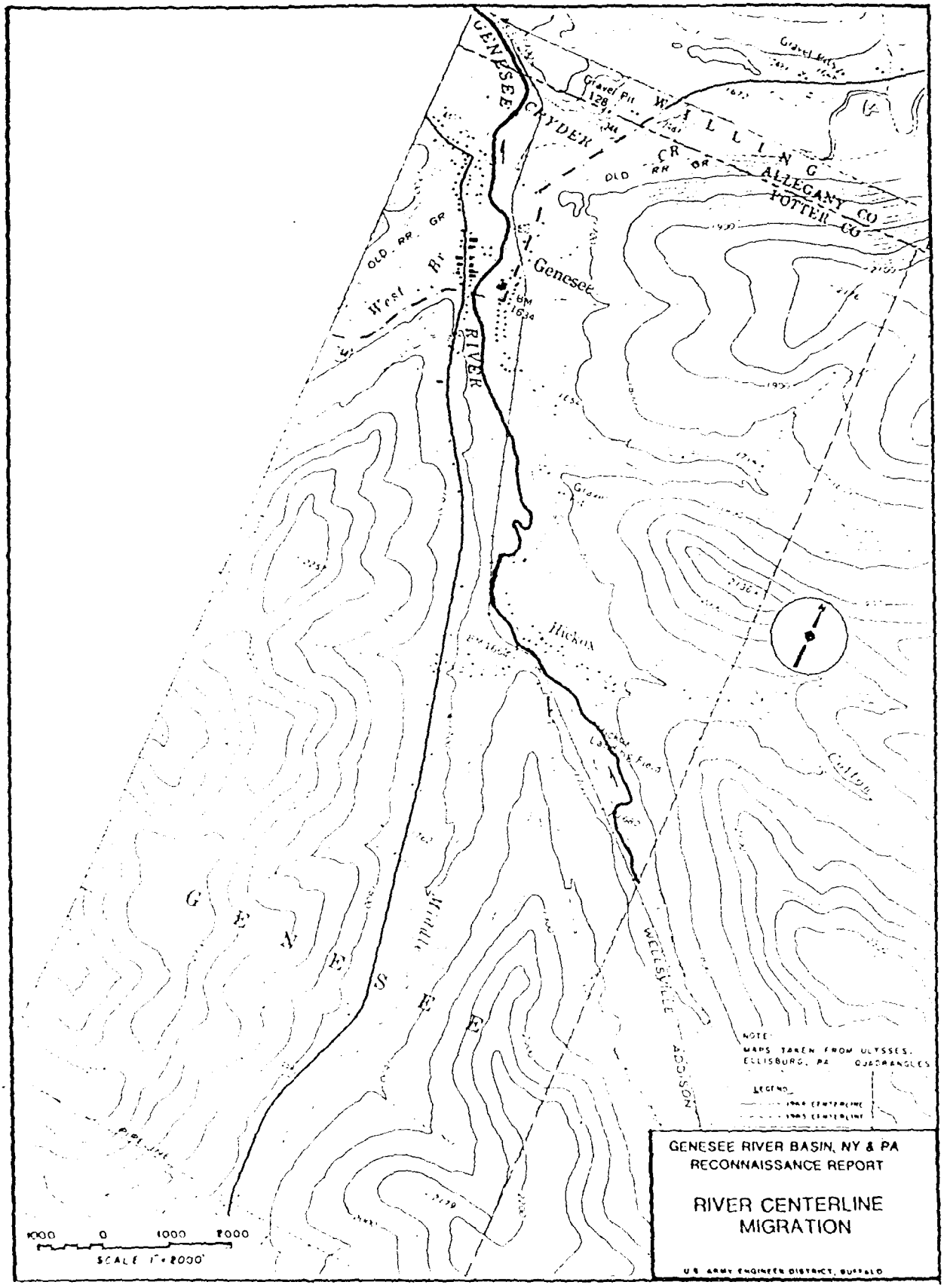
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ALLEGANY CO
POTTER CO
OLD RR GR
West Br
Genesee
BM 1634
RIVER
Hickox
Carlton
GENESEE
RIVER
WELLSVILLE
ADDISON
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1985 CENTERLINE
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SCALE 1"=2000'
GENESEE RIVER BASIN, NY & PA
RECONNAISSANCE REPORT
RIVER CENTERLINE MIGRATION
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE A 29

GENESEE RIVER BASIN STUDY
NEW YORK

RECONNAISSANCE REPORT

APPENDIX B

ECONOMICS

U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207

GENESEE RIVER BASIN
NEW YORK

RECONNAISSANCE REPORT

APPENDIX B
ECONOMIC EVALUATION

TABLE OF CONTENTS

APPENDIX B
ECONOMIC EVALUATION

B1. INTRODUCTION

a. The reconnaissance phase of this study provides an indication of water resources needs in the Genesee River Basin, a preliminary indication of the potential of this study to yield solutions to these problems and provides a basis for evaluating the merits of continuing the study and allocating feasibility phase funds.

A comprehensive study for the Genesee River Basin was authorized by the Committee on Public Works of the United States Senate in a resolution adopted 1 February 1962. The overall study was requested by the New York State Water Resources Commission and the authorizing resolution was sponsored by Senator Jacab K. Javits of New York.

The authorizing resolution for the overall study reads:

"Resolved by the Committee on Public Works of the United States Senate, that the Board of Engineers for Rivers and Harbors created under Section 3 of the River and Harbor Act approved 13 June 1902, be and is hereby requested to review the reports of the Genesee River, New York contained in House Document 615, 78th Congress, 2nd Session, and other reports, with a view to determining whether any modification of the basin-wide plans should be made at this time with respect to improvements for flood control, navigation and other related water and land resources. In making this study the Corps of Engineers shall coordinate fully with the State of New York and Commonwealth of Pennsylvania and other Federal agencies concerned to insure full consideration of all views and requirements of all interrelated programs, which those agencies may develop with respect to flood prevention, water supply, stream pollution abatement, recreation, fish and wildlife management, irrigation, soil conservation, hydro-electric power, and related water and land resources."

This report presents a general appraisal of the water and related land resource potential and needs for the Genesee River Basin and the agricultural potential of the adjoining Ontario Lake Plains service area.

b. The NED account describes that part of the NEPA human environment, as defined in 40 CFR 1508.14, that identifies beneficial and adverse effects of the economy. The beneficial effects in the NED account are increases in the economic value of the national output of goods and services from a plan. The NED account includes goods and services in the following categories that are addressed in this Reconnaissance Report:

1. Municipal and industrial water supply
2. Agricultural flood damage reduction
3. Urban flood damage reduction
4. Hydropower
5. Transportation (inland navigation)
6. Transportation (deep draft navigation)

7. Recreation
8. Commercial fishing
9. Area redevelopment

B2. PREVIOUS STUDIES

A complete listing of previous studies is located in the Main Report.

B3. DESCRIPTION OF BASIN

a. Basin Area - The Genesee River Basin is the watershed of the Genesee River. The latter has its headwaters in extreme north-central Pennsylvania and flows northward into Lake Ontario. The basin has a roughly elliptical shape that extends north-south about 100 miles and east-west about 40 miles (Figure B1).

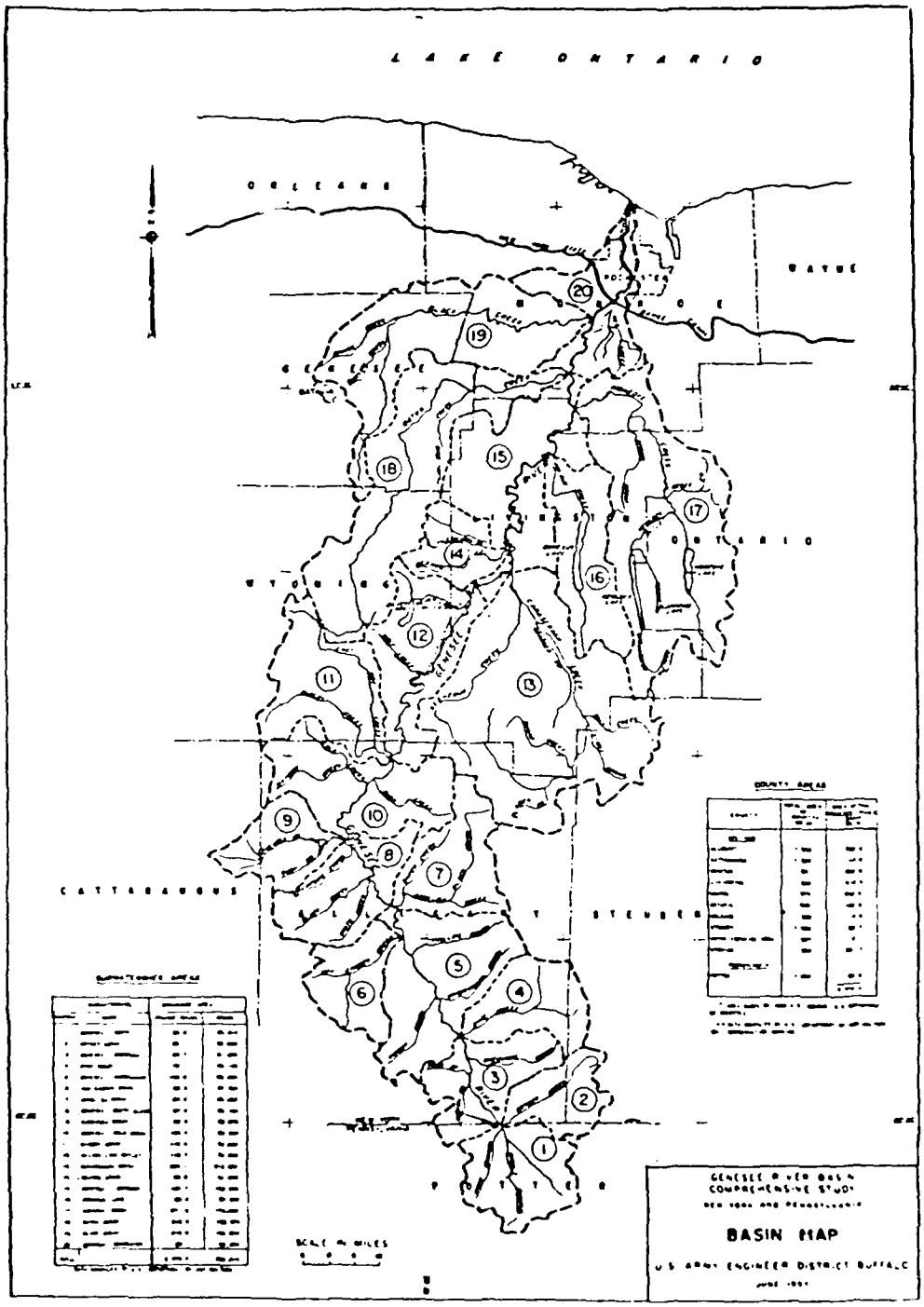
b. Topography - The Genesee River rises on the Allegheny Plateau, just south of the New York - Pennsylvania boundary. It flows in a northward direction, descending down the northern edge of the Allegheny Plateau at the Portage Escarpment onto a lake plain. It then flows into Lake Ontario in the city of Rochester.

The Allegheny Plateau encompasses about 60 percent of the Genesee River basin. The plateau consists of rounded hills with intervening valleys. Surface elevations on the plateau, which rise up to 500 ft. above the valleys, are in the vicinity of 1,000 to 2,000 feet above sea level.

The Genesee River flows off the Allegheny Plateau at the Portage Escarpment near the village of Mount Morris. Here the river has a fairly steep gradient. The channel has eroded down through bedrock to form a deep gorge which is occupied by Letchworth State Park. The gorge is a natural reservoir site and Mount Morris Dam has been constructed in the gorge. The dam is located within Letchworth State Park. Mount Morris Dam was built and is operated by the Corps of Engineers as a single function dam. The dam provides flood protection to the lower Genesee River Valley, principally to the city of Rochester and its surrounding suburbs.

Flowing down the Portage Escarpment, the Genesee River exits onto a lake plain before emptying into Lake Ontario. In theory, the lake plain is a succession of three individual plains, separated from each other by an escarpment. The Erie Plain is separated from the Huron Plain by the Onondaga Escarpment and the Huron Plain is separated form the Lake Ontario Plain by the Niagara Escarpment. Since the escarpments are buried by substantial glacial deposits, the three plains merge into one which slopes down from the Portage Escarpment in the south to Lake Ontario in the north. Once on the lake plain, the Genesee River meanders across it at a very low grade into Lake Ontario. A nearly flat valley, as much as three miles in width has been formed. The topography of the lake plain is characterized as gently undulating. The most significant topographic features on the lake plain are beach ridges formed by retreating glacial lakes. These ridges trend east-west across the plain.

Figure B-1 Genesee River Basin Water Shed



c. Soils - The topography of the basin below the Portage Escarpment is a product of deposition of sediments from temporary lakes. These lakes formed behind the last (most recent) retreat of continental glaciation. When the glacier retreated northward, a series of temporary glacial lakes were formed, each of which was successively drained. Thus the formation of the three plains - Erie, Huron, and Ontario - downstream of the Portage Escarpment.

The soils found in the basin are largely a product of glacial and lacustrine deposits. The soils of the Allegheny Plateau, with the exception of soils on the floodplains of the major streams, tend to be: strongly acidic, have poor drainage and are relatively infertile. They are not generally well suited to cultivation of crops. The Volusia-Mardin-Lordstown soils are characteristic soils found over much of the upland areas of the plateau.

The floodplain soils occupying the valley bottoms of the plateau, principally the valley of the Genesee River and its larger tributary creeks, are quite different. Though relatively strongly acidic, they have: excellent physical properties, are well drained and are highly fertile. The Chenango-Tioga Association is a characteristic soil association for the upland valleys. Along with some of the soils found on the Lake Ontario Plain, these soils are some of the prime farmlands in New York State.

The mixture and spatial distribution of soils found on the lake plain is much more complex. There is a larger number of associations and the spatial pattern is one of an intermingling of difference associations resulting from the complex pattern of lacustrine deposition of sediments from glacial meltwater lakes. Some associations, such as the Honeoye-Lima Association, are: well drained, medium textured, neutral to slightly acidic soils with high fertility. This association is reasonably typical of the lake plain soils. Others, such as the Ontario-Hilton Association, which occupies extensive areas on the Ontario Plain, are similar but somewhat less fertile. In general, however, the lake plain soils are very fertile and very productive. They are generally well suited to produce a wide range of crops including corn, alfalfa, and a variety of vegetables. Their suitability for production of vegetables reflects their high fertility. They are also well drained and are found in areas with gentle slope. The latter two are important characteristics for application of irrigation water to Lake Ontario plain crops. The water could be used for the production of vegetables, and to a lesser degree orchard fruits, on the Lake Ontario Plain.

d. Planning Region - It has been necessary to define a Genesee River Basin Planning Region in terms of counties falling within the boundaries of the basin. This was done since economic data are not readily available in terms of river basins.

Since there is not a one for one correspondence between county and basin boundaries, the specification of counties in the Planning Region is somewhat subjective. The Planning Region has been defined to include five counties within (partially or principally) the basin and one county outside of the basin. The five counties within the basin are: Allegany, Wyoming, Livingston, Genesee, and Monroe. The one county outside of the basin which has been included in the Planning Region is Orleans County. It has been

included because of the potential agricultural irrigation benefits they might be realized on the Lake Ontario Plain as a result of implementation of a plan for the Genesee River.

e. Economic Variables - Table B3-1 presents projections of basic economic variables in the Genesee River Basins Planning Region Population shows a little over .3 percent annual growth from 1980 to 2035. Likewise, employment is projected to grow around 45 percent annually. However, personal income per capita shows around a 1 percent annual growth rate.

Table B3-1 - Projections of Basic Economic Variables in the Genesee River Basins Planning Region

Date	Population	Employment	Personal Income per capita
1980	948,777	426,641	$10,227
1985	968,700	455,300	10,680
1990	1,015,100	497,400	11,920
2000	1,068,800	545,100	13,530
2015	1,118,900	559,400	15,420
2035	1,148,100	539,600	18,320

NOTES:

1. The counties of the Genesee River Basin have been defined to include the following: Allegany, Wyoming, Livingston, Monroe, Genesee, and Orleans.

2. Projections are based upon projected values for Upstate New York (NY State minus counties of the NY State portion of the New York PMSA) presented in Vols. 1 and 2 of 1985 OBERS, BEA Regional Projections.

f. Land Use Data - The data in Table B3-2 reflects land use in minor civil divisions (MCDs) in New York State through which the Genesee River flows. The affected counties are Allegany, Wyoming, Livingston, and Monroe. With the exception of Monroe, which contains the city of Rochester and its rapidly growing suburbs, all are predominantly rural counties. The land use data for the MCDs in Allegany, Wyoming, and Livingston Counties are that presented in New York State Land Use and Natural Resource Inventory, which was conducted in 1968. Land use data for the MCDs in Monroe County are based upon a tabulation of 1982 land use data derived from the Assessment Roll and Levy Module provided by the Monroe County Department of Planning. Though dated, the former are believed to be reasonably reflective of current land use patterns in the MCDs of the three upstream, rural counties. The data for Monroe County (1982) is the most current data available. A degree of judgment was used in developing these estimates. The definitions of the individual categories differed between the two data sources, LUNR and Monroe County Assessment Roll and Levy Module.

Table B3-2 - Land Use in Minor Civil Divisions Along the Genesee River, New York State

Land Use Category	Area (Sq. Miles)	Area (Percent)
Agriculture	339	38.83
Woodlands	297	34.02
Wetlands	13	1.49
Waterbodies	13	1.49
Residential	58	6.64
Commercial	9	1.03
Industrial	5	.57
Extractive	10	1.15
Public & Semipublic	13	1.49
Outdoor recreation	30	3.44
Transportation	8	.92
Nonproductive	78	8.93
All Land Uses	873	100.0

Table B3-3 - Land Use Patterns in the Genesee River Basin

Land Use Category	Six Counties (mi. sq.) (1)	Six Counties (%) (2)	River Strip (mi. sq.) (3)	River Strip (%) (4)	% Col. (3)/(1) (5)
Agriculture	1,649	42.85	339	38.83	20.56
Forest	1,337	34.75	297	34.02	22.21
Wetlands	148	3.85	13	1.49	8.78
Water	52	1.35	13	1.49	25.0
Residential	130	3.38	58	6.64	44.62
Commercial	14	.36	9	1.03	64.29
Industrial	13	.34	5	.57	38.46
Extractive	60	1.56	10	1.15	16.67
Public & Semipublic	25	.65	13	1.49	52.00
Outdoor Recreation	52	1.35	30	3.44	57.69
Transportation	16	.42	8	.92	50.00
Nonproductive	352	9.15	78	8.93	22.16
Total	3,848	100.0	873	100.0	22.69

SOURCE: New York State Land Use and Natural Resource Inventory, 1968.

NOTES:

1. Six Counties includes Allegany, Livingston, Genesee, Wyoming, Monroe, and Orleans.

2. Genesee River Strip includes the municipalities, towns, and the city of Rochester, through which the Genesee River flows.

Table B3-4 - Land Use Projections in the Counties of the Genesee River Basin

Land Use Category	Percent of Total Land Use				
	1968	1980	2000	2015	2035
Agriculture	42.8	42.3	41.5	40.8	40.0
Forests	34.8	34.7	34.5	34.6	35.0
Urban	5.1	5.3	5.5	5.7	6.0
Conservation & Recreation	6.5	6.6	6.7	6.8	6.9
Other Uses	10.8	11.1	11.8	12.1	12.1
Total	100.0	100.0	100.0	100.0	100.0

NOTES:

1. The counties of New York encompassed by the Genesee River Basin have been defined to include: Allegany, Wyoming, Livingston, Genesee, Monroe, and Orleans.

2. Projections based on 1968 LUNR Data; projections beyond have been developed by the Economics Branch, Buffalo District. These estimates are preliminary and subject to revision in subsequent phases of the Genesee River Basin Project.

3. Urban Land Use has been defined to include the LUNR categories of: residential, commercial, industrial, public & semipublic and transportation uses.

4. Other Uses includes the LUNR category of nonproductive use and Extractive use.

Table B3-3 presents land use patterns in the Genesee River basin on a county wide basis instead of Minor Civil division. The River strip analysis in Table B3-3 is closest in concept to Table B3-2.

Finally, Table B3-4 presents land use projections for the counties in the Genesee River Basin. Table B3-4 highlights the relative stability of the "Agriculture" and "Forest" land use category. The conclusion of Tale B3-2 to B3-4 is that the Genesee River Basins current land use pattern will not change dramatically in the future. The lands will continue to be predominately agricultural and forest in nature (77 percent in 1980 and 75 percent in 2035).

B4. PLANS OF IMPROVEMENT

There were twelve plans developed to meet the needs of the basin. Nine of the plans consider development of hydropower. Plans 6 through 12 allow 375 cfs of NY State Barge Canal Water to be used for irrigation on the Lake Ontario Plain. A summary of the plans, their major components, and potential benefit categories are presented in Table B4-1. Refer to the main report for a more complete description of the various plan components.

Table M-1 - Plans of Improvement

Plan	Description	Potential Benefit Categories
1	Reregulate existing Mt. Morris Dam. This would reduce the occurence of full channel flow downstream of the dam.	Downstream from Mt. Morris, agricultural inundation benefits and erosion benefits.
2	No-Action Plan.	
3	Stannard, Portage and existing Mt. Morris Dams. The dams will operate as a system to generate hdyropower. The Stannard Dam will provide storage for flood control on the upper reaches of the basin. Water available for hydropower generation at Mt. Morris is equal to the sum of hydro storage at Stannard and Portage Dams. No additional urban flooding protection of the reaches below Mt. Morris is projected.	Upstream from Mt. Morris agricultural and non-agricultural inundation benefits, erosion hydropower, and recreation benefits.
4	Develop hydropower at the Portage and existing Mt. Morris Dams. No additional urban flooding protection of the reaches below Mt. Morris is projected.	Erosion, hydropower, and recreation benefits.
5	Develop hydropower at Stannard, Portage, and existing Mt. Morris Dams. The dams would operate as a system to generate hydropower. The Stannard Dam will provide storage for flood control on the upper reaches of the basin. Water available for hydropower generation at Mt. Morris is equal to the sum of flood control storages at Stannard and Portage Dams. No additional urban flooding protection of the reaches below Mt. Morris is projected.	Upstream from Mt. Morris agricultural and non-agricultural inundation benefits, erosion, hydropower, and recreation benefits.

Table [illegible] Plans [illegible] (Cont'd)

Plan	Description	Potential Benefit Categories
5	Develop a scaled down version of the Stannard dam/reservoir. This dam in conjunction with Mt. Morris will operate as a system and would provide additional flood protection to the reaches downstream of Mt. Morris. The Stannard Dam would provide storage for flood control on the upper reach of the basin and a summer conservation pool. This plan would allow 375 cfs of New York State Barge Canal water to be used for irrigation on the Lake Ontario plain.	Upstream and downstream from Mt. Morris agricultural and nonagricultural inundation benefits, erosion, recreation, and Lake Plain agricultural irrigation benefits.
[illegible]	Develop hydropower at Mt. Morris by adding a [illegible] foot high spillway gate onto the existing dam/ reservoir. The increased storage would be used exclusively for generating hydropower. No additional urban flooding protection of the reaches below Mt. Morris is projected. This plan would allow 375 cfs of New York State Barge Canal water to be used for irrigation on the Lake Ontario plain.	[illegible]sion, hydropower, recreation, and Lake Plain agricultural irrigation benefits.
[illegible]	Develop hydropower at Mt. Morris by adding a 27-foot high spillway gate onto the existing dam/ reservoir. The increased storage would be used to generate hydropower. This plan would allow 375 cfs of New York State Barge Canal water to be used for irrigation on the Lake Ontario plain.	Erosion, hydropower, recreation, and Lake Plain agricultural irrigation benefits.
7	Develop hydropower at Stannard, Portage, and Mt. Morris. Add a 27-foot high spillway gate to existing Mt. Morris Dam. The increased storage would be allocated to hydropower generation. The Stannard Dam would provide storage for flood control on the upper reaches of the basin. This plan would allow 375 cfs of New York State Barge Canal water to be used for irrigation on the Lake Ontario plain.	Upstream from Mt. Morris agricultural and nonagricultural inundation benefits, erosion, hydropower, recreation, and Lake Plain agricultural irrigation benefits.

Table B4-1 - Plans of Improvement (Cont'd)

Plan	Description	Potential Benefit Categories
10	Develop hydropower at Mt. Morris by adding 27-foot high spillway gates to existing Mt. Morris Dam. The increased storage would be used to generate hydropower and provide additional flood protection to the reaches downstream of Mt. Morris. This plan would allow 375 cfs of New York State Barge Canal water to be used for irrigation on the Lake Ontario plain.	Downstream from Mt. Morris agricultural and nonagricultural inundation benefits, erosion, hydropower, recreation, and Lake Plain agricultural irrigation benefits.
11	Develop hydropower at Stannard and Mt. Morris Dam. Add 27-foot high spillway gates to existing Mt. Morris Dam. Additional urban flooding protection for the reaches above and below Mt. Morris is projected. This plan would allow 375 cfs of New York State Barge Canal water to be used for irrigation on the Lake Ontario plain.	Upstream and downstream from Mt. Morris, agricultural and non-agricultural inundation benefits, erosion, hydropower, recreation, and Lake Plain agricultural irrigation benefits.
12	Develop hydropower at Poags Hole and existing Mt. Morris Dam. The water available for hydropower generation at Mt. Morris would equal the flood control storage at Poags Hole. The dam at Poags Hole would provide additional flood protection to the reaches on the Canasseraga Creek. No additional flood protection to the reaches below Mt. Morris is projected. The plan would allow 375 cfs of New York State Barge Canal water to be used for irrigation on the Lake Ontario plain.	Agricultural and nonagricultural inundation benefits for Canasseraga Creek, erosion, hydropower, recreation, and Lake Plain agricultural irrigation benefits.

B5. MUNICIPAL AND INDUSTRIAL WATER SUPPLY

a. Introduction.

The purpose of this section is to inventory the present municipal and industrial water demand in the basin that could potentially use the Genesee River or its tributaries as supply sources. The project evaluation period is 100 years. However, water demands were projected from 1995 to 2010. Water demand after 2010 was assumed to be constant until the end of the project evaluation period 2095. These projections will be compared to existing water supplies. The resulting surplus or deficits will be used as guidelines in framing a basin-wide water resources development plan.

b. Description of the Area.

The Genesee River basin is located in Western New York and Northwestern Pennsylvania. The river empties into Lake Ontario at Rochester Harbor. The harbor is approximately 63 miles east of Olcott Harbor, New York, and 59 miles west of Oswego Harbor, New York. The basin drains a 2,479 square mile area located in the counties of Allegany, Cattaraugus, Genesee, Livingston, Monroe, Ontario, Orleans, Stuben, and Wyoming Counties in New York and Potter County in Pennsylvania. The Genesee River is about 157 miles long and begins in Potter County, Pennsylvania. The run flows generally northward to its terminus - Lake Ontario. The watershed is bordered on the west by the Lake Erie - Niagara Run basins, on the east by the Oswego Run basin, and on the south by the Alleghany and Susquehanna River basins (Figure B1).

c. Population.

The present and projected populations of the counties in the Genesee River basin are presented in Table B5-1.

Table B5-1 - Present and Projected County Populations

County	Present Population 1985	Projected Populations 1995	2000	2015	2035	2095
Allegany	52,829	56,823	58,288	61,020	62,612	62,612
Genesee	60,647	65,233	66,914	70,051	71,879	71,879
Livingston	58,203	62,604	64,217	67,228	68,982	68,982
Monroe	716,984	771,200	791,073	828,155	849,767	849,767
Wyoming	40,733	43,813	44,942	47,084	48,276	48,276
Orleans	39,304	42,276	43,366	45,399	46,583	46,583
Total	968,700	1,041,950	1,068,800	1,118,900	1,148,100	1,148,100

d. Water Supply Systems and Characteristics.

Previous water supply studies for the counties in the basin were used to locate the towns, villages, and hamlets in the basin that currently have water supply systems. Information on the daily per capita consumption rates

by town/village were derived from these studies. Also inventoried was the maximum amount of water available per day per system. This information is summarized in Table B5-2.

The gallons per capita per day presented in Table B5-2 include water demand for municipal as well as industrial usages. The difference in gallons per capita consumed among the various villages accounts for differences in individual habits, personal income levels, cost of water, and amount of industry in the area. Daily per capita consumption ranged from a low of 120 gallons to a high of 400 gallons in large villages.

Water supply capabilities of the various systems are presented in gallons per day available from each system's water supply source (Table B5-2).

e. Municipal and Industrial Water Demands.

Water use forecasts were developed using the per capita requirements method. The per capita requirements method estimates future water use as the product of projected population served and a projected per capita water use coefficient.

As noted previously, per capita water use coefficients were determined for each of the water systems in the basin area. These coefficients were derived from information in various county water supply studies. The gallons per capita usage rates include municipal and industrial water demand. These gallons per capita usage rates were assumed to remain constant over the project evaluation period.

Projections of populations served by water supply systems within the basin are presented in Table B5-3. The population projections were based upon April 1985 New York State Department of Commerce county projections, previous county water supply studies and interviews with various local town and village officials. The New York State Department of Commerce county population projections extended to the year 2010. Most village and town population projections were assumed to remain constant after the year 2010. Village population projections to the year 2010 were based upon April 1985 New York State Department of Commerce county projections.

The multiplication of population projections times daily per capita use rates by water system resulted in water use forecasts for each water system identified. The results of this process are presented in Table B5-4.

f. Water Balance.

Water balance is the surplus or deficit of water available in each supply system given the systems water demand and current water supply. This water balance is summarized in Table B5-5.

g. Summary.

There are no future water demands in the basin that cannot be met by expansion of current supply capabilities via obtaining water from Lake

Ontario or drilling wells. Well drilling is the preferred method of expansion for inland areas noted in all previous water supply studies.

First, water derived from wells is usually of superior quality to surface water. Secondly, well water would most likely only need chlorination before it can be added to the current water supply distribution system. This would eliminate the requirement of building flocculation, sedimentation, and filtration facilities for additional water added via a surface supply (Genesee River and/or its tributaries).

Table B5-2 - Gallons Per Capita Per Day Demanded and Available Water Supply in Gallons Per Day

County/Town/ Village	Gallons Per Capita Per Day	Available Water Supply in Gallons Per Day
Allegany County		
Andover (V)	150	216,000 (1)
Angelica (V)	120	134,000 (1)
Belmont (V)	120	260,000 (1)
Belfast (V)	120	288,000 (1)
Canaseraga (V)	120	432,000 (2)
Houghton College	120	875,000 (2)
Friendship, Nile	165	480,000 (1)
Filmore (V)	120	195,000 (1)
Whitesville (H)	120	252,000 (1)
Scio (H)	120	90,000 (2)
Wellsville (V)	190	1,000,000 (3)
Stannards (H)	120	115,000 (1)
Genesee County		
Bergen (V)	125	500,000 (1)
Leroy (V)	260	2,540,000 (2)
Pavilion (H)	125	216,000 (1)
Livingston County		
Avon	400	940,000 (4)
Caledonia	125	1,800,000 (1)
Geneseo	150	3,000,000 (2)
Leicester	125	90,000 (2)
Lima	125	50,000 (1)
Livonia	160	100,000 (2)
Mt. Morris	200	1,200,000 (2)
Dansville	280	3,500,000 (1)
Nunda	135	240,000 (2)
Springwater	120	50,000 (7)
York	(included in Geneseo, Retsof also)	
Monroe County		
Rochester	260	84,000,000 (2)
Rest on Monroe		62,000,000 (2)
Ontario County		
Honeoye (H)	125	57,000 (1)
Steuben County		
Wayland (V)	120	300,000 (1)
Wyoming County		
Castile (V)	125	125,000 (2)
Bliss (H)	125	100,000 (1)
Silversprings (V)	150	480,000 (1)
Wyoming (V)	125	220,000 (1)
Perry	125	5,000,000 (2)
Pike (V)	125	65,000 (1)
Warsaw (V)	175	650,000 (1)

1. Source - "Comprehensive Water Resources Plan for the Genesee River Basin," November 1977, pp III 6-9

2. Source - "Comprehensive Water Resources Plan for the Genesee River Basin," pp III 10-11

3. Source - "Comprehensive Water Resources Plan for the Genesee River Basin," p III 13.
Wellesville is authorized to withdraw up to 1 mgpd. However the river can supply 4.46 mgpd (p III 6)

4. Source - "Comprehensive Water Resources Plan for the Genesee River Basin," pp III 10, 11.
Avon has a permit to take water from Conesus Lake to a maximum of 3 mgd.

Table B5-3 - Projection of Population Served by Public Water Supplies

County/Town Village	Year					
	1985	1995	2000	2005	2010	2095
Allegany County						
Andover (V)	1200	1200	1200	1200	1200	1200
Angelica (V)	975	1000	1000	1050	1100	1100
Belmont (V)	975	1000	1000	1000	1000	1020
Belfast (V)	650	650	650	650	650	650
Canaseraga (V)	675	675	675	700	700	700
Houghton College	1100	1100	1100	1100	1100	1100
Friendship (V) (1)	1682	1780	1879	1879	1879	1879
Fillmore (V)	563	657	657	657	657	657
Whitesville (H)	500	500	500	500	500	500
Scio (H)	477	477	477	477	477	477
Wellsville (V)	5700	5650	5700	5750	5750	5750
Stannards (H)	210	210	210	210	210	210
Genesee County						
Bergen (V)	1000	1150	1200	1200	1200	1200
Leroy (V)	4989	5256	5256	5256	5256	5256
Pavilion (H)	560	560	560	560	560	560
Livingston County						
Avon (V) (2)	3921	4098	4186	4186	4186	4186
Caledonia (V) (3)	2956	3209	3377	3377	3377	3377
Geneseo (4)	12136	12231	12231	12231	12231	12231
Leigester	462	462	462	462	462	462
Lima	2025	2138	2363	2363	2363	2363
Livonia (5)	3648	3736	3913	3913	3913	3913
Mt. Morris	3213	3299	3386	3386	3386	3386
Dansville	5167	5355	5449	5449	5449	5449
Nunda	1169	1259	1259	1259	1259	1259
Springwater	200	200	200	200	200	200
York	1500	1500	1500	1500	1500	1500
Monroe County						
Rochester	239852	249295	254017	254017	254017	254017
Rest on Monroe	704887	704717	702500	696534	689659	689659
Ontario County						
Honeoye (H)	1160	1160	1160	1160	1160	1160
Steuben County						
Wayland (V)	1846	1846	1930	1930	1930	1930
Wyoming County						
Castile (V)	1446	1541	1598	1598	1598	1598
Bliss (H)	350	350	350	350	350	350
Silversprings (V)	801	890	890	890	890	890
Wyoming (V)	519	552	573	573	573	573
Perry (6)	5662	5960	6131	6131	6131	6131
Pike (V)	377	402	417	417	417	417
Warsaw (V)	3641	3815	3957	3957	3957	3957

1. Friendship populations include the village of Friendship and Hamlet of Nile.
2. Avon populations include the village of Avon and East Avon.
3. Caledonia populations include the village of Caledonia and the town of Mumford.
4. Geneseo populations include the village of Geneseo, the hamlet of Tahi and Rest of S.D. College
5. Livonia populations include the village of Livonia and the hamlets of South Livonia and Lakeville.
6. Perry populations include the village of Perry, the hamlets of Perry Center and

V = Village, P = Private, T = Town, H = Hamlet

Table B5-4 - Water Demand in Gallons Per Day

County/Town Village	Year 1985	1995	2000	2005	2010	2095
ALLEGANY COUNTY						
ANDOVER						
Population	1200	1200	1200	1200	1200	1200
GPCPD	150	150	150	150	150	150
Water Demanded	180000	180000	180000	180000	180000	180000
ANGELICA (V)						
Population	975	1000	1000	1050	1100	1100
GPCPD	120	120	120	120	120	120
Water Demanded	117000	120000	120000	126000	132000	132000
BELMONT (V)						
Population	975	1000	1000	1000	1000	1000
GPCPD	120	120	120	120	120	120
Water Demanded	117000	120000	120000	120000	120000	120000
BELFAST (V)						
Population	650	650	650	650	650	650
GPCPD	120	120	120	120	120	120
Water Demanded	78000	78000	78000	78000	78000	78000
CANASERAGA (V)						
Population	675	675	675	700	700	700
GPCPD	120	120	120	120	120	120
Water Demanded	81000	81000	81000	84000	84000	84000
HOUGHTON COLLEGE						
Population	1100	1100	1100	1100	1100	1100
GPCPD	120	120	120	120	120	120
Water Demanded	132000	132000	132000	132000	132000	132000
FRIENDSHIP (V)						
Population	1680	1780	1880	1880	1880	1880
GPCPD (1)	165	165	165	165	165	165
Water Demanded	277200	293700	310200	310200	310200	310200
FILMORE (V)						
Population	565	660	660	660	660	660
GPCPD	120	120	120	120	120	120
Water Demanded	67800	79200	79200	79200	79200	79200
WHITESVILLE (V)						
Population	500	500	500	500	500	500
GPCPD (1)	120	120	120	120	120	120
Water Demanded	60000	60000	60000	60000	60000	60000

Table B5-4 - Water Demand in Gallons Per Day (Cont'd)

County/Town Village	Year 1985	1995	2000	2005	2010	2095
SCIO (V)						
Population	480	480	480	480	480	480
GPCPD	120	120	120	120	120	120
Water Demanded	57600	57600	57600	57600	57600	57600
WELLSVILLE (V)						
Population	5700	5650	5700	5750	5750	5750
GPCPD	190	190	190	190	190	190
Water Demanded	1083000	1073500	1083000	1092500	1092500	1092500
STANNARDS (H)						
Population	210	210	210	210	210	210
GPCPD	120	120	120	120	120	120
Water Demanded	25200	25200	25200	25200	25200	25200
GENESEE COUNTY						
BERGEN (V)						
Population	1000	1150	1200	1200	1200	1200
GPCPD	125	125	125	125	125	125
Water Demanded	125000	143750	150000	150000	150000	150000
LEROY (V)						
Population	4990	5260	5260	5260	5260	5260
GPCPD	260	260	260	260	260	260
Water Demanded	1297400	1367600	1367600	1367600	1367600	1367600
PAULION (H)						
Population	560	560	560	560	560	560
GPCPD	125	125	125	125	125	125
Water Demanded	70000	70000	70000	70000	70000	70000
LIVINGSTON COUNTY						
AVON (V)						
Population	3920	4100	4190	4190	4190	4190
GPCPD	400	400	400	400	400	400
Water Demanded	1568000	1640000	1676000	1676000	1676000	1676000
CALEDONIA (V)						
Population	2960	3210	3380	3380	3380	3380
GPCPD	125	125	125	125	125	125
Water Demanded	370000	401250	422500	422500	422500	422500
GENESEO						
Population	12140	12230	12230	12230	12230	12230
GPCPD	150	150	150	150	150	150
Water Demanded	1821000	1834500	1834500	1834500	1834500	1834500

Table B5-4 - Water Demand in Gallons Per Day (Cont'd)

County/Town Village	Year					
	1985	1995	2000	2005	2010	2095
LEICESTER						
Population	460	460	460	460	460	460
GPCPD	125	125	125	125	125	125
Water Demanded	57500	57500	57500	57500	57500	57500
LIMA						
Population	2025	2140	2360	2360	2360	2360
GPCPD	125	125	125	125	125	125
Water Demanded	253125	267500	295000	295000	295000	295000
LIVONIA						
Population	3650	3740	3910	3910	3910	3910
GPCPD	160	160	160	160	160	160
Water Demanded	584000	598400	625600	625600	625600	625600
MT. MORRIS						
Population	3210	3300	3390	3390	3390	3390
GPCPD	200	200	200	200	200	200
Water Demanded	642000	660000	678000	678000	678000	678000
DANSVILLE						
Population	5170	5360	5450	5450	5450	5450
GPCPD	280	280	280	280	280	280
Water Demanded	1447600	1500800	1526000	1526000	1526000	1526000
NUNDA						
Population	1170	1260	1260	1260	1260	1260
GPCPD	135	135	135	135	135	135
Water Demanded	157950	170100	170100	170100	170100	170100
SPRINGWATER						
Population	200	200	200	200	200	200
GPCPD (1)	120	120	120	120	120	120
Water Demanded	24000	24000	24000	24000	24000	24000
YORK						
Population	1500	1500	1500	1500	1500	1500
GPCPD	165	165	165	165	165	165
Water Demanded	247500	247500	247500	247500	247500	247500

Table B5-4 - Water Demand in Gallons Per Day (Cont'd)

County/Town Village	Year 1985	1995	2000	2005	2010	2095
MONROE COUNTY						
ROCHESTER						
Population	239850	249300	254020	254020	254020	254020
GPCPD	260	260	260	260	260	260
Water Demanded	62361000	64818000	66045200	66045200	66045200	66045200
REST OF MONROE						
Population	704890	704800	702500	696530	689660	689660
GPCPD	180	180	180	180	180	180
Water Demanded	126880200	626864000	126450000	125375400	124138800	124138800
ONTARIO COUNTY						
HONEOYE (H)						
Population	1160	1160	1160	1160	1160	1160
GPCPD	125	125	125	125	125	125
Water Demanded	145000	145000	145000	145000	145000	145000
STUBEN COUNTY						
WAYLAND (V)						
Population	1850	1850	1930	1930	1930	1930
GPCPD	120	120	120	120	120	120
Water Demanded	222000	222000	231600	231600	231600	231600
WYOMING COUNTY						
CASTILE (V)						
Population	1450	1540	1600	1600	1600	1600
GPCPD	125	125	125	125	125	125
Water Demanded	181250	192500	200000	200000	200000	200000
BLISS (H)						
Population	350	350	350	350	350	350
GPCPD	125	125	125	125	125	125
Water Demanded	43750	43750	43750	43750	43750	43750
SILVERSPRINGS (V)						
Population	800	890	890	890	890	890
GPCPD	150	150	150	150	150	150
Water Demanded	120000	133500	133500	133500	133500	133500
WYOMING (V)						
Population	520	550	570	570	570	570
GPCPD	125	125	125	125	125	125
Water Demanded	65000	68750	71250	71250	71250	71250

Table B5-4 - Water Demand in Gallons Per Day (Cont'd)

County/Town Village	Year					
	1985	1995	2000	2005	2010	2095
PERRY						
Population	5660	5960	6130	6130	6130	6130
GPCPD	125	125	125	125	125	125
Water Demanded	707500	745000	766250	766250	766250	766250
PIKE (V)						
Population	380	400	420	420	420	420
GPCPD	125	125	125	125	125	125
Water Demanded	47500	50000	52500	52500	52500	52500
WARSAW (V)						
Population	3640	3820	3960	3960	3960	3960
GPCPD	160	160	160	160	160	160
Water Demanded	582400	611200	633600	633600	633600	633600

1. Estimated based on town/village with approximatley the same population size.
2. Estimated based on Rochester and Leroy GPCPD figures.

Table B5-5 - Water Balance Average Gallons Per Day

County/Town Village Hamlet	Year 1985	1995	2000	2005	2010	2095
ALLEGANY COUNTY						
ANDOVER (V)						
Water Supply	216000	216000	216000	216000	216000	216000
Water Demanded	180000	180000	180000	180000	180000	180000
Surplus	36000	36000	36000	36000	36000	36000
ANGELICA (V)						
Water Supply	134000	134000	134000	134000	134000	134000
Water Demanded	117000	120000	120000	126000	132000	132000
Surplus	17000	14000	14000	8000	2000	2000
BELMONT (V)						
Water Supply	260000	260000	260000	260000	260000	260000
Water Demanded	117000	120000	120000	120000	120000	120000
Surplus	143000	140000	140000	140000	140000	140000
BELFAST (V)						
Water Supply	288000	288000	288000	288000	288000	288000
Water Demanded	78000	78000	78000	78000	78000	78000
Surplus	210000	210000	210000	210000	210000	210000
CANASSERAGA (V)						
Water Supply	432000	432000	432000	432000	432000	432000
Water Demanded	81000	81000	81000	84000	84000	84000
Surplus	351000	351000	351000	348000	348000	348000
HOUGHTON COLLEGE						
Water Supply	875000	875000	875000	875000	875000	875000
Water Demanded	132000	132000	132000	132000	132000	132000
Surplus	743000	743000	743000	743000	743000	743000
FRIENDSHIP						
Water Supply	480000	480000	480000	480000	480000	480000
Water Demanded	277200	293700	310200	310200	310200	310200
Surplus	202800	186300	169800	169800	169800	169800
FILMORE (V)						
Water Supply	195000	195000	195000	195000	195000	195000
Water Demanded	67800	79200	79200	79200	79200	79200
Surplus	127200	115800	115800	115800	115800	115800
WHITESVILLE (H)						
Water Supply	252000	252000	252000	252000	252000	252000
Water Demanded	60000	60000	60000	60000	60000	60000
Surplus	192000	192000	192000	192000	192000	192000

Table B5-5 - Water Balance Average Gallons Per Day (Cont'd)

County/Town Village Hamlet	Year 1985	1995	2000	2005	2010	2095
SCIO (H)						
Water Supply	90000	90000	90000	90000	90000	90000
Water Demanded	57600	57600	57600	57600	57600	57600
Surplus	32400	32400	32400	32400	32400	32400
WELLSVILLE						
Water Supply	1000000	1000000	1000000	1000000	1000000	1000000
Water Demanded	1083000	1073500	1083000	1092500	1092500	1092500
Surplus	83000	73500	83000	92500	92500	92500
STANNARDS (H)						
Water Supply	115000	155000	155000	155000	155000	155000
Water Demanded	25200	25200	25200	25200	25200	25200
Surplus	89800	89800	89800	89800	89800	89800
GENESEE COUNTY						
BERGEN (V)						
Water Supply	500000	500000	500000	500000	500000	500000
Water Demanded	125000	143750	150000	150000	150000	150000
Surplus	375000	356250	350000	350000	350000	350000
LEROY (V)						
Water Supply	2540000	2540000	2540000	2540000	2540000	2540000
Water Demanded	1297400	1367600	1367600	1367600	1367600	1367600
Surplus	1242600	1172400	1172400	1172400	1172400	1172400
PAVILION (H)						
Water Supply	216000	216000	216000	216000	216000	216000
Water Demanded	70000	70000	70000	70000	70000	70000
Surplus	146000	146000	146000	146000	146000	146000
LIVINGSTON COUNTY						
AVON						
Water Supply	940000	940000	940000	940000	940000	940000
Water Demanded	1568000	1640000	1676000	1676000	1676000	1676000
Surplus/Deficit	628000	700000	736000	736000	736000	736000
CALEDONIA						
Water Supply	1800000	1800000	1800000	1800000	1800000	1800000
Water Demanded	370000	401250	422500	422500	422500	422500
Surplus	1430000	1398750	1377500	1377500	1377500	1377500

Table B5-5 - Water Balance Average Gallons Per Day (Cont'd)

County/Town Village Hamlet	Year 1985	1995	2000	2005	2010	2095
GENESEO						
Water Supply	3000000	3000000	3000000	3000000	3000000	3000000
Water Demanded	1821000	1834500	1834500	1834500	1834500	1834500
Surplus	1179000	1165500	1165500	1165500	1165500	1165500
LEICESTER						
Water Supply	90000	90000	90000	90000	90000	90000
Water Demanded	57500	57500	57500	57500	57500	57500
Surplus	32500	32500	32500	32500	32500	32500
LIMA						
Water Supply	500000	500000	500000	500000	500000	500000
Water Demanded	235125	267500	295000	295000	295000	295000
Surplus	246875	232500	205000	205000	205000	205000
LIVONIA						
Water Supply	100000	100000	100000	100000	100000	100000
Water Demanded	584000	598400	625600	625000	625000	625000
Surplus/Deficit	484000	498000	525600	525600	525600	525600
MOUNT MORRIS						
Water Supply	1200000	1200000	1200000	1200000	1200000	1200000
Water Demanded	642000	660000	678000	678000	678000	678000
Surplus	558000	540000	522000	522000	522000	522000
DANSVILLE						
Water Supply	3500000	3500000	3500000	3500000	3500000	3500000
Water Demanded	1447600	1500800	1526000	1526000	1526000	1526000
Surplus	2052400	1999200	1974000	1974000	1924000	1974000
NUNDA						
Water Supply	240000	240000	240000	240000	240000	240000
Water Demanded	157950	170100	170100	170100	170100	170100
Surplus	82050	69900	69900	69900	69900	69900
SPRINGWATER						
Water Supply	50000	50000	50000	50000	50000	50000
Water Demanded	24000	24000	24000	24000	24000	24000
Surplus	26000	26000	26000	26000	26000	26000

Table B5-5 - Water Balance Average Gallons Per Day (Cont'd)

County/Town Village Hamlet	Year 1985	1995	2000	2005	2010	2095
MONROE COUNTY						
ROCHESTER						
Water Supply	84000000	84000000	84000000	84000000	84000000	84000000
Water Demanded	62361000	64818000	66045200	66045200	66045200	66045200
Surplus	21639000	19182000	17954800	17954800	17954800	17954800
REST OF MONROE						
Water Supply	62000000	62000000	62000000	62000000	62000000	62000000
Water Demanded	126880200	126864000	126450000	125375400	124138800	124138800
Surplus/Deficit	64880200	64864000	64450000	63375400	62138800	62138800
ONTARIO COUNTY						
HONEOYE (H)						
Water Supply	57000	57000	57000	57000	57000	57000
Water Demanded	145000	145000	145000	145000	145000	145000
Surplus/Deficit	88000	88000	88000	88000	88000	88000
STUBEN COUNTY						
WAYLAND (V)						
Water Supply	300000	300000	300000	300000	300000	300000
Water Demanded	222000	222000	231600	231600	231600	231600
Surplus	78000	78000	68400	68400	68400	68400
WYOMING COUNTY						
CASTILE (V)						
Water Supply	125000	125000	125000	125000	125000	125000
Water Demanded	181250	192500	200000	200000	200000	200000
Surplus/Deficit	56250	67500	75000	75000	75000	75000
BLISS (H)						
Water Supply	100000	100000	100000	100000	100000	100000
Water Demanded	43750	43750	43750	43750	43750	43750
Surplus	56250	56250	56250	56250	56250	56250
SILVERSPRINGS (V)						
Water Supply	480000	480000	480000	480000	480000	480000
Water Demanded	120000	133500	133500	133500	133500	133500
Surplus	360000	346500	346500	346500	346500	346500
WYOMING (V)						
Water Supply	220000	220000	220000	220000	220000	220000
Water Demanded	65000	68750	71250	71250	71250	71250
Surplus	155000	151250	148750	148750	148750	148750

Table B5-5 - Water Balance Average Gallons Per Day (Cont'd)

County/Town Village Hamlet	Year 1985	1995	2000	2005	2010	2095
PERRY						
Water Supply	5000000	5000000	5000000	5000000	5000000	5000000
Water Demanded	707500	745000	766250	766250	766250	766250
Surplus	4292500	4255000	4233750	4233750	4233750	4233750
PIKE (V)						
Water Supply	65000	65000	65000	65000	65000	65000
Water Demanded	47500	50000	52500	52500	52500	52500
Surplus	17500	15000	12500	12500	12500	12500
WARSAW (V)						
Water Supply	650000	650000	650000	650000	650000	650000
Water Demanded	582400	611200	633600	633600	633600	633600
Surplus	67600	38800	16400	16400	16400	16400

B6. AGRICULTURAL FLOOD DAMAGE REDUCTION.

The Mt. Morris, Stannard, and Poags Hole Reservoir plans will reduce the flood hazard to rural (agricultural) areas downstream of the dams thereby generating agricultural benefits.

a. Methodology.

There is very little current data available for an evaluation of agricultural benefits accruing to the three reservoir plans. H&H data and data on current agricultural land use on the effected floodplain are not available. However, historical data from a variety of sources were found. Field planting patterns were from 1966 LUNR Maps (New York State Land Utilization and Natural Resource). Information on agricultural inundation damages on the main stem of the Genesee River were obtained from the Genesee River Basin Report of Flood Tropical Storm Agnes (August 73). Canaseraga Creek agricultural inundation damages came from the Phase 1 Report Canaseraga Creek, New York, Local protection Project, October 1973.

b. Agricultural Land Use.

Agricultural land use on the floodplains downstream of the 3 dams have been estimated. The basic source for this data are the LUNR maps which mapped land use in 1966 at a scale of 1:24,000. A field trip to the floodplain indicated that the LUNR maps, though nearly 20 years old, do provide an effective basis for identifying and quantifying agricultural land use of the floodplain. In the preponderance of cases, fields which were cultivated in 1966 are cultivated in 1985. Similarly, areas not cultivated in 1966 are not cultivated in 1985. This judgement has been supported by all knowledgeable agricultural authorities contacted - SCS, ASCS, and the NY State Extension Service. Agricultural land use from the field survey was compared to agricultural land use in the two aforementioned reports. They were found to be very similar. On that basis, existing damages in the affected reaches were updated to May 1986 prices.

c. Agricultural Benefits.

Agricultural benefits accruing to the Stannard, Mt. Morris, and Poags Hole Reservoirs can be classified as Existing Condition Benefits and Future Condition Benefits. The former include two distinct benefit categories: benefits resulting from the elimination of land loss because of streambank erosion and damages resulting from elimination of inundation damages.

(1) Existing Condition Benefits: Elimination of Streambank Erosion Loss.

Local agricultural authorities have identified streambank erosion as one of the most serious water resource problems in the Genesee Basin.

Although streambank erosion is a highly visible problem, no local agricultural authority was able to provide an estimate of the quantity of land lost to this process. The only documented estimate of the quantity of land lost to streambank erosion is contained in Appendix K (Sedimentation) of the Genesee River Basin study, published in 1968. This source estimated that 220 acres of agricultural land along the Genesee River, excluding all tributaries, were lost in a nine year period prior to 1967. Thus an average of 24.4 acres of agricultural land have been estimated to be lost annually to streambank erosion of the Genesee River. A streambank erosion computer model of the main stem of the Genesee River was developed by the Buffalo District. This model predicted 22.2 acres would be lost yearly.

This estimate, includes land lost from the more severe and less frequent events such as Tropical Storm Agnes which occurred in June 1972. The model predicted 7.7 acres would be lost below Mt. Morris annually and 14.5 acres above Mt. Morris.

The current market value of an acre of cropland on the affected floodplain was identified as $600. The total value of land lost due to streambank erosion amounts to $13,320 per year. However, any reservoir plan would not eliminate streambank erosion totally. It was assumed any plan that involved a dam at Stannard or Mt. Morris, would eliminate 40 percent of the streambank erosion taking place below that dam. Streambank erosion benefits attributable to building either the Stannard Dam or the Mt. Morris Dam (Plan 1, 4, 7, 8, 10, and 12) equaled $1,800. If a specific plan involved building both dams, streambank erosion benefits would equal $5,300 (Plans 3, 5, 6, 9, and 11).

(2) Existing Condition Benefits: Inundation Damages Avoided.

Existing condition agricultural inundation damages were determined for agricultural reaches located downstream of the dams proposed at Stannard, Mt. Morris, and Poags Hole. The agricultural flooding evaluation concentrated on the main stem of the Genesee River and Canaseraga Creek respectively. These damages are summarized in Table B6-1 and are in May 1986 prices.

Construction of the various reservoirs would not eliminate all existing agricultural inundation damages. The residual agricultural inundation damages associated with each reservoir being built are also presented in Table B6-1.

Agricultural inundation benefits are the difference between existing agricultural inundation damages and residual agricultural inundation damages. Benefits by reservoir plan are presented in Table B6-1. Agricultural inundation benefits of $83,800 attributable to building the Stannard reservoir would apply to Plans 3, 5, 6, 9, and 11. Agricultural inundation benefits of $35,400 accruing to reaches downstream of Mt. Morris would apply to Plans 1, 6, 10, and 11. Finally agricultural inundation benefits of $45,600 accruing to reaches downstream of Poags apply to Plan 12.

Additionally there are agricultural inundation benefits accruing to reaches located on the branches of the Genesee River and Canaseraga Creek. However, this Reconnaissance Report emphasized agricultural inundation benefits located on the main stem of the Genesee and Canaseraga. Tributary agricultural inundation benefits will be investigated in the next study stage.

(3) Future Condition Benefits: Intensification - Future agricultural damages are alternatively termed intensification benefits. These benefits represent the application of more intensive farming procedures to existing agricultural land. Most intensification benefits originate with the upward shift from low value agricultural use (i.e. pasture) to high value use (corn). Future agricultural intensification benefits for the affected portion of the Genesee River Basin would be estimated by first determining the amount of land by crop that would be shifted upward. These shifted acres would then be multiplied by the net increase in gross profit per acre divided from the new, higher use.

The potential of using Genesee River Basin water to irrigate vegetable and selected orchard fruits on the Lake Ontario Plain was investigated in the 1969 Genesee River Basin Study. The water would be delivered to the Lake Ontario Plain via the New York State Barge Canal. The study for the 1969 report was conducted by various agencies of the U.S. Department of Agriculture. The study documented the need to irrigate vegetable and orchard fruits grown on the Lake Plain. It evaluated 42 structural plans, each of which was designed to irrigate one localized area. Twenty-three plans were found to have positive net benefit (a benefit to cost ratio greater than one).

Since the previous study of the Genesee River Basin had evaluated irrigation on the Lake Plain, this topic was included in the current Reconnaissance Study of the Genesee River Basin. Contacts were made with a large number of agricultural authorities in the area. These contacts included faculty at the New York State College of Agriculture at Cornell University (Departments of Vegetable Production, Polmology and Agricultural Economics), Cooperative Extension Officers, Soil Conservation Officers, Agricultural Stabilization and Conservation Service Officers, farmers, vegetable processors, and irrigation supply firms. The purpose of these contacts was to determine:

1. The need for irrigation on the lake plain.
2. Possible means of distributing irrigation water onto the lake plain.
3. Potential benefits to be obtained from providing irrigation water to the lake plain.

The findings of the current investigation follows.

Table B6-1 - Agricultural Inundation Benfits

Reach	Existing Damages	Improved Conditions	Total Benefits (1)
Stannard Reservoir			
Reach			
5	0	0	0
6	18,100	2,100	16,000
7	31,700	3,700	28,000
8	17,100	2,500	14,600
9	8,700	1,700	7,000
10	3,100	0	3,100
11	11,700	0	11,700
13	3,400	0	3,400
14	2,900	2,900	0
Total	96,700	12,900	83,800
Mount Morris Reservoir			
Reach			
1	0		
2	16,700	7,200	9,500
3	9,600	1,000	8,600
4	17,500	200	17,300
Total	43,800	8,400	35,400
Poags Hole Reservoir			
Reach			
1	40,100	9,400	30,700
2	15,700	3,900	11,800
3	2,100	2,100	0
4	24,400	24,400	0
5	3,100	0	3,100
6	8,400	8,400	0
7	2,400	2,400	0
8	318,600	318,600	0
Total	414,800	369,200	45,600

(1) Benefits are in May 1986 prices.

the need for more water to irrigate vegetables and selected orchard fruits currently grown on the Lake Plain remains. All of the agricultural authorities contacted at the New York State College of Agriculture, as well as all of the County Extension Agents in the counties on the Lake Plain, are in agreement. There is need for increased irrigation on the Lake Plain if the region is to maintain its share of national production of vegetables and selected orchard fruits. The primary advantages of irrigation, compared to non-irrigated production of vegetables and selected orchard fruits are: (1) improvement of the quality of the crops grown on the lake plain - presently there is a serious drought induced "stress" problem which is reflected in reduced quality of produce; and (2) an increase in the consistency of the yield of these crops grown on the Lake Plain. Increased irrigation would reduce or eliminate these problems and would increase the net income of farmers.

How (in a physical sense) water would be diverted from the Genesee River onto the Lake Plain needed to be addressed. The initial thought was to transmit water from the Genesee River to the Lake Plain via the New York State Barge Canal. The Barge Canal passes through the Lake Plain and crosses the Genesee River just upstream of the city of Rochester. Water pumped from the Genesee River into the Barge Canal, could be carried westward along the canal for release into creeks which flow downstream onto the Lake Plain. Water thus released into the creeks could then be siphoned off to irrigate fields on either side of the creeks. In addition, some water could be siphoned directly from the canal itself. At present, some of this is done under the without project condition of development.

There are three principal problems with this concept. First, the Barge Canal physically passes over the Genesee River at the crossing of the two water bodies. Water would have to be pumped up out of the river and into the canal, or alternatively, it would have to be diverted upstream of the crossing and allowed to flow down to the Barge Canal by a channel of some sort. Second, the flow of water in the Barge Canal is from west to east, from the Niagara River to the Genesee River. Any diversion from the Genesee River onto the Lake Plain via the Barge Canal would require a reversal in direction of the current flow. Third, the flow of water out of the Niagara River, including the discharge into the Barge Canal, is regulated by the International Joint Commission. This is an international body representing the United States and Canada. Presumably, the first two problems could be resolved at some unknown cost. The third problem, the question of regulation of the flow from/into the Niagara River is a political question. This might prove difficult to resolve for a number of reasons, including the fact that the Lower Great Lakes are at or near their historic high water levels. Taken together, these three problems make it most unlikely that water could physically be diverted from the Genesee River onto the Lake Plain via the New York State Barge Canal.

There is a method of using Genesee River water to irrigate crops grown on the Lake Plain. The method revolves around the fact that 375 cfs of water is released from the Barge Canal into the Genesee River. These releases maintain the flow in the lower Genesee River at the site of Rochester Gas and Electric's Court Street Dam hydroelectric facility in the city of Rochester.

Assume the Genesee River could be managed by a plan under the With Project condition which would generate a sustained flow of 375 cfs. This 375 cfs would come from reregulation of the current Mount Morris dam or construction of a new dam (Stannards, Portage, Poags Hole). This flow could be substituted for the 375 cfs currently under the "Without Project" condition, obtained from the Barge Canal. The latter flow, not being needed for hydropower generation, could then be diverted into the creeks which flow down upon the Lake Plain for irrigation.

This analysis assumes that plans 6 through 12 will generate a flow of 375 cfs.

An estimate of the number of acres of land that can be irrigated on the Lake Plain with a diversion of 375 cfs was calculated. This estimate depends on the crops to be irrigated. Different crops require different amounts of irrigation water. The basic distinction is between shallow rooted and deep rooted crops. The former require relatively limited amounts of water at one application. The latter requires larger amounts of water at one application. As the vast majority of vegetable crops grown on the Lake Plain are shallow rooted vegetables, principally beans, shallow rooted vegetables are presumed to be the dominant crop under "With" as well as "Without Plan" conditions of development.

Most shallow rooted vegetables require between 1.0 to 1.5 inches of water per application. This was the findings of discussions with vegetable farmers and academic vegetable specialists, as well as with two irrigation supply firms situated on the Lake Plain. Further, under the most severe (worse) drought conditions, the minimum number of days between applications of irrigation water to an individual field of shallow rooted vegetables is 5 days. From this information an estimate of the number of acres of land that can be irrigated with 375 cfs was made. The following assumptions were made: (1) application of 1.5 inches of water per application, (2) a minimum of 5 days between applications on an individual field, and (3) irrigation only occurs during a 12 hour period each day. These assumptions indicate that 375 cfs will irrigate 14,875 acres. The latter has been rounded up to 15,000 acres.

An estimate of demand for the Lake Plain output from 15,000 acres of irrigated vegetables was needed. The consensus of knowledgeable agricultural authorities, including the principal processors of vegetables grown on the Lake Plain is that the demand does exist. Given a 10 year transition period after implementation of the project, 15,000 acres of unirrigated vegetable production are projected to be replaced by 15,000 acres of irrigated vegetable production. Part of this demand will come from an expanding fresh market outlet. This market demands premium quality produce that can only be produced with the aid of irrigation. The remaining vegetable demand comes from existing vegetable processors who greatly wish to upgrade the quality of their product. The above statement does not represent a net addition of 15,000 acres of vegetable production on the Lake Plain. It is substitution of 15,000 irrigated acres for 15,000 unirrigated acres of land presently used to cultivate vegetables.

The derivation of average annual net benefits which would accrue to plans that provided the additional 375 cfs of water needed to irrigate the 15,000 acres of vegetables follows.

Because of limited resources available in the Reconnaissance Phase of the study, it has not been possible to construct the detailed crop budget schedules needed to accurately determine net income under "With" and "Without Project" conditions of development. Instead, an estimate of the increase in net income accruing to vegetable farmers under a shift from unirrigated ("Without Plan" condition) production to irrigated ("With Plan" condition) production has been developed through discussion with the aforementioned agricultural authorities. The consensus is that the net increase per weighted acre of vegetables grown on the Lake Plain, assuming a 10 year time span to allow for varying moisture conditions, averages between $100 to $200 per acre. In this analysis, the mean value ($150 per acre) has been utilized to estimate potential intensification benefits.

Table B6-2 presents the data used in calculating intensification benefits for the Lake Ontario Plain. The undiscounted value of the net increase in income in project year 10 comes to $2,250,000. The discounted average annual equivalent value amounts to $1,594,000. This assumes a 100 year project life, an 8-5/8 percent annual interest rate, and May 1986 price levels. This intensification benefit is attributable to plans 7, 8, 9, 11, and 12. Plans 6 and 10 would capture approximately 87 percent of this intensification benefit (7,400,000).

Table B6-2 - Agricultural Intensification Benefits

	Project Year 0	Project Year 10	Project Year 100	Average Annual Intensification Benefits (1)
Acres intensified	0	15,000	15,000	
Increase in Net Income I Acre	$150.00	$150.00	$150.00	
	0	$2,250,000	$2,250,000	1,594,600

(1) Assumes a 100 year project life, an 8-5/8 percent annual interest rate, and May 1986 price levels.

d. Total Agricultural Benefits.

Total average annual agricultural benefits by plan are summarized in Table B6-3. These benefits are in May 1986 prices and assumes a 100 year project life and an 8-5/8 percent annual discount rate.

Table BA-1 - Agricultural Benefits By Plan

Benefit Categories/Location	Plan 1 (D1)	Plan 2 (No Action)	Plan 3 (D3)	Plan 4 (D4)	Plan 5 (D5)	Plan 6 (D1, A1)	Plan 7 (D1, D7)	Plan 8 (D1, D8)	Plan 9 (D1, D5)	Plan 10 (D1, D8a)	Plan 11 (D1, A1, D8a)	Plan 12 (D1, D12)
Flood Damage Reduction	35,400	-	83,800	-	83,800	119,200	-	-	83,800	35,400	119,200	45,600
Upstream of Mt. Morris Agricultural		-	(83,800)		(83,800)	(83,800)			(83,800)	(83,800)	(83,800)	
Downstream of Mt. Morris Agricultural	(35,400)	-				(35,400)				(35,400)	(35,400)	
Canaseraga Agricultural		-										(45,600)
Erosion	1,800	-	5,300	1,800	5,300	5,300	1,800	1,800	5,300	1,800	5,300	1,800
Irrigation	-	-	-	-	-	1,400,000	1,594,600	1,594,600	1,594,600	1,400,000	1,594,600	1,594,600
Total	37,200	-	89,100	1,800	89,100	1,524,500	1,596,400	1,596,400	1,683,700	1,437,200	1,719,100	1,642,000

B7. URBAN FLOOD DAMAGE REDUCTION

a. Without Project Conditions - Existing.

The best information available on damages in the Genesee River Basin is contained in the Past Flood Report on Tropical Storm Agnes, Stannard Reservoir, 1 April 1974 and Phase I Report, Canaseraga Creek, New York, October 1973. Damages estimates from these reports, by reach, were revised to reflect current conditions based on field surveys and interviews. Price levels were updated to May 1986 using a variety of indexes developed for performing project cost estimate updates for budget testimony. Areas of the basin that would be affected by flood control plans developed during this Reconnaissance Study were divided into three areas of flooding. Area 1 is from the location of the Stannard Project Dam site to the current location of the Mt. Morris Dam. Area 2 is located between Mt. Morris Dam and Chili, New York. This area does not include existing flood damages that take place in the city of Rochester. Area 3 is from the proposed Poag's Hole Dam site to 1,600 feet downstream of the confluence with Keshequa Creek. Table B7-1 presents study year 1986 existing urban inundation damages for these three areas. Table B7-2 presents study year 1986 urban inundation damages under improved conditions. Improved conditions indicate either the construction of a new dam (Stannard, Poag's Hole) or reregulation of an existing dam (Mt. Morris) to reduce downstream urban inundation damages.

b. Without Project Conditions - Future.

Based on census demographic data and historical trends, no significant future growth is expected in Areas 1 and 3 of the Genesee River Basin affected by flooding. Nor is there expected to be any significant change in flood plain land use in these two areas. Area 2, especially around Chili, has experienced some residential and commercial growth. The impacts of this growth needs to be evaluated in the next stage of study.

However, it is assumed that future flood damages will rise based on the increased value of residential contents within the flood plain. The value of residential contents is expected to increase as a result of rising regional per capita income. As more people have increased income, they tend to increase the value of their stock of personal property. The methodology used to calculate residential affluence follows. Residential content value is assumed to grow at the same rate as regional per capita income. All of the urban damages evaluated were outside of the city of Rochester. It was felt the percent change in regional per capita income for the Rochester SMSA would not provide a realistic proxy of the basin's affluence growth rate. A proxy for income growth for the basin as a whole was devised. New York PMSA income and population levels were subtracted from total New York State income and population levels (1985 OBERS BEA Regional Projections). The residuals were assumed to equal the basins affluence growth rate. This resulted in a per capita income value of $10,334 in 1983 and a $15,766 per capita income value in the year 2035. Per capita income will increase at an annual compound growth rate of 1.2815 percent. It is assumed that residential content growth occurs at the same rate as the regional per capita income growth rate. For this study, the residential content value is estimated as 33 percent of the

total value of urban residential damages. The maximum value of contents that may be used for flood control evaluation is 75 percent. Given a 1.12815 percent compound growth rate the residential content value will increase to 75 percent in 73 years. Table B7-3 shows the projected growth of existing condition residential content damages for a 100-year evaluation period starting from the base year 1995 to the terminal year 2095. Total Average Annual Residential Damages are: $745,400 for Area 1; $345,700 for Area 2; and $81,500 for Area 3.

c. With Project Conditions.

Urban flood damages by area for the "with project" condition are displayed in Table B7-4. Benefits attributable to preventing flooding in each of the three areas equals "without project" condition average annual damages (Table B7-3) minus with project condition average annual flood damages (TableB7-4). This is performed in Table B7-5. Urban inundation benefits for areas 1-3 come to $707,400, $434,400, and $81,500, respectively. Area 1 benefits of $707,400 are attributable to Plans 3, 5, 6, 9, and 11. Area 2 benefits of $434,400 are attributable to Plans 6 and 10. Area 3 benefits of $81,500 are attributable to Plan 12.

Table B7-1 - Existing Urban Inundation Damages (1)

Reach	Residential Structures	Residential Contents	Commercial	Public and Other	Total
	$	$	$	$	$
Area 1 - Below Stannard Reservoir					
5	0	0	0	0	0
6	2,000	600	2,900	13,900	19,400
7	13,500	4,100	900	47,100	65,600
8	1,100	300	0	62,500	63,900
9	0	0	0	15,400	15,400
10	1,300	400	6,000	32,700	40,400
11	9,200	2,800	8,800	56,400	77,200
12	13,600	4,100	286,450	107,650	411,800
12.1	(0)	(0)	(22,600)	(24,100)	(46,700)
12.2	(1,300)	(400)	(0)	(700)	(2,400)
12.3	(2,700)	(800)	(2,800)	(63,500)	(69,800)
12.4	(4,600)	(1,400)	(0)	(17,500)	(23,500)
12.5A	(5,000)	(1,500)	(10,800)	(600)	(17,900)
12.5B	(0)	(0)	(50)	(1,250)	(1,300)
12.6	(0)	(0)	(250,200)	(0)	(250,200)
13	20,400	6,100	0	3,100	29,600
14	16,600	3,000	3,600	0	16,200
Total	71,100	21,400	305,650	338,750	740,100
Area 2 Below Mt. Morris Reservoir					
1					0
2	196,700	59,200	72,700	29,700	358,300
3	6,700	2,000	5,300	0	68,000
4	14,800	4,500	83,700	0	103,000
Total	218,200	65,700	215,700	29,700	529,300
Area 3 Below Poag's Hole Reservoir					
	2,600	800	77,900	0	081,300

(1) Damages are in May 1980 prices.

Table B7-2 - Improved Urban Inundation Damages (1)

Reach	Residential Structures	Residential Contents	Commercial	Public and Other	Total
	$	$	$	$	$
Area 1 - Below Stannard Reservoir					
5	0	0	0	0	0
6	200	100	200	1,200	1,700
7	1,500	500	100	5,200	7,300
8	200	0	0	6,200	8,300
9	0	0	0	2,900	2,900
10	0	0	0	0	0
11	0	0	0	0	0
12	0	0	50	50	100
12.1	(0)	(0)	(50)	(50)	(100)
12.2	(0)	(0)	(0)	(0)	(0)
12.3	(0)	(0)	(0)	(0)	(0)
12.4	(0)	(0)	(0)	(0)	(0)
12.5A	(0)	(0)	(0)	(0)	(0)
12.5B	(0)	(0)	(0)	(0)	(0)
12.6	(0)	(0)	(0)	(0)	(0)
13	(0)	(0)	(0)	(0)	(0)
14	10,000	3,000	3,800	0	16,800
Total	11,800	3,600	4,150	17,550	37,100
Area 2 Below Mt. Morris Reservoir					
1	0	0	0	0	0
2	55,200	16,600	20,400	8,300	100,500
3	700	200	5,700	0	6,600
4	0	0	0	0	0
Total	55,900	16,800	26,100	8,300	107,100
Area 3 Below Poag's Hole Reservoir					
	0	0	0	0	0

(1) Damages are in May 1986 prices.

Table B7-3 - Existing Condition Urban Inundation Damages

	Study Year Existing 1986	Base Year 1995	2005	2015	2025	2035	2045	2095	Average Annual Equivalent
Area 1 - Below Stannard Reservoir (Plans 3, 5, 6, 9, 11)									
Residential									
Structures	71,100	71,100	71,100	71,100	71,100	71,100	71,100	71,100	71,100
Contents	21,400	23,400	25,900	28,700	31,700	35,000	38,700	38,700	26,700
Subtotal	92,500	94,500	97,000	99,800	102,800	106,100	109,800	109,800	97,800
Commercial	308,850	308,850	308,850	308,850	308,850	308,850	308,850	308,850	308,850
Public & Other	338,750	338,750	338,750	338,750	338,750	338,750	338,750	338,750	338,750
Total	740,100	742,100	744,600	747,400	750,400	753,700	757,400	757,400	745,400
Area 2 - Below Mt. Morris Reservoir (Plans 6, 10)									
Residential									
Structures	218,200	218,200	218,200	218,200	218,200	218,200	218,200	218,200	218,200
Contents	65,700	71,900	79,500	88,000	97,300	107,600	119,000	119,000	82,100
Subtotal	283,900	290,100	297,700	306,200	315,500	325,800	337,200	337,200	300,300
Commercial	215,700	215,700	215,700	215,700	215,700	215,700	215,700	215,700	215,700
Public & Other	29,700	29,700	29,700	29,700	29,700	29,700	29,700	29,700	29,700
Total	529,300	535,500	543,100	551,600	560,900	571,200	582,600	582,600	545,700
Area 3 - Below Poag's Hole Reservoir (Plan 12)									
Residential									
Structures	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600
Contents	800	900	1,000	1,100	1,200	1,300	1,400	1,400	1,000
Subtotal	3,400	3,500	3,600	3,700	3,800	3,900	4,000	4,000	3,600
Commercial	77,900	77,900	77,900	77,900	77,900	77,900	77,900	77,900	77,900
Public & Other	0	0	0	0	0	0	0	0	0
Total	81,300	81,400	81,500	81,600	81,700	81,800	81,900	81,900	81,500

Table B7-4 - Improved Condition Urban Inundation Damages

	Study Year Existing 1986	Base Year 1995	2005	2015	2025	2035	2045	2095	Average Annual Equivalent
Area 1 - Below Stannard Reservoir (Plans 3, 5, 6, 9, 11)									
Residential									
Structures	11,800	11,800	11,800	11,800	11,800	11,800	11,800	11,800	11,800
Contents	3,600	3,900	4,400	4,800	5,300	5,900	6,500	6,500	4,500
Subtotal	15,400	15,700	16,200	16,600	17,100	17,700	18,300	18,300	16,300
Commercial	4,150	4,150	4,150	4,150	4,150	4,150	4,150	4,150	4,150
Public & Other	17,550	17,550	17,550	17,550	17,500	17,550	17,550	17,550	17,550
Total	37,100	37,400	37,900	38,300	38,800	39,400	40,000	40,000	38,000
Area 2 - Below Mt. Morris Reservoir (Plans 6, 10)									
Residential									
Structures	55,900	55,900	55,900	55,900	55,900	55,900	55,900	55,900	55,900
Contents	16,800	18,400	20,300	22,500	24,900	27,500	30,400	30,400	21,000
Subtotal	72,700	74,300	76,200	78,400	80,900	83,400	86,300	86,300	76,900
Commercial	26,100	26,100	26,100	26,100	26,100	26,100	26,100	26,100	26,100
Public & Other	8,300	8,300	8,300	8,300	8,300	8,300	8,300	8,300	8,300
Total	107,100	108,700	110,600	112,800	115,200	117,800	120,700	120,700	111,300
Area 3 - Below Poag's Hole Reservoir (Plan 12)									
Residential									
Structures	0	0	0	0	0	0	0	0	0
Contents	0	0	0	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0
Public & Other	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0

Table B7-5 - Average Annual Urban Inundation Benefits

Without Project Average Annual Inundation Damages	With Project Average Annual Urban Inundation Damages	With Project Average Annual Urban Inundation Benefits
$	$	$
Area 1 - Below Stannard Reservoir (Plans 3, 5, 6, 9, and 11)		
745,400	38,000	707,400
Area 2 - Below Mt. Morris Reservoir (Plans 6 and 10)		
545,700	111,300	434,400
Area 3 - Below Poag's Hole Reservoir (Plan 12)		
81,500	0	81,500

B8. HYDROPOWER BENEFITS

a. Introduction.

An accepted procedure of calculating hydropower benefits for small hydro projects is to base the benefits on the average cost of energy from existing thermal plants that would be displaced by the hydro project's energy output (EM 1110-2-1701, 31 July 1985, p. 9-38). This method can be applied to the evaluation of hydro plants to be constructed in power systems having a high proportion of expensive oil or gas fire generation. The key assumption underlying this procedure is the value of the hydro project and is based solely on the displacement of generation from existing projects rather than the displacement of the construction and operation of an increment of new thermal generation. This method computes energy values only. The value is based on the new hydro plant displacing the most expensive generation on line at any given time which will vary with time of day, week, and year.

Benefits are based entirely on the projects energy output and no credit is given for capacity.

b. Plans.

All plans except 1, 2, and 6 have a hydropower component. Most of the plans (Plans 3, 4, 5, 9, 11, 12) involve building a new dam upstream of the present Mt. Morris Dam. All of the hydropower plans have hydropower generation taking place at Mt. Morris. Such a configuration would usually result in increased generating capability at the Mt. Morris powerhouse since water flow to the dam could now be regulated. A brief description of the hydropower plans are presented in Table B8-1. A more complete explanation of the components of the various plans are given in the Main Report.

Table B8-1 - Hydropower Plan Descriptions

Plan	Description
3	Construction of Stannard Dam/Reservoir in combination with installing hydropower generating capacity into the existing Mt. Morris Dam. They would operate as a system generating 439,563,200 kilowatt hours (KWH) in average annual energy. Hydropower storage available to Mt. Morris is projected to equal the sum of hydro/storage at Stannard and Portage Dams.
4	Construction of a dam/reservoir at the Portageville site and installing hydropower generating capacity into the existing Mt. Morris Dam. This systems available average annual energy is 392,769,300 KWH.
5	Construction of Stannard and Portage Dam/Reservoir in combination with installing hydropower generating capacity into the existing Mt. Morris Dam. They would operate as a system generating 432,494,600 KWH in average annual energy. The hydropower storage available to Mt. Morris is projected to equal the sum of flood control storages at Stannard and Portage Dams.

Table B8-1 - Hydropower Plan Descriptions (Cont'd)

Plan	Description
7	Install hydropower generation capability into the Mt. Morris Dam. Add 15-foot high spillway gates onto the existing Mt. Morris Dam. The increased storage is allocated to hydropower generation. This results in 34,358,200 KWH of average annual energy.
8	Install hydropower generating capability into Mt. Morris Dam. Add 27-foot high spillway gates to the existing Mt. Morris Dam. The increased storage is allocated to hydropower generation. This results in 51,761,200 KWH of average annual energy.
9	Construction of Stannard and Portageville Dam/Reservoirs. Install hydropower generation capability into Mt. Morris Dam. Add 27-foot high spillway gates to the existing Mt. Morris Dam. The increased storage is allocated to hydropower. The system generates 467,118,200 KWH of average annual energy.
10	Install hydropower generation capability into Mt. Morris Dam. Add 27-foot high spillway gates to the existing Mt. Morris Dam. This increased storage is allocated to flood control and hydropower. The system generates about 51,761,200 KWH of average annual energy with the implimentation of Scenario D8a's Target rule curve.
11	Construction of Stannard Dam/Reservoir for flood control purposes exclusively. Install hydropower generation capability into Mt. Morris Dam. Add 27-foot high spillway gates to the existing Mt. Morris dam. Incareased storage capacity will be used for additional flood control and hydropower generation. An operating policy similar to D8a would be implimented. The system generates at least 51,761,200 KWH of Average Annual Energy.
12	Construction of Poag's Hole Dam/Reservoir to include hydropower generation. Install hydropower generation capability into existing Mt. Morris Dam. The hydropower storage at Mt. Morris would equal the flood control storages at Poag's Hole. This system generates 30,976,400 KWH of average annual energy.

c. Demand for Hydropower.

The power generated from the 9 plans could be placed into the New York Power Pool. A report of the Planning Committee of the New York Power Pool entitled "New York Power Pool Long Range Plan: Electric Supply and Demand, 1985-2001," April 1985, outlines long range demand and supply strategies for

the Pool. The average annual growth rate of demand for energy between 1985 and 2001 is 1.4 percent. The Pool plans to add 3,189 megawatts of new generating power during the same time period. Oil consumption for the Pool is 59 million barrels in 1985 and 89 million barrels in 2001. Table B2 outlines the energy generation mix of the Pool in 1985 and in the year 2001.

Table B2 - New York Power Pool Energy Generation Mix

Energy Generation Type	Percent of Total Generating Capacity	
	1985	2001
Purchase	13	12
Gas	10	-
Oil	25	32
Coal	17	19
Nuclear	17	21
Hydro	18	16
TOTAL	100	100

A significant portion of the power system's demand is met by oil or gas fired generation: 35 percent in 1985 and 32 percent in 2001. The proposed hydro projects might serve the system best by displacing at times this high cost existing generation, rather than deferring new generation. Since the plan with the largest generating capacity is only 53 megawatts, and the Pool's smallest planned expansion is 300 megawatts, it is unlikely that the completion of any hydropower plan would defer any new generation. A more likely scenario would be to use the proposed hydro project to displace or "back off" the most expensive thermal generation that might be otherwise operated at that time.

d. New Energy Output by Plan.

The development of any one of the 9 proposed plans would result in new electricity being generated. Table B3 summarizes average annual energy generated by each plan.

Average Annual Energy output by plan was provided by the Hydrology Section of the Hydraulics Branch. This Average Annual Energy generation by plan will be used to develop hydropower benefits.

e. Development of Power Values.

Hydropower benefits based on the "Energy Displacement Method" needs Average Annual energy generation by plan and the value of energy over the plan evaluation period. In order to calculate the value of energy, it is necessary to determine the type and quality of existing thermal generation that might be displaced by the hydro plant. This is done by examining the way the system's power plans are operated to meet loads. During periods of minimum demand (early morning hours), only the plants with the lowest operating costs would be on-line. As the demand for power increases, the net increment load would be met by the plant with the next lowest operating cost. Perhaps hydropower or nuclear or more efficient coal-fired plants would be operating during the low load hours. When the load is unusually high, expensive oil-fired peaking generation would be used. The overall objective is to meet system loads with the lowest possible overall operation cost.

The proposed hydro project would be used to displace the most expensive thermal generation being operated at that time. This marginal generation would range over the course of the day as the load varies, and would vary on a seasonal basis. Over a period of time, the hydro plant would displace a mix of different generation sources, each having different operating or energy costs. The benefit analysis needs to determine the average cost of the mix of generation and apply it to the energy output of the hydro plant.

The Federal Energy Regulatory Commission (FERC) was contacted concerning the value of electrical power in Western New York. However, FERC only periodically receives information on energy generation costs from the various types of power plants (coal, nuclear, oil, gas, etc.). A suggested alternative source of information on energy generation costs was the New York State Public Service Commission (NYSPSC). The Commission has been in the process of estimating system long run avoided costs when utility loads for a number of New York power generation companies changes. Their report (Opinion No. 86-8, March 27, 1986) generated long run avoided costs for the State electric system as a whole, given the change in Rochester Gas and Electric utility load.

Decisions concerning the generation and dispatch of electric power are coordinated and made centrally by the New York Power Pool. The dispatching is based on principles of economic dispatch which seek minimization of energy costs to the State's interconnected system as a whole. Rochester Gas and Electric Company (RG&E) has exclusive wheeling rights to any electric power generated in the Genesee River Basin. Any electricity generated by any of the plans would be wheeled out by Rochester Gas and Electric. Since the pool controls the generation and dispatch of power within the State, the pool is "the utility" in the context of transactions with on-site generators. Since RG&E would wheel the power out, the value of the power should be evaluated in the context of the system's long run average costs when RG&E's utility load is being changed. The system's long run avoided costs when RG&E utility load changes came to 4.1416 cents per kilowatt hour at the secondary transmission level. This rate reflects long run incremental power costs for New York State. Therefore, this value was used as the value of power that would be displaced by the proposed hydropower project.

Table B8-3 - Average Annual Energy Output by Plan

Plan	Average Annual Energy Out
3	439,563,200
4	392,769,300
5	432,494,600
7	34,358,200
8	51,761,200
9	467,118,200
10	51,761,200
11	51,761,200
12	30,976,400

(1) System Energy Cost Adjustment - Frequently, a proposed hydro plant will operate somewhat differently in a given power system. The Planning Guidance Notebook requires that the resulting additional system costs (or savings) be accounted for in deriving power values. However, the proposed hydro power additions are small compared to the system and will not change long-term system resource development. The addition of future generating resources will proceed in the same manner for both the "with" and "without" project scenarios. The change in system energy costs due to the development of any of the alternative plans is considered negligible.

(2) Capacity Value Adjustment - The current Planning Guidance Notebook allows a capacity value adjustment of from 5 to 10 percent on the cost per kilowatt for plant capacity costs. This reflects the inherent reliability of hydro projects when compared to thermal plants, their ability to respond rapidly to changes in loading, and their ability to be placed on line rapidly. However, as stated previously, benefits based on the cost of displaced energy does not involve a capacity value adjustment.

(3) Real Fuel Cost Escalation - The Planning Guidance Notebook permits accounting for real fuel cost escalation.

The Water Resource Council's Water and Energy Task Force has proposed that escalation be limited to 30 years from the present. Fuel cost escalation rates were derived from the Department of Energy "Annual Energy Outlook 1984, with Projections to 1985." For the Genesee River Basin, real fuel cost escalation adjustments must be derived for the mix of electrical generating

facility types that will be displaced by the energy produced from the various alternatives. Average electricity prices in dollars per thousand kilometers were presented from 1985 to 1995 in the report. These average prices assumed a 3.1 percent annual growth in GNP for the same time period. These average electricity prices were broken down into a capital component, a fuel component, and an O&M component. The annual rate of growth for the fuel component from 1985 to 1995 came to 2.09 percent.

It is assumed that the Genesee River Basin project will come on line in 1995. The base fuel cost is the fuel cost portion of the 4.14 cent ($.0414) per kilowatt hour value of the displaced energy: 1.49491 cents per kilowatt hour. This fuel cost was escalated at an annual compound rate of 2.09 percent to 1995. Fuel costs will continue to be compounded at 2.09 percent from 1995 to 2015 and then remain constant through project year 100 (2095). Table B8-4 summarizes the escalation of fuel costs over the project evaluation period.

Table B8-4 - Escalation of Fuel Costs Over the Project Evaluation Period

	Study Year 1986	Base Year 1995	2000	2005	2010	2015	2095
	$	$	$	$	$	$	$
Fuel Costs in Cents per Kilowatt Hour (1)	.0149491	.0183843	.020387	.022608	.025072	.027804	.027804

(1) Study year fuel costs were escalated by 2.09 percent annually from 1986 to 2015. Fuel costs after 2015 remained constant to 2095.

(4) Value of Alternative Energy - The total value of alternative energy per kilowatt hour for the evaluation period is provided in Table B8-5. These values include fuel escalation.

Table B8-5 - Value of Alternative Energy with Fuel Cost Escalation

	Study Year	Evaluation Period					
	1986	1995	2000	2005	2010	2015	2095
	$	$	$	$	$	$	$
Fuel Value	.0149491	.0183843	.0203875	.022608	.025072	.027804	.027804
Capital and O&M	.0264669	.0264669	.0264669	.0264669	.0264669	.0264669	.0264669
Total Energy Value	4.14160	.0448512	.0468544	.0490758	.0515393	.0542711	.0542711

f. Computation of Power Benefits.

Power benefits by plan are computed by multiplying total average annual power generated by alternative (Table B8-3) times the value of alternative energy over the project evaluation period (Table B5). This is presented in Table B8-6.

These power benefit time streams were then converted to an average annual basis, given a project interest rate of 8.625 percent, and a 100-year project life. This process is summarized in Table B8-7 by plan. Average annual hydropower benefits ranged from $23,078,400 for Plan 9 to $1,530,400 for Plan 12.

Table B8-6 - Value of Alternative Energy by Plan

Plan	Year					
	1985	1995	2000	2005	2010	2015
	$	$	$	$	$	$
Plan 3 - Hydro Generation at Stannard, Portage, and Existing Mt. Morris Hydro Generation at Mt. Morris Equals Stannard and Portage Hydro Water						
Average Annual Energy (kilowatts)	439,563,200	439,563,200	439,563,200	439,563,200	439,563,200	439,563,200
$ Per Kilowatt Hour	.041416	.0448512	.0468544	.0490758	.0515393	.0542711
Energy Value	18,204,949	19,714,937	20,595,470	21,571,916	22,654,780	23,855,578
Plan 4 - Hydro Generation at Portage and Existing Mt. Morris						
Average Annual Energy (kilowatts)	392,769,300	392,769,300	392,769,300	392,769,300	392,769,300	392,769,300
$ Per Kilowatt Hour	.041416	.0448512	.0468544	.0490758	.0515393	.0542711
Energy Value	16,266,933	17,616,174	18,402,970	19,275,468	20,243,055	21,316,022
Plan 5 - Hydro Generation at Stannard, Portage, and Existing Mt. Morris Hydro Generation at Mt. Morris Equals Stannard and Portage Flood Control						
Average Annual Energy (kilowatts)	432,494,600	432,494,600	432,494,600	432,494,600	432,494,600	432,494,600
$ Per Kilowatt Hour	.041416	.0448512	.0468544	.0490758	.0515393	.0542711
Energy Value	17,912,196	19,397,902	20,264,275	21,225,018	22,290,469	23,471,958

Table B8-6 - Value of Alternative Energy by Plan (Cont'd)

Plan	Year 1985	1995	2000	2005	2010	2015
	$	$	$	$	$	$
Plan 7 - Add 15-Foot Gates to Mt. Morris. All Capacity Used for Hydro Generation						
Average Annual Energy (kilowatts)	34,358,200	34,358,200	34,358,200	34,358,200	34,358,200	34,358,200
$ Per Kilowatt Hour	.041416	.0448512	.0468544	.0490758	.0515393	.0542711
Energy Value	1,422,979	1,541,006	1,609,833	1,686,156	1,770,798	1,864,657
Plan 8 - Add 27-Foot Gates to Mt. Morris. All Capacity Used for Hydro Generation						
Average Annual Energy (kilowatts)	51,761,200	51,761,200	51,761,200	51,761,200	51,761,200	51,761,200
$ Per Kilowatt Hour	.041416	.0448512	.0468544	.0490758	.0515393	.0542711
Energy Value	2,143,742	2,321,552	2,425,240	2,540,222	2,667,736	2,809,137
Plan 9 - Build Stannard and Portage Dams for Hydro Generation. Add 27 Feet to Mt. Morris for Hydro Generation Only						
Average Annual Energy (kilowatts)	467,118,200	467,118,200	467,118,200	467,118,200	467,118,200	467,118,200
$ Per Kilowatt Hour	.041416	.0448512	.0468544	.0490758	.0515393	.0542711
Energy Value	19,346,167	20,950,812	21,886,543	22,924,199	24,074,945	25,351,019
Plan 10 - Add 27 Feet to Mt. Morris for Hydro and Flood Control						
Average Annual Energy (kilowatts)	51,761,200	51,761,200	51,761,200	51,761,200	51,761,200	51,761,200
$ Per Kilowatt Hour	.041416	.0448512	.0468544	.0490758	.0515393	.0542711
Energy Value	2,143,742	2,321,552	2,425,240	2,540,222	2,667,736	2,809,137

Table B8-6 - Value of Alternative Energy by Plan (Cont'd)

Plan	Year					
	1985	1995	2000	2005	2010	2015
	$	$	$	$	$	$
Plan 11 - Build Stannard for flood control only. Add 27-foot to Mt. Morris for Hydro Generation and flood control.						
Average Annual Energy (kilowatts)	51,761,200	51,761,200	51,761,200	51,761,200	51,761,200	51,761,200
$ Per Kilowatt Hour	.041416	.0448512	.0468544	.0490758	.0515393	.0542711
Energy Value	2,143,742	2,321,552	2,425,240	2,540,222	2,667,736	2,809,137
Plan 12 - Build Poag's Hole for Hydro Generation. Place Hydro Generation in the Existing Mt. Morris Dam						
Average Annual Energy (kilowatts)	30,976,400	30,976,400	30,976,400	30,976,400	30,976,400	30,976,400
$ Per Kilowatt Hour	.041416	.0448512	.0468544	.0490758	.0515393	.0542711
Energy Value	1,282,919	1,389,329	1,451,381	1,520,192	1,596,502	1,681,123

Table E-7 - Average Annual Value of Alternative Energy by Plan

Plan	Energy Value Over Time						Average Annual Equivalent
	1995	2005	2045	2015	2045	2095	
3	19,714,900	20,595,500	21,571,900	22,654,800	23,855,600	23,855,600	21,717,000
4	17,616,200	18,403,000	19,275,500	20,243,100	21,316,000	21,316,000	19,405,100
5	19,397,900	20,264,300	21,225,000	22,290,500	23,472,000	23,472,000	21,367,800
7	1,541,000	1,609,800	1,686,200	1,770,800	1,864,700	1,864,700	1,697,500
8	2,321,600	2,425,200	2,540,200	2,667,700	2,809,100	2,809,100	2,557,300
9	20,950,800	21,886,500	22,924,200	24,074,900	25,351,000	25,351,000	23,078,400
10	2,321,600	2,425,200	2,540,200	2,667,700	2,809,100	2,809,100	2,557,300
11	2,321,600	2,425,200	2,540,200	2,667,700	2,809,100	2,809,100	2,557,300
12	1,389,300	1,451,400	1,520,200	1,596,500	1,681,100	1,681,100	1,530,400

B9. TRANSPORTATION

There are no commodity movements involving inland navigation on the Genesee River.

B10. RECREATION

a. Overview.

The outdoor recreational demand presented in the Genesee River Basin, Volume VII, Appendix M - Outdoor Recreation, Subappendix B, December 1969 was updated using current population projections.

The recreation market area of the Genesee River Basin was composed of 18 counties. These counties were grouped into four recreation subareas: Metropolitan, Barge Canal, Central Plains, and Allegany Plateau. Population projections for these subareas by county, were made (Table B10-1).

Four recreational activities were keyed upon: boating, camping, picnicking, and swimming. The supply and demand of activity days for the above activities were developed on a decadal basis (1995, 2005, 2015, 2095). Supply was compared to demand to determine deficit or surplus activity days. The derivation of the activity day demand, supply and surplus/deficit follows.

Table B10-1 - Recreation Subarea Population Projections

Subareas	1995	2000	2005	2010	2095
Metropolitan					
Erie	1,002,558	994,560	981,973	966,454	966,454
Monroe (1)	704,797	702,500	696,534	689,659	689,659
Niagara	226,044	225,356	224,667	223,090	223,090
Subtotal	1,933,399	1,922,416	1,903,174	1,879,203	1,879,203
Barge Canal					
Orleans (1)	42,124	43,322	44,771	46,502	46,502
Wayne (1)	96,360	100,798	105,160	109,760	109,760
Subtotal	138,484	144,120	149,931	156,262	156,262
Central Plains					
Genesee (1)	63,087	64,420	65,389	66,328	66,328
Livingston (1)	63,571	65,265	66,544	67,186	67,186
Ontario (1)	103,606	107,555	109,826	111,765	111,765
Wyoming (1)	44,400	45,891	47,259	48,603	48,603
Yates	24,315	25,125	25,813	26,405	26,405
Subtotal	298,979	308,256	314,831	320,287	320,287
Allegany Plateau					
Allegany (1)	57,921	59,496	60,824	61,886	61,886
Cattaraugus (1)	93,442	95,664	97,623	99,155	99,155
Chautauqua	152,394	154,539	155,876	156,856	156,956
Steuben (1)	106,453	108,091	108,972	119,962	109,962
McKean, PA	54,388	55,732	56,259	56,785	56,785
Potter, PA (1)	18,502	18,694	18,871	19,047	19,047
Tioga, PA	45,844	47,111	47,556	48,001	48,001
Warren, PA	55,080	57,022	57,561	58,099	58,099
Subtotal	584,024	596,349	603,542	609,791	609,791

b. Recreational Demand.

Gross demand by key activity way calculated by multiplying recreation subarea population by the market area participation rates for each activity. The participation rates varied by activity over time (Table B10-2).

Table B10-2 - Activity Participation Rates by Decade

Activity	1985	1995	2000	2005	2015 to 2095
Boating	2.09	2.09	2.84	2.84	2.84
Camping	.65	.65	1.2	1.2	1.20
Picnicking	3.69	3.69	4.54	4.54	4.54
Swimming	9.41	9.41	12.43	12.43	12.43

Gross demand was divided into three types of outdoor recreation excursions: day use outings, weekend trips, and vacations. The percent distribution of gross demand for boating and swimming are as follows: day use outings - 89.4 percent; weekend trips - 10.7 percent; and vacations - 8.9 percent.

Overnight camping excludes day use, while picnicking excludes overnight visits on weekends and vacations. The use time classification of camping in Pennsylvania was adapted for the Genesee market area. Weekday nonresident users equaled 60 percent of total camping occasions. The remaining 40 percent of the camping occasions were weekend resident users.

Picnicking was considered 100 percent day use by market area residents. Gross demand was divided into net resident demand and nonresident demand. Net resident demands are any outdoor recreation activity days originating and expended in the Genesee River Basin's recreation market area. Nonresident demands are outdoor recreation activity days originating outside, but expended within the Genesee River Basin's market area. All vacation activity occasions were assumed to be taken outside the Genesee River Basin's market area.

The Genesee River Basin report assumed the ratio between resident/nonresident demand was the same as the ratio between market area resident and nonresident current visitations in area State Parks. Letchworth State Park was chosen as the State park to be evaluated. It is centrally located in both the basin area and the resident area. The park attracts nationwide visitors not only for camping, but other activities as well. Camping surveys indicated 45 percent of campers were residents and 55 percent nonresidents. Also, 35 percent of nonresident campers were also boaters. Nonresident boaters equaled nonresident campers times (1/.45). Nonresident boaters were also potential nonresident swimmers. Picnic demand is 100 percent resident. Camping and swimming resident weekend use was 85 percent of resident weekend demand which was 10.7 percent of gross demand. The above was used to generate total demand by recreational activity for each recreation subarea. Table B10-3 has sample 1995 calculations for camping and swimming for the Metropolitan planning area. Annual activity days were calculated for each of the four

recreational activities for the four recreation subareas for 1995, 2000, 2005, 2015, and 2020-2095. Table B10-4 presents a summary of annual activity days demanded in the four recreation subareas for 1995.

Table B10-3 - Annual Activity Days for the Metropolitan Area - 1995

		Derivation of Camping Demand		Derivation of Swimming Demand
1. Gross Demand				
Metropolitan Population		1,933,339		1,933,339
Participation Rate/1,000		.65		9.41
Gross Demand		1,256,709		18,193,285
2. Resident Demand				
a. Use Class				
Weekday Use			(80.4%)	14,627,401
Weekend Use	(40% Res)	502,684	(10.7%)	1,946,681
Vacation	(60% NR)	754,025	(8.9%)	1,619,202
b. Distribution				
Day use as a percent of wkday resident demand use (100%)				14,627,401
weekend resident demand (85%)		427,281		1,654,679
Total Resident Demand		427,281		16,282,080
3. Nonresident Demand				
Participants		427,281		522,233
Percent Participating		122%		100%
Total Nonresident Demand		521,283		522,233
4. Total Demand				
Resident Demand		427,281		16,282,080
Nonresident Demand		521,283		522,233
		948,564		16,804,313

Table B10-4 - Annual Activity Days, Demand and Supply - 1995

	Boating	Camping	Picnicking	Swimming
Metropolitan				
Supply	1,178,100	843,800	10,181,500	16,465,700
Demand	3,799,100	948,600	7,134,200	16,804,300
± Supply	-2,621,000	-104,800	+3,047,300	-338,600
Large				
Supply	346,700	228,000	714,000	1,290,300
Demand	272,100	67,900	511,000	1,203,600
± Supply	74,600	160,100	203,000	86,700
Central Plains				
Supply	202,100	717,300	2,515,100	2,338,400
Demand	587,500	146,700	1,103,200	2,598,600
± Supply	-385,400	570,600	1,411,900	-260,200
Allegany				
Supply	416,400	1,056,500	3,108,000	5,515,200
Demand	1,147,600	286,500	2,155,000	5,076,100
± Supply	731,200	770,000	953,000	439,200

c. Recreational Supply.

The Genesee River Basin Study, December 1969, inventoried the supply of recreational facilities available in the Genesee River Basin to meet the needs of the four recreation activities: boating, camping, picnicking, and swimming. The inventory included major public supplies obtained from the Bureau of Outdoor Recreations Nationwide Plan Inventory and from material provided by the Genesee Park Commission. Private sector supply concentrated on private campgrounds in the recreation market area. Finally, municipal supply of recreational facilities was obtained from Volume 2 of the New York State Comprehensive Outdoor Recreation Plan.

This inventory was used with outdoor recreation space and facility standards to estimate supply in activity days for the four key activities. These standards introduce design load and capacity into the supply analysis.

All existing and programmed outdoor recreation developments known at the time the inventory was being completed was assumed to represent 1980 supply conditions. The supply in the year 2000 was estimated by increasing the 1980 tangible supply by 25 percent. An improvement factor of 25 percent was added to the year 2000 supply to obtain an estimate of supply in the year 2020. These projected supplies 1(1980, 2000, and 2020) were used to derive interpolated activity day supplies for the years 1995, 2005, 2010, and 2015. A summary of these annual activity days supplied by area by recreational activity are presented in Table B10-5.

Table B10-5 - Deficit/Surplus of Supply of Annual Activity Days

Area	Boating	Camping	Picnicking	Swimming
		1995		
Metropolitan	-2,621,000	-104,800	3,047,300	-338,600
Barge	74,660	160,100	203,000	86,700
Central Plains	-385,400	570,600	1,411,900	-260,200
Allegany	-731,200	770,000	953,000	439,200
		2000		
Metropolitan	-3,981,600	-853,000	1,989,600	-5,011,700
Barge	-26,600	109,500	97,200	-316,900
Central Plains	-624,600	475,800	1,248,000	-1,121,300
Allegany	-1,181,500	572,000	564,100	-1,125,800
		2005		
Metropolitan	-3,851,800	-780,100	2,747,700	-3,704,800
Barge	-19,500	119,200	117,800	-299,500
Central Plains	-629,100	523,300	1,383,700	-1,043,800
Allegany	-1,173,600	634,900	735,900	-846,500
		2015		
Metropolitan	-3,631,700	-647,400	4,195,400	-1,259,700
Barge	8,900	143,500	183,000	-203,300
Central Plains	-617,400	625,800	1,692,800	-799,600
Allegany	-1,135,800	768,300	1,116,400	-193,400
		2020-2095		
Metropolitan	-3,554,200	-591,900	4,865,200	-176,400
Barge	31,700	158,500	230,000	-118,400
Central Plains	-604,100	678,700	1,858,300	-645,800
Allegany	-1,108,400	837,800	1,320,900	169,400

d. Need Analysis.

The comparison of annual activity days supplied to annual activity days demanded for the four recreational activities was completed. The analysis for 1995 is presented in Table B10-4. This analysis was computed for 1995, 2000, 2005, 2015, and 2020. If annual activity days demanded was greater than the supply, additional recreational facilities are needed to satisfy the demand. Table B10-5 presents a summary of this surplus, deficit analysis. The analysis indicates there is a need for additional boating and swimming activity days in the Genesee River Basin's recreational demand area. Any of the proposed reservoir plans could help meet some of this excess demand.

The next stage of study should investigate recreational benefits associated with dam construction. At this time, more information should be available on such items as potential access points, carrying capacity of such sites, development costs, maintenance costs, pool size, a minimum pool elevation, and pool fluctuation.

e. White Water Rafting.

New York State has granted one permit for white water rafting on the Genesee River. The rafting takes place in the Letchworth State Park gorge from 1 April through 31 October. The best rafting takes place between April and June. After June, rafting trips are scheduled based upon available flows. Estimated annual trips currently equal 5,250. The trips taken between 1 April and mid-June (2,870) are considered "quality" trips. The remaining trips (2,380) are taken during low flow conditions. Any reservoir plan that would regulate flows during mid-June to October would enhance the recreational experience of these trips. Annual trips are estimated to increase to 7,525 with regulated flows.

In this reconnaissance phase of study, the unit day value method is used for estimating recreation values for whitewater rafting. Following the criteria for selection procedures for evaluating recreation benefits, the unit day value method was selected. Recreation costs do not exceed 25 percent of the expected total project costs and no regional model is available.

A point rating is used to reflect quality, relative scarcity, ease of access, and esthetic features for each activity. The points are related to a specific value chosen from the FY 1986 Conversion of Points to Dollar Values and applied to estimated use to determine recreation values under without and with project conditions.

(1) Table B10-6 displays the accumulated points under with and without project conditions for white water rafting. Recreation values associated with these points are interpolated from Table B10-7 and result in $10.87 under low flow conditions and $11.89 for with project conditions.

(2) The existing annual recreational value for this activity is $60,000. The estimate was derived by multiplying the number of trips taken between 1 April and mid-June by $11.89 (2,870 X $11.89 = $34,124). To this was added the value of the remaining trips (2,380 X $10.87 = $25,871). This was then subtracted from the with project condition recreational value (7,325 X $11.89 = $89,500). This came to $29,500. (NOTE: Trips taken between 1 April and mid-June have the same recreational experience value ($11.89) under with and without project conditions. This is because flows during this time would be optimal for white water rafting.)

Construction of the Stannard or Portage Reservoir would allow Genesee River flows to be regulated in the Letchworth Park area. Any plan that had the Stannard or Portage Reservoir as one of its components was credited with white water rafting benefits of $29,500 (Plans 3, 4, 5, and 9).

Table RIII-6 - Unit Day Value Point System
Special Recreation
Whitewater Rafting

Criteria	Judgment Factors					Total Points Existing	Total Points Improved
a. Recreation Experience (1)	Heavy use or frequent crowding or other interference with use.	Moderate use, other users evidence and likely to interfere with use.	Moderate use, some evidence of other users and occasional interference with use due to crowding.	Usually little evidence of other users, rarely if ever crowded.	Very low evidence of other users, never crowded.		
Total Points: 30							
Point Value:	0-4	5-10	11-16	17-23	24-30	20	20
b. Availability of Opportunity	Several within 1 hour travel time; a few within 30 minutes travel time.	Several within 1 hour travel time; none within 30 minutes travel time.	One or two within 1 hour travel time, none within 45 minutes travel time.	None within 1 hour travel time.	None within 2 hours travel time.		
Total Points: 18							
Point Value:	0-3	4-6	7-10	11-14	15-18	10	10
c. Carrying Capacity	Minimum facility development for public health and safety.	Basic facilities to conduct activity-(ies).	Adequate facilities to conduct without deterioration of the resource or activity experience.	Optimum facilities to conduct activity at site potential.	Ultimate facilities to achieve intent of selected alternative.		
Total Points: 14							
Point Value:	0-2	3-5	6-8	9-11	12-14	7	10
d. Accessibility (2)	Limited access by any means to site or within site.	Fair access, poor quality roads to site; limited access within site.	Fair access, fair road to site; fair access, good roads within site.	Good access, good roads to site; fair access, good roads within site.	Good access, high standard road to site; good access within site.		
Total Points: 18							
Point Value:	0-2	4-6	7-10	11-14	15-18	10	10
e. Environmental Quality	Low esthetic factors that significantly lower quality.	Average aesthetic quality; factors exist that lower quality to minor degree.	Above average aesthetic quality; any limiting factors can be reasonably rectified.	High aesthetic quality, no factors exist that lower quality.	Outstanding aesthetic quality; no factors exist that lower quality.		
Total Points: 20							
Point Value:	0-2	3-6	7-10	11-15	16-20	10	13
Total						57	63

(1) Competitive sites on Genesee River, Salmon River, and Black River in New York State. Each waterway has its own uniqueness and aesthetics and users opt for sites based on qualities that appeal to each user.

Table B10-7 - Conversion of Points to Dollar Values

Activity Categories	0	10	20	30	40	50	60	70	80	90	100
Specialized Recreation Other than Fishing and Hunting	6.70	7.80	7.80	8.40	9.00	10.10	11.20	13.50	1[illegible].70	18.00	20.20

f. Recreation Benefits - Plans 6, 10 and 11.

Preliminary recreation benefits for these three plans were developed based on a November 1977 "Comprehensive Water Resources plan for the Genesee River Basin" by New York State Department of Environmental Conservation. Information on annual recreation visitations for a reservoir facility at Stannard was used. The above plans would provide a similar sized pool. The reports annual visitation rates for general recreation and downstream canoeing were used to determine recreation benefits attributable to the above plans.

The unit day value method was used to estimate recreation benefits for general recreation and canoeing associated with these plans reservoir. A point rating was used to reflect quality, relative scarcity, ease of access and esthetic features for each activity. The points are related to a specific value derived from the FY 1987 Reference Handbook Conversion of Points to Dollar Values. With project condition points for general recreation and canoeing came to 41 and 48 respectively. These converted to $3.21 and $10.26 respectively for general recreation and canoeing (Specialized Recreation). These unit day values were then multiplied by the projected annual attendance by activity.

General recreation benefits were based upon a unit day value of $3.21 and 195,500 projected annual general recreation activities. General recreation benefits for Plans 6, 10, and 11 came to $627,600.

Canoe based benefits were developed using a unit day value of $10.26 and 105,000 projected annual canoe experiences. canoe benefits for Plans 6, 10, and 11 came to $1,077,300.

Total recreation benefits for Plans 6, 10, and 11 came to $1,704,900. In addition to the above, there are also cold water fishing benefits at the dam itself. However, a dollar value was not placed on these benefits. These benefits should be investigated further in the Feasibility Phase.

B11. COMMERCIAL FISHING.

There are no marine, estuarine, and fresh water commercial fisheries for either fish or shellfish in the Genesee River Basin.

B12. AREA REDEVELOPMENT

The economic effects of the direct use of otherwise unemployed or underemployed labor resources during project construction or installation may, under certain conditions, be included as a national economic development (NED) benefit.

Conceptually, any employment, anywhere in the nation of otherwise unemployed or underemployed resources that result from a project represents a valid NED benefit. However, primarily because of identification and measurement problems and because unemployment is regarded as a temporary phenomenon, only those labor resources employed onsite in the construction or installation of a project should be counted. Benefits from use of otherwise unemployed or underemployed labor resources may be recognized as a project benefit if the

area has substantial and persistent unemployment at the time the plan is submitted for authorization and for appropriations to begin construction.

None of the counties in the Genesee River Basin qualify for NED benefits according to the FY 86 Reference Handbook. Area redevelopment benefits have not been evaluated for this project.

B13. SUMMARY OF COSTS.

a. Table B13-1 contains average annual costs for all alternatives described in Section B4. The average annual costs for the proposed plans of improvement have been calculated at the FY 86 project interest rate of 8-5/8 percent and a 100 year project life for the reservoir alternatives.

Interest rates determined by the department of the treasury relating to hydropower purposes under secretarial order RA 6120.2 paragraph 11(B) of the Secretary of Energy and Departmental Manual 730 DM3 superseding secretarial order 2929 of the Secretary of Interior are 11-3/8 percent for FY 86. These rates are limited in application to calculation of interest during construction and repayment of construction costs allocated to hydropower purposes.

The hydropower cost component of all reservoir plans was calculated for interest during construction and for repayment of construction cost using the 11-3/8 percent interest rate referenced above.

B14. SUMMARY OF BENEFITS

Benefits for the 12 alternative plans are listed in Table B14-1.

B15. ECONOMIC EFFICIENCY

Net discounted benefits and B/C ratio are the two methods of economic efficiency used to determine the economic justification of the project alternatives. Table B15-1 is the benefit/cost summary table. Plans 1, 6, 7, 8, 10, and 11 are economically justified.

Table B13-1 - Summary of Annual Costs

Category	Plan 1	Plan 2	Plan 3	Plan 4
First Cost	15,000	0	464,000,000	248,000,000
Interest During Construction	0	0	97,838,400*	55,335,100*
Total Investment	15,000	0	561,838,400	299,335,100
Annual Charges				
Interest	1,300	0	48,458,600	25,817,700
Amortization	Insignificant	0	11,200	6,000
Annual O&M	0	0	1,000,000	1,000,000
Total	1,300	0	49,469,800	26,823,700

Category	Plan 5	Plan 6	Plan 7	Plan 8
First Cost	464,000,000	41,000,000	8,500,000	12,500,000
Interest During Construction	97,838,400*	7,000,000	1,323,000*	1,945,500*
Total Investment	561,838,400	48,000,000	9,823,000	14,445,500
Annual Charges				
Interest	48,458,600	4,140,000	847,000	1,245,900
Amortization	11,200	1,000	200	300
Annual O&M	1,200,000	62,000	360,000	430,000
Total	49,669,800	4,203,000	1,207,400	1,676,200

Category	Plan 9	Plan 10	Plan 11	Plan 12
First Cost	471,000,000	12,500,000	57,300,000	163,909,600
Interest During Construction	99,425,900*	1,945,500	10,077,300	37,172,000*
Total Investment	570,425,900	14,445,500	67,377,300	201,081,600
Annual Charges				
Interest	49,199,200	1,246,000	5,811,300	17,343,200
Amortization	11,400	300	1,300	4,000
Annual O&M	1,300,000	430,000	313,900	425,000
Total	50,510,600	1,676,300	6,126,500	17,772,200

* Interest during construction on the hydropower cost component of all reservoir plans was calculated at 11-3/8 percent. All other costs were evaluated at 8-5/8 percent. Plans 3-6 and 9-12 had a 4-year construction period. Plans 7 and 8 had a 3-year construction period.

Table B14-1 - Summary of Benefits by Plan

Benefit Categories	Plans					
	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5	Plan 6
Flood Damage Reduction	35400	0	791200	0	791200	1270000
Upstream of Mt. Morris	0	0	791200	0	791200	791200
Nonagricultural			(707400)		(707400)	(707400)
Agricultural			(83800)		(83800)	(83800)
Downstream of Mt. Morris	35400	0	0	0	0	478800
Nonagricultural						(443400)
Agricultural	35400					(35400)
Canaseraga Creek	0	0	0	0	0	0
Nonagricultural						
Agricultural						
Erosion	1800		5300	1800	5300	5300
Hydropower	0	0	21717000	19405100	21367800	0
Recreation	0	0	29500	29500	29500	1704900
Irrigation	0	0	0	0	0	1400000
Total	37200	0	22543000	19436400	22193800	4380200

Benefit Categories	Plans					
	Plan 7	Plan 8	Plan 9	Plan 10	Plan 11	Plan 12
Flood Damage Reduction	0	0	791200	632800	1331000	127100
Upstream of Mt. Morris	0	0	791200	0	791200	0
Nonagricultural			(707400)		(707400)	
Agricultural			(83800)		(83800)	
Downstream of Mt. Morris	0	0	0	632800	539800	0
Nonagricultural				(597400)	(504400)	
Agricultural				(35400)	(35400)	
Canaseraga Creek	0	0	0	0	0	127100
Nonagricultural						(81500)
Agricultural						(45600)
Erosion	1800	1800	5300	1800	5300	1800
Hydropower	1697500	2557300	23078400	2557300	2557300	1530400
Recreation	0	0	29,500	1704900	1704900	0
Irrigation	1594600	1594600	1594600	1400000	1594600	1594600
Total	3293900	4153700	25499000	6296800	7193100	3253900

Table B15-1 - Benefit/Cost Summary

Category/Plan	Plan 1	Plan 2	Plan 3
Average Annual Benefits	37,200	-	22,543,000
Average Annual Costs	1,300	-	49,469,800
Net Benefits	35,900	-	-26,926,800
B/C Ratio	29 to 1	-	.46
Category/Plan	**Plan 4**	**Plan 5**	**Plan 6**
Average Annual Benefits	19,436,400	22,193,800	4,380,200
Average Annual Costs	26,823,700	49,669,800	4,203,000
Net Benefits	-7,387,300	-27,476,000	177,200
B/C Ratio	.72	.45	1.04
Category/Plan	**Plan 7**	**Plan 8**	**Plan 9**
Average Annual Benefits	3,293,900	4,153,700	25,499,000
Average Annual Costs	1,207,400	1,676,200	50,510,600
Net Benefits	2,086,500	2,477,500	-25,011,600
B/C Ratio	2.7	2.48	.50
Category/Plan	**Plan 10**	**Plan 11**	**Plan 12**
Average Annual Benefits	6,296,800	7,193,100	3,253,900
Average Annual Costs	1,676,300	6,126,500	17,772,200
Net Benefits	4,620,500	1,066,600	-14,518,300
B/C Ratio	3.76	1.17	.18

NOTE: June 1986 price levels: 8-5/8 percent interest rate.

GENESEE RIVER BASIN STUDY
NEW YORK

RECONNAISSANCE REPORT

APPENDIX C

COST ESTIMATES

U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207

May 1986 Prices

REASONABLE CONTRACT ESTIMATE

SHEET 1 OF 1

PROJECT: ALT. PLAN 1

INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1	Prepare regulation manual			L.S	10,000
	CONTINGENCIES (@ 25%)				3,000
	TOTAL EARNING INCL. CONTINGENCIES (@ 25%)				13,000
	ENGINEERING & DESIGN				600
	SUPERVISION & ADMINISTRATION				1,400
	TOTAL COST				15,000
	NO additional O&M cost				

ENG FORM APR 67 1738 SUPERSEDES ENG FORM 1738, 1 APR 54, WHICH IS OBSOLETE.

May 1986 Prices

REASONABLE CONTRACT ESTIMATE

SHEET 1 OF 1

PROJECT: ALT. PLAN 3

INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1.	Stannard dam/reservoir & powerplant			L.S	150,545,000
2.	Portage dam/reservoir & powerplant			L.S	156,607,000
3.	Mt Morris powerplant			L.S	10,271,000
	TOTAL CONTRACTOR'S EARNING				317,423,000
	CONTINGENCIES @ 25%				79,577,000
	TOTAL CONT. EARNINGS INCL. CONTINGENCIES				397,000,000
	ENGINEERING & DESIGN				19,850,000
	SUPERVISION & ADMINISTRATION				47,150,000
	TOTAL FIRST COST				464,000,000
4.	Annual Operation and Maintenance				700,000
	Replacement Cost Incl. Contingencies				300,000
	Total Annual O&M and Replacement				1,000,000

ENG FORM APR 67 1738 SUPERSEDES ENG FORM 1738, 1 APR 54, WHICH IS OBSOLETE.

GPO : 1967 O-265-053

May 1986 Prices

REASONABLE CONTRACT ESTIMATE

SHEET 1 OF 1

PROJECT: ALT. PLAN 4; [illegible] Basin, N.Y.

INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1.	Portage dam/reservoir & powerplant			L.S	156,607,000
2.	Mt. Morris powerplant			L.S	10,271,000
	TOTAL CONTRACTOR'S EARNINGS				166,878,000
	CONTINGENCIES @ 25%				41,722,000
	TOTAL CONT. EARNINGS INCL. CONTINGENCIES				208,600,000
	ENGINEERING & DESIGN				10,400,000
	SUPERVISION & ADMINISTRATION				25,000,000
	TOTAL FIRST COST				244,000,000
3	Annual Operation & Maintenance Cost				700,000
	Replacement Cost Incl. Contingencies				300,000
	Total Annual O&M and Replacement Cost				1,000,000

ENG FORM APR 67 1738 SUPERSEDES ENG FORM 1738, 1 APR 54, WHICH IS OBSOLETE.

GPO : 1967 O—[illegible]

May 1986 Prices

REASONABLE CONTRACT ESTIMATE

SHEET 1 OF 1

PROJECT: ALT PLAN 5; Genesee River Basin, N.Y.

INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1.	Stannard dam/reservoir & power			L.S	150,545,000
2.	Portage dam/reservoir & power			L.S	156,607,000
3.	MT. Morris power			L.S	10,271,000
	TOTAL CONTRACTOR'S EARNINGS				317,423,000
	CONTINGENCIES @ 25%				79,577,000
	TOTAL CONTRACTOR'S EARNG. INCL. CONTING.				397,000,000
	ENGINEERING & DESIGN				19,850,000
	SUPERVISION & ADMINISTRATION				47,150,000
	TOTAL FIRST COST				464,000,000
4.	Annual Operation & Maintenance				600,000
	Replacement Cost Incl Contingencies @ 25%				400,000
	Total Annual O&M and replacement Cost				1,000,000

ENG FORM APR 67 1738 SUPERSEDES ENG FORM 1738, 1 APR 54, WHICH IS OBSOLETE.

REASONABLE CONTRACT ESTIMATE May '86 prices					SHEET 1 OF 1
PROJECT Genesee River Basin, N.Y Plan 6					INVITATION NO.
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Dam/Spillway & Dike				16,000,000
	Relocation & Construction RR19 & Roads				12,500,000
	Relocation of Gas, Elec. & Trans. Line		LS		1,500,000
	Total Contractor's Earning				30,000,000
	Contingencies @ 25%				7,000,000
	Total Contractor's Earning + Contingencies				37,000,000
	Engineering & Design				1,000,000
	Supervision and Admin				2,000,000
	TOTAL FIRST COST				40,000,000
	Highway and Bridge Relocations				62,000
	Lands and Damages				1,300,000

ENG FORM APR 67 1738 SUPERSEDES ENG FORM 1738, 1 APR 54, WHICH IS OBSOLETE.

GPO : 1967 O-244-533

May 1986 Prices

REASONABLE CONTRACT ESTIMATE

SHEET 1 OF 1

PROJECT: Genesee River Basin N Y; Plan 7

INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1.	Clearing and site preparation				200,000
2.	Dam and spillway (15ft high)				2,500,000
3.	Powerhouse				3,000,000
4.	Intake and outlet works.				100,000
5.	Transmission facilities				14,000
6.	Relocations:				
	a) Railroads				-
	b) Roads				-
	c) Utilities				-
7.	Lands and damages				
	TOTAL CONTRACTOR'S EARNINGS				5,814,000
	CONTINGENCIES @ 25% ±				1,453,000
	TOTAL CONTRACTOR'S EARNINGS PLUS CONTINGENCIES				7,267,000
	ENGINEERING & DESIGN				363,000
	SUPERVISION & ADMINISTRATION				870,000
	TOTAL FIRST COST OF CONSTRUCTION				8500,000
8.	Annual Operation & Maintenance				150,000
	Replacement Cost + Contingencies @ 25% ±				210,000
	TOTAL ANNUAL COST				360,000

ENG FORM APR 67 1738 SUPERSEDES ENG FORM 1738, 1 APR 54, WHICH IS OBSOLETE.

REASONABLE CONTRACT ESTIMATE May 1986 Prices — SHEET 1 OF 1

PROJECT: Genesee River Basin N.Y; Plans 8 and 10 — INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1.	Clearing and site preparation				200,000
2.	Dam and Spillway				4,500,000
3.	Powerhouse				3,800,000
4.	Intake and outlet works.				14,000
5.	Transmission facilities				
6.	Relocations:				
	a) Railroads				-
	b) Roads				-
	c) Utilities				-
7.	Lands and Damages				-
	TOTAL CONTRACTOR'S EARNINGS				8,514,000
	CONTINGENCIES @ 25% ±				2,186,000
	TOTAL CONTRACTOR'S EARNINGS PLUS CONTINGENCIES				10,700,000
	ENGINEERING & DESIGN				535,000
	SUPERVISION & ADMINISTRATION				1,265,000
	TOTAL FIRST COST OF CONSTRUCTION				12,500,000
8.	Annual Operation & Maintenance				160,000
	Replacement Cost + Contingencies @ 25% ±				270,000
	TOTAL ANNUAL COST				430,000

ENG FORM APR 67 1738 SUPERSEDES ENG FORM 1738, 1 APR 54, WHICH IS OBSOLETE.

May 1986 Prices

REASONABLE CONTRACT ESTIMATE

SHEET 1 OF 1

PROJECT: ALT. PLAN 9; Genesee River Basin, New York

INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1.	Stannard dam/reservoir & powerplant			L.S	150,545,000
2.	Portage dam/reservoir & powerplant			L.S	156,607,000
3.	27 Foot gate for hydro at Mt. Morris			L.S	15,114,000
	TOTAL CONTRACTOR'S EARNINGS				322,266,000
	CONTINGENCIES @ 25%				80,534,000
	TOTAL EARNINGS INCL. CONTINGENCIES				402,800,000
	ENGINEERING & DESIGN				20,207,000
	SUPERVISION & ADMINISTRATION				48,000,000
	TOTAL FIRST COST				471,000,000
4.	Annual O&M				900,000
	Replacement Cost Incl. Contingencies @ 25%				400,000
	Total Annual O&M and Replacement				1,300,000

ENG FORM APR 67 1738 SUPERSEDES ENG FORM 1738, 1 APR 54, WHICH IS OBSOLETE.

GPO : 1967 O-[illegible]

May 1986 Prices

REASONABLE CONTRACT ESTIMATE

SHEET 1 OF 1

PROJECT: Genesee River Basin N.Y Plan 11

INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Dam & Spillway & Dike				16,000,000
	Relocat. & Construct Rt 19 & Roads				12,500,000
	Relocat. Gas, Elec & Trans. line		L.S		1,500,000
	Spillway Gates (27-ft)				4,500,000
	Powerhouse				3,800,000
	Intake, outlet and Misc. works				300,000
	TOTAL CONTRACTOR'S EARNINGS				38,600,000
	Contingencies @ 25%±				9,400,000
	TOTAL CONT. EARNINGS INCL. CONT.				48,200,000
	Engineering & Design				2,400,000
	Supervision & Administration				5,600,000
	TOTAL FIRST COST OF CONST.				56,000,000
	Annual Operation & Maintenance				73,900
	Replacement Cost + Contingencies				±40,000
					313,900
	Lands and Damages				1,300,000

ENG FORM APR 67 1738 SUPERSEDES ENG FORM 1738, 1 APR 54, WHICH IS OBSOLETE.

GPO : 1967 O-[illegible]

May 1986 Prices

REASONABLE CONTRACT ESTIMATE

SHEET 1 OF 1

PROJECT: ALT. PLAN 12

INVITATION NO.:

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1.	Foxigs' dam/reservoir & powerplant				116,200,000
2.	Mt. Morris powerplant				2,940,000
	TOTAL CONTRACTOR'S EARNINGS				119,140,000
	CONTINGENCIES @ 25%				29,860,000
	TOTAL CONTRACTOR'S EARNINGS INCL CONTINGENCIES				149,000,000
	ENGINEERING & DESIGN				7,450,000
	SUPERVISION & ADMINISTRATION				17,550,000
	TOTAL FIRST COST				174,000,000
3.	Annual Operation & Maintenance				250,000
	Replacement Cost Incl. Contingencies @ 25%				175,000
	Total Annual O&M and Replacement Cost				425,000

ENG FORM 1738 APR 67 SUPERSEDES ENG FORM 1738, 1 APR 54, WHICH IS OBSOLETE.

GPO 1967 O-243-453

GENESEE RIVER BASIN STUDY
NEW YORK

RECONNAISSANCE REPORT

APPENDIX D

ENVIRONMENTAL ASSESSMENT

U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207

EXISTING CONDITIONS

This section provides a broad overview of existing conditions in the Genesee River basin. It is divided into two parts - the Man-Made Environment and the Natural Resources Environment.

HUMAN (MAN-MADE) ENVIRONMENT

Community and Regional Growth

The following sections pertain to aspects of community and regional growth.

Population

The 1980 population within the basin was about 1,000,000 persons, most of whom were concentrated near the city of Rochester. Moderate population growth is expected within the basin in the future.

Land Use and Development

Generally, the densely developed area of the basin occurs at the northern end of the basin, in and around the city of Rochester. The rest of the basin is more rural in nature. Future urbanization developments are anticipated in the area surrounding the city of Rochester and in areas serviced by major transportation routes west, south, and east of Rochester.

Projections of land use for the river basin indicate that, cropland acreage will decline by about 21 percent; pasture lands will decline by about 22 percent; forest lands will increase by about 21 percent; lands in urban use will increase by about 35 percent.

Business and Industry/Employment and Income

The total economy of the Genesee River basin is well diversified with substantial portions of trade, manufacturing, and agriculture. The city of Rochester is the major manufacturing and commerce center within the basin.

Manufacturing is the major industry and employment sector followed by the wholesale retail service sectors. The average unemployment rate for the four county area in 1980 was about 12 percent. The average median family income for the five county area in 1980 was about $22,000. Projections in the wholesale/retail and service oriented sectors is anticipated to grow.

Agriculture and Farmland

With the exception of the Rochester metropolitan area the Genesee River basin is basically an agricultural area. Most of the land area in Genesee, Livingston, and Wyoming Counties (approximately 61 percent) is devoted to agriculture. Less land area is devoted to agriculture (approximately 37 percent) in Monroe and Allegany Counties due to development and topography, respectively. Major products produced include dairy, field crops, grains, and livestock and products.

Recreation

Central New York is abundant in water resources, recreational facilities, and opportunities. Developments support activities such as: fishing, hunting, boating, camping, hiking, horseback riding, swimming, skiing, snowmobiling, and picnicking. Review of the New York State wide Comprehensive Recreation Plan indicates that the most sizable future recreation deficiencies and developmental needs are expected in day-use and local winter facilities, with notable needs also in camping and boating. Skiing, golfing, fishing, and hunting demands are expected to tax the existing facilities; and trail activities should be accommodated.

Letchworth State Park along the upper gorge of the Genesee River is a natural, scenic, and recreation area of State significance.

PUBLIC FACILITIES AND SERVICES

Municipal Water Supply

Surface water: Most of the population of the Rochester Metropolitan subarea, Monroe County, is served by public water supply systems. Since 1875, the city of Rochester has drawn from Canadice and Hemlock Lakes, located in the Central Plains subarea about 30 miles south of the city. Estimated dependable yield is 34 million gallons per day (mgd). In 1954, a treatment plant of 36 mgd capacity went into operation using Lake Ontario water to supplement the Hemlock system in meeting average and peak demands for the city. Monroe County Water Authority, serving a small portion of the city land the rest of the county, began operation of a 32 mgd treatment plant at Lake Ontario in 1963. Plans are implemented to increase capacity of 57 mgd and the ultimate capacity with existing intakes will be 100 mgd. The authority is planning to construct another treatment plant on Lake Ontario near the eastern county boundary A principal user, Rochester Gas and Electric Corporation, has an intake of 158 mgd capacity which takes cooling water from Lake Ontario. The subarea appears committed to Lake Ontario for water and the supply is adequate in quality as well as in quantity.

Ground water: Ground water of good quality is readily available in the valleys of the Genesee River and larger tributaries throughout the central and southern sections of the basin. Withdrawals could be increased several times over present usage.

The small communities characteristic of the entire Allegheny Plateau subarea draw almost exclusively on ground water as the most economic and convenient source of water. Wellsville, is the exception, but is considering development of ground water sources. Ground water form domestic use in the other subareas are relatively small.

Sewage treatment: Larger community development centers within the basin are serviced by municipal sewage treatment facilities. These facilities have been undergoing improvement to satisfy Federal and State treatment and water quality standards.

Power: Three private utilities and the Power Authority of the State of New York supply virtually all electric energy for the basin power market area. These utilities are interconnected among themselves and neighboring utilities in the highly coordinated New York Power Pool which has an estimated peak demand in 1990 of 48,100 MW. The basin potential for hydroelectric power generation is small, both in relation to total system capacity and peak loads.

Transportation: The Genesee River basin is adequately served by the present road system. The basin in the northern portion is traversed from east to west by the New York State Thruway (Interstate 90) and the Southern Tier Expressway which crosses the southern portion. The basin is traversed in the north-south direction by U.S. Highway 15.

Railroad passenger service in the basin has declined rapidly in recent years as it has in most of the northeastern portions of the United States. Rochester is the main city served by passenger service. The basin does have sufficient freight service.

Commercial passenger and air freight transport are available are the Rochester - Monroe airport.

Commercial navigation, both shallow draft and deep draft is available at Rochester. Shallow draft navigation is provided by the New York State Barge Canal which transverses the northern portion of the basin from west to east. In the past, the Barge Canal was a major economic factor in the growth of Rochester and the Lake Plain area. However, the present commercial traffic has declined, aithough pleasure craft traffic is steadily increasing. Deep draft commercial navigation is maintained in the last three miles of the Genesee River for the Port of Rochester. The port facilities serve both lake and ocean vessels with the principal products being coal, salt, and newsprint.

Property Values and Tax Revenues

Based on preliminary data (1983) the average value of farmland and buildings within the basin ranges from about $600 to $1500 an acre. Values very relative to characteristics including: location, structural development and facilities, slope, water, soils, woodland, etc.

Community tax revenues are derived through a number of ways including: property and service district taxes, sales taxes, and State and Federal revenue sharing.

Aesthetics and Noise

The predominantly rural agriculturally oriented watershed contains a number of scenic vistas. Its variety of terrain provides a generally aesthetically pleasing environment for local people as well as visitors. Letchworth State Park with its picturesque falls and gorges provides a natural area for outdoor enthusiasts year-round. Much of the basin, other than the metropolitan Rochester area, is devoted to small communities, farmland, and woodlands. Rolling hills with the many creeks and tributaries to the Genesee River provide for a significant natural resource within New York State.

Most noise problems would be associated with major transportation routes, in addition to the commercial centers of the more developed community centers.

EXISTING CONDITIONS

NATURAL ENVIRONMENT

Air Quality

The ambient air quality data of the Genesee River Watershed meets or exceeds the allowable maximum Federal and State Standards for Level I, Level II, and Level III classifications for total suspended particulates, sulfates, dioxides, carbon monoxide, ozone, nitrogen dioxide, lead, sulfur dioxide, and nitrates as indicated by the New York State Department of Environmental Conservation (NYSDEC - Memorandum on Quarterly Evaluation of Ambient Air Quality and Compliance with Ambient Quality Standards, 1982). Air quality levels in the vicinity of the possible sites are listed as either Levels I, II, or III.

The land uses associated with three NYSDEC air quality classification levels found in the Genesee River Basin are outlined broadly as follows:

Level I - Predominantly used for timber, agricultural crops, dairy farming, or recreation. Habitation and industry are sparse.

Level II - Predominantly single and two-family residences, small farms, and limited commercial services and industrial development.

Level III - Densely populated, primarily commercial office buildings, department stores, and light industrial complexes, or suburban areas of limited commercial and industrial development near large metropolitan complexes.

Water Quality

The New York State Department of Environmental Conservation, Region 9 and Region 8, were contacted in August 1985 relative to stream water classification of the Genesee River and major tributaries within the Genesee River Watershed. Data obtained form the Region 9 Office indicates that water quality for the Genesee River Watershed ranges from A through C, with various reaches and tributaries subrated to t. An "A" classification indicates that the water is suitable for drinking, culinary, or food processing purposes, and other uses. A "B" classification indicates that the stream water is best used for primary contact recreation and any other use except as a source of water supply for drinking, culinary or food processing purposes. A "C" classification indicates that the stream is best suited for fishing and all other uses except as a source of drinking and food processing relationships. The subrating of "t" further indicates water quality by denoting the water as suitable for trout. The portion of the Genesee River from Route 36 to the Mount Morris Dam is classified as "A"; from the Mount Morris Dam to the town of Portageville as "B"; from the town of Portageville to the town of Belmont as "C"; from Dyke Creek to the Standard Road bridge as "A"; and from the Standard Road bridge to the Pennsylvania State line as "C".

Region 8 indicated the following classifications for Canaseraga Creek, Dansville; Spring Creek Caledonia; and Red Creek, West Henrietta:

Canaseraga Creek from the headwaters to the town of Dansville is classified as "C"; from the town of Dansville north to the Genesee River as "C"; Spring Creek in the town of Caledonia is classified as "C" throughout the entire reach of the stream; Red Creek is classified as being "C" for that section outside of the Genesee Valley Park; within the Park, Red Creek is classified as being "B" water.

Fisheries

In general, the Genesee River originates in the Allegany Mountains of northern Pennsylvania, and flows in a northward direction for a distance of 158 miles before entering Lake Ontario at Rochester, New York.

In the Pennsylvania portion of the Genesee River Basin, the Pennsylvania Fish Commission indicated that about 18 species of fish are found in the Genesee River within Pennsylvania - which includes the West Branch, Middle Branch and Ludington Run; of these, 3 species are salmonids (rainbow, brown, and brook trout). Smallmouth bass are also present. The remaining species comprise a forage base of minnows, darters, shiners, and suckers. Two sections of the Middle and West branches of the Genesee River have been classified as Class A Trout waters that sustain an exceptional wild brook and brown trout population, as well as receiving hatchery raised trout. Ludington Run is listed as trout water and receives hatchery raised brown and rainbow trout. Ludington Run also has a natural population of smallmouth bass which are absent from the Middle and West branches of the Genesee River.

Information received from the New York State Department of Environmental Conservation (NYSDEC) indicated that there are a number of tributary streams in the Genesee River Basin which provide cold water fisheries habitat for trout. Recent communication with the NYSDEC shows that many of these tributaries provide significant spawning and nursery habitat for trout and therefore, contribute toward maintaining good coldwater fishing within the basin. Portions of the Oatka Creek, Spring Creek, Springwater Creek, Canaseraga Creek, and Mill Creek contain native self-sustaining populations of brood trout, rainbow trout, and brown trout. Also, a large number of tributaries receive annual stocking of brown and rainbow trout. In addition to small stream recreational trout fishing, the Genesee River - in a reach from its mouth at Lake Ontario to the first impassable barrier located in the city of Rochester - provides lake run salmon and steelhead trout fishing. Upstream form Rochester to about Belmont, New York, the river provides a warmwater fishery that includes such fish species as smallmouth black bass, northern pike, walleye, channel catfish, and a variety of minnows and panfish.

The lower Genesee River basin region provides an extensive lake-type fisheries that include both coldwater and warmwater habitat. Six lakes - Honeoye, Hemlock, Canadice, Conesus, Silver, and Rushford - range in size from 580 to 3,251 acres. Information received from the NYSDEC indicates that Canadice Lake has a native population of lake trout along with rainbow trout. Hemlock Lake also contains these two species. The remaining lakes are primarily a warmwater fisheries and contain such species as northern pike, largemouth bass, yellow perch and walleye, as well as sunfish.

The following provides a general overview of the existing fishery at the four potential reservoir sites under consideration: The Genesee River, Marsh Creek and Orebed Creek in the vicinity of the Stannard Dam/Reservoir site is a significant trout fishery. Trout are stocked in the river and in some of the adjacent tributaries. Orebed Creek contains a wild brook trout population. Redwater Creek does not have a significant fishery which may be due to pollution problems on that stream. In the vicinity of the Portage Dam/Reservoir site and the site considered for possible raising of the Mount Morris Dam, the Genesee River contains a warmwater fishery that includes panfish, northern pike and smallmouth bass. Walleye are found to some degree downstream of the existing Mount Morris Dam. In the vicinity of the Foags Hole Dam/Reservoir site on Canaseraga Creek, the creek contains stocked brown trout, portions of which may even be sustaining some populations of wild brown trout.

Wildlife

The diversity of openland, idleland, woodland and wetland in the Genesee River Watershed provides habitat for a variety of wildlife. Among the openland farm-game species found are cottontail rabbit, ring-necked pheasant, and woodchuck. Generally, the more productive farm-game habitat is located in the lake plain area. From the vicinity of about Mount Morris southward, the topography becomes steeply rolling, woodland and abandoned farmland acreage increases and agriculture tends to be more confined to the narrower bottomlands. White-tailed deer is the most important big game species inhabiting woodlands throughout the watershed. Other woodland wildlife included in the basin are the black bear (to some degree in Allegany County), wild turkey, ruffed grouse, red squirrel, gray squirrel, fox squirrel (in the lower Genesee Valley), and eastern chipmunk. Raccoon, skunk, opossum, and fox are also fairly common furbearers utilizing woodland and cropland habitat. Aquatic furbearers such as the muskrat, mink, and beaver are also found in the vicinity of the river, tributaries and wetlands in the watershed. Voles, moles, and mice are among the smaller rodents utilized as food by predaceous wildlife such as foxes, owls, and hawks.

In addition to the aforementioned game birds, a number of different species of non-game birds and waterfowl are found in the Genesee River Watershed. Some live year-round in the watershed, whereas other species are seasonal. In general, birds utilizing various watershed habitats include a variety of hawks, owls and passerine birds, herons, bitterns, ducks and Canada geese. Some of these birds prefer openland habitats such as cropfields, hayfields, and idlelands overgrown to weeds and low shrubs, whereas others prefer field edges, woodlands (hardwood, conifer, or a mixture of hardwoods and conifers) or wetlands.

Amphibians (frogs) and reptiles (snakes, turtles, salamanders, and newts) also occupy habitats in the watershed. Some species are found in wetland habitats and some are found associated with grassy, weedy, and shrubby fields and among stones and rotting logs and understory vegetation in woodland areas on soils having various drainage types.

All of the previously mentioned Alternative Plans under consideration are interspered to some degree with the aforementioned openland (croplands, hayfields), idleland, woodland, and wetland habitat types that are utilized by wildlife for cover, nesting, brooding of young and feeding. In the case of the Mount Morris Dam alternative, no farmland is located in the Genesee Gorge, although some herbaceous and shrubby habitat occurs on mudflat areas peripheral to the Genesee River. Recent data received through coordination with the New York State Department of Environmental Conservation and with U.S. Fish and Wildlife Service indicates that some white tail deer wintering habitat may be present at the potential Portage and Poags Hole sites.

Significant Habitats

Coordination with the NYSDEC, Delmar, New York Office revealed that there are a number of known significant natural resource areas in the watershed. The diversity of the natural resource areas of importance range from coldwater sources form some of the creeks, to wild trout spawning habitat, waterfowl habitat, deer wintering habitat, locations containing unique bog vegetation and geological formations. Coordination with USFWS and NYSDEC indicated that the American bald eagle, and endangered species, is nesting and wintering to some extent in the watershed.

Vegetation

There is a diversity of natural and planted terrestrial and herbaceous vegetation in the Genesee River Basin. This diversity is influenced to some degree by the different land use types such as croplands (planted to corn, wheat, beans, and vegetables), managed grasslands for long-term hay (planted to clover, timothy, alfalfa, and birdsfoot trefoil) and pasturelands. A number of abandoned farm fields are progressing into secondary and more advanced stages of plant succession.

With regard to woody plant species, the Genesee River Watershed is considered to be within the typical northern hardwood forest ecosystem. Most, if not all, of the standing timber has been cut over at least once. Many of the trees are second growth hardwoods such as sugar maple, beech and yellow birch; and in the southern part of the basin black cherry, oak, and hickory are also common. White pine and hemlock are the most common conifers. Other hardwood species include ash, black walnut, butternut, basswood, tulip poplar, spruce, redpine, jack pine, eastern cottonwood, quaking aspen, boxelder, and black willow. A variety of shrubs and vines also naturally occur along field and woodland boarders as well as to some degree within the woodland understory - included are sumac, witch hazel, hawthorn, raspberry, elderberry, gooseberry, dogwood, viburnum, wild grape, and choke cherry. A variety of natural grass and forb weed species have established throughout the watershed. Included are wild violets, gill-over-the-ground, ferns, penny wort, goldenrod, evening primrose, wild carrot, dandelion, burdock, bluegrass, orchard grass, foxtail, barnyard grass, quackgrass, chickory, daisy, pokeweed, and musk mallow. Vegetation relative to wetlands is addressed in the section below.

Wetlands

There are a number of wetlands located in the Genesee River Watershed. These wetlands provide valuable habitat for wildlife such as song birds, waterfowl, aquatic fur-bearing animals, as well as winter cover for some species of mammals and birds. Some idea of wetland types to be found were extracted from wetland overlay maps provided by the NYSDEC for use over U.S. Geodetic Survey (USGS) topographic maps. The following provides a general overview of the variety of wetland cover types that may be encountered in the Genesee River Watershed: Linear wetlands that are less than 100 feet wide but greater than 25 feet wide; flooded live deciduous trees; flooded shrubs; open water areas; flooded shrubs mixed with emergent plants; open water with emergent plants; emergent plants with standing open water areas; flooded shrubs mixed with wet meadow plants; flooded live deciduous trees mixed with flooded shrubs; open water with mixed flooded shrubs; emergents mixed with flooded dead trees; emergents mixed with flooded live trees; flooded live trees mixed with wet meadow plants; emergents mixed with flooded conifers; emergents; flooded shrubs mixed with flooded live deciduous trees.

With regard to the specific dam/reservoir alternative sites under consideration, a review of the NYSDEC wetland overlay maps indicated that:

There are approximately forty wetlands - some of which may be NYS protected (greater than 12.4 acres in size) - representing approximately nine cover types scattered within the potential Stannard Dam and Reservoir site. Some of the wetland cover types represented include wet meadow, linear wetlands, flooded shrubs, open water, and combinations of these cover types (with flooded shrubs dominant in some wetlands);

About 13 wetlands (most of which are estimated to be less than 12.4 acres is size) are located about two to three miles upstream of the Mount Morris Dam site.

Table D1 - Assessment of Impacts

Environmental Parameters	Alternative Plans Considered			
	No Action	Plan I: Re-regulation at Existing Mount Morris Dam and Reservoir	Plan B: Mount Morris Dam and Reservoir with 27 Foot Gate (Hydro)	Plan II: Stannard Dam and Reservoir (FC)/Mount Morris Dam and Reservoir with 27 Foot Gate (FC)(Hydro)
Air Quality	No significant impact on existing air quality is anticipated. Air quality is expected to remain similar to existing conditions depending on future land use.	No adverse impact on air quality is anticipated.	Similar impacts on air quality as indicated for the Stannard/Mount Morris Alternative Plan 10. It is estimated that approximately 3 construction seasons would be needed to build the project.	No significant adverse impact is anticipated. There would be some temporary fugitive dust and exhaust emissions from operation of heavy equipment and trucks during construction and periodic maintenance. It is estimated that approximately 3 construction seasons would be needed to build the project.
Water Quality	No significant impact on existing water quality conditions is anticipated. The Genesee River annually experiences silty turbid conditions during extensive storm periods. Future water quality on some sections of the river and its tributaries may even eventually improve if sewage facilities are upgraded, and/or stricter water quality regulations are implemented.	No adverse impact on water quality is anticipated. Reduction in occurrence of full channel flow would contribute toward reducing the rate of bank erosion, which in turn would contribute toward reducing siltation into the Genesee River to some degree.	Similar impacts on water quality as indicated for the Stannard/Mount Morris Alternative Plan 10, however, the impacts overall would be less because construction work would only occur at the Mount Morris Dam and Reservoir site.	A temporary increase in water turbidity due to silt, sediment and detritus distrubance during construction and maintenance periods is anticipated. As much as is feasibly possible, construction work in the river would probably occur during the low-flow periods. Removal of riparian vegetation to construct the Stannard Dam and Reservoir. Disturbed soils above the waterline would be seeded to reduce potential siltation runoff into the river at the project site. The Contractor would be required to adhere to the Corps Construction Guide Specifications (CW-01430, dated July 1978) relative to protection of water resources as well as adherence to appropriate State water quality laws to prevent significant pollution.
Benthos	No significant impact on the existing benthic community is anticipated. Future composition and distribution of the benthic community would depend on whether or not the water quality in the Genesee River is impacted by future development that could influence benthic habitat conditions. (i.e., aquatic substrate changes; water quality improvement or pollution, etc.)	More water would be supplied to maintain benthic organisms and their associated habitats in downstream areas. Also, the contribution toward reducing bank erosion would probably benefit benthic organisms to some degree by reducing disruption of their habitat. Minimal pooling to store water for eventual release would probably temporarily provide additional habitat for benthic organisms, however, release of such pooled water would also provide unstable habitat that could destroy some of these organisms if the periphery of the minimal pool should occasionally dry out. If pool water is not released too fast, the periphery may stay moist and sustain some of these organisms until it filled up.	Similar impacts on bethos and benthic habitat as indicated for the Stannard/Mount Morris Alternative Plan 10, however, the impacts would be less in amount of area impacted because construction work would only occur at the Mount Morris Dam and Reservoir site. Present estimates incate that it would take about 16 days to empty the flood control pool after water reached the spillway crest.	Benthic organisms and their associated habitats would be disrupted at the immediate construction sites. Many existing invertebrates within such excavated sites would be destroyed. Resettlement of temporarily suspended silt and sediments created by construction activity may smother some benthic organisms downstream. These adverse impacts would likely be short-term, since on-site benthic invertebrates that survived construction, and invertebrates that drift into the new reservoir habitat from upstream would probably soon begin to recolonize the new habitat. Some short and long-term benthic aquatic habitat would be created at the Mt. Morris reservoir site by the summer conservation pool. Some short-term benthic habitat would be created at the Stannard Reservoir site by the temporary conservation pool which is expected to occur during the summer months.

Table 01 - Assessment of Impacts (Cont'd)

Environmental Parameters	Alternative Plans Considered			
	No Action	Plan I: Re-regulation at Existing Mount Morris Dam and Reservoir	Plan B: Mount Morris Dam and Reservoir with 27 Foot Gate (Hydro)	Plan II: Stannard Dam and Reservoir (FC)/Mount Morris Dam and Reservoir with 27 Foot Gate (FC)(Hydro)
				Both reservoir sites would provide some additional, very temporary, benthic habitat during flooding periods. However, the unstable aquatic habitat within the zone of water level fluctuation during flood periods and in a portion of the conservation pool, would likely provide poor habitat for invertebrate organisms, because such zones would be subjected to long-term dry and short-term wet periods. At times, it is also possible that the reservoir sites in some years may have flows that are reduced to minimum run-of-the-river flows during seasonal periods having little precipitation. Present estimates indicate that it would take about 5 days to empty the flood control pool at Stannard after water reached the spillway crest.
Vegetation	No significant impact on existing vegetation is anticipated unless future development occurs and land-use patterns are changed. Some disruption due to natural causes may also occur over time.	No significant adverse impact on vegetation is anticipated. Some of the moist soil around the pool's periphery may provide habitat for sparse establishment of some aquatic plants, however, fluctuating water levels due to release of water when needed would provide an unstable shallow water zone around the pool periphery.	Similar to vegetation impacts described for the Stannard/Mount Morris Alternative Plan 10. The impacts overall would be less in amount of area impacted because construction work would only occur at the Mount Morris Dam and Reservoir Site.	Vegetation at the immediate project sites would probably be destroyed by cutting, clearing, excavation, grading, and placement of building materials by heavy equipment. Vegetation not removed by construction that is within the potential flood pool area would be subject to short-term inundation, depending on the depth of the flood control pool at any given time. Much existing aquatic vegetation within the conservation pool area would probably be destroyed. Some aquatic vegetation would probably reestablish over time - particularly along the more long-term conservation pool's periphery at Mt. Morris Reservoir. Disturbed terrestrial soils would be seeded to grass or grass/ligume plant mixtures to help prevent or reduce potential soil erosion. The Contractor would be required to adhere to Corps Construction Guide Specifications for Environmental Protection (CW-01430, dated July 1978), relative to protection of land resources which includes protection of vegetation.

Table 11 - Assessment of Impacts (Cont'd)

Environmental Parameters	Alternative Plans Considered			
	No Action	Plan 1: Re-regulation at Existing Mount Morris Dam and Reservoir	Plan 8: Mount Morris Dam and Reservoir with 27 Foot Gate (Hydro)	Plan 11: Stannard Dam and Reservoir (FC)/Mount Morris Dam and Reservoir with 27 Foot Gate (FC)(Hydro)
Fisheries	A coldwater salmonid fishery exists in the Genesee River from its mouth upstream to the first impassable barrier in the city of Rochester, and upriver from about Belmont, NY into Pennsylvania. The remainder of the river is a warmwater fishery. A cold or warm water fishery also exists in a number of tributaries in the basin. The fisheries in the river and in its tributaries would be expected to remain as such in the future.	Reduction of erosion and flooding would provide some benefit to fisheries in the stream by reducing potential water siltation and agricultural non-point source run off pollution into waters of the Genesee River.	Similar to fisheries impacts described for the Stannard/Mount Morris Alternative Plan 10, except that the adverse impacts would be on warmwater fisheries and not on coldwater fisheries. The overall fisheries impacts for this plan would be less than for Plan 10 because construction work would only occur at the Mount Morris Dam and Reservoir site.	Turbidity caused by construction may decrease photosynthesis of submerged aquatic plants downstream to some degree, until silt, sediment, and detritus settled out of the water. Coldwater fish (stocked and wild trout) and associated fish habitat in the vicinity of the Stannard dam and Reservoir would be disrupted by construction. Some existing riffle/pool zones would be destroyed and/or altered during excavation, grubbing, clearing and grading. Riparian trees that now contribute riparian shade over the aquatic shoreline of the river and its tributaries would be destroyed within the Stannard Dam and Reservoir site and within the conservation pool area of the Mount Morris Dam. Eventually, remaining trees just above the upper margin of the conservation pool would probably provide some scattered shade to the peripheral shoreline, as branches of such trees continued to grow outward over the water's edge in response to reduced competition and increased exposure to sunlight. Lower limits of stream tributaries that presently provide free-flowing aquatic habitat for fish may be pooled temporarily when seasonal flood pooling occurs. Some temporary increase in water turbidity during construction would be anticipated that may disturb fish in the general vicinity of the project sites, as well as to some degree downstream, until turbidity cleared up. Fish that moved out of the immediate project disturbance zones would probably return to inhabit the altered habitats to some degree after construction ceased. Although water would probably be maintained as much as possible in the conservation pool area on the upstream side of Mount Morris Dam, drawdown of the pool to some degree, when needed to provide hydropower could adversely impact some fish spawning. Fluctuating water levels at both reservoir sites could destroy some fish eggs during the warmwater fish spring spawning period. At Mount Morris Dam, some adverse impacts on fish in the forms of turbine mortality, entrainment or impingement may occur.

Table D1 - Assessment of Impacts (Cont'd)

Environmental Parameters	Alternative Plans Considered			
	No Action	Plan I: Re-regulation at Existing Mount Morris Dam and Reservoir	Plan B: Mount Morris Dam and Reservoir with 27 Foot Gate (Hydro)	Plan II: Stannard Dam and Reservoir (FC)/Mount Morris Dam and Reservoir with 27 Foot Gate (FC)(Hydro)
Wetlands	Since no action would be taken if this alternative were selected, no significant adverse impact on wetlands would be anticipated. Eventually, some of the existing wetlands would probably advance to the higher stage of plant growth. However, many of the wetlands would remain as such over the long-term.	No significant adverse impact on wetlands either in the minimal pooling water storage area on the upstream side of Mount Morris Dam, or downstream of the dam is anticipated by this alternative plan.	Similar to impacts on wetlands described for the Stannard/Mount Morris Alternative Plan 10. As compared to Plan 10, a lesser number of wetlands would probably be adversely affected (13) on a short or long-term basis.	A number of wetlands could be adversely impacted at the Stannard Dam and Reservoir site. Although all wetlands are considered to be a significant natural resource in NYS, some of the wetlands at this site could be 12.4 12 acres in size or greater and, therefore, are NYS protected. The wetlands may be destroyed or disrupted on a short-term basis - depending on whether the wetlands are located directly in the areas to be inundated with deep water for long-term periods, whether the wetlands are in the temporary flood pool zone that would hold floodwater for short-term periods, or whether the wetlands are along the upper periphery of the maximum temporary flood pool zone. Since the conservation pool would be subject to some annual water level drawdown due to evaporation, use for hydropower, etc., damp soils left by temporarily receding pool water, could create moist soil conditions around the pool periphery that would stimulate growth of some aquatic plant species such as sedge, cattail, iris, and rush. About 13 wetlands may be adversely impacted on a short or long-term basis upstream of the existing Mount Morris Dam; the NYS protected wetlands at this site appear to be near the upstream limit of the maximum proposed flood pool elevation at the lower falls in Letchworth State Park.
Wildlife	Game and non-game species of birds, mammals, reptiles and amphibians can be expected to continue to utilize the watershed's variety of habitats for nesting, rearing of young, feeding and cover. As development of the basin continues, wildlife habitat will be reduced unless it is replaced or conserved.	No significant adverse impact on wildlife is anticipated by this alternative plan. Some reduction in agricultural land flooding and bank erosion would contribute toward providing more stability to existing wildlife food, cover, and nesting habitat. Irrigation of croplands in the Lake Ontario Plain from the Barge Canal water supply as part of the re-regulation plan, would probably contribute minor secondary benefits to wildlife by providing improved temporary food, nesting, and cover habitat in and around cropfields for openland and nearby woodland wildlife species.	Similar to impacts on wildlife and wildlife habitat as described for the Stannard/Mount Morris Alternative Plan 10. As compared to Plan 10, a lesser amount and variety of wildlife habitat would probably be adversely affected on a short or long-term basis.	Loss of existing terrestrial and aquatic habitat would result in loss of cover, nesting, rearing, and feeding habitat for wildlife. Some new long-term aquatic habitat would probably be created by the conservation pool at the Mount Morris site. Clearing, grubbing, and grading to construct the Stannard Dam and Reservoir, and to construct the conservation pool on the upstream side of the Mount Morris Dam, and Stannard Dam would destroy and/or disrupt terrestrial wildlife habitat (openland, woodland) as well as some wetland habitat. Long-term inundation in the proposed conservation pool at the Mt. Morris site would convert much of the land from terrestrial to aquatic habitat with deep water, with some new peripheral shallow habitat. Fluctuating water levels that would occur to some degree at the

Table 21 - Assessment of Impacts (Cont'd)

Environmental Parameters	Alternative Plans Considered: No Action	Plan I: Re-regulation at Existing Mount Morris Dam and Reservoir	Plan B: Mount Morris Dam and Reservoir with 27 Foot Gate (Hydro)	Plan II: Stannard Dam and Reservoir (FC)/Mount Morris Dam and Reservoir with 27 Foot Gate (FC)(Hydro)
Wildlife (Cont'd)		If water releases are made during the nesting season, a rise in water level along the banks of the Genesee River may cause some temporary inundation resulting in some disruption to nesting wildlife.		some degree at the conservation pool site, could adversely impact wildlife and aquatic bird nesting along the periphery of the shoreline. Also, if temporary flooding above the conservation pool suddenly occurred during the nesting season, some loss of wildlife could occur. Similarly, if sudden pooling due to storm runoff occured at the Stannard site during the nesting season, some loss of wildlife could occur.
Desirable Community and Regional Growth	No significant impact on Community or Regional growth. Growth trends expected to remain relatively unchanged, with only minor changes in population.	No significant impact on Community and Regional growth is anticipated.	No adverse impacts to community growth is anticipated as no structures need be taken or relocated due to the large holding capacity of the Genesee gorge. Increase in hydropower may facilitate some moderate desirable increase in businesses and population both within the community and to a lesser extent on a regional basis.	Significant impacts on desirable community and regional growth in that over a number of structures affecting six towns and villages, in varying degrees, would have to be raised or relocated. Some roadways and utilities would also have to be relocated.
Noise	No impact.	No significant impacts are anticipated.	No significant impact except in the immediate project area during construction and maintenance periods.	Temporary moderate impacts during construction and maintenance periods. Noise from construction is expected to be confined to the immediate project area.
Displacement of People	No impacts anticipated except to the extent that people are displaced due to future flooding.	No significant impacts are anticipated.	No impacts are anticipated due to the adequate holding capacity of the Genesee gorge.	A number of houses and some people would be displaced by implementation of this plan. Some persons would undoubtedly move to nearby locations while a few would relocate away from the area entirely.
Aesthetic Values	No impacts except for possible negative visual impacts due to continued periodic flooding.	No significant impacts are anticipated.	Some visual negative impacts are expected from implacement of the gate atop the Mount Morris Dam, particularly in visually blocking limited segments of the gorge from vantage points on either side of the dam.	Similar impacts as described in Plan B plus construction of the 90-foot high Stannard Dam would create not only visual obstructions but also would inundate some acreage of upland area. Currently forested areas and expanses of vegetation would be destroyed.
Community Cohesion	No impacts expected except to the extent that out migration occurs due to continued periodic flooding.	No significant impacts are anticipated.	Long-term positive impacts may accrue in terms of downstream community stability due to decreased threat of flooding and possible lessening of power costs.	Possibly significant negative impacts due to out migration from displacement of people, houses, etc. Long-term benefits may accrue to the community from increased flood protection and hydropower.
Displacement of Farms	No impacts	No significant impacts are anticipated.	No impacts anticipated.	Some farms and farmland may be displaced/inundated by construction of the Stannard Dam and Reservoir.

ENVIRONMENTAL STUDIES AND COORDINATION

This section describes the areas of environmental investigation and environmental coordination that would be performed if authorization is received to proceed to the next phase of the study. Based upon review of appropriate legislation and guidelines, preliminary environmental planning, impacts and concerns, a Draft Environmental Impact Statement (DEIS) would have to be prepared and coordinated with Federal and State agencies and with public concerns, since the project would be a major federal action impacting the environment. Before a DEIS could be prepared, the following environmental studies would have to be performed and further environmental coordination with Federal and State agencies would be continued.

A comprehensive 3-season (spring, summer, fall) biological survey of the Genesee River and any affected tributaries within the proposed project sites would be necessary to more fully evaluate the potential adverse and beneficial impacts. During this survey, natural resource parameters such as fisheries, aquatic invertebrates (benthos), terrestrial and aquatic vegetation, benthos, dissolved oxygen, pH, water temperature, wildlife and wildlife signs would be recorded, and information relative to the human environment would be developed for the purpose of evaluating existing conditions.

Additional environmental coordination in the future would include:

Preparation of a Draft U.S. Fish and Wildlife Coordination Act Report; Section 404(b)(1) Evaluation; and a request for either a Section 401 State Water Quality Certification or a waiver thereof from NYSDEC.

In addition to the above mentioned activities, a Cultural Resources Survey would have to be done to comply with the National Historic Preservation Act.

Coordination and Compliance. As summarized in Table D2, preliminary compliance with Federal and State environmental statutes is as follows:

a. Preservation of Historical Archeological Data Act of 1974 (16 USC et seq.); National Historic Preservation Act of 1966, as amended, 16 USC 470 et seq.; Executive Order 11593, Protection and Enhancement of the Cultural Environment, 13 May 1971. The State Historic Preservation Officers (SHPO) of New York State and Pennsylvania have been coordinated with by letter dated 26 April 1985. Their 7 July 1985 and 13 June 1985 letter responses indicated that the Genesee River basin is archeologically sensitive and that once project plans are delineated and refined, a cultural resources survey of the study area should be conducted at the construction impact area.

b. Clean Air Act, as amended, 42 USC 7401 et seq.. As indicated in this environmental assessment, no significant adverse impacts to air quality would be expected due to project implementation. The Reconnaissance Report containing the environmental assessment will be coordinated with the U.S. Environmental Protection Agency and with the NYS Department of Environmental Conservation (NYSDEC).

c. Clean Water Act of 1977 (Federal Water Pollution Control Act Amendments of 1972) 33 USC 1251 et seq.. As indicated in this environmental assessment, some short-term increase in water turbidity due to silt sediment and detritus disturbance during construction and maintenance periods is anticipated. Measures would be taken to reduce turbidity during these periods. A Section 404(b)(1) Evaluation would be prepared and circulated with the public in order to comply with the Clean Water Act if this proposed project is authorized and funded for the next planning stage. The Section 404(b)(1) Evaluation along with an Environmental Impact Statement would then be coordinated with the NYSDEC and U.S. Environmental Protection Agency.

d. Coastal Zone Management Act, as amended, 16 USC 1451 et seq.. Not applicable since the project site is not located in an area administratively defined as coastal zone by New York State.

e. Endangered Species Act, as amended, 16 USC 1531 et seq.. In a recent Planning Aid Letter from the U.S. Fish and Wildlife Service dated 25 June 1986, it was stated that, excluding the bald eagle, American peregrine falcon and Indiana bat, except for occasional transient individuals, no other Federally listed or proposed endangered or threatened species under the Cortland, New York U.S. Fish and Wildlife Services' jurisdiction are known to exist in the Genesee River Basin's Study area. Therefore no Biological Assessment or further Section 7 consultation is required with the Fish and Wildlife Service. Should project plans change, or if additional information on listed or proposed species becomes available, this determination may be reconsidered. Additionally, a coordination letter was sent to the New York State Department of Environmental Conservation (Significant Habitat Unit) in Delmar, New York, dated 15 April 1985 relative to location of any significant habitats in the Genesee River Basin or State protected species that the Corps should be made aware of.

f. Estuary Protection Act, 16 USC et seq.. Not applicable for this study.

g. Federal Water Project Recreation Act, as amended, 16 USC 460-1(12) et seq.. A copy of the Reconnaissance Report and Environmental Assessment will be provided to the U.S. Department of the Interior, Fish and Wildlife Service for coordination in this regard when these documents become available for release.

h. Fish and Wildlife Coordination Act, 16 USC 661 et seq.. Coordination was established with representatives of the U.S. Fish and Wildlife Service and New York State Department of Environmental Conservation, and further coordination with these agencies will be maintained if the Genesee River Basin Study is authorized and funded to continue into the next stage of the planning process. Their views and recommendations will be given significant consideration towards development of a selected plan or plans. As needed, biological surveys would be conducted in the vicinity of any selected plan or plans, and a U.S. Fish and Wildlife Service Coordination Act Report would be requested from the Service if the study continues into the next planning stage in order to fully comply with the Fish and Wildlife Coordination Act.

i. Land and Water Conservation Fund Act (16 USC 4601 et seq.). The Reconnaissance Report and associated Environmental Assessment will be fully coordinated with the Department of Interior for review of conformance with their comprehensive outdoor recreation plan.

j. Marine Protection Research and Sanctuaries Act of 1972, a amended, 16 USC 1401 et seq.. Not applicable for this study.

k. National Environmental Policy Act, 42 USC 470a, et seq.. Alternative plans were developed and evaluated in accordance with environmental considerations as set forth by this Act.

l. River and Harbor Act (33 USC 401 et seq.). No requirements for Corps projects or programs authorized by Congress. (Requirements of the Act fulfilled by the Corps planning actions.)

m. Watershed Protection and Flood Prevention Act (16 USC 1001 et seq.). No requirements for Corps activities. (Requirements of the Act fulfilled by the Corps planning actions.)

n. Executive Order 11988, Flood Plain Management, 24 May 1977. The proposed project would substantially reduce existing potential flooding and associated damages. No additional development in the flood plain is anticipated to occur as a result of the proposed project.

o. Executive Order 11990, Protection of Wetlands, 24 May 1977. Any wetlands that may be adversely affected by the project would be coordinated with the U.S. Fish and Wildlife Service and NYSDEC during preparation of an EIS and during agency and public review of the EIS, in order to avoid or mitigate impacts on this resource.

AD-A190 139 GENESEE RIVER BASIN STUDY: RECONNAISSANCE REPORT VOLUME 3/3
2 SUPPORTING DOCUMENTATION(U) CORPS OF ENGINEERS
BUFFALO NY BUFFALO DISTRICT 1986

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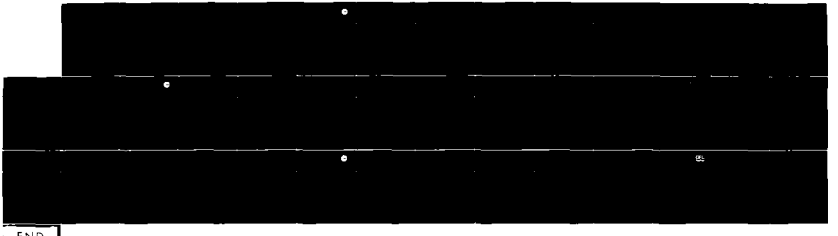

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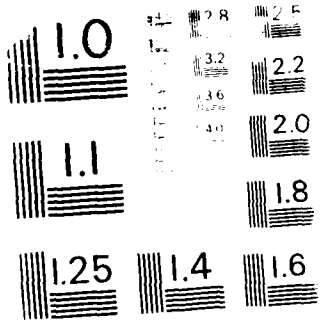
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p. Executive Order 12114, Environmental Effects Abroad of Major Federal Actions, 4 January 1979. Not applicable for this study.

q. Executive Memorandum Analysis of Impacts on Prime and Unique Farmlands in EIS, CEQ Memorandum, 30 August 1976. Soils maps for the Genesee River Basin were provided to the Corps by the U.S. Soil Conservation Service. Analysis of the maps indicated that the majority of land to be affected by Stannard Dam and Reservoir is designated to be less than 50 percent prime and unique farmlands. This Environmental Assessment will be coordinated with the Department of Agriculture Soil Conservation Service. No significant impact to prime and unique farmland is anticipated due to implementation of the proposed project.

r. Wild and Scenic Rivers Act, as amended, (16 USC 1271, et seq.). The Department of Interior's "Nationwide Rivers Inventory" lists two sections of the Genesee River potentially affected by the Stannard Dam and Reservoir/Mount Morris Dam Plans. Coordination and Consultation with DOI will be accomplished during the next phase of study.

Public Views and Comments. The New York State Department of Environmental Conservation (NYSDEC) is the designated local cooperator for this project. To date, coordination indicates that the local cooperator and the local communities are supportive of the proposed project.

The U.S. Fish and Wildlife Service in their Planning Aid Letter recommended:

- that a "HEP" (Habitat Evaluation Procedures) analysis be conducted on each of the proposed reservoir sites and on the proposed enlarged reservoir site a Mount Morris to more fully evaluate the project-related impacts on wildlife resources;

- conducting a comprehensive species (other than fish and invertebrates) inventory of each of the proposed project areas up to the maximum pool elevations;

- that deer movement patterns within and immediately adjacent to the proposed project areas be studied to more fully evaluate project-related impacts on deer.

Recommendations from the New York State Office of Parks, Recreation, and Historic Preservation - State Historic Preservation Officer based on review of the cultural resources survey study report (1986) will be incorporated in the next study phase if study authorization and funding is received.

Table D2 - Relationship of Plans to Environmental Protection Statutes and Other Environmental Requirements this Stage

	Plan
Federal Statutes	
Archeological and Historic Preservation Act, as amended, 16 USC 469, et seq.	Full
National Historic Preservation Act, as amended 16 USC 470a, et seq.	Full
Fish and Wildlife Coordination Act, as amended, USC 661, et seq.	Full
Endangered Species Act, as amended, 16 USC 1531, et seq.	Full
Clean Air Act, as amended, 42 USC 7401, et seq.	Full
Clean Water Act, as amended (Federal Water Pollution Control Act), 33 USC 1251, et seq.	Full
Federal Water Project Recreation Act, as amended, 16 USC 460-1(12), et seq.	Full
Land and Water Conservation Fund Act, as amended, 16 USC 4601-11, et seq.	Full
National Environmental Policy Act, as amended, 42 USC 4321, et seq.	Full
Rivers and Harbors Act, 33 USC 401, et seq.	Full
Wild and Scenic Rivers Act, as amended, 16 USC 1271, et seq.	Full
Coastal Zone Management Act, as amended, 16 USC 1451, et seq.	N/A
Estuary Protection Act, 16 USC 1221, et seq.	N/A
Marine Protection, Research and Sanctuaries Act, 22 USC 1401, et seq.	N/A
Watershed Protection and Flood Prevention Act, 16 USC 1001, et seq.	Full
Farmland Protection Policy Act, 7 USC 420, et seq.	Partial
Executive Orders, Memoranda, Etc.	
Protection and Enhancement of the Cultural environment (EO 11593)	Full
Flood Plain Management (EO 11988)	Full
Protection of Wetlands (EO 11990)	Full
Environmental Effects Abroad of Major Federal Actions (EO 12114)	N/A
Analysis of Impacts on Prime and Unique Farmlands (CEQ Memorandum, 30 Aug 76)	Full
New York State Freshwater Wetlands Act (Wetlands >12.4 acres)	Full
Environmental Conservation Law - Article 15 (Protection of Water)	Full
Local Land Use Plans (See Flood Plain Management EO 11988, also)	Full

The compliance categories used in this table were assigned based on the following definitions:

a. Full Compliance. All requirements of the statute, EO, or other policy and related regulations have been met for this stage of the study.

b. Partial Compliance. Some requirements of the statute, EO, or other policy and related regulations, which are normally met by this stage of planning, remain to be met.

c. Noncompliance. None of the requirements of the statute, EO, or other policy and related regulations have been met.

d. N/A. The statute, EO, or other policy and related regulations are not applicable for this study.

GENESEE RIVER BASIN STUDY
NEW YORK

RECONNAISSANCE REPORT

APPENDIX E

PUBLIC INVOLVEMENT

U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-

Henry G. Williams
Commissioner

August 11, 1986

Colonel Daniel R. Clark
District Commander
U.S. Corps of Engineers
Buffalo District
Department of the Army
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Clark:

This is in reply to your letter of July 3, 1986 concerning deauthorization of the Caledonia Project to which we had sent an interim reply dated July 9, 1986. This is to advise you that we have coordinated the matter with the Village of Caledonia and concur with your recommendation to deauthorize the project because of the lack of economic justification.

Sincerely,

James F. Kelley, Director
Flood Protection Bureau

FLK/dl

cc: E. Seiffer
A. Buddle
Honorable Robert Bostwick

EXHIBIT 1.0

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

d1/2222

NCBPO

3 JUL 1986

SUBJECT: Review for Deauthorization for the Caledonia Flood Control Project, Caledonia, New York

OFC. MGMT. OAS
3 JUL 86 14 07

Mr. James Kelley
Director
Flood Protection Bureau
New York State Department of
Environmental Conservation
50 Wolf Road
Albany, New York 12233-0001

Dear Mr. Kelley:

This is in response to a 25 June 1986 telephone request from Mr. Richard Konsella of your office and a 30 June 1986 letter from Mr. Eric A. Seiffer, Director, Region 8, DEC, for direct coordination on the subject project and file information on our 1976 review.

The Buffalo District is currently conducting this deauthorization review, pursuant to the Water Resources Development Act of 1974 (Public Law 93-251, as amended), approved 7 March 1974. This Act requires that Congress annually be provided a list of uncompleted Corps of Engineers projects which no longer are considered appropriate for continued authorization. Your present views regarding the appropriateness of deauthorization action on the project are requested.

The Spring Creek project, at Caledonia, NY, was authorized by the Flood Control Act of 1950 (House Document 232, 81st Congress, 1st Session), and provides for a diversion channel with a capacity of 400 cubic feet per second, to start at Spring Creek, just south of the New York Central Railroad, extending west, about 1,600 feet along the south side of the railroad, thence south about 900 feet to the end, at the Erie Railroad fill, passing through a new bridge at Main Street, and the filling of a low area west of Spring Road.

No work has been done on the Corps project, and it has been classified as deferred for restudy since 1954, due to the lack of local cooperation and opposition by the New York State Fish Hatchery at Caledonia, NY.

An initial deauthorization review was conducted in 1975 and completed in January 1976. The report on this initial review recommended that the project be deauthorized because of lack of economic justification. This recommendation was reconsidered at the request of local and congressional interests. Details of this review are attached as Enclosure 1. Reviews conducted in 1977 and 1983 reconfirmed the 1975 review findings and recommendations. The project, however, continue to be classified

EXHIBIT 2

NCBPO
SUBJECT: Review for Deauthorization of the Caledonia Flood Control Project, Caledonia, NY

continued to be classified as deferred for restudy. The estimated construction costs for the project, at October 1985 price levels are $240,000 Federal and $205,000 non-Federal, yielding estimated annual costs and benefits of $61,000 and $12,000, respectively. (Benefit-to-Cost-Ratio: 0.20 to 1). Improvement works performed in 1979, by local interest groups to reduce local flooding problems, consist of a ditch and a 4-foot diameter tile pipe running from the south side of Route 5 to the old New York Central Railroad and Mill Street. These improvements have further increased the lack of economic justification for the project. Since this benefit-to-cost ratio is substantially below the 1.0 benefit-to-cost ratio needed to economically justify Federal participation in the project, I will recommend that the project be deauthorized unless input you provide in writing, by 25 July 1986, causes me to decide otherwise.

The final decision on the deauthorization recommendation of the Office, Chief of Engineers rests with Congress. Any project submitted on the Chief of Engineers recommended list, may be removed by a resolution adopted by either of the Committees on Public Works, within a 90-day Congressional review period.

My point of contact pertaining to this matter is Ms. Mary Jo Braun of my Program Development Office who can be contacted at commercial number (716) 876-5454, extension 2222 or by writing to:

District Commander
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, New York 14207-3199
ATTN: Ms. Mary Jo Braun

Thank you for your views and assistance in this matter.

Buffalo District - Leadership in Engineering.

Sincerely,

Bruce W. Leigh, LTC

DANIEL R. CLARK
Colonel, Corps of Engineers
District Commander

1 Enclosure
As stated

CF:
Mr. Eric A. Seiffer
Regional Director
New York State Department
of Environmental Conservation
6274 East Avon-Lima Road
Avon, New York 14414

NCBPD-PF
NCBPD
NCBPA
NCBDE
NCBPO

EXHIBIT 2-1

NCBPO

20 JUN 1986

SUBJECT: Review for Deauthorization of the Caledonia Flood Control Project, Caledonia, NY

OFC. MGMT. OAS
20 Jun 86 16 10

Mr. James Booth
District Conservationist
U.S. Soil Conservation Service,
Livingston County Office
Leicester, NY 14481

Dear Mr. Booth:

The Buffalo District is currently conducting a review of the subject project, for deauthorization, pursuant to the Water Resources Development Act of 1974 (Public Law 93-251, as amended), approved 7 March 1974. This act requires that Congress annually be provided a list of uncompleted Corps of Engineers projects which are no longer considered appropriate for continued authorization. Your present views regarding the appropriateness of deauthorization action on the project were requested by letter dated 24 April, 1986. I have not received a written response from you. I will recommend to the Chief of Engineers, that the project be deauthorized, unless input you provide, in writing, by 15 July 1986, causes me to decide otherwise.

The final decision on the deauthorization recommendation of the Chief of Engineers rests with Congress. Any project submitted on the Chief of Engineers recommended list may be removed by a resolution adopted by either of the Committees on Public Works, within a 90-day Congressional review period.

My point of contact pertaining to this matter is Ms. Mary Jo Braun of my Program Development Office, who can be contacted by calling commercial number (716) 876-5454, extension 2222, or by writing to:

District Commander
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207
ATTN: Ms. Mary Jo Braun

EXHIBIT 3

NCBPO

SUBJECT: Review for Reauthorization of the Caledonia Flood Control Project, Caledonia, NY

the Buffalo District -- Leadership in Engineering.

Sincerely,

SIGNED

DAVID S. CLARK
Colonel, Corps of Engineers
District Commander

Copy Furnished:
NCBPO
NCBDE
NCBPA
NCBPB-PF

EXHIBIT 3-1

NCBPO

20 JUN 1986

SUBJECT: Review for Deauthorization of the Caledonia Flood Control Project, Caledonia, NY

OFC. MGMT. OAS
20 JUN 86 16 09

Mr. Carroll Bickford
Town Supervisor
Town of Caledonia
370 Leicester Street
Caledonia, NY 14423

Dear Mr. Bickford:

The Buffalo District is currently conducting a review of the subject project, for deauthorization, pursuant to the Water Resources Development Act of 1974 (Public Law 93-251, as amended), approved 7 March 1974. This act requires that Congress annually be provided a list of uncompleted Corps of Engineers projects which are no longer considered appropriate for continued authorization. Your present views regarding the appropriateness of deauthorization action on the project were requested by letter dated 24 April, 1986. I have not received a written response from you. I will recommend to the Chief of Engineers, that the project be deauthorized, unless input you provide, in writing, by 15 July 1986, causes me to decide otherwise.

The final decision on the deauthorization recommendation of the Chief of Engineers rests with Congress. Any project submitted on the Chief of Engineers recommended list may be removed by a resolution adopted by either of the Committees on Public works, within a 90-day Congressional review period.

My point of contact pertaining to this matter is Ms. Mary Jo Braun of my Program Development Office, who can be contacted by calling commercial number (716) 876-5454, extension 2222, or by writing to:

District Commander
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207
ATTN: Ms. Mary Jo Braun

EXHIBIT 4

NCBPO

SUBJECT: Review for Deauthorization of the Caledonia Flood Control Project, Caledonia, NY

The Buffalo District -- Leadership in Engineering.

Sincerely,

SIGNED

DANIEL R. CLARK
Colonel, Corps of Engineers
District Commander

Copy Furnished:
NCBPO
NCBDE
NCBPA
NCBPD-PF

EXHIBIT 4-1

New York Power Authority

June 13, 1986

District Commander
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, New York 14207

Attention: Mr. Wiener Cadet

Subject: Genesee River Basin, New York

Dear Mr. Cadet:

Thank you for your recent letter concerning your office's reconnaissance study of water resources opportunities in the Genessee River Basin, including the potential for development of hydropower as an increment of a multi-purpose project.

The Authority has not conducted extensive investigations into the hydro potential of the Genessee basin. Some studies were conducted by the New York State Energy Research and Development Authority in the late 1970's. I have enclosed a copy of one of them - Caneadea/Rushford Lake - for your information and use.

As we discussed on the telephone yesterday, the Authority might be interested in developing a hydro site in the Genesse basin as an increment to a Corps multi-purpose project - depending of course on the site, its economics and the regulatory/institutional issues involved. We would therefore appreciate receiving a copy of your study when it is completed and will read it with interest.

I will be the Authority's point of contact on this matter in the future. Correspondence should be sent to the above address; my direct telephone number is 212-397-5149.

Thank you for considering the Authority. If I may provide any additional information, please contact me.

Sincerely,

Douglas M. Kerr

Douglas M. Kerr
Director
Licensing Division

EXHIBIT 5

ALLEGANY COUNTY
BOARD OF LEGISLATORS
COUNTY OFFICE BUILDING
BELMONT, NEW YORK
14813

John W. Hasper, *Chairman*
Linda J. Canfield, *Clerk*
Telephone 716 268-9222

John E. Margeson, *Administrative Assistant*
Telephone 716 268-9217

May 27, 1986

John Zorich, Chief Planner
U.S. Army Corps of Engineers
Buffalo District
1776 Niagara St.
Buffalo, New York 14207

Dear Mr. Zorich:

On behalf of the entire Allegany County Planning Board, I wish to thank both you and Mr. Cadet for your presentation explaining the current study of the potential Genesee River dam project at Stannards.

The study has provoked a great deal of interest in our County and your program answered many questions.

Again, thank you for your time, effort and expertise. Wishing you success with your study.

Best regards,

Delores Cross, Chairman
Planning Board

DC:lle

EXHIBIT 6

NCSED-PF

MAY 02 1986

SUBJECT: Genesee River Basin Study, New York

Honorable Stanley N. Lundine
House of Representatives
Washington, DC 20515

Dear Mr. Lundine:

Thank you for your letter of 23 April 1986 requesting information on the Genesee River Study, specifically as it relates to Allegany County.

As background information, the Corps essentially completed a Genesee River Basin comprehensive study of water and related land resource needs in the late 1960's. The final report, completed in 1970, recommended an early-action plan which included a multi-purpose reservoir at the Stannard site located on the Genesee River south of Wellsville. However, because of the devastation by Tropical Storm "Agnes" in 1972, a modified Stannard reservoir project was considered with reservoir storage previously intended for water supply and water quality to be reallocated to flood control. In general, there was lack of local support for the modified Stannard project as developed. The economic justification was marginal and large scale recreational development was a necessary portion of the project in order to obtain limited flood control benefits.

In Fiscal Year 1985, I received funds to resume studies to determine whether any modifications of previous basin-wide plans should be made with respect to a broad range of water resource problems including flood prevention, hydro-electric power, water supply, and erosion control. I will complete a Reconnaissance Report on this aspect in the fall of 1986. This report will address, along with other alternatives, the feasibility of a multi-purpose reservoir at the Stannard site. At this time, no conclusion has been reached as to the feasibility of the Stannard site.

The Corps Public Involvement Program requires that I fully coordinate with all interested parties including private citizens, and local, State, and other Federal agencies. This coordination includes holding workshops and public meetings throughout the course of the study, as appropriate. To date, we have met with a number of individuals and agency representatives to discuss the study and obtain information. With regards to the Stannard

EXHIBIT 7

NCBPD-PF

SUBJECT: Genesee River Basin Study, New York

site, my staff will discuss its status on 21 May in the Allegany Legislative Chambers, County Office Building, Belmont, New York, at the request of the Allegany County Planning Board. I also plan to hold one or more meetings in the Genesee Watershed shortly after completing the Reconnaissance Study in August. I will inform you and other known interests of these meetings when the dates are known.

If I may be of further assistance in this matter, please contact me at (716)876-5464.

"The Buffalo District - Leadership in Engineering"

Sincerely,

SIGNED

DANIEL R. CLARK
Colonel, Corps of Engineers
District Commander

Copy Furnished:
Honorable Stanley N. Lundine
Representative in Congress
Federal Building, Room 122
Third Street, P.O. Box 908
Jamestown, NY 14701

CDR, USACE (DAEN-CWP-A)
NCDPD
NCDDE
NCDPA
NCDPD (reading file)
NCBPD-PP

EXHIBIT 7-1

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-0001

Henry G. Williams
Commissioner

April 24, 1986

Colonel Daniel R. Clark
District Commander
U.S. Corps of Engineers
Department of the Army
Buffalo District
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Clark:

Please be advised of our continued interest in the Genesee River Basin Study and desire that expeditious action be taken to complete pre-authorization planning on this project as soon as possible.

Sincerely,

Richard F. Tonsella

for James F. Kelley
Director, Flood
Protection Bureau

RLK/dl

cc: Eric Seiffer
John Spagnoli
Ed Karath

EXHIBIT 8

STAN LUNDINE
34TH DISTRICT, NEW YORK

COMMITTEE ON
BANKING, FINANCE AND
URBAN AFFAIRS

COMMITTEE ON
SCIENCE AND TECHNOLOGY

SELECT COMMITTEE ON
AGING

2427 RAYBURN BUILDING
WASHINGTON, D.C. 20515
PHONE: 202-225-3161

Congress of the United States
House of Representatives
Washington, D.C. 20515

DISTRICT OFFICES:
ROOM 122, FEDERAL BUILDING
P.O. BOX 908
JAMESTOWN, NEW YORK 14702
PHONE: 716-484-0252

180 CLEMENS CENTER PARKWAY
ELMIRA, NEW YORK 14901
PHONE: 607-734-0302

ROOM 505, 101 N. UNION STREET
OLEAN, NEW YORK 14760
PHONE: 716-372-1818

April 23, 1986

Colonel Daniel R. Clark
District Commander
U.S. Army Corps of Engineers
1776 Niagara St.
Buffalo, N.Y. 14207

Dear Colonel Clark,

I am writing to you for information concerning a study which the Corps is presently conducting in the Genesee River Basin; specifically, in Allegany County.

Several constituents have contacted me to express their views on the anticipated proposal to develop a dam and resevoir in Stannards, N.Y. Naturally, I would like to provide them with accurate, up to date information on the status of this study, as well as its purposes and time schedule.

Since it appears that my consituents have differing views on this issue, I would also like assurance that a public information plan will be implemented throughout the course of this study, and that citizens will be afforded the opportunity to give input.

Thank you for your continued assistance and cooperation with my offices.

Sincerely yours,

Stan Lundine

Stan Lundine
Member of Congress

SL/pm

25 Apr 86 09 132

EXHIBIT 9

NCBPD-PF

APR 18 1986

SUBJECT: Genesee River Basin, New York

Mr. John F. Downing
Coordinator of Hydro Policy
Intergovernmental Relations and
Policy Affairs
New York Power Authority
P. O. Box 277
Niagara Falls, NY 14302

Dear Mr. Downing:

The Buffalo District, Corps of Engineers, is currently investigating the short and long-term needs for water resource development in the Genesee River Basin. Funds have been appropriated by Congress to initiate a Reconnaissance Report for resumption of studies to consider flood control, water supply (irrigation), and recreational enhancement measures. Your present views, expressed interests, and willingness to sponsor a recommended hydropower project in the basin are requested.

In the late 1960's, the Corps completed a Type II Comprehensive Basin Study of water-related and land resources needs in the Genesee River Basin. Fourteen potential hydropower sites were examined and in our present reconnaissance study, the Corps is considering the preliminary feasibility of three of those sites: Stannard and Portage, both on the Genesee River; and Poag's Hole on Canaseraga Creek. In addition, the Corps is considering the feasibility of modifying the existing flood control project at Mount Morris for other purposes. The enclosed Plate L1 (Enclosure 1) shows the 14 sites initially examined in the Type II Comprehensive Basin Study. All of the site capabilities were based on the evaluation of each reservoir acting individually with all available storage allocated to the single purpose of power generation or, as an alternative, for flow regulation for possible downstream use.

The current study will consider hydropower as an increment of a multi-purpose project; and the cost to construct, operate, and maintain the hydropower increment would be 100 percent non-Federal cost.

I would like to know if the New York Power Authority (NYPA) ever considered development of hydropower in the Genesee River Basin or has an interest in

EXHIBIT 10.

NCBPD-PF
SUBJECT: Genesee River Basin, New York

developing a hydropower facility in the Genesee River Basin as an increment to a Corps multipurpose project. I would also appreciate copies of reports or other data you may have regarding hydropower investigations in the Genesee River Basin.

Preliminary data developed for the Corps current study indicates the potential of installed hydropower capacity at Stannard of 2,700 KW, 66,000 KW at Portage, 1,100 KW at Poag's Hole, and a range of 5,000 KW to 100,000 KW at Mount Morris in series with one or more of the other three sites.

If an economically feasible hydropower project is identified, and is considered impractical for non-Federal development for reasons such as legal, operational, or institutional, a Letter of Intent would be required to indicate your willingness to cost-share in the Federal hydropower increment of the recommended project with cost recovery from revenues from the sale of power.

My point of contact pertaining to this matter is Mr. Wiener Cadet of my Planning Division, who can be contacted by calling commercial number (716)876-5454, extension 2247 or by writing to:

District Commander
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207
ATTN: Mr. Wiener Cadet

"The Buffalo District - Leadership in Engineering"

Sincerely,

DANIEL P. CLARK
Colonel, Corps of Engineers
District Commander

1 Enclosure
as stated

Copy Furnished:
NCBPD (reading file)
√NCBPD-PF

EXHIBIT 10.0

NCBPD-PF

APR 18 1986

SUBJECT: Genesee River Basin, New York

Mr. Roger Kobur
Vice President
Rochester Gas & Electric Corp.
89 East Avenue
Rochester, NY 14604

Dear Mr. Kobur:

The Buffalo District, Corps of Engineers, is currently investigating the short and long-term needs for water resource development in the Genesee River Basin. Funds have been appropriated by Congress to initiate a Reconnaissance Report for resumption of studies to consider flood control, water supply (irrigation), and recreational enhancement measures. Your present views, expressed interests, and willingness to sponsor a recommended hydropower project in the basin are requested.

In the late 1960's, the Corps completed a Type II Comprehensive Basin Study of water-related and land resources needs in the Genesee River Basin. Fourteen potential hydropower sites were examined and in our present reconnaissance study, the Corps is considering the preliminary feasibility of three of those sites: Stannard and Portage, both on the Genesee River and Poag's Hole on Canaseraga Creek. In addition, the Corps is considering the feasibility of modifying the existing flood control project at Mount Morris for other purposes. The enclosed Plate L1 (Enclosure 1) shows the 14 sites initially examined in the Type II Comprehensive Basin Study. All of the site capabilities were based on the evaluation of each reservoir acting individually with all available storage allocated to the single purpose of power generation or, as an alternative, for flow regulation for possible downstream use.

The current study will consider hydropower as an increment of a multi-purpose project; and the cost to construct, operate, and maintain the hydropower increment would be 100 percent non-Federal cost.

I would like to know if the Rochester Gas & Electric Corporation (RG&EC) ever considered development of hydropower in the Genesee River Basin or has an

EXHIBIT 11.0

NCBPD-PF
SUBJECT: Genesee River Basin, New York

developing a hydropower facility in the Genesee River Basin as an increment to a Corps multipurpose project. I would also appreciate copies of reports or other data you may have regarding hydropower investigations in the Genesee River Basin.

Preliminary data developed for the Corps current study indicates the potential of installed hydropower capacity at Stannard of 2,700 KW, 66,000 KW at Portage, 1,100 KW at Poag's Hole, and a range of 5,000 KW to 100,000 KW at Mount Morris in series with one or more of the other three sites.

If an economically feasible hydropower project is identified, and is considered impractical for non-Federal development for reasons such as legal, operational, or institutional, a Letter of Intent would be required to indicate your willingness to cost-share in the Federal hydropower increment of the recommended project with cost recovery from revenues from the sale of power.

My point of contact pertaining to this matter is Mr. Wiener Cadet of my Planning Division, who can be contacted by calling commercial number (716)876-5454, extension 2247 or by writing to:

District Commander
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207
ATTN: Mr. Wiener Cader

"The Buffalo District - Leadership in Engineering"

Sincerely,

DANIEL R. CLARK
Colonel, Corps of Engineers
District Commander

1 Enclosure
as stated

Copy Furnished:
NCBPD (reading file)
✓ NCBPD-PF

EXHIBIT II.D-1

21 FEB 1986

NCBED-HI

SUBJECT: Hydroelectric Design Center Services

Commander, North Pacific Division
ATTN: NPDEN-HDC

1. This is in response to NPDEN-HDC letter dated 21 January 1986, SAB.

2. Buffalo District is presently scheduled to complete a draft feasibility report in November 1987 that will, among other things, address the feasibility of adding hydropower at our Mt. Morris dam and the feasibility of constructing other reservoirs in the Genesee River Basin, NY, for multiple purpose water use including hydropower.

3. I would like to have the Hydroelectric Design Center develop feasibility study level designs and cost estimates for the hydropower portion of each project. At present, I estimate that a total of approximately $50,000 will be available for this effort. The present schedule provides that the design effort would have to be initiated after August 1986 and be completed by July 1987.

4. Our currently ongoing reconnaissance level studies of the Genesee River Basin will be completed by August 1986 utilizing the hydropower equipment cost estimating routines of computer program HYDUR and the NPD cost estimating manual dated 1979. I will contact you soon with a more detailed scope of services needed from HDC for the feasibility study.

5. My point of contact pertaining to this matter is Mr. Bradford S. Price, P.E., of my Hydrology Section, who can be contacted at commercial number (716) 876-5454, extension 2147 or FTS 473-2147.

6. The Buffalo District — Leadership in Engineering.

DANIEL R. CLARK
Colonel, Corps of Engineers
District Commander

Copy Furnished:
NCDED-W
NCDED-T
✓NCBPO-PF

EXHIBIT 12

GREAT WESTERN POWER & LIGHT, INC.
P.O. Box N
Manti, Utah 84642
Telephone: (801) 835-0202

January 7, 1986

Environmental Resource Planner
U.S. Army Corps of Engineer
Post Office Building, Room 341
350 South Main Street
Salt Lake City, Utah 84101

To whom it may concern:

In accordance with the Federal Energy Regulatory Commission (FERC) proceedures we request your comments for the filing of an application for licensing of a major hydroelectric water project, Great Western Power & light Inc. acting as the agent for Livingston County Associates request your input concerning the following proposal:

Description of Existing and Proposed Facility

Mount Morris Dam is located on the Genesee River approximately 67 river miles above the mouth of the Genesee River in Livingston County, New York. The project was authorized by the Flood Control Act of 1944, and construction was initiated in March 1948 and was substantially completed in December of 1951. The Chief of Engineers in April 1944 commented that "...the proposed Mount Morris Reservoir should be the initial step in any comprehensive plan for the development of the water resources of the Genesee River Basin. Provision should be made or increasing the storage capacity of the reservoir if found desirable when construction is undertaken. The increased capacity would afford greater security against flooding and the enlarged reservoir could be better utilized in the further development of the river's resources..."

Thus, the dam when constructed had flood control as its prime objective, but maintained flexibility for other uses including hydropower, by the inclusion of two intake openings in the left abutment suitable for installation of two 18 feet diameter penstocks.

Mt. Morris is a concrete gravity overflow dam, with an overall length of 1,028 feet, a top width of 20 feet and a bottom width of 212.8 feet.

The top of the non-overflow section is at elevation 790, while the overflow section is at elevation 760. The maximum height of the structure above stream bed is 215 feet. A control tower is located in the right abutment.

(continued on next page)

EXHIBIT 13

The spillway is an uncontrolled ogee section, 550 feet long, located in the center of the dam. With a head of 28 feet the spillway design discharge is 320,000 cfs.

The outlet consists of nine 5' x 7' rectangular conduits located in the base of the spillway section. Each conduit is controlled by a hydraulic vertical slide gate, with a second gate for emergency operation. The inlet invert elevation of each conduit is at 585.0 ft., while the outlet invert is at 560.7 ft.

As noted above, the construction of the dam also included provision of future hydropower development at the site by inclusion of two intakes in the left abutment, suitable for installation of two 18 ft. diameter penstocks. Each penstock opening with centerline elevation at 644.5 ft. is plugged with concrete pending future power installation.

No powerhouse or other power generating facilities are at the dam. It should be noted, however, that approximately 500 feet downstream of the dam toe, [left abutment] a relatively flat area has been created essentially from spoil material from the dam construction. This area may be suitable for location of a powerhouse and support facilities.

A 240 foot long, 464 foot wide stilling basin is located at the toe of the overflow section and serves both the spillway discharge and outlet conduits. The basin is set at elevation 560.0 feet and the training walls are at elevation 610.0 feet.

The proposed concept for power generation uses two of the low level outlets near the left abutment, combined in a single conduit, aligned to run at the base of the stepped training wall to the powerhouse located on relatively flat topography, just downstream of the stilling basin and sill. This configuration will have minimal impact upon the stilling basin and will result with the powerhouse above tailwater levels.

Livingston County Associates plans to utilize the existing 18 foot pipe provisions already located on the dam for hydroelectric facilities. We plan to have a total installed capacity of 5000 kW. We plan to operate this facility as a run-of-the-river hydro unit and do not plan to alter or change any of the flows released from the Mt. Morris Dam. We will be working closely with the Army Corps of Engineers, Buffalo District.

(continued on next page)

EXHIBIT 13-1

A copy of the preliminary permit No.8140 approved by FERC on this project is available upon written request.

We would appreciate receiving, at your earliest convenience, the results of your research and any comments,studies or recommendations you may have.

Thank you for you help in this matter.

Jordan R. Walker

Jordan R. Walker

(continued on next page)

EXHIBIT 13 2

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION
BUREAU FOR HISTORIC PRESERVATION
BOX 1026
HARRISBURG, PENNSYLVANIA 17108-1026

June 13, 1985

Robert R. Hardiman
Colonel, Corps of Engineers
District Commander
Department of the Army
Buffalo District
1776 Niagara Street
Buffalo, New York, 14207

Re: ER #85-0409-042-A
Subject: Genesee River Basin (Authorization Report), NY & PA, Study

Dear Mr. Hardiman:

The above named project has been reviewed by the Bureau for Historic Preservation in accordance with Section 106 of the National Historic Preservation Act of 1966, Executive Order 11593 and the regulations of the Advisory Council on Historic Preservation (36 CFR 800).

Because this planning study indicates that a large area is under consideration and a much smaller area will ultimately be affected, it is impractical to consider project impact on historic and archaeological resources at this time. When planning specific alternative project locations, provisions should be made for the identification of historic properties listed in or eligible for the National Register of Historic Places and for the assessment of the effects of the project will have on these resources. If you need any advice or assistance in conducting these kinds of investigations, please contact the Division of Planning and Protection, Bureau for Historic Preservation.

A preliminary review of this project indicates that there is a high probability that historic/and or archaeological resources exist in the project areas. We would advise that project planners conduct investigations or surveys to identify any possible resources before final plans are formulated. For assistance in conducting and organizing a survey, please contact the Division of Planning and Protection.

If you need further information in this matter, please consult Kurt Carr or Dr. Paul Raber of the Bureau for Historic Preservation at (717) 783-8947.

Sincerely,

Dan G. Deibler, Acting Chief
Division of Planning & Protection
Bureau for Historic Preservation
(717) 783-8946

EXHIBIT 14.9

LEAGUE of WOMEN VOTERS

May 26, 1985

Robert R. Hardiman
Colonel, Corps of Engineers
District Commander
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207

Attn: Mr. Timothy L. Byrnes, P.E.

Dear Mr. Byrnes:

In reference to Colonel Hardiman's letter of January 14, 1985 concerning a restudy on the Genesee River Basin, NY and PA, the League of Women Voters/Rochester Metro would like to be kept informed as to the scope of this study. We would appreciate receiving any information that is available during the course of the study.

Thank you.

Sincerely,

Elizabeth Hancock

Elizabeth Hancock
Natural Resources Committee

LWV - ROCHESTER METRO / 132 Spring Street / Rochester, New York 14608 / (716) 232-3380

EXHIBIT 15.0

MW/2216
5-14-85 (1)
R 5-15-85

20 MAY 1985

OFC. MGMT. OAS
20 MAY 85 19 09

NCBPD-PF

SUBJECT: Genesee River Basin Study, NY & PA

Honorable L. William Paxon
NYS Assembly
Room 543
Legislative Office Building
Albany, NY 12248

Dear Mr. Paxon:

This is in further response to my 14 February 1985 letter regarding the subject study and flooding problems at Portageville, NY. Members of my staff visited Portageville on 10 April 1985 and discussed the potential for flooding in Portageville with Ms. Elizabeth Neiberhauser, Supervisor, town of Genesee Falls; Mr. Brusche, Councilman; and Mr. Robert Hartrick, SCS District Conservationist. An additional visit to Portageville was made by a member of my staff on 28 April 1985 to evaluate the flood potential.

Discussions with Ms. Neiberhauser and Mr. Brusche indicated that the Genesee Falls Inn, one of the few low-lying developments in Portageville, was only flooded once. That was during Tropical Storms Agnes which was a greater than 500-year event at Portageville. The only other threat to the Inn was referred to as adjacent road flooding in the early 1900's. According to local officials, there was no other flooding of developed areas identified over the past 150 years, including none during the 18 June 1984 event, which was only slightly greater than a 10-year event. Information indicates, that except for rare events, such as Tropical Storm Agnes, there is no flood threat to development in Portageville, although flooding frequently occurs on the farm in the floodplain just upstream and east of the village.

The field visit on 29 April 1985 was made to obtain specifics about a potential flood problem in Portageville identified by a local property owner, Vincent Benedetto. Mr. Benedetto was concerned about the loss of a dike located just upstream of Portageville. The dike was constructed following Tropical Storm Agnes as a post-disaster relief effort under PL 93-288, which is administrated by the Federal Emergency Management Agency (FEMA). The dike was to prevent a high water channel from cutting across the adjacent farm during Tropical Storm Agnes and it has served its purpose. No provision was made for maintenance or upkeep because its function was post-flood relief only.

EXHIBIT 16.0

NCBPD-PF
SUBJECT: Genesee River Basin Study, NY & PA

The dike is in very poor condition with a loss of more than half of its former cross-section on the lower end due to erosive forces on the river. The dike does not prevent flooding as it is not tied into high ground at its lower end, therefore, there is nothing to prevent water from backing around the dike. Additionally, all development is located at elevations above the dike. The only function of the dike is to direct stream flows away from the adjacent farmland at low flows and intermediate floods. This is certainly of benefit to the farmowner, however, that is just a secondary benefit of a post-disaster relief effort which served its purpose.

In summary, the flood potential for developed properties in Portageville is very small with little likelihood of damage, except during rare events. This does not allow for economic justification of the usual measures for flood protection. Further, the eroding of a post-disaster dike which has served its purpose will not aggravate the community's flood potential. Maintenance of the dike may prevent erosion of a single landowner's farmland, but provide little other benefit. On this basis, I do not plan to consider the flooding problem in the Portageville area. I trust this responds to your inquiries on the potential for Corps involvement in flood damage reduction in the Portageville area.

Correspondence pertaining to this matter should be addressed to the District Commander, U.S. Army Engineer District, Buffalo, 1776 Niagara Street, Buffalo, NY 14207, ATTN: Mr. Timothy E. Byrnes, P.E. If you have any questions or require additional information, please contact Mr. Byrnes of my Planning Division at (716) 876-5454, extention 2276.

The Buffalo District -- Leadership in Engineering.

Sincerely

SIGNED

ROBERT R. HARDIMAN
Colonel, Corps of Engineers
District Commander

Copy Furnished
NCBPD (Reading File)
NCBPD-PF
NCBED-HD
NCBEM

Concr: HD FLB 5/16
NCBED
NEBEM

EXHIBIT 16

07 MAY 1985

[illegible]

[illegible]: Genesee River Basin Study, NY & PA

Honorable Jack F. Kemp
Representative in Congress
434 S. Main Street
Geneva, NY 14456

Dear Mr. Kemp:

This is in further response to my 18 March 1985 letter regarding Vincent Benedetto's concern about flooding problems at Portageville. Also, as requested by your Ms. Trish Libassi, I have enclosed information on my staff members' 10-12 April visit to the subject study area to identify problems and needs (Enclosure 1).

I was unable to obtain further information from Mr. Benedetto regarding the specifics of the flooding problems mentioned in his 2nd February 1985 letter to you. Therefore, I prepared a response based on the information available or that could be observed in the field (Enclosure 2).

The majority of the Portageville community is on high ground. The remaining portion of the community would only experience minor damage from flood events other than for extreme cases such as Tropical Storm Agnes. The dike Mr. Benedetto referred to has served its purpose and a reconstruction of that dike would not reduce flooding in the area which appears to be limited to farmland east of the village. Because only a single landowner's farm experiences recurrent flooding, I have no justification for further Federal involvement.

EXHIBIT 17

NCBPD-PF

SUBJECT: Genesee River Basin Study, NY & PA

If I may be of further assistance on this matter, please contact me at (716) 876-5454.

The Buffalo District -- Leadership in Engineering.

Sincerely,

Kenneth R. Bailey

ROBERT P. HARDIMAN
Colonel, Corps of Engineers
District Commander

2 Enclosures
as stated

Copy Furnished:

Honorable Jack F. Kemp
House of Representatives
Washington, DC 20515

CDR, USACE (CECW-OMA-S) Concr: NCBED
NCBED
NCRDS
NCBPA
NCBPD
NCBED-HD
NCBED-PF

EXHIBIT 17-1

United States Department of Agriculture
Soil Conservation Service
Ag Service Ctr.
R.D. #1
Belmont, NY 14813

March 29, 1985

District Commander
US Army Engineer District
1776 Niagara Street
Buffalo, NY 14207

Att: Mr. Timothy Byrnes

Dear Mr. Byrnes;

Enclosed is a draft of the Dyke Creek Watershed Plan that you requested. As per our phone conversation, the Plan is presently being revised as a result of the public review process. The final draft should be completed for review by early July.

Mr. Frederick Sinclair, District Manager for the Allegany County Soil & Water Conservation District, will be awaiting your call in regards to the field trip you have planned for April 11th. Unfortunately, due to previous committments, I will not be able to attend.

The Allegany County Soil & Water Conservation District Board of Directors feel that a local meeting might be of value in identifying specific sites. You might want to discuss this with Mr. Sinclair on the 11th.

If I can be of any further service, please contact me.

Respectfully,

Robert D. Pederson
District Conservationist

RDP/gm

ENC

EXHIBIT 16

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-0001

OFC. MGMT. OAS
4 APR 85 11 05

Henry G. Williams
Commissioner

March 29, 1985

Colonel Robert R. Hardiman
District Commander
Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, NY 14207

Dear Colonel Hardiman:

Please be advised of our continued interest in the Genesee River Basin Study and desire that expeditious action be taken to complete pre-authorization planning on this project as soon as possible.

Sincerely,

Richard L. Gonzalez
for James F. Kelley
Director
Flood Protection Bureau

RLK:pt

cc: Eric Seiffer
John Spagnoli
Ed Karath

EXHIBIT 19

NCBED-PP

SUBJECT: Genesee River Basin Study, New York 15 [illegible] 1985

Honorable Jack Kemp
Representative in Congress
[illegible] S. Main Street
Geneva, NY 14456

Dear Mr. Kemp:

This is in response to your 8 March 1985 letter enclosing a letter from your constituent, Vincent Benedetto, regarding the subject study and flooding problems at Portageville. I recently received the same letter from Mr. Benedetto, and I have enclosed a copy of my response to him. As discussed in my letter to Mr. Benedetto, my staff will be making a field trip in the Genesee River basin within the next 3 weeks and will evaluate potential flooding problems in the Portageville area. I will inform you of the results of my staff's evaluation.

If I may be of further assistance on this matter, please contact me.

Sincerely,

[signature]

[illegible] A. CAMPBELL
Colonel, Corps of Engineers
District Commander

1 Enclosure
as stated

Copy Furnished:

Honorable Jack Kemp
House of Representatives
Washington, DC 20515
CDE, USACE (DAEN-CWA-L)
NCBED
NCBDE
NCBPA
NCBPD (Reading File)
NCBPD-PP

Concur: [illegible]

EXHIBIT 20

JACK KEMP
31ST DISTRICT OF NEW YORK

COMMITTEES

APPROPRIATIONS
SUBCOMMITTEE
FOREIGN OPERATIONS
RANKING MEMBER

BUDGET

Congress of the United States
House of Representatives
Washington, D.C. 20515

PLEASE RESPOND
☐ WASHINGTON OFFICE:
2252 RAYBURN OFFICE BUILDING
WASHINGTON, D.C. 20515
(202) 225-5265

DISTRICT OFFICES:
☐ 1101 FEDERAL BUILDING
111 WEST HURON STREET
BUFFALO, NEW YORK 14202
(716) 846-4123

☒ 484 S. MAIN STREET
GENEVA, NEW YORK 14456
(315) 789-3360

March 8, 1985

Colonel Robert R. Hardiman
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Colonel Hardiman,

I recently received the attached letter from Vincent Pomeletto of Portageville, New York.

I would appreciate very much your comments on this matter and any information you can give me so that I can adequately respond to my constituent.

Please respond to my Geneva office which is handling this case.

Thank you for your help in this matter.

Sincerely,

Jack Kemp
Member of Congress

JK:ab

Enclosure

EXHIBIT 21

Box 247, Hamilton Street
Portageville, New York 14536
February 28, 1985

Congressman Jack Kemp
Federal Office Building
111 West Huron Street
Buffalo, New York 14202

Dear Sir:

Concerning the restudy of the Genesee River basin now being undertaken:

Part of this village has been inundated once in the past fifteen years.

Last Spring we were here on a twenty-four hour alert--the river having risen to twenty-two feet, flooding adjacent fieldsand threatening some of our homes.

Route 436 bridges the river mid-town. Truck and car traffic are steady. We are located one-quarter mile from the south entrance of Letchworth State Park. This is itself a 'public interest', too.

The incompleted protective dyke here constructed by the Army Engineers after the last flood (1972) has more than half (150 yds.) been eroded away by the river.

The Corp of Engineers should include within this study the area through Portageville along the Genesee River.

Please give your attentionto this matter. Thank you.

Truly yours,

Vincent Benedetto

EXHIBIT 22

Box 247, Hamilton Street
Portageville, New York 14536
February 28, 1985

Colonel Robert R. Hardiman
U.S. Army Corp. of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Sir:

Concerning the restudy of the Genesee River basin now being undertaken:

Part of this village has been inundated once in the past fifteen years.

Last Spring we were here on a twenty-four hour alert--the river having risen to twenty-two feet, flooding adjacent fields and threatening some of our homes.

Route 436 bridges the river mid-town. Truck and car traffic are steady. We are located one-quarter mile from the south entrance of Letchworth State Part. These are surely in the 'public interest'.

The incompleted protective dyke here constructed by the Army Engineers after the last flood (1972) has more than half (150 yds.) been eroded away by the river.

The Corp of Engineers should include within this study the area through Portageville along the Genesee River.

Do we have your attention? Thank you.

Truly yours,

Vincent Benedetto

EXHIBIT 23

THE ASSEMBLY
STATE OF NEW YORK
ALBANY

L. WILLIAM PAXON
Assemblyman, 143rd District
Erie and Wyoming Counties

ALBANY OFFICE
Room 543
Legislative Office Building
Albany, N.Y. 12248
(518) 455-5741

DISTRICT OFFICE
P.O. Box 98
586 Main Street
East Aurora, N.Y. 14052
(716) 652-8840

February 4, 1985

Colonel Robert R. Hardiman
U.S. Army Corp. of Engineers - Buffalo District
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Hardiman:

I would like to thank you for forwarding to me a copy of your letter in regard to the restudy of the Genesee River Basin through New York and Pennsylvania.

As representative for the Town of Genesee Falls and the hamlet of Portageville in Wyoming County, I am formally requesting that this restudy include the section of the Genesee River throughout this community and, particularly, within the Portageville area.

In recent months, I have met with the residents living along this section of the Genesee River and have learned, first hand, of the severe flooding problems they have suffered for many years at this site.

The flooding of the Genesee River in Portageville has destroyed productive fields and the property of many residents and, to date, threatens the business section in Portageville and potentially, state highways in this area.

Your consideration of this request would be deeply appreciated and I look forward to hearing from you in the near future as to your decision in this matter.

Many thanks for your consideration.

Sincerely,

L. WILLIAM PAXON
Member of Assembly

LWP/ts

EXHIBIT 24

GENESEE/FINGER LAKES REGIONAL PLANNING COUNCIL
33 South Washington Street, Rochester, New York 14608
716-546-5902

January 29, 1985

Mr. Timothy Burnes
Civil Engineer
Water Resource Planning
U. S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

RE: INFORMATION FOR GENESEE RIVER BASIN PLANNING

Dear Mr. Burnes:

As you know, this office has been working with member counties to gather information on problems or issues in the Genesee River Basin. Thus far I have had a formal response from the Livingston County Planning Department and have enclosed this material for your review. I have also been advised that the Monroe County Planning Department will be sending you materials directly. Further, Ontario County has indicated that they have not been able to identify any problems or needs in the Basin. Finally, the Genesee County Planning Department is now working on the matter and will provide materials shortly. No response has been received from Wyoming County.

Should you require any additional information, please contact me at your convenience.

Sincerely,

Glenn R. Cooke
Executive Director

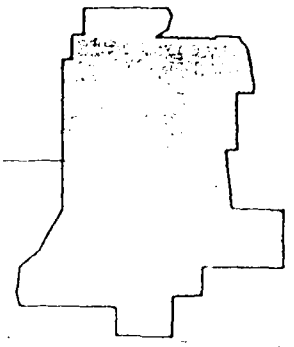
GRC:rar
Encl.

EXHIBIT 25

Livingston County Planning Department

Building No. 2, County Campus
Mt. Morris, New York 14510

Telephone: 716 - 658-2851



January 23, 1985

Mr. Glenn R. Cooke
Executive Director
Genesee/Finger Lakes Regional
Planning Council
33 South Washington Street
Rochester, NY 14608

Dear Glenn:

Enclosed please find the following material in response to your request for suggestions for problems and needs for the Army Corps of Engineers to address in the study of the Genesee River Basin:

1. Water Quality Management Plan for Livingston County.
2. Nonpoint Source Stream Segments.
3. Livingston County Streambank Erosion Analysis.
4. Letter from James Booth, DEC, dated 1/10/85.

I have circled in red relevant portions of these documents.

Thank you for giving us the opportunity to suggest areas for this study. We would appreciate being kept informed as work progresses.

Sincerely,

David O. Woods
Planner

DOW/meb

EXHIBIT 26

UNITED STATES DEPARTMENT OF AGRICULTURE

JAN 14 1985

SOIL CONSERVATION SERVICE

[illegible] Main St., Leicester, NY 14481

SUBJECT

DATE January 10, 1985

TO David Woods
Livingston Co. Planning Dept.
Bldg. #2, County Campus
Mount Morris, NY 14510

The following are some comments on your memo about the Army Corps of Engineer's Genesee River Basin Study. There are several areas of concern I would like to bring to their attention.

One is flooding along the Canaseraga Creek. This has been a problem ever since the Canaseraga valley has been used for crop production. Since the last study, a lot more land has been cleared and drained in the valley.

Another problem is streambank erosion on the Genesee River below the Mount Morris Dam. While this has always been a problem, many people feel it has been accelerated since construction of the dam.

A third area of concern is water quality problems associated with agriculture. These include problems associated with livestock, such as barnyard run off, improper manure handling and improper treatment or disposal of milking center wastes. They also include phosphorus and nitrogen being carried off farm land by run off or attached to soil particles [illegible] sheet erosion.

A last problem area concerns sewage disposal. One problem is what to do with sludge from sewage treatment plants. Another is the rather extensive problem of improperly functioning septic systems throughout the county.

Thank you for giving me a chance to comment on some of the problems that the Soil Conservation Service and Livingston County Soil and Water Conservation District would like to see looked at in any future Genesee River Basin Study.

Sincerely yours,

James Booth

James Booth
District Conservationist.

EXHIBIT 21


DATE
FILMED
48