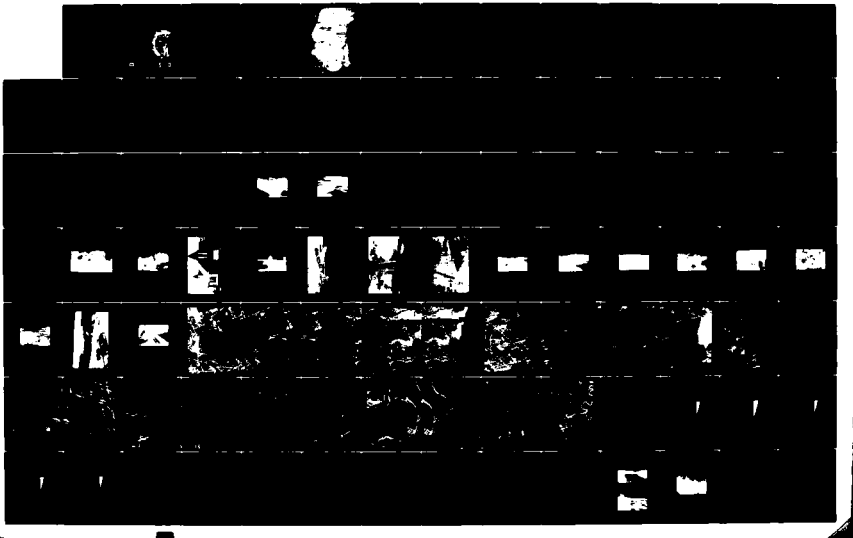
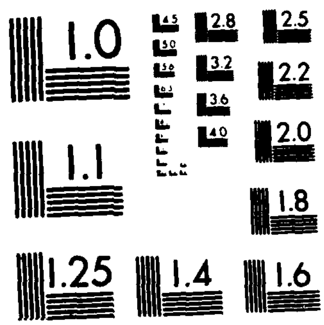
AD-A194 985 GENESEE RIVER BASIN STUDY VOLUME 1 MAIN REPORT(U) CORPS 1/2
OF ENGINEERS BUFFALO NY BUFFALO DISTRICT JUN 88

UNCLASSIFIED F/G 13/2 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963 A

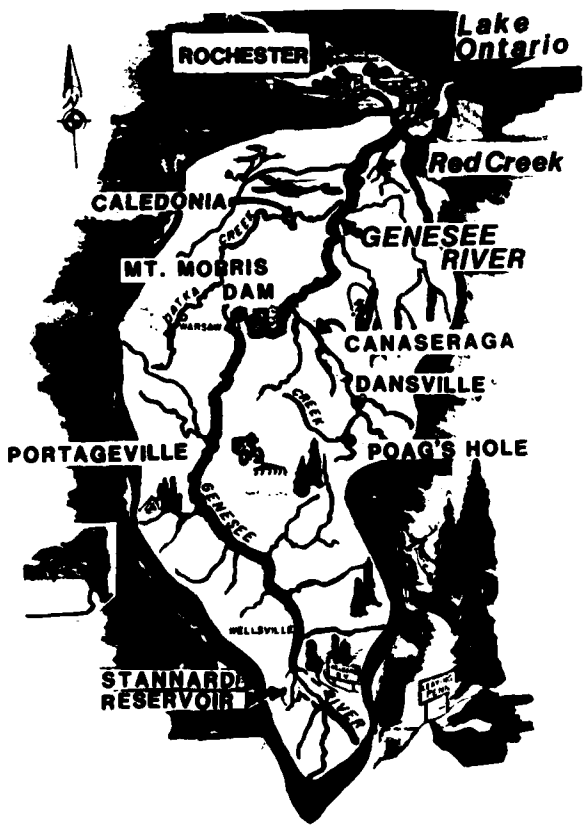
Feasibility Report

(4)

AD-A194 985

Genesee River Basin Study

Volume 1
Main Report



US Army Corps of Engineers
Buffalo District

June 1988

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. ADA194985 / 3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Feasibility Report Genesee River Basin Study New York & Pennsylvania	5. TYPE OF REPORT & PERIOD COVERED Feasibility 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. Army Corps of Engineers Buffalo District	8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Army Corps of Engineers, Buffalo District 1776 Niagara Street Buffalo, New York 14207	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS --	12. REPORT DATE June 1988 13. NUMBER OF PAGES Main Report 96 Appendics 220
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) --	15. SECURITY CLASS. (of this report) Unclassified 15a. DECLASSIFICATION DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

This report is to be made available to anyone requesting a copy at cost

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

--

18. SUPPLEMENTARY NOTES

This Feasibility Report is Final.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Genesee River Basin Comprehensive Study
Mt. Morris Dam and Reservoir
Letchworth State Park at Mt. Morris, New York
Considered Stannard Dam/Reservoir and Modification to existing Mt. Morris Dam.

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

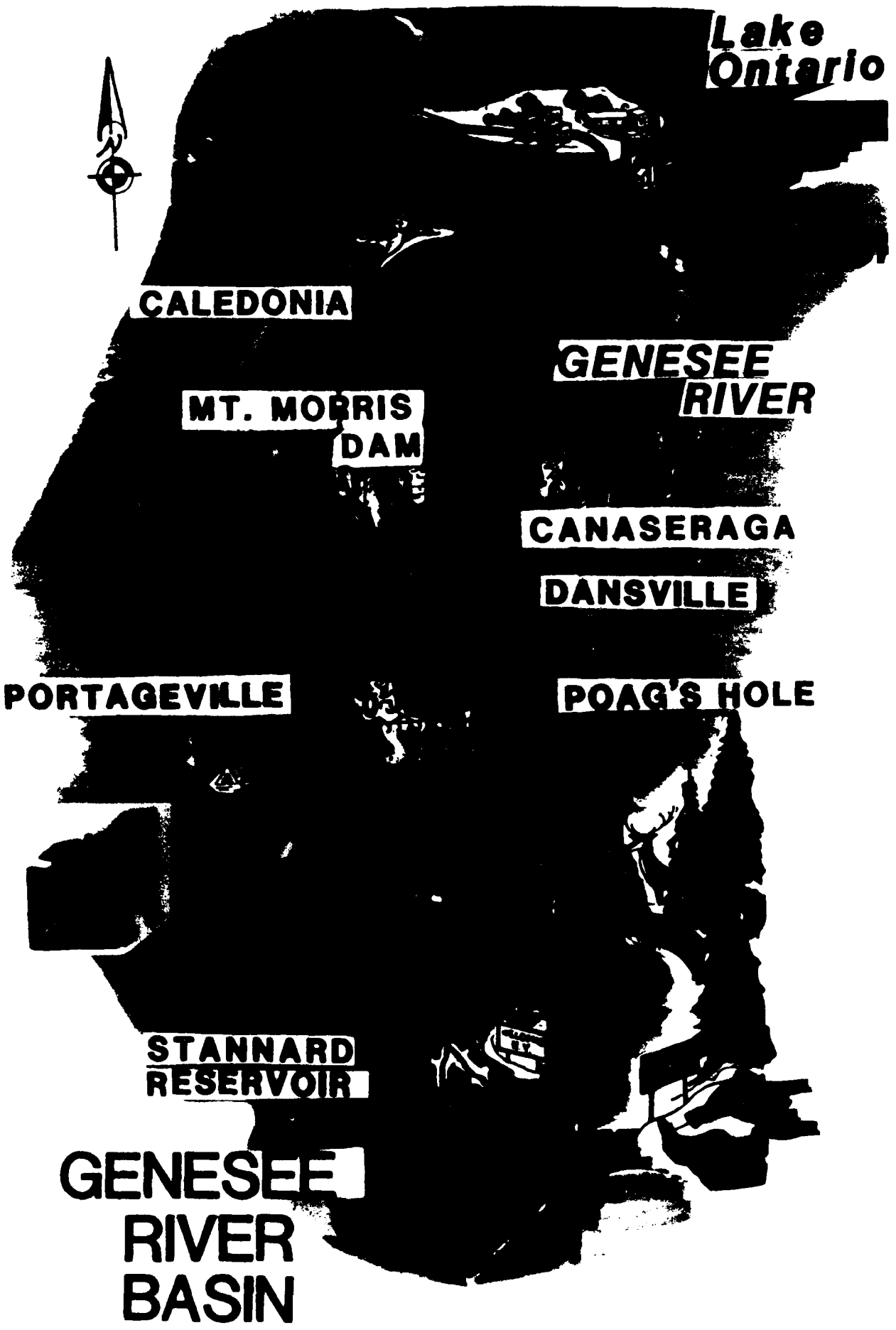
This Feasibility Report discusses plans considered under the Genesee River Basin Study Authority. Two of these plans, a multi-use reservoir at Stannards and modification to the existing Mt. Morris Dam and reservoir for multi-use including flood control, recreation, hydropower, and irrigation. These plans were found not economically feasible for single-purpose flood control. The Federal Government therefore recommended no further Federal actions.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

MAIN REPORT


Lake Ontario
CALEDONIA
GENESEE RIVER
MT. MORRIS DAM
CANASERAGA
DANSVILLE
PORTAGEVILLE
POAG'S HOLE
STANNARD RESERVOIR
GENESEE RIVER BASIN

GENESEE RIVER BASIN STUDY
NEW YORK

FEASIBILITY REPORT

Table of Contents

Paragraph	Description	Page
	Acknowledgments	
	General Introduction	
	SECTION 1 INTRODUCTION	
1.1	Introduction	1-1
1.2	Geographical Setting	1-1
1.3	Study Authority	1-1
1.4	Purpose of the Feasibility Report	1-4
1.5	Scope of Study	1-4
1.6	Study Participants and Coordination	1-5
1.7	The Report	1-6
1.8	Prior Studies, Reports, and Projects	1-6
	SECTION 2 EXISTING CONDITIONS	
2.1	Existing Conditions	2-1
	Human (Man-Made Environment)	
2.2	Community and Regional Growth	2-1
2.3	Population	2-1
2.4	Land Use and Development	2-1
2.5	Business and Industry/Employment and Income	2-1
2.6	Agriculture and Farmland	2-1
2.7	Recreation	2-1
	PUBLIC FACILITY AND SERVICES MUNICIPAL WATER SUPPLY	
2.8	Surface Water	2-5
2.9	Ground Water	2-5
2.10	Sewage Treatment	2-5
2.11	Power	2-5
2.12	Transportation	2-5
2.13	Property Values and Tax Revenues	2-6
2.14	Aesthetics and Noise	2-6
2.15	Community Cohesion	2-6

"Origi... plat... for... whi...

Table of Contents (Cont'd)

Paragraph	Description	Page
	EXISTING CONDITIONS	
2.16	Air Quality	2-8
2.17	Water Quality	2-8
2.18	Fisheries	2-8
2.19	Wildlife	2-8
2.20	Significant Habitats	2-9
2.21	Vegetation	2-9
2.22	Wetlands	2-9
	SECTION 3 PROBLEM IDENTIFICATION	
	PROBLEMS, NEEDS, AND OPPORTUNITIES	
3.1	Flooding	3-1
3.2	Stream Bank Erosion and Agricultural Land Damages	3-33
3.3	Irrigation	3-33
3.4	Recreation	3-34
3.5	Hydropower	3-34
3.6	Water Supply	3-34
3.7	Water Quality	3-35
3.8	Summary	3-35
3.9	Planning Constraints	3-35
3.10	National Objectives	3-36
3.11	Specific Planning Objectives	3-36
3.12	Conditions If No Federal Action Taken (Without Project Conditions)	3-36
	SECTION 4 PLAN FORMULATION	
4.1	General Formulation and Evaluation Criteria	4-1
4.2	Technical Criteria	4-1
4.3	Economic Criteria	4-2
4.4	Socioeconomic and Environmental Criteria	4-2
4.5	Cost Sharing	4-2
4.6	Flood Control (Structural)	4-2
4.7	Flood Control (Non-Structural)	4-2
4.8	Add-On Recreation	4-3
4.9	Add-On Hydroelectric Power	4-3
4.10	Local Sponsor	4-3
	PRELIMINARY ALTERNATIVE PLANS CONSIDERED	
4.11	General	4-3

Table of Contents (Cont'd)

	Description	Page
	PLANS ELIMINATED EARLY IN THE FEASIBILITY PHASE	
4.12	Stannard Dam and Reservoir (Rationale)	4-15
4.13	Multi-Use Plans (10 and 11) for Flood Control, Hydropower, and Irrigation	4-15
	ALTERNATIVE STUDIED IN THE FEASIBILITY PHASE	
4.14	Addition of Gates to the Mt. Morris Dam Spillway	4-20
4.15	Designation of NED Plan	4-21
	SECTION 5 FINDINGS AND CONCLUSIONS	
5.1	Introduction	5-1
5.2	Considered Stannard Project	5-1
5.3	Considered Mt. Morris Project	5-1
5.4	Conclusions	5-1
	SECTION 6 RECOMMENDATIONS	
6.1	*Recommendations*	6-1

TABLES

Number	Title	Page
3.1	Channel Capacities Downstream of Mt. Morris Dam	3-24
3.2	Total Estimated Damage From the June 1972 Flood in the Genesee River Basin	3-30
3.3	Summary of Peak Stages and Discharges in the Upper Genesee River Basin	3-31
3.4	Summary of Peak Stages and Discharges in the Lower Genesee River Basin	3-32
4.1	Assessment, Evaluation, and Comparison of Alternative Plans	4-9
4.2a	Estimate of First Cost - Stannard Dam - January 1988 Price Levels	4-17
4.2b	Total Investment Costs - Stannard	4-19
4.2c	Average Annual Benefits for Stannard Dam and Reservoir for Flood Control Only	4-19

Table of Contents (Cont'd)

TABLES (Cont'd)

Number	Title	Page
4.2d	Average Annual Benefit Costs and Apportionment	4-19
4.2e	Economic Efficiency - Stannard	4-19
4.3a	Estimate of First Cost - Mt. Morris - January 1988 Price Levels	4-26
4.3b	Total Investment Cost and Apportionment - Mt. Morris	4-29
4.3c	Economic Analysis for Mt. Morris - Spillway Gates - Average Annual Benefits	4-29
4.3d	Average Annual Cost - Mt. Morris	4-30
4.3e	Economic Efficiency - Mt. Morris	4-30

FIGURES

Number	Title	
1.1	Genesee River Profile	1-2
1.2	Genesee River Basin Map	1-3
3.1-3.5	Reservoir Pool Profiles	3-25
4.1	Reservoir Area - Capacity Curve	4-25

PLATES

Number	Title	
3.1	Mt. Morris Dam February 1981 Pool	3-19
3.2	Mt. Morris Dam March 1980 and December 1983 Pool	3-20
3.3	Mt. Morris Dam March 1982 and January 1986 Pool	3-21
3.4	Mt. Morris Dam February 1984 Pool	3-22
3.5	Mt. Morris Dam February 1985 Pool	3-23
4.0	Basin Map Showing Location of Considered Project Sites	4-4
4.1	Red Creek, Rochester, New York	4-5
4.2	Genesee River, Calendonia, New York	4-6
4.3	Canaseraga Creek Project, New York	4-7
4.4	Modification to Mt. Morris Dam Altern tive	4-22
4.5	Modification to Mt. Morris Dam Alternative	4-23

Table of Contents (Cont'd)

PHOTOS

Number	Title	Page
2.1	Representative Agricultural Land of the Genesee River Basin	2-2
2.2	Agricultural Land in the Genesee River Basin	2-3
3.1	Wellsville Hospital	3-4
3.2	Residence in Portageville at 87.5, Photo Taken 23 June 1972	3-5
3.3	Flooded Farm along Route 19 in Belfast, Photo Taken 21 June 1972	3-6
3.4	Looking North at State Route 245 Bridge in Portageville at Rivermile 87, Photo Taken 23 June 1972	3-7
3.5	Looking North along State Route 19 Between Wellsville and Scio, Photo Taken 21 June 1972	3-8
3.6	Looking East at Corbin Hill Road Bridge at River Mile 128.2, Photo Taken 21 June 1972.	3-9
3.7	April 1985 Genesee River Streambank Erosion at Oramel Allegany County	3-10
3.8	April 1985 Genesee River Erosion of Farmland at Portageville	3-11
3.9	April 1985 Genesee River Farmland Erosion End of Robin Road Shongo	3-12
3.10	Streambank Erosion Endangering Homes, Wiedrick Road, South Wellsville	3-13
3.11	Mt. Morris Dam With the Water Level Within 4' of the Spillway	3-14
3.12	Corps Employees, Army National Guard, Students, and Citizens Erecting Sand Bank Levees on the River Banks	3-15
3.13	1972 Lowlying Areas Which Suffered Damages	3-16
3.14	Flooded Horse Farm in Scottsville, Monroe County, NY	3-17
3.15	Peak Reservoir Elevation of 744' in 1976	3-18

Table of Contents (Cont'd)

PHOTOS (Cont'd)

Number	Title	Page
3.16-17	March 1988 - Genesee River Farmland Erosion at Geneseo, Livingston County	3-38
3.18	March 1988 Genesee River Streambank Erosion Endangering Residential Properties at Chili, Monroe County	3-39
4.1	Stannard Reservoir Area Which Has a Storage Capacity of 54,000 Acre-Foot	4-16
4.2	Plan View of Dam at Stannard	4-16
4.3	The Addition of Tainter Gates to the Top of the Spillway	4-24

GENESEE RIVER BASIN COMPREHENSIVE STUDY
FEASIBILITY REPORT

PREFACE

The Genesee River Basin, located primarily in western New York, is in the eastern portion of the Great Lakes region. It drains an area of approximately 2,500 square miles, including 96 square miles in northern Pennsylvania. The river rises in the physiographic area known as the Allegany Plateau, a few miles south of the New York-Pennsylvania border. It flows in a generally northerly direction, passing through the city of Rochester and empties into Lake Ontario.

The basin has experienced extensive floodings throughout its history. The record of floods on the Genesee River dates back to the 1800's, with the most destructive flood to date being caused by the tropical storm Agnes in 1972.

Construction of the Mt. Morris Dam in the Lower Basin, and other local flood protection works in the Upper Basin abated flood damages. However, several watersheds continue to experience residential and commercial flood damages as recorded in 1956, 1959, 1960, 1961, 1972, 1976, 1978, 1979, 1984, 1986, and 1987. Subsequent to several counties being declared disaster areas in 1984, the Corps of Engineers, Buffalo District, in 1985, initiated planning studies to determine whether any modification to the basin-wide plan should be made with respect to improvements to flood control and other related water and land resources. As a result of these studies, many local water resource projects authorized over the years to satisfy these concerns will be deauthorized due to a lack of economic justification.

This report presents the considered alternatives and resulting recommendations.

SECTION I

INTRODUCTION

SECTION 1

INTRODUCTION

The purposes of this section are to introduce the reader to the Genesee River Basin and to explain the content and organization of this report. The section presents information on the geographical setting of the study area, the study authority, the purpose of the study, the scope of the study, study participants and coordination, the organization of the report, and prior studies and reports in the area.

Geographical Setting

The Genesee River Basin is about 100 miles long and drains an area of about 2,500 square miles in western New York and northwestern Pennsylvania, as shown in Figure 1.1. The river flows northerly, from its inception south of the New York-Pennsylvania border, to Lake Ontario at Rochester, New York. The topography of the southern portion of the basin (hereafter referred to as the Upper Basin), upstream of the Mt. Morris Dam, is steep and rugged, while the northern portion of the basin (the Lower Basin) is gently rolling. In Letchworth State Park, just upstream of the Mt. Morris Dam, the river drops from an elevation of about 1,100 feet to 575 feet, over three successive falls, flowing from a deep gorge cut in rock. The profile of the Genesee River is portrayed in Figure 1.2.

The Genesee River Basin is predominantly rural; however, the main branch passes through urban, suburban communities like Portageville, Mt. Morris, Avon, and Rochester. Tributaries of the Genesee River include Canaseraga Creek, Angelica Creek, Black Creek, Honeoye Creek, and Oatka Creek, among others.

STUDY AUTHORITY

The Genesee River Basin comprehensive study was authorized by the Committee on Public Works of the United States Senate in a resolution adapted 1 February 1962. The authorizing resolution was sponsored by the late Senator Jacob K. Javits at the request of the New York State Water Resources Commission. The authorizing resolution 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, hydroelectric power and related water and land resources."

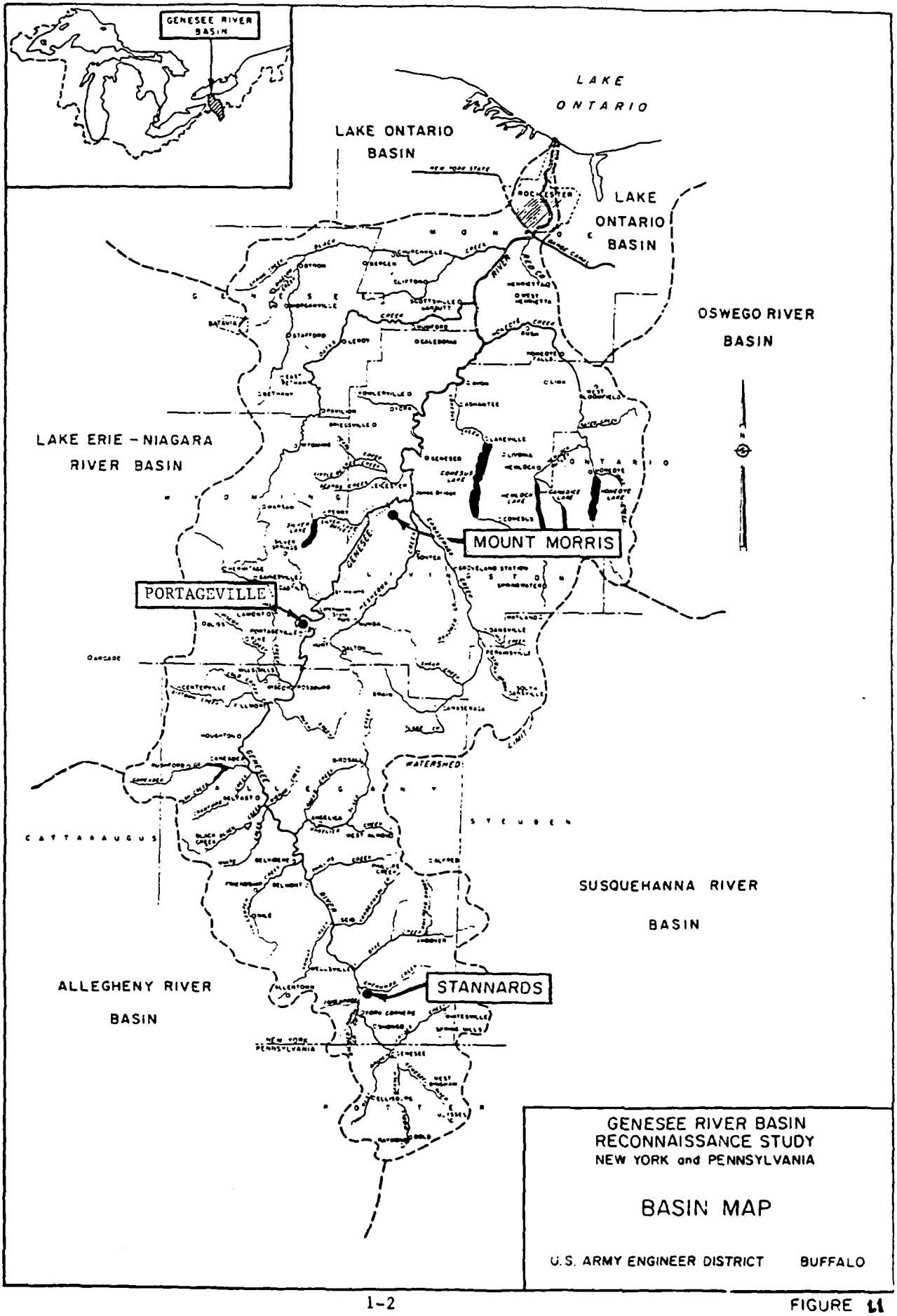

GENESEE RIVER BASIN
LAKE ONTARIO
LAKE ONTARIO BASIN
LAKE ONTARIO BASIN
OSWEGO RIVER BASIN
LAKE ERIE - NIAGARA RIVER BASIN
MOUNT MORRIS
PORTAGEVILLE
SUSQUEHANNA RIVER BASIN
ALLEGHENY RIVER BASIN
STANNARDS
GENESEE RIVER BASIN RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA
BASIN MAP
U.S. ARMY ENGINEER DISTRICT BUFFALO

FIGURE 11

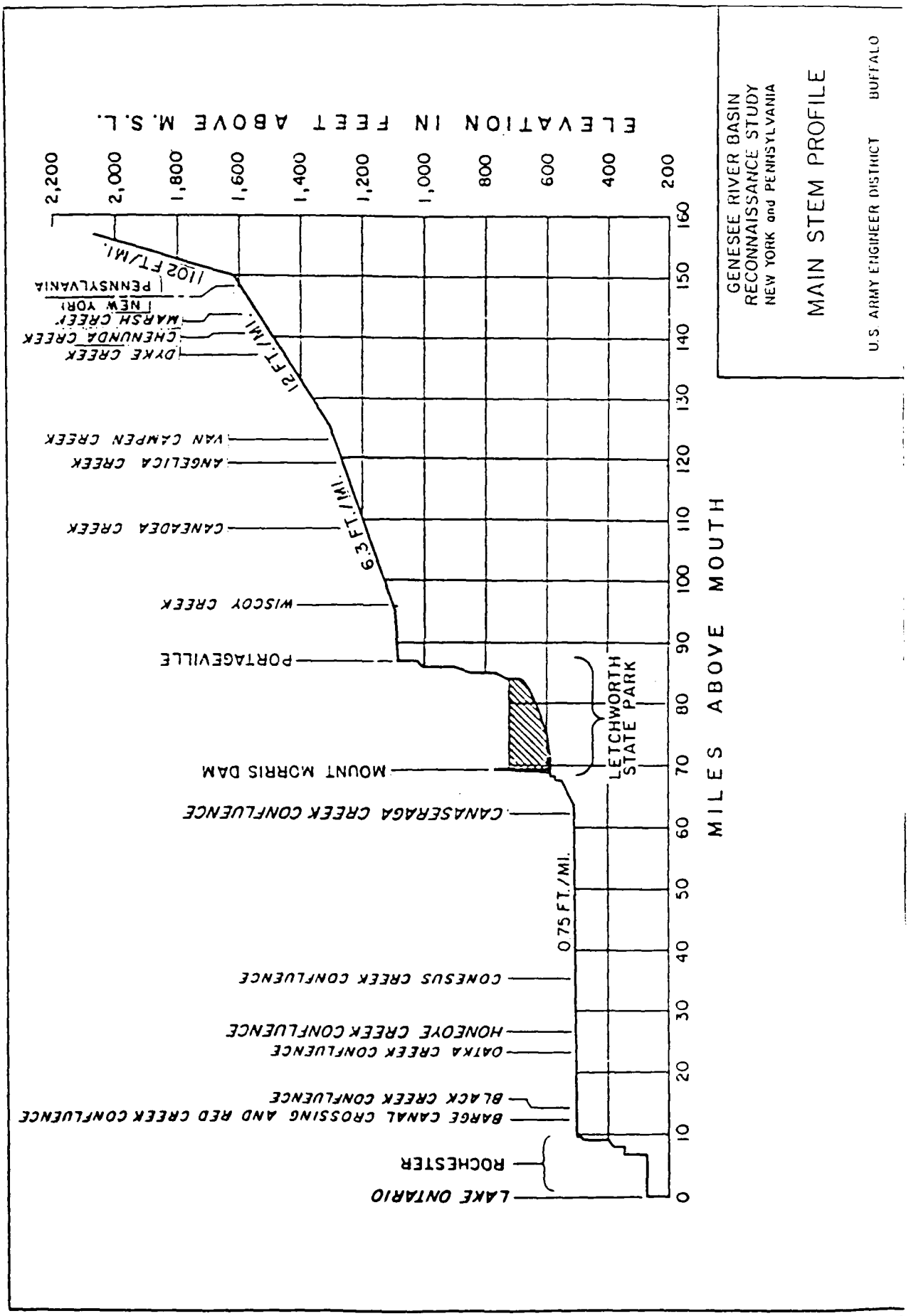

GENESEE RIVER BASIN
RECONNAISSANCE STUDY
NEW YORK and PENNSYLVANIA
MAIN STEM PROFILE
U.S. ARMY ENGINEER DISTRICT BUFFALO
ELEVATION IN FEET ABOVE M.S.L.
2,200
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
MILES ABOVE MOUTH
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
102 FT./MI.
12 FT./MI.
6.3 FT./MI.
0.75 FT./MI.
PENNSYLVANIA
NEW YORK
MARSH CREEK
CHENUNDA CREEK
DYKE CREEK
VAN CAMPEN CREEK
ANGELICA CREEK
CANEADEA CREEK
WISCOY CREEK
PORTAGEVILLE
LETCHWORTH STATE PARK
MOUNT MORRIS DAM
CANASERAGA CREEK CONFLUENCE
CONESUS CREEK CONFLUENCE
HONEOYE CREEK CONFLUENCE
OATKA CREEK CONFLUENCE
BLACK CREEK CONFLUENCE
BARGE CANAL CROSSING AND RED CREEK CONFLUENCE
ROCHESTER
LAKE ONTARIO

FIGURE 1.2

PURPOSE OF THE FEASIBILITY REPORT

In accordance with the authorizing resolution, the Genesee River Basin Comprehensive Study was initiated in November 1962. Special task groups were formed in 1965 to identify the Basin's problems and needs and formulate plans to address these problems and needs. As a result, an early-action plan was recommended in 1969 and reevaluated in the early 1970's. The most significant outcome from these studies were recommendations to construct a local flood protection project in Canaseraga Creek and a pump-storage reservoir near Portageville for hydropower generation. Neither of these potential water resources projects have been constructed. In Fiscal Year 1985, funds were provided to resume the studies. A Reconnaissance Report published in August 1986, recommended detailed study of the considered dam and reservoir at Stannard for flood control and other uses; re-regulation of the existing Mt. Morris dam and reservoir outflows; and addition of gates on top of the spillway section of the existing Mt. Morris dam and reservoir for greater security against flood hazards. The feasibility phase of the Genesee River Basin study was initiated in 1986. During the feasibility phase, further studies were conducted on the most promising alternatives identified in the reconnaissance phase, or some variation thereof, to: (1) identify all major components of each alternative; (2) estimate the first cost of construction and the annual operation and maintenance cost associated with each alternative; (3) estimate the benefits associated with each alternative; and (4) assess the environmental impacts of each alternative. These studies were conducted so that a rational choice could be made among the various alternative plans investigated.

This Final Feasibility Report documents the results of the Genesee River Basin study. However, the report emphasizes the results of the feasibility phase study effort with summary information on the results of the reconnaissance phase of the study.

SCOPE OF THE STUDY

The study area extends from Potter County in Northern Pennsylvania through the city of Rochester in New York, and covers the entire 157 miles of the Genesee river and its tributaries. The study was scoped to review, formulate, assess, and evaluate alternative measures and plans to primarily reduce flood damages. These plans included regional dam and reservoir projects, and authorized local protection projects. In addition to the dam and reservoir plans that were developed, hydroelectric power generating facilities, recreation, and agriculture were also considered to maximize the economic efficiency of the basic flood control plans. A broader range of water resource problems including farmland erosion, water quality, and water supply, were also considered. The existing Corps project at Mt. Morris was also studied to determine its economic potential for hydropower development. However, as will be discussed in Section 4 of this report, "Plan Formulation," the study scope was reduced at the conclusion of the reconnaissance phase of the study to include flood control only. Therefore, the Corps feasibility study will address the need for additional flood control in the Upper and Lower Genesee River Basin. Originally, 12 preliminary alternatives were formulated and assessed. The assessment indicated that seven alternatives warranted further study and only these seven were carried into the feasibility stage. The five other alternatives were dropped from consideration because of lack of economic justification, or because of their failure to achieve the primary water resource needs considered.

STUDY PARTICIPANTS AND COORDINATION

The public involvement program is a two-way form of communication by which the Corps receives information from, and provides information to, the public during the study process. Information on study status, report findings, and recommendations are disseminated to the public in an ongoing fashion. This is achieved through letters, news media, workshops, public meetings, and hearings.

Regarding this study, the first action accomplished was to send letters to United States Senators, and Congressmen; States and local representatives; and other Federal, State, and local agencies to inform them of the resumption of the study. This action was immediately followed by a "News Release" issued on 28 November 1984 to inform the general public of the study resumption. Coordination was also initiated with the various agencies to obtain and identify water resource problems and needs in the basin. This coordination was achieved through correspondence, telephone conversations, and workshop meetings.

A meeting was held on 21 May 1986 with the Allegany County Planning Board to discuss the reconnaissance study as it relates to the Upper Basin. On 29 October 1986, the District met with the Town Board in the town of Willing (Allegany County) to discuss the feasibility study, particularly the considered project at Stannard. A coordination meeting was held on 17 March 1987 with the New York State Department of Environmental Conservation (NYSDEC) to discuss the considered alternatives, sponsorship of potential projects, and cost-sharing arrangements. On 31 March 1987, a meeting to discuss the hydropower and recreational aspects of the considered projects was held in the Buffalo District office. Representatives from several private companies as well as NYSDEC and State park officials participated. Two meetings were held on 7 April 1987, one with Rochester Gas and Electric to discuss the incidental hydropower aspect of the study; and one with General Food, Comstock Food, Seneca Food, and Cooperative Extension to discuss agricultural production and irrigation needs on the Lake Ontario plain. On 19 August 1987, representatives of Cornell University were contacted by phone to discuss irrigation benefits as related to the Genesee River Basin study. On 10 September 1987, the Buffalo District held a public meeting to discuss the results of the Reconnaissance study and solicit input from the public. On 24 September 1987, as part of Corps coordination with permit holders vis-a-vis the Federal Energy Regulatory Commission (FERC) permit process, a meeting was held with the representatives of several private companies to discuss the feasibility of hydropower. On 5 October 1987, a meeting was held with representatives of New York State Office of Parks, Recreation, and Historical Preservation (Genesee Region, New York State Park System) to discuss the Reconnaissance Report. Representatives of a private corporation - Pack, Paddle, and Ski Corporation - also participated. The District assured the park officials that the Corps is only studying modification to the dam to provide additional flood protection. On 28 October 1987, the District met with the Genesee State Park Commissioners and Directors at their regular meeting at Letchworth State Park to discuss the considered alternatives and scope of the feasibility study. Another coordination meeting with New York State Department of Environmental Conservation was held on 2 December 1987 to further discuss the considered Stannard and modification to Mt. Morris dam alternatives. The Corps and State agreed that the Stannard project would have adverse impacts on fish and wildlife and the environment; and given the apparent marginal economic viability of a multi-purpose dam and reservoir

project and lack of local sponsors, the project would not warrant further study. On the same day, and in response to the many newspaper articles and subsequent letters from individuals and organized groups expressing opposition to any action that would change the character of the Letchworth Gorge, the Commander of the Corps Buffalo District Office, Colonel Daniel R. Clark, in a "Letter to the Editor," published in the Buffalo News, emphasized that the Corps will not approve any plan that degrades existing recreational opportunities or significantly alters the existing character of Letchworth Gorge. He concluded that "the Corps will recommend no project that is not socially acceptable, environmentally sound, economically smart, and practical from an engineering viewpoint." The District met with the Niagara Chapter of the Sierra Club, on 10 December 1987 in Buffalo to discuss the considered projects at Stannards and Mt. Morris. The District emphasized that the main purpose of the overall Genesee study is flood control. The District's role in the incidental hydropower study was also explained. On 11 December 1987, a meeting was held with elected officials from both Allegany County and New York State to further discuss the feasibility of the considered Stannard project. This meeting highlighted the environmental and institutional impracticalities of the considered Stannard project. Corps and State representatives informed members of the Allegany Board of Legislators and U.S. Soil Conservation Service that the study of Stannard would be terminated. On 24 February 1988, a meeting was held in Buffalo, New York, with the New York State Society of Professional Engineers to discuss the considered projects. The Society appreciated the Corps presentation, as the main purpose of the study was clearly explained. On 9 March 1988, a meeting was held with the American Society of Civil Engineers in Rochester, New York, to discuss these same considered projects at Mt. Morris and Stannard. The Society expressed best regards in the continued efforts on the Mt. Morris project. On 29 March 1988, a meeting was held with the Glencoe Conservation Society in Colden, New York, to discuss these same considered projects. The presentation was well received. On 27 April 1988, the Corps, Buffalo District met with Genesee State Park Commission and discussed the flooding problems of the basin, possible alternatives and hydropower; and provided status on the feasibility study.

THE REPORT

The overall organization of this report consists of a Main Report and Supporting Documentation. The Main Report is written to give both the general and technical reader a clear understanding of the study, the study results, and conclusions and recommendations. The Supporting Documentation provides additional detailed information on the design, costs, and benefits of the considered alternatives. It also includes copies of typical pertinent correspondence with organizations and individuals in the development of this study, and other appropriate information.

PRIOR STUDIES, REPORTS, AND PROJECTS

While the records of floods on the Genesee River date back to the 1800's, no study of remedial measures was undertaken until after the 1865 flood which caused extensive damage. Following this severe flood of 1865, a number of

studies and reports on flood control measures were undertaken by Governmental agencies and private interests, as well. (1)

In 1836, the New York State Legislature authorized construction of a canal along the Genesee River. Construction began in 1837 and lasted 21 years before it was completed. The Genesee Valley Canal stretched from the Erie Canal to the Allegheny River at Millgrove Road and required 106 locks. Railroads were soon to replace the canal which was closed in 1877.

In 1889-1893, the State of New York investigated the possibility of reservoirs on the Genesee River for water supply for the Erie Canal. The first reservoir sites studied included reservoirs in the Mount Morris Gorge, but owing to the development of other water supply sources for the canal the State of New York did not proceed with development of reservoirs on the Genesee River. These investigations are described in the "Annual Report of the New York State Engineer and Surveyor" for 1890 and 1893.

In 1905, a special committee was appointed by the Mayor of Rochester, and another committee by the Chamber of Commerce to investigate and report on flood conditions. A report was prepared covering the history of previous floods and suggesting remedies. In 1928, the City Manager of Rochester enlarged the scope of an investigation for a civic center for the city of Rochester to include the general subject of flood protection. A detailed report referred to as the "Fisher Report" on flood conditions was published in 1937.

In 1906, a dam for run-of-river hydropower generation, Station 172, was constructed across Wiscoy Creek at Mills and is operated by Rochester Gas and Electric Company.

The Water Supply Commission of the State of New York, between the years 1907-1910 made a study of the Genesee River for flood control and power. Two sites were found for multiple-purpose reservoirs, one near Mount Morris, and the other near Portageville.

Floodwalls at Rochester, New York, were constructed in 1916 for the State of New York as part of the Barge Canal contracts. They extend about 7,000 feet along the east bank of the river upstream from the Court Street dam and about 8,000 feet on the west bank. In 1945, some of the failing and deteriorated sections of wall were replaced by the State of New York. Since that time, no appreciable maintenance has been done on these floodwalls; however, in 1973 a portion of the walls near the Rochester Convention Center were reconstructed.

In 1917, a dam for run-of-river hydropower generation, Station No. 5, was constructed across the Genesee River in Rochester below the lower falls. This hydropower dam is operated by Rochester Gas and Electric Company.

(1) The projects, reports, and studies described here were undertaken by the Corps of Engineers unless otherwise noted.

In the 1920's, the Mt. Morris Water Power Company developed a plan for a dam across the Genesee River upstream of the earlier constructed facility at Mt. Morris. The Power Company had acquired the necessary lands for a dam and reservoir with hydropower capability. Lands owned by the Power Company adjacent to the proposed works, but in excess of their needs, were conveyed to the State of New York on 12 July 1926 in accordance with Chapter 379 of the Laws of the State of New York. The lands were conveyed to the State for use as park land in perpetuity in return for the right to vary and control flow in the Genesee. Rochester Gas and Electric Corporation subsequently purchased the assets of the Mt. Morris Water Power Company and maintained interest in the Mt. Morris site for hydropower.

In 1922, a dam for run-of-river hydro generation, Station No. 170, was constructed across Wiscoy Creek at Wiscoy and is operated by Rochester Gas and Electric Company.

In 1926, a dam for hydropower generation was constructed across the Genesee River at Mt. Morris just upstream of the present Route 36 bridge. The dam is still operated by Rochester Gas and Electric Company for run-of-river hydropower generation.

In 1927, the Commonwealth Power Company applied to the Conservation Department of the State of New York for a license to develop power on the Genesee River in the vicinity of Portageville. This application was rejected, as a clause in the grant of Letchworth Park lands to the State stipulated that these lands were to be used for park purposes in perpetuity.

A preliminary examination and survey for flood control on the Genesee River was authorized under Section 6 of the Flood Control Act, Public Law 738, 74th Congress, approved 22 June 1936. The preliminary examination report dated 23 November 1936 recommended a survey be made on the Genesee River. A report entitled "Survey Report on the Genesee River, New York, for Flood Control" was completed 16 May 1941 covering Dyke Creek at Wellsville, New York; Canaseraga Creek between the Genesee River and Dansville, New York; the Genesee River downstream from Mount Morris, and through Rochester, New York. This survey report was published in 1944 in House Document No. 615, 78th congress, 2nd Session with the only recommended improvement being construction of an earth-fill dam in the Genesee River near Mount Morris.

A proposed plan for development of the Genesee River Basin involving a number of multipurpose reservoirs for power, flood control, recreation, and other purposes was prepared by the Federal Power Commission in February 1943.

Mount Morris Dam and Reservoir was authorized by Section 10 of the Flood Control Act, Public Law 534, 78th Congress, approved 22 December 1944. A definite Project Report was approved 21 February 1946 and construction was initiated in March 1948 and completed in May 1952.

A survey report entitled "Review of Report on Genesee River, New York, Vicinity of Dansville" dated 30 July 1945 and published in House Document No. 206, 80th Congress, 1st Session, recommended channel improvements in Canaseraga Creek for flood control in the vicinity of Dansville, New York. The report also found

flood control, by reservoirs either alone or in combination with power production or river regulation, was not economically favorable.

A flood control project at Dansville and Vicinity, New York, was authorized by the Flood Control Act of 1948, Public Law 858, 80th Congress, approved 30 June 1948. Plans and Specifications were completed in February 1982 and funding last received in FY 83. If cost sharing requirements for the project are not resolved, the project will be recommended for deauthorization.

A survey report dated 12 March 1948 and published in House Document No. 232, 81st Congress, 1st Session, recommended channel improvements for flood control at Wellsville and Caledonia, New York.

A Review of Reports on the Genesee River with particular reference to Angelica Creek, Allegany County, New York, was authorized by resolution adopted by the Committee on Public Works, House of Representatives, 27 May 1949. The report submitted 18 March 1955 recommended that improvements were not justified.

A flood control project at Wellsville, New York, was authorized by the Flood Control Act of 1950, Public Law 516, 81st Congress, approved 17 May 1950. The "Design Memorandum on Local Flood Protection, Wellsville and Vicinity, Genesee River and Dyke Creek, New York" was completed in August 1955. Construction was initiated in July 1956 and completed in November 1957.

A flood control project at Caledonia, New York, was authorized by the Flood Control Act of 1950, Public Law 516, 81st Congress, approved 17 May 1950. This project has been classified as deferred. The project was reconsidered in the reconnaissance phase of this study resumption, and was recommended for deauthorization.

A comprehensive study of the Genesee River Basin was completed by the New England - New York Interagency Committee, conducted under the general authority of Section 205 of the Flood Control Act of 1950, Public Law 516, 81st Congress, and other acts. Chapter XXXIII of this report was a detailed study of the Genesee River and was completed in 1954.

A snagging and clearing project on the Genesee River and Dyke Creek at Wellsville, New York, was completed in 1951.

In 1952, a dam for run-of-river hydropower generation was constructed across the Genesee River at Rochester.

An unfavorable preliminary examination of the Allegheny-Genesee waterway barge navigation, was submitted to Congress 12 April 1953.

A snagging and clearing project in Canaseraga Creek from Groveland Station to the Genesee River, was completed in 1954.

A snagging and clearing project in Keshequa Creek, in the vicinity of Nunda, New York, was completed in 1955.

The former New York State Water Pollution Control Board published Survey Report No. 1 and No. 2 entitled the "Upper" and "Lower Genesee River Drainage Basin," in 1955 and 1961, respectively. These reports recommended classification and assigned standards of quality and purity for various reaches of the tributaries and main stem of the Genesee River.

A study of flood problems at Honeoye Lake and Honeoye Creek, was initiated by the Soil Conservation Service in 1958 under Public Law 566, 83rd Congress.

A Review of Reports on the Genesee River, in the vicinity of Dansville, New York, with respect to Canaseraga Creek, was authorized by resolution adopted by the Committee on Public Works, House of Representatives, 3 June 1959. This Corps study was concurrent with a study by the Soil Conservation Service under Public Law 566, 83rd Congress. The Canaseraga Creek study by both agencies was later combined with this Genesee River Comprehensive Study.

A Reconnaissance Report on Oatka Creek at Warsaw, New York, for flood control was completed under Public Law 685, 84th Congress and dated 27 September 1960. A Detailed Project Report was authorized by the Chief of Engineers, 6 January 1961. Construction of the project was started in October 1966 and was completed 24 July 1968.

A design memorandum for rectification of deficiencies in the completed local flood protection project at Wellsville, New York, was authorized by Office, Chief of Engineers, 22 March 1962. The report was submitted to higher authority 22 April 1966. In 1973 and 1974, the channels in the Genesee River and Dyke Creek were widened and deepened, 3,500 feet of levees were constructed, and alterations made to two weirs to correct deficiencies in the project. In 1976, channel clearing and bank protection work was done on the upstream areas of Dyke Creek and the Genesee River. Also, levees and a steel sheet pile energy dissipator were constructed on the Genesee River section.

The New York State Water Resources Commission in November 1963, performed a preliminary investigation of the Conesus Lake Basin.

The "Primary Requirements for Drainage Planning, Rochester - Monroe County Metropolitan Area Drainage Study - Stage II" was completed in March 1964. The report contained considerable hydrologic information, flood plain mapping, and drainage design information dealing with the Genesee River and its tributaries in the county.

A report entitled "Summary of Water Resources Records at Principal Measurement Sites in the Genesee River Basin through 1963" was completed in 1965. The report was prepared by the United States Department of Interior, Geological Survey in cooperation with the New York Conservation Department, Water Resources Commission.

A flood control project for Red Creek, Monroe County, New York, was authorized by the Flood Control Act of 1966, Public Law 89-789, approved 7 November 1966. This project was initiated by the Soil Conservation Service in 1961 under authority of Public Law 566, 83rd Congress, and the Corps of Engineers was requested to participate in October 1961 under authority of Public Law 685,

84th Congress. As the study developed, the scope of the project exceeded the limitations of Public Law 685, 84th Congress, and the study was transferred by authority Office, Chief of Engineers, 20 March 1963, to the Genesee River Basin Comprehensive Study. A review report on Red Creek for flood control was submitted to Congress on 23 August 1966 in partial response to the comprehensive study authorization and served as the basis for the project authorization. This project is being reconsidered under the authority of this study resumption and will be discussed later is this report.

A joint Federal-State pollution study that included the Genesee River Basin was the Great Lakes-Illinois River Basins Project. This project began studying the Lake Ontario Basin in 1964 under authority of Section 3(a) of Public Law 84-660, as amended. The project report is "Lake Ontario and St. Lawrence River Basins, Water Pollution Problems and Improvement Needs, June 1968."

"A Flood Plain Information Report on Black Creek and Genesee River in the towns of Chili and Riga, Monroe County, New York" was prepared in September 1969. The report gives a history of flooding and outlines the extent of possible future floods, including the Intermediate Regional Flood and Standard Project Floods.

A "Report of Development of Water Resources in Appalachia" was completed in September 1969. The report emphasized the need for water supply and water quality improvements. The Stannard Reservoir project was included in the Appalachia report. It was recommended that the project be considered for authorization after additional studies.

A comprehensive water resources study of the Genesee River Basin was completed in 1969. The study detail was insufficient for project authorization. The Final Level B Study Report, completed in 1970, contained recommendations as a guide to future development. An early-action plan included a flood management project on the lower reach of Canaseraga Creek and a multi-purpose reservoir at the Stannard site located on the Genesee River south of Wellsville. The Level B Study also examined the multi-purpose Portage Reservoir Project which would have served hydropower and other needs but was deferred because of local opposition. The Level B Study found streambank erosion along the main Genesee River widespread but erosion control was not economically feasible.

The "Mount Morris Storage Allocation Study" authorized by Section 214 of the 1965 Flood Control Act and completed in September 1971 concluded that Mt. Morris Reservoir had storage in excess of flood control requirements which could be used to supply conservation purposes without measurably reducing its level of flood protection. It recommended further study to consider plans for allocation of storage for conservation purposes.

A "Flood Plain Information Report on Red Creek and the Genesee River in the towns of Brighton and Henrietta, Monroe County, New York," was prepared in June 1972. The report gives a history of flooding and outlines the Intermediate Regional Flood and Standard Project Flood.

In late 1972, a contract was awarded for removal of debris and shoals with the authorization of the Office of Emergency Preparedness under Public Law 91-606

from Beards Creek from the confluence with the Genesee through the village of Leicester, New York.

A "Flood Plain Information Report on Oatka Creek and Genesee River, Town of Wheatland, Monroe County, New York," was prepared in April 1973. The report gives a history of flooding and outlines the Intermediate Regional Flood and Standard Project Flood.

A snagging and clearing project on Canaseraga Creek from Groveland Station to its mouth was completed in the winter of 1972-1973 following tropical storm Agnes.

In August 1973, the "Report of Flood, Tropical Storm Agnes, Genesee River Basin, 21-23 June 1972" was published. The report summarized the extent and character of flooding from the major storm of record for the basin.

A "Section 14 Report for Bank Stabilization, Genesee River at Avon, New York," was prepared in November 1973. The report recommended rebuilding of the Avon sewage treatment plant access road bank, protection of the toe of slope, and protection of a sewer outfall with riprap. In 1975, during preconstruction engineering and design, the bank failure problem was found to be related to seepage, surface runoff, bank overloading, and traffic overloading and not bank erosion or flooding. No further Federal action was taken.

A "Letter Report on Stannard Reservoir, New York," was prepared in April 1974 in cooperation with the State of New York under the authorization of Section 214 of the 1965 Flood Control Act. The report evaluated the use of Stannard Reservoir for flood control with the resultant analysis yielding a benefit-cost ratio of less than unity.

A report entitled "Flood Recovery Planning Program - Preliminary Evaluation of Stony Brook and Mill Creek, Van Campen Creek, Plum Bottom Creek Watersheds" by the U.S. Department of Agriculture, Soil Conservation Service, was prepared in June and October 1974.

The report entitled "Dyke Creek Watershed Preliminary Evaluation" by the U.S. Department of Agriculture, Soil Conservation Service, was prepared in December 1974. The report recommended two small flood-retarding structures, channel modification on Hanover Brook, and floodplain management to reduce floodings along with land treatment to reduce erosion in the vicinity of Wellsville, New York.

A Preliminary Feasibility Report addressing flood damage reduction along Canaseraga Creek was essentially completed in 1975. This problem was re-evaluated in this study. It was found that the farmers in the area have provided their own flood protection measures. Also provision of a dam/reservoir to primarily provide flood protection for the lower Canaseraga Valley was not economically justified.

The "Reconnaissance Report on Dyke Creek at Wellsville, New York, for Flood Control under Section 205" was prepared in April 1975 and it found that an economically and engineeringly justifiable flood control project could be designed

and that further study was justified. A "Detailed Project Report for Flood Control, Dyke Creek, New York," was completed in January 1978 which recommended discontinuing the study in favor of a watershed study conducted by SCS. SCS began the Dyke Creek Watershed Study in January 1980 under authorization of Public Law 566.

A General Design Memorandum entitled "Red Creek, Local Flood Protection Project, Monroe County, New York," was completed in May 1975. The memorandum discussed modification of the original project authorized in 1966. Due to the lack of economic justification, the project was classified as inactive and preconstruction planning terminated in September 1975.

A report entitled "Flood Plain Information, Little Black Creek, Town of Gates, Chili, and Ogden, Monroe County, New York," was prepared in August 1975. The report presents a brief history of flooding and identifies areas which may be subject to possible future floods.

In November 1976, New York State Department of Environmental Conservation prepared a report entitled "Water Quality Management Plan for the Genesee River Basin" pursuant to Section 303(e) of the Federal Water Pollution Control Act Amendments of 1972. The report identified pollution problems, treatment needs, priorities, and schedules for pollution abatement.

A "Section 205, Flood Control Reconnaissance Report, Genesee River, Genesee Township, Potter County, Pennsylvania" was completed in October 1977. The associated study examined use of impoundments, levees, floodproofing, and relocation to protect Genesee and Hickox, Pennsylvania. No economically justified plan was identified.

In November 1977, the New York State Department of Environmental Conservation and the Genesee River Basin Regional Water Resources Planning Board published the "Comprehensive Water Resources Plan for the Genesee River Basin." Basic elements of the plan placed emphasis on existing needs and problems and proposals included improvement of water quality, an accelerated flood plain management program, and improved multi-purpose management of lakes, the Barge Canal, and Mt. Morris Reservoir.

A Section 14 Streambank Protection Project in Friendship, New York, upstream of State Route 408 bridge consisting of repairing 180 feet of the right bank along with placement of gabions, was completed in April 1978.

A report on "Streambank Erosion on the Genesee River along Ballard Road, Hume, New York," was prepared in June 1978. The report was prepared under the authority of Section 14 of the 1946 Flood Control Act, and identified the problem as one of inadequate storm drainage rather than streambank erosion. No Federal action was recommended.

A "Section 14 Reconnaissance Report on Streambank Erosion along Rush Creek at Bottsford Hollow Road, Allen-Home, New York," was completed in June 1978. No economically feasible plans for protection of two bridges along Bottsford Hollow Road were identified and no further Federal action was taken.

The "Section 205 Reconnaissance Report on Flooding of Ewart Creek, Swain, New York," was completed in July 1978. Engineering solutions investigated, including floodwalls and levees, were found cost prohibitive.

A letter report on "Streambank Erosion on Houghton Creek at Houghton College, Houghton, New York," was completed in August 1978 under the authority of Section 14 of the 1946 Flood Control Act. No plans of improvement considered for Houghton Creek were found economically justified.

A report on "Streambank Erosion on Van Campen Creek at Wellman Athletic Field, Friendship, New York," was completed in August 1978 under the authority of Section 14 of 1946 Flood Control Act. No measures evaluated were found economically justified and no further Federal action was taken.

A letter report on "Streambank Erosion on Unnamed Tributary of Caneadea Creek at Rushford, New York," was prepared in September 1978 under the authority of Section 14 of the 1946 Flood Control Act. The report concluded that the feasibility of providing protection to West Branch Road bridge and Hardy Corners Road bridge was not economically justified.

A letter report on "Streambank Erosion on Forked Brook along McCurdy Road, Town of Willing, New York," was completed in September 1978. The report was prepared under the authority of Section 14 of the 1946 Flood Control Act. The findings were that no structural alternative was justifiable; however, a nonstructural alternative which was economically justified, was not within Federal authority to implement.

A "Section 205 Reconnaissance Report on Flooding of Plumbottom Creek, Belmont, New York," was completed in September 1978. Plans of improvement evaluated, including channel improvements and modifications, were not found economically justified; and no further Federal action was taken.

A Section 14 Streambank Protection Project in Amity, New York, at Rogers Cemetery consisting of bank repair and gabion revetment to protect 500 feet of the Genesee River bank was completed in September 1978. Progressive failure of gabions threatened a 250-foot section of the cemetery and remedial work consisting of placement of stone riprap was completed in December of 1984.

The "Reservoir Regulation Manual, Mount Morris Dam and Reservoir, Genesee River Basin, Mount Morris, New York", was prepared in September 1978. The report contains reservoir regulation procedures along with a description of the project and hydrometerology information.

A report on "Streambank Erosion on the Genesee River along Lattice Bridge Road, Caneadea, New York," was completed in October 1978. The report, which was prepared under the authority of Section 14 of the 1946 Flood Control Act indicated that there was no Federal interest in the proposed drainage improvement measures.

A "Section 205 Reconnaissance Report on the Flooding Problems within the Town of Scio, New York," was completed in December 1978. The report indicated that

the cost of structural improvements evaluated exceeded benefits and that no further Federal investigation was warranted.

A Section 14 Streambank Protection Project in Houghton, New York," near the sewage treatment plant consisting of 300 feet of stone revetment along the Genesee River was completed in November 1979.

A Section 14 Streambank Protection Project in Geneseo, New York," along Route 20A consisting of 1,600 feet of stone revetment along the Genesee River was completed in November 1979.

The "State Water Plan" prepared by the Department of Environmental Resources, Office of Resources Management addressed the land and water resource needs of the Commonwealth of Pennsylvania in a series of reports covering various subbasins. Subbasin 14, the Genesee River, was included with Subbasin 16 the Upper Allegheny River in a report completed in December 1980. The report identified water resource goals and objectives, physical features and resources, social-economic features and water resource problems and solution alternatives.

A "Detailed Project Report and Environmental Impact Statement, Conesus Lake, New York" was prepared in September 1981 under the authority of Section 205 of the 1948 Flood Control Act, as amended. The report recommended implementation of a plan consisting of channelization, construction of a new control structure, and lake level regulation for control of the 25-year flood generated in the Conesus Lake Basin. Construction of this project will be completed in the summer of 1988.

A Section 14 Streambank Protection Project in Nunda, New York," at the School Garage consisting of 315 feet of stone revetment along the south bank and an additional 60 feet on the north bank of Keshequa Creek was completed in November 1981.

A "Section 14 Reconnaissance Report on Streambank Erosion Along Crawford Creek, Towns of Belfast and Caneadea, New York" was prepared in November 1981. The report identified inadequate drainage, a local responsibility; and, therefore, recommended no Federal action.

The Monroe County Comprehensive Development Plan was prepared in the late 1970's and published in 1982. The plan addressed those objectives related to county development, such as wastewater management, flood plain management, and land use.

The "State of the Environmental and Annual Report 1982" prepared by the Monroe County Environmental Management Council addressed the condition of county surface waters, drinking water supply, and wetlands.

A Section 14 Streambank Protection Project in Amity, New York, at Back River Road consisting of 208 feet of stone revetment and 70 feet of bank rebuilding along the Genesee River was completed in October 1982.

A "Section 14 Reconnaissance Report on Erosion along the Genesee River at East River Road, Caneadea, New York," was prepared in March 1983. The only

economically feasible plan evaluated was relocation of East River Road by local interests. No Federal action was warranted.

A "Section 14 Reconnaissance Report on Erosion along the Genesee County Road 48, Amity, New York," was prepared in March 1983. No Federal plans were found feasible, but road relocation by locals was identified as a possible solution.

Several draft technical reports on the Genesee River Pilot Watershed Study were completed in 1983 for the Environmental Protection Agency as a part of the Task C - Pilot Watershed Program for the International Joint Commission's Reference Group on Pollution from Land Use Activities. The reports concentrated on water quality and transport of pollutants. One report briefly discussed streambank erosion.

The "National Hydroelectric Power Resources Study" conducted under authority of the Water Resources Development Act of 1976 (Public Law 94-587), was completed in May 1983. Volumes IV and XIV of the final report dealt with specific needs and potential hydroelectric sites in New York State. Two undeveloped sites at Portageville and the New York State Barge Canal on the Genesee River were found with favorable hydroelectric power potential.

The document entitled "Report of Sedimentation, 1983 Resurvey, Mt. Morris Dam, Genesee River, New York" was prepared in October 1983 and revised in June 1984. The resurvey results indicated that the storage capacity of the Mt. Morris Dam Reservoir had been reduced by 11 percent since initial survey in 1952, the year the project was completed. The document recommended a resurvey within 10 years.

The Soil Conservation Service prepared the draft report "Dyke Creek, P.L. 566 Watershed Project, Watershed Plan and Environmental Assessment" in June 1984. The draft report proposed a levee system along Dyke Creek just upstream of Wellsville to reduce flooding along the creek which would consist of Federal and non-Federal expenditures.

The "Annual Report of the Monroe County Water Quality Management Agency" prepared in September 1984 outlined needs and plans for improvement related to water quality in the county. The report indicated that the most significant water problem affecting Monroe County concerned the effect of natural turbidity on the city of Rochester's Hemlock/Canadice Lake water supply.

An "Interagency Flood Hazard Mitigation Report" was prepared in October 1984 in response to the 25 September 1984 Disaster Declaration in Allegany, Steuben, and Yates County, New York, which was a result of severe flooding caused by the 11-14 August 1984 storm. The Federal Emergency Management Agency along with other Federal, State, and local governments provided input to the report which addressed hazard mitigation during the recovery period and reduction of the potential of future flood losses. Further study, under Section 14 of the 1946 Flood Control Act administered by the U.S. Army Corps of Engineers, was recommended regarding streambank protection at Centerville, Hume, Allen (2 sites) and Angelica in Allegany County, New York.

SECTION II

EXISTING CONDITIONS

SECTION 2

EXISTING CONDITIONS

This section provides an overview of existing conditions in the Genesee River Basin. It is divided into two parts: the Human (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 as projected by the New York State Department of Commerce, April 1985 County population projections.

Land Use and Development

Generally, the densely developed area of the basin occurs at the northern end, 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 in 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 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. Photos 2.1 and 2.2 show some of the agricultural lands of the basin. Most of the land area in Genesee, Livingston, and Wyoming Counties (approximately 61 percent) is devoted to agriculture.

March 1987
Representative agricultural land
of the Genesee River Basin.
Photo 2.1

March 1987
Agricultural land in the Genesee River basin.
Photo 2.2

Less land area is devoted to agriculture (approximately 37 percent) in Monroe and Allegany Counties due to development and topography, respectively. Maior products produced include dairy, field crops, grains, and livestock.

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.

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 and the rest of the county, began operation of a 32 mgd treatment plant at Lake Ontario in 1963. The Authority is planning to increase capacity to 57 mgd. The Authority is also 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 withdrawals for 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 US 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 at the Rochester-Monroe County 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, although pleasure craft traffic is steadily increasing. Deep-draft commercial navigation is maintained in the last 3 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

The average value of farmland within the basin ranges from about $600 to $1500 an acre. Values vary based on location, 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 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.

Community Cohesion

Local officials and residents in the basin have identified problems pertaining to scattered areas of erosion along the Genesee River relative to farmland, residential properties, and some public facilities. Local officials and residents have demonstrated significant effort in addressing the problems. Their efforts have included formation of basin protection committees to try to identify, survey and document problem areas, and to initiate resolutions to some of these problems including requests for investigations through various Federal and State programs.

With regard to future development, a number of basin residents would probably be adverse to any significant developments that would disrupt rural setting, and associated dwellings. Many residents are long-time property owners in the basin and would not want to relocate from their property or see their property significantly altered.

EXISTING CONDITIONS

NATURAL RESOURCES ENVIRONMENT

Air Quality

The ambient air quality data of the Genesee River Watershed meet or exceed the allowable 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).

The land uses associated with the three aforementioned NYSDEC air quality classification levels found in the Genesee River Basin are outlined in Appendix D.

Water Quality

Water quality for the Genesee River Watershed varies with the various reaches and tributaries. For the portion of the Genesee River from Route 36 to the Mount Morris Dam and from Dyke Creek to the Stannard Road bridge, the water is suitable for drinking, food processing purposes, and other uses; from the Mount Morris Dam to the town of Portageville, the stream water is best used for primary contact recreation and other uses, except for water supply. From Portageville to the town of Belmont and from the Stannards Road bridge to the State of Pennsylvania the stream is best suited for fishing and other uses, except for drinking and food processing.

Water from Canaseraga Creek, Dansville; Spring Creek, Caledonia; Red Creek, West Henrietta; Canaseraga Creek from the headwaters to the town of Dansville, is best suited for fishing and all other uses, except for drinking and food processing.

Fisheries

In general, the Genesee River and its tributaries provide habitat for a variety of fish species including trout, smallmouth bass, lake run salmon, steelhead trout, northern pike, walleye, channel catfish, minnows, panfish, darters, shiners, and suckers.

The following provides a brief overview of the existing fishery. The Genesee River, in the vicinity of Stannards in the upper basin, is a significant warmwater and coldwater fishery (smallmouth bass, panfish, and stocked trout). In the vicinity of Portageville and the village of Mount Morris, the Genesee River contains a warmwater fishery that includes panfish, northern pike, and smallmouth bass.

Wildlife

The diversity of habitat types in the Genesee River Basin support a variety of wildlife, including cottontail rabbit, ring-neck pheasant, woodchuck, whitetail deer, black bear, wild turkey, ruffled grouse, red squirrel, grey

squirrel, fox squirrel, eastern chipmunk, raccoon, skunk, opossum, fox, muskrat, mink, beaver, voles, moles, mice, and foxes.

Non-game birds present in the basin include a variety of hawks, owls and passerine birds, herons, bitterns, ducks, and Canadian geese.

There also is a variety of reptiles (snakes and turtles) and amphibians (salamanders, newts, and frogs) present in the basin.

Significant Habitats

There are a number of known significant natural resource areas in the watershed. The diversity of the natural resource areas of importance include but are not limited to coldwater sources in some of the tributaries, to wild trout spawning habitat, wetlands, waterfowl habitat, deer wintering areas, unique vegetation, and geological formations.

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 crop lands, managed grasslands for long-term hay, and pasture lands. 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, red pine, jack pine, eastern cottonwood, quaking aspen, box elder, and black willow. A variety of natural grass and forb weed species have established throughout the watershed.

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. 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.

SECTION III

PROBLEM IDENTIFICATION

SECTION 3

PROBLEM IDENTIFICATION

This section informs the reader of the water and related resource problems and needs in the study area for which this study seeks a solution. It identifies problem areas and discusses the need to reduce flood damages, streambank and farmland erosion in the Genesee River Basin. Add-on purposes such as irrigation, recreation, hydropower, and water supply are also discussed. This section also discusses the planning constraints under which this study was conducted, the without-project conditions, and the specific planning and national objectives of the feasibility study.

PROBLEMS, NEEDS, AND OPPORTUNITIES.

Flooding

Floods, a common occurrence in the basin, have caused severe damages along the Genesee River and its major tributaries. In the upper basin, serious floods occurred in the village of Wellsville in Allegany County, and have been of concern to communities in the lower basin as far as the towns of Henrietta and Chili in Monroe County. Substantial residential and commercial damages occurred during the 1956, 1959, 1960, 1961, 1972, 1976, and 1984 floods. Also, streambank erosion resulting in an average soil loss of approximately 1 million tons per year, and agricultural and farmland erosion damages have been significant because of the recurrence of the more frequent, less severe flood events. The June 1972 tropical storm Agnes and associated weather systems produced the most destructive widespread flooding conditions of record over the entire Genesee River Basin. Total flood damages caused by the June 1972 flood were estimated at $128 million (1987 price levels).

In the upper basin, Dyke Creek and the towns of Wellsville and Fillmore, in 1972, sustained severe flood damages estimated at approximately $60,000,000 (1987 price levels). The Wellsville Hospital (Photo 3.1) sustained excessive flood damages. Devastation was pervasive throughout the village. As the flood swept across the area, roads and bridges became small waterways. Photos 3.2-3.6 depict some of the effects of that flood. The effects of floods in 1984 on Allegany and Steuben Counties residents, properties, creeks, and public facilities caused the Federal Government to declare these counties disaster areas. Streambank and farmland erosion damages were highest (Photos 3.7-3.10). Total damages were estimated at $5.7 million. The latest flood event in the upper basin occurred on September 12, 1987 in Andover, Allegany County. Local residents estimated damages at approximately $.5 million (1987 price levels).

The lower basin has experienced significant flood damages in 1972 estimated at about $68 million (1987 price levels) in spite of the existing Mt. Morris dam and reservoir. During the 1972 flood, regulation of the reservoir required temporary release of reservoir outflows in excess of safe downstream channel capacities to prevent overtopping of the spillway with debris-laden flows. Flood waters came to within 4 feet of overtopping the spillway crest of the dam as shown on Photo 3.11. The reservoir pool reached a peak elevation of 756.0

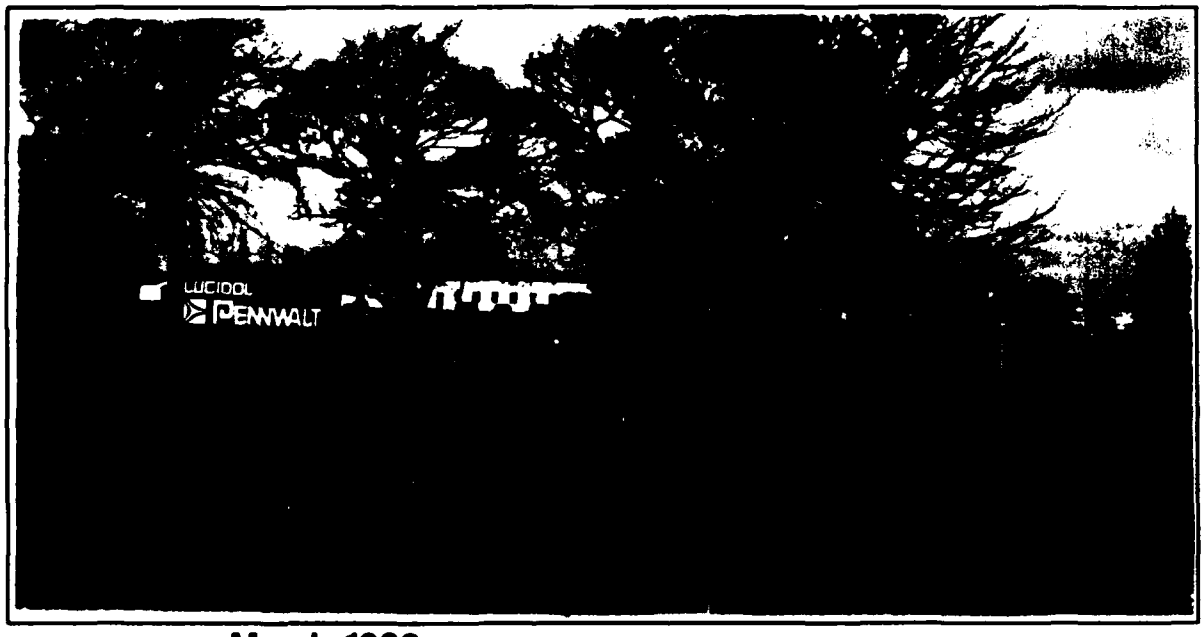
feet above mean sea level. Corps employees aided approximately 700 Army National Guardsmen, students, and local citizens in erecting sand bag levees on the river banks in the Rochester suburbs of Henrietta and Brighton (Photo 3.12). Low-lying areas below the dam (Photos 3.13-3.14) suffered immense damages. It was the most extensive inundation of these areas since construction of the dam in 1952. Plates 3.1-3.5 show the floodway of the lower Genesee River and the outline of flooded areas during the Agnes flood in 1972. In Reach 4 (Plate 3.4), the Lucidol Company at Piffard became a matter of concern . The company manufactures and stores phosgene and toxic gases, which placed a constraint on flow releases from the reservoir. If flooded, contaminated waters and unstable gas explosion from the company would have a far reaching effect on the highly populated and industrialized areas of Rochester, and surrounding suburbs. A composite photo of the Company is shown on page 3-3.

Four years later, the 1976 flood caused damages estimated at $10.0 million (1987 price levels). This flood resulted in a peak reservoir elevation of 744 feet (See Photo 3.15).

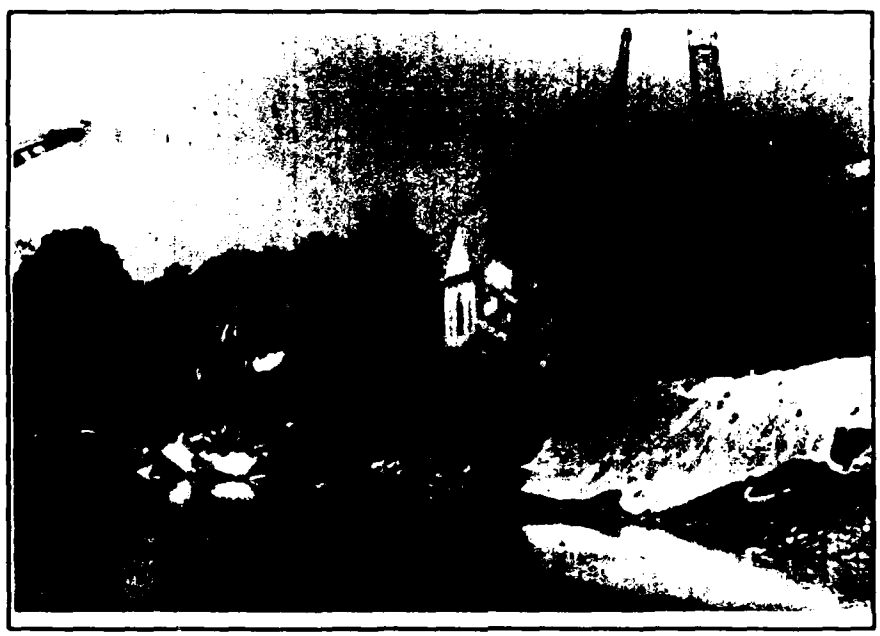
Since the 1976 flood, frequent overbank flooding events occurred on the tributaries to the Genesee River at Black Creek and Oatka Creek Watersheds. These watersheds were flooded in March 1978, March 1979, March 1984, December 1984, and January 1986. A contributing factor to these repeated overbank flooding conditions on the tributaries is the release of water through the Mt. Morris dam even though these releases have been limited to a maximum of 8,000 cubic feet per second (cfs): As the Mt. Morris dam and reservoir was not built to have any storage capacity for purposes other than flood control, all inflow was instantly released to continuously avail the total storage capacity to flood control. The downstream channels were running at almost bankful-flow condition. The problem was further complicated by the very flat gradients that caused ponding which lasted for several months. Subsequent to the 1956 flood, farmers from Mt. Morris to the southern part of Rochester complained and this prompted a study of the channel capacities. The safe channel capacity near Avon, New York, was approximately 10,500 cfs, which was the smallest capacity below the Mt. Morris Dam/Reservoir (See Table 3.1). Consequently, it was determined that the outflow from the dam would be held to no more than 8,000 cfs, in as much as it was possible. Contrary to the beliefs that no pool is occurring in the gorge, figures 3.1 thru 3.5 illustrate the highest annual pools that occurred in the gorge for the period 1980-1986. These periodic pools resulted from the release of lesser flows to the lower basin, and reduce the flood storage capacity in the reservoir. However, the release of lesser flows to the downstream reduces the occurrence of overbank flooding conditions on the main stem of the lower Genesee River and its tributaries.

A substantial acreage of high value vegetable crops was inundated in the Canaseraga Creek Valley with losses estimated at over $1,000,000. Table 3.2 shows detailed damages in terms of dollars for the 1972 flood in the basin. Tables 3.3 and 3.4 provide a comparison of this flood with past record flows in the upper and lower portions of the Genesee River Basin.

The Canaseraga Creek Valley, which has been improved over the years, can still be flooded by the Standard Probable Flood despite the levee-work improvements implemented by some local farmers. Expected total annual flood damages in the Canaseraga Valley were estimated at $496,000 (May 1986 price levels).

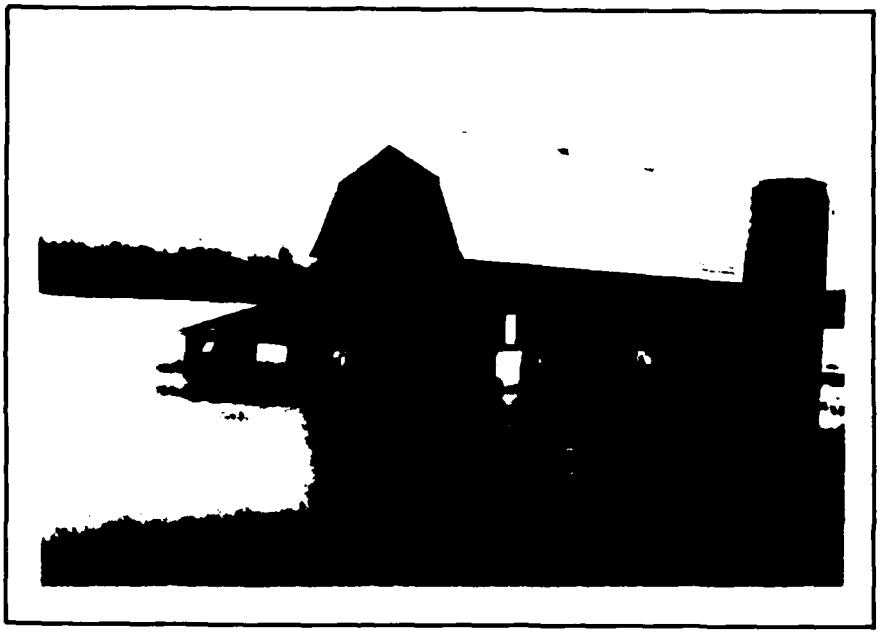


March 1988
Lucidol Penwalt Plant
at Geneseo, Livingston County.
Composite Photo



June 1972
Wellsville Hospital, Allegany County, NY
during Hurricane Agnes Flood.
Photo 3.1

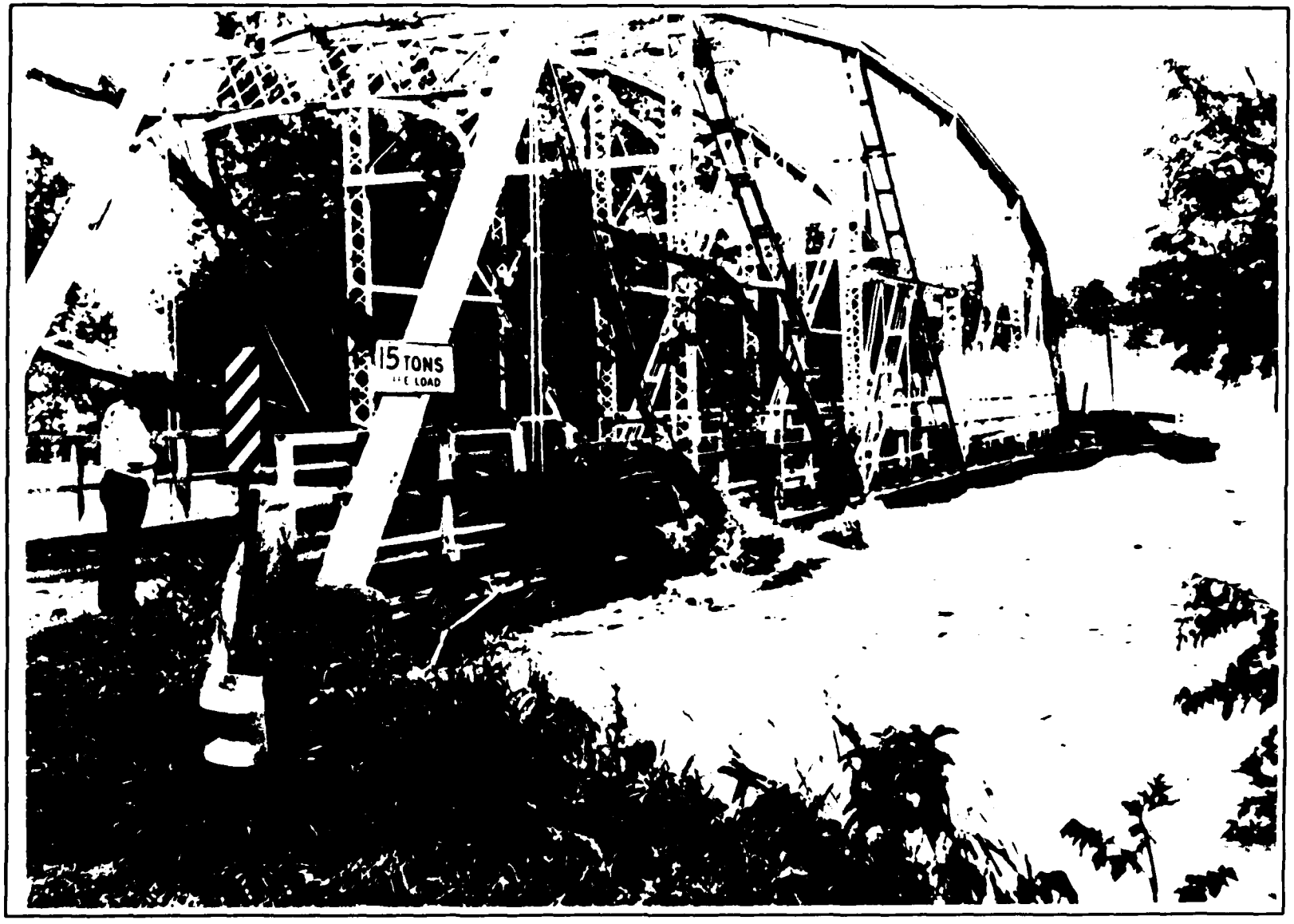
Flooded residence in Portageville at River mile 87.5 in photo taken 23 June 1972.
Photo 3.2



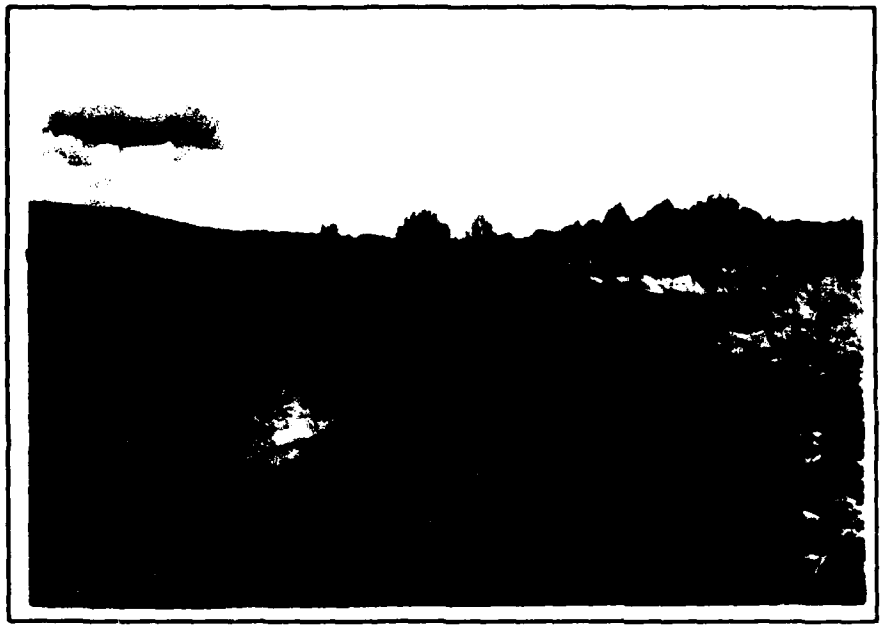
Flooded farm along Route 19 in Belfast.
Photo taken 21 June 1972.
Photo 3.3

State Route 245 bridge in Portageville at River mile 87 in photo taken 23 June 1972.
Photo 3.4

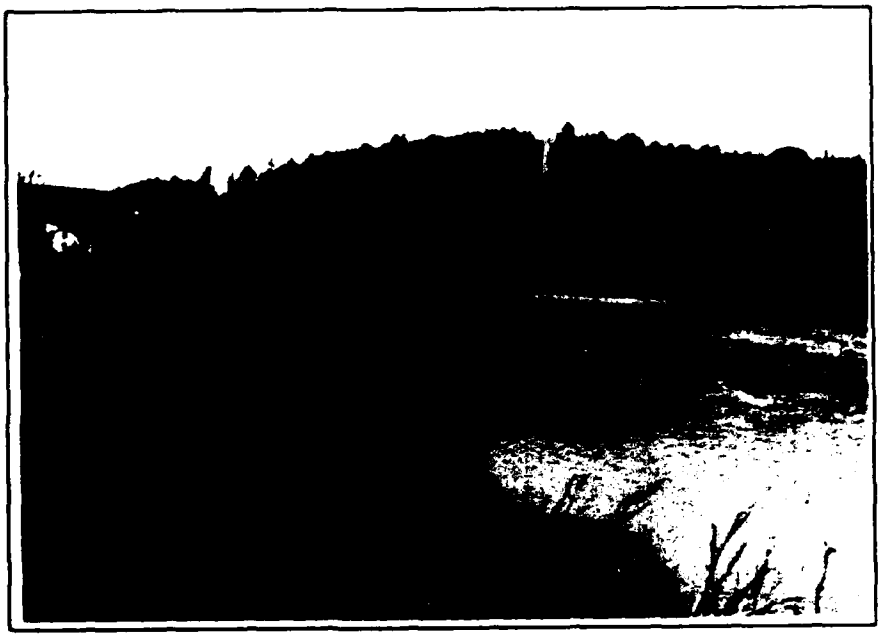
State Route 19 between Wellsville and Scio in photo taken 21 June 1972.
Photo 3.5



Corbin Hill Road bridge at River mile 128.2 in photo taken 21 June 1972.
Photo 3.6



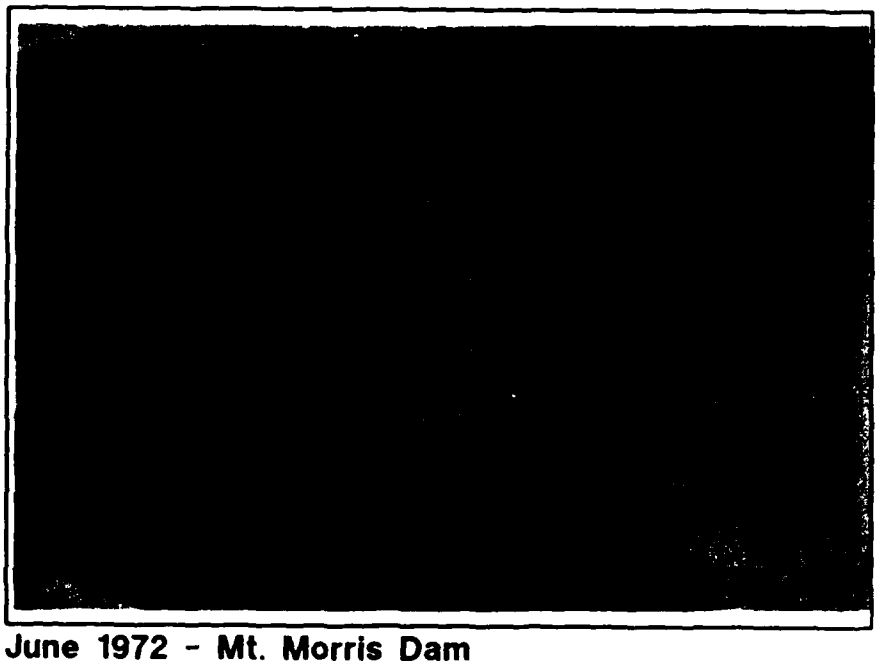
April 1985 - Genesee River
Streambank erosion at Oramel, Allegany County.
Photo 3.7



April 1985 - Genesee River
Erosion of farmland at Portageville.
Photo 3.8

April 1985 - Genesee River
Farmland erosion end of Robin Road Shongo.
Photo 3.9

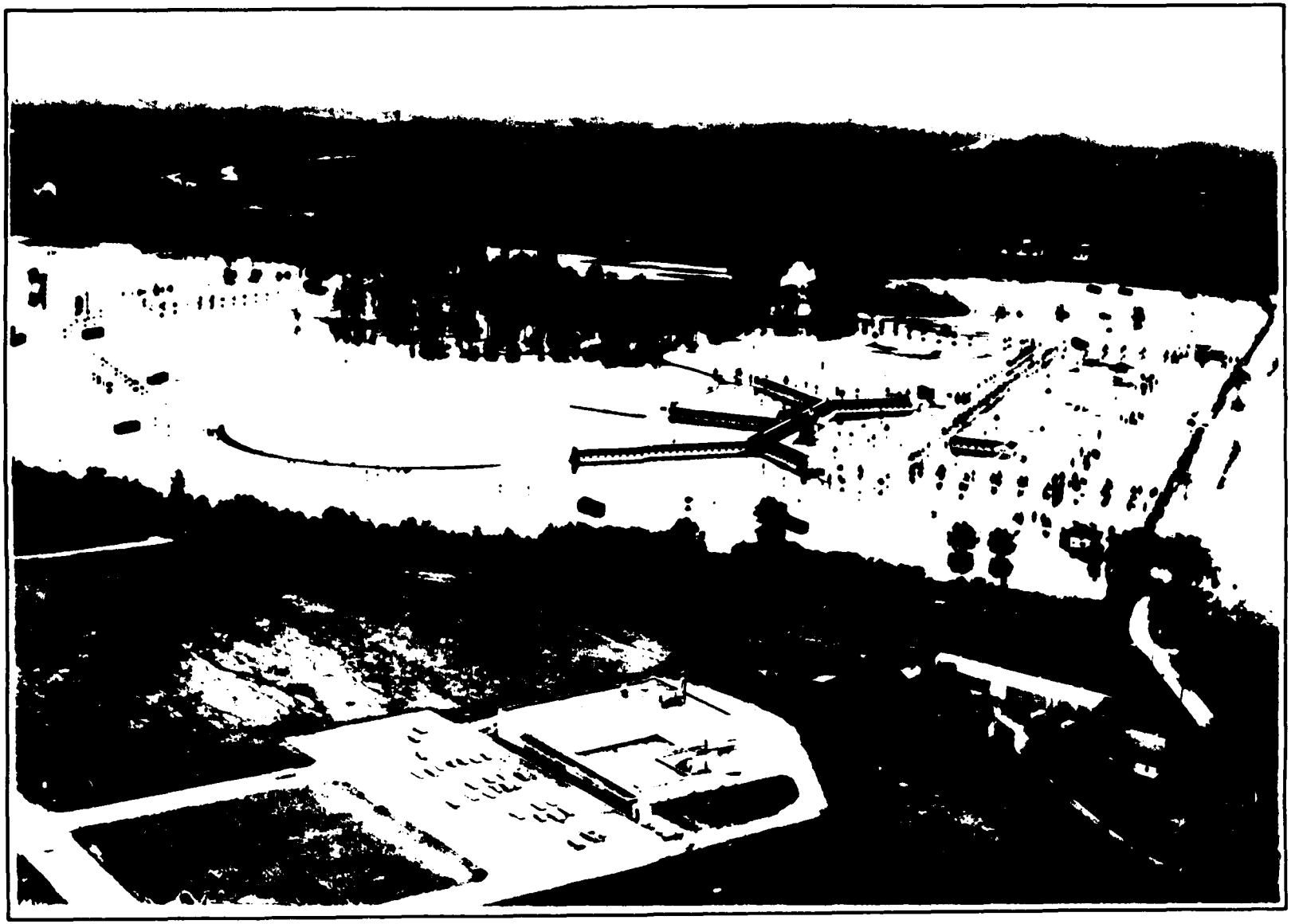
April 1985
Streambank Erosion endangering homes
Wiedrick Rd., South Wellsville.
Photo 3.10



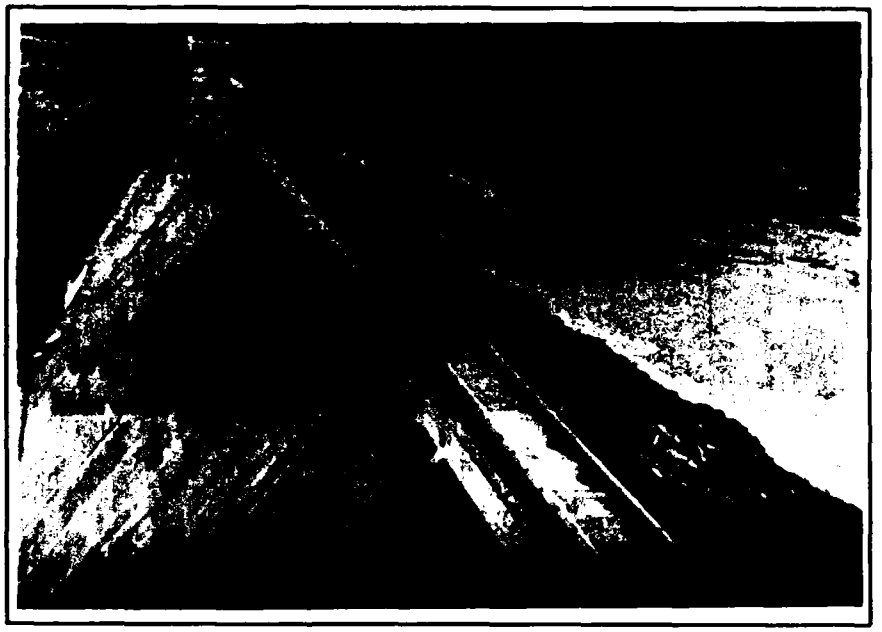
**June 1972 - Mt. Morris Dam
with the water level within 4' of the spillway
during Hurricane Agnes Flood.
Photo 3.11**

June 1972
Corps Employees, Army National Guard and students erecting sandbag levees on the river banks during Hurricane Agnes Flood.
Photo 3.12

June 1972
Low lying areas below the dam suffered immense flood damages.
Photo 3.13

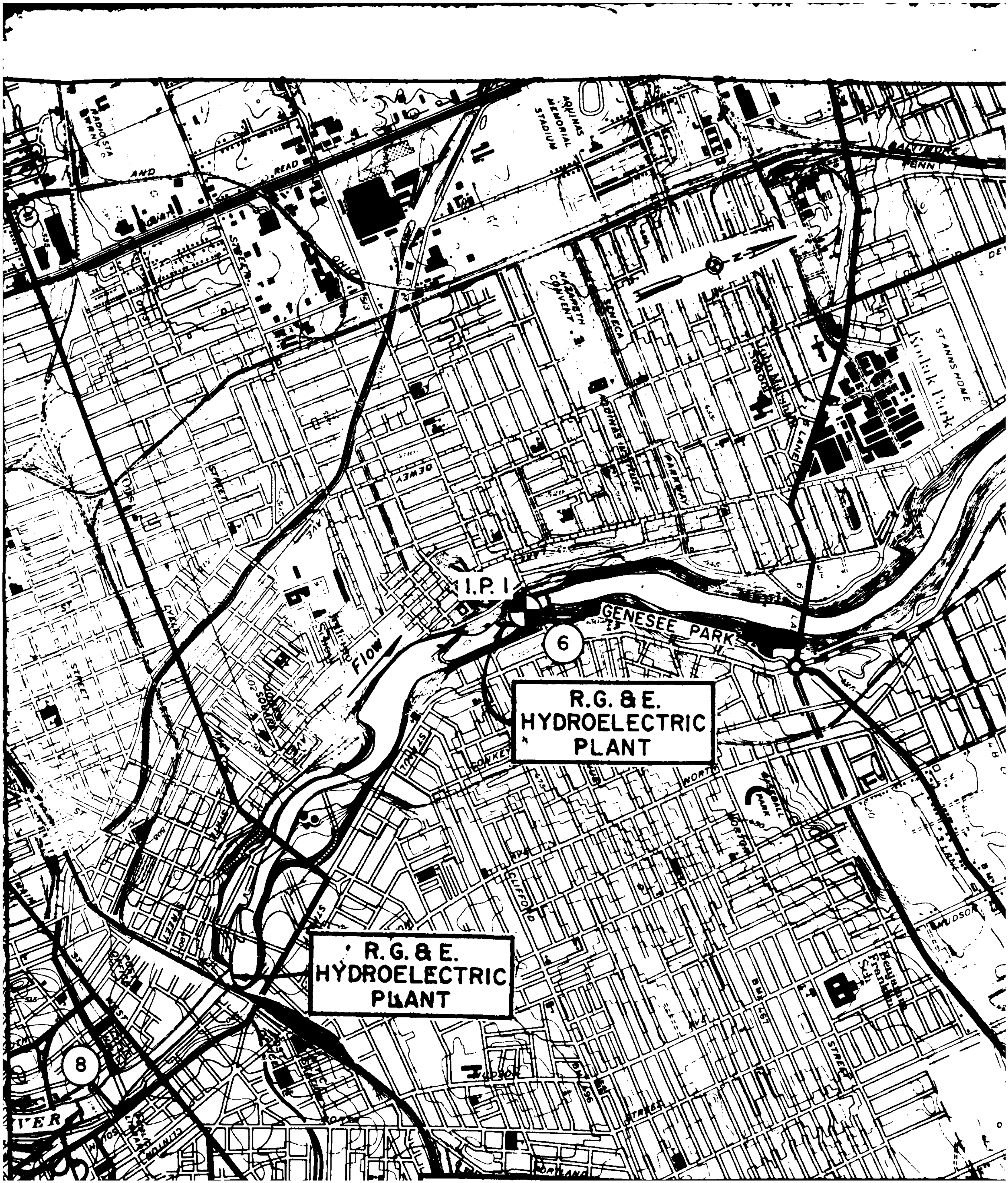


June 1972 - Flooded Horse Farm in Scottsville, Monroe County, NY.
Photo 3.14

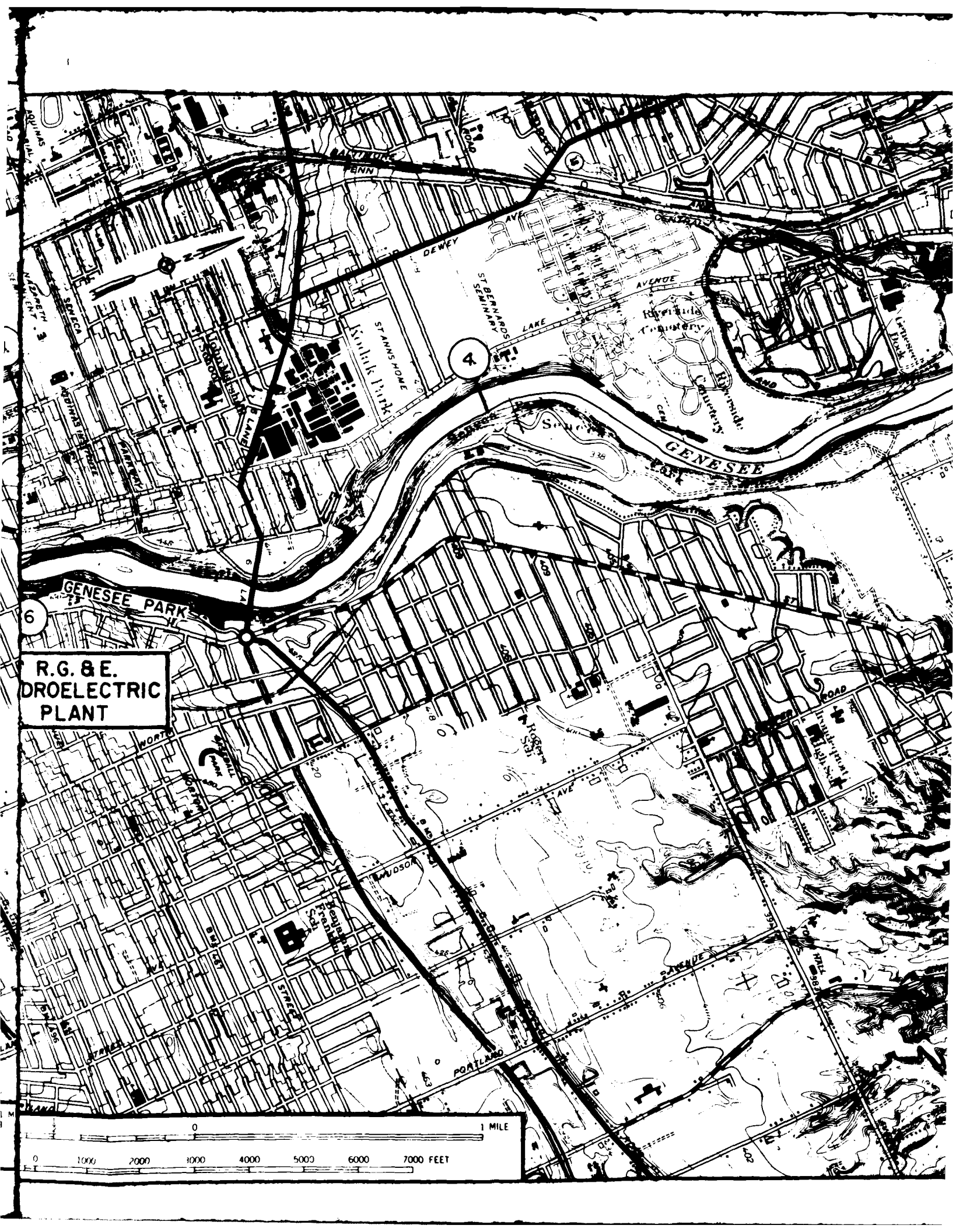


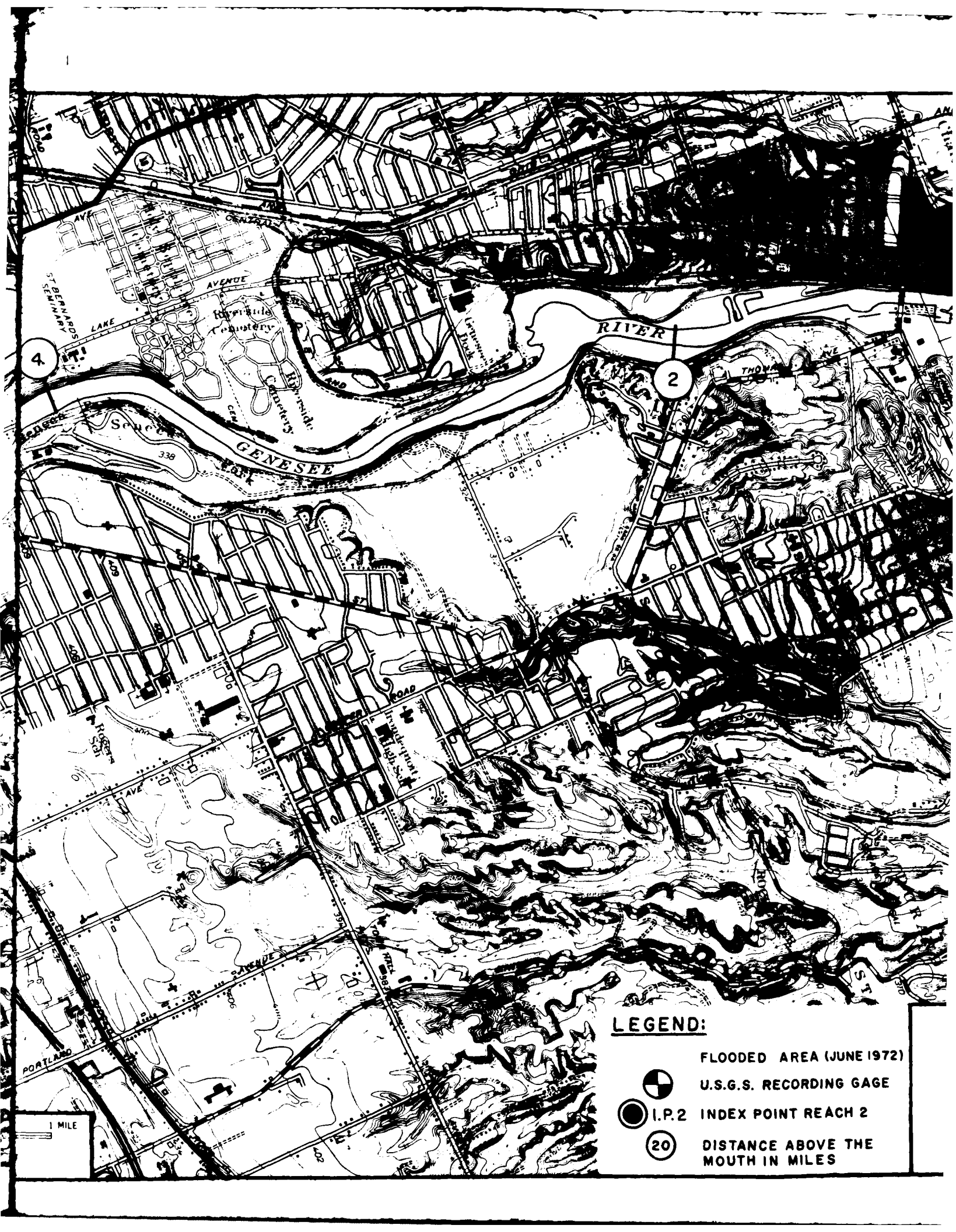
Peak Water Elevation in Mt. Morris Dam during Flood of 1976.
Photo 3.15

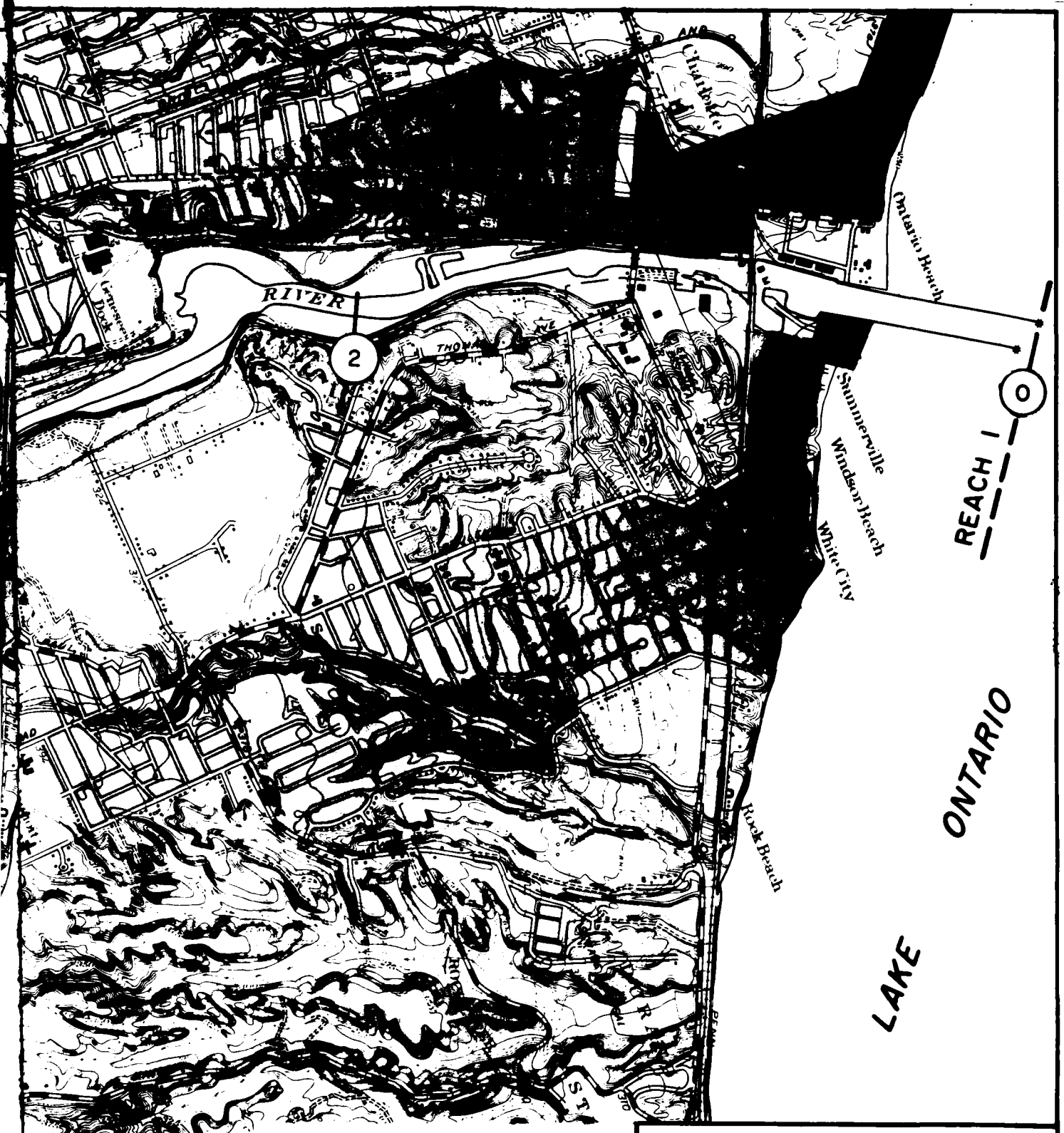

PENN
ROAD
CANAL
CENTRAL
AVE
STREET
BROWN
SEWARD
JEFFERSON
10



I.P. I
GENESEE PARK
6
R.G. & E.
HYDROELECTRIC
PLANT
R.G. & E.
HYDROELECTRIC
PLANT
8
Flow
AQUINAS
MEMORIAL
STADIUM
NAZARETH
CONVENT
SENECA
PARKWAY
DEWEY
CLIFFORD
STANNS HOME
Kodak Park
PENN
HUDSON
PORTLAND


R.G. & E.
HYDROELECTRIC
PLANT
GENESEE PARK
GENESEE
RIVER
OAKLEY
DEWEY
AVE
ST BERNARDS SEMINARY
ST ANNS HOME
LAKE
AVENUE
PORTLAND
AVENUE
0
1 MILE
0
1000
2000
3000
4000
5000
6000
7000 FEET


LEGEND:
FLOODED AREA (JUNE 1972)
U.S.G.S. RECORDING GAGE
I.P.2 INDEX POINT REACH 2
20 DISTANCE ABOVE THE MOUTH IN MILES
1 MILE
GENESEE
RIVER
PARK
AVENUE
PORTLAND
ROAD
LAKE
4
2



LEGEND:

- FLOODED AREA (JUNE 1972)
- U.S.G.S. RECORDING GAGE
- I.P.2 INDEX POINT REACH 2
- (20) DISTANCE ABOVE THE MOUTH IN MILES

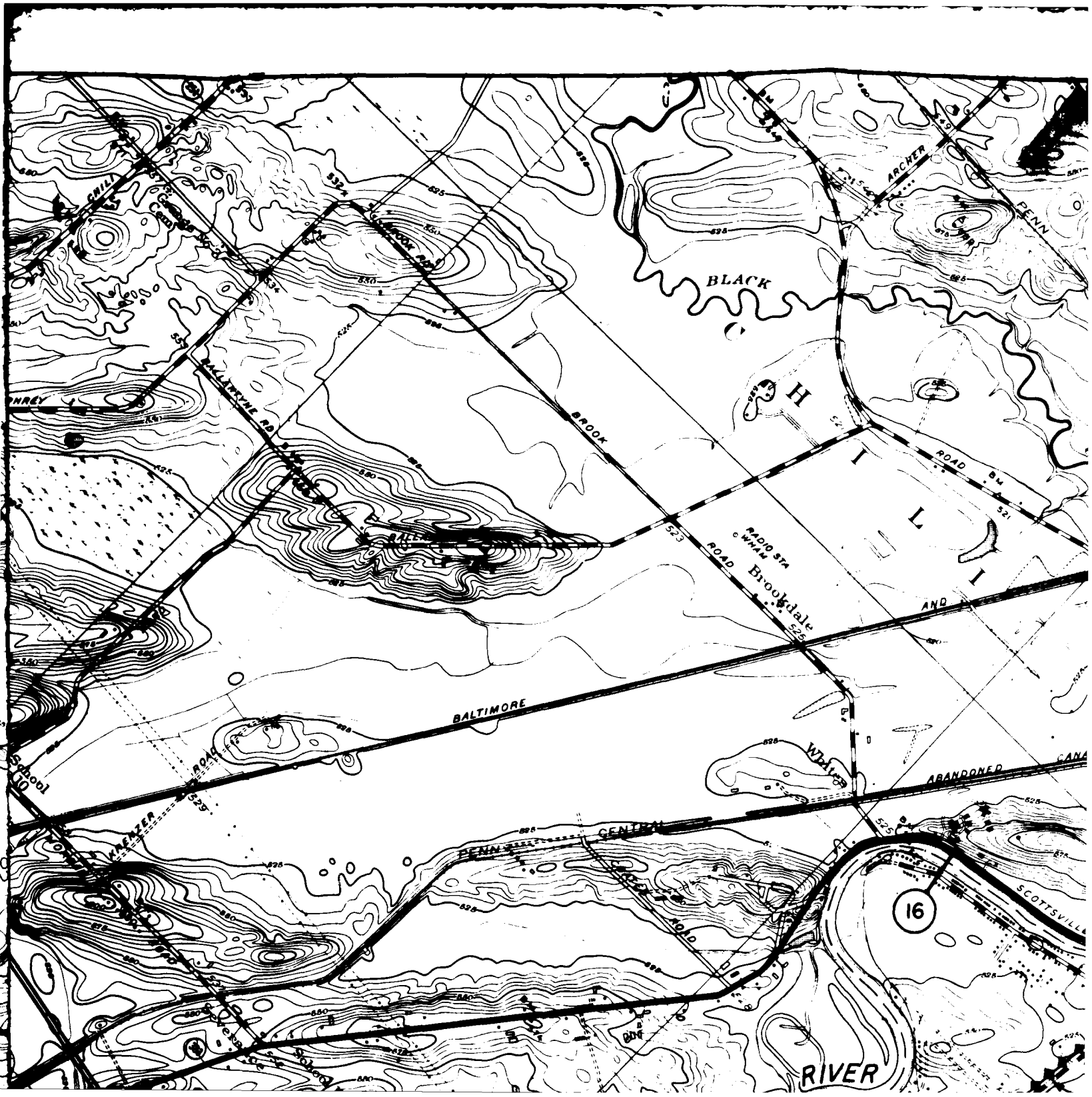
GENESEE RIVER BASIN STUDY
TROPICAL STORM AGNES, JUNE 1972

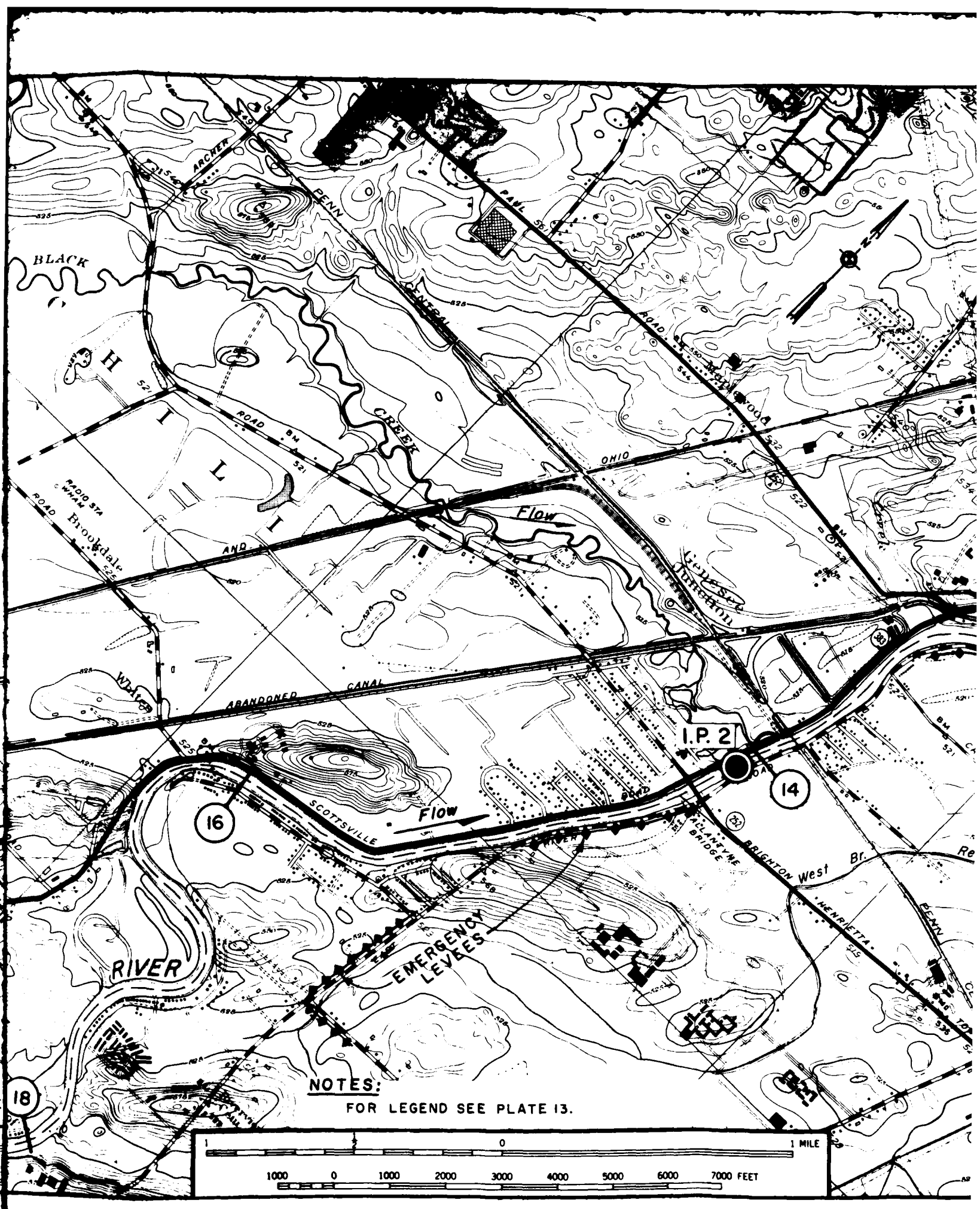
ROCHESTER FLOODED AREAS

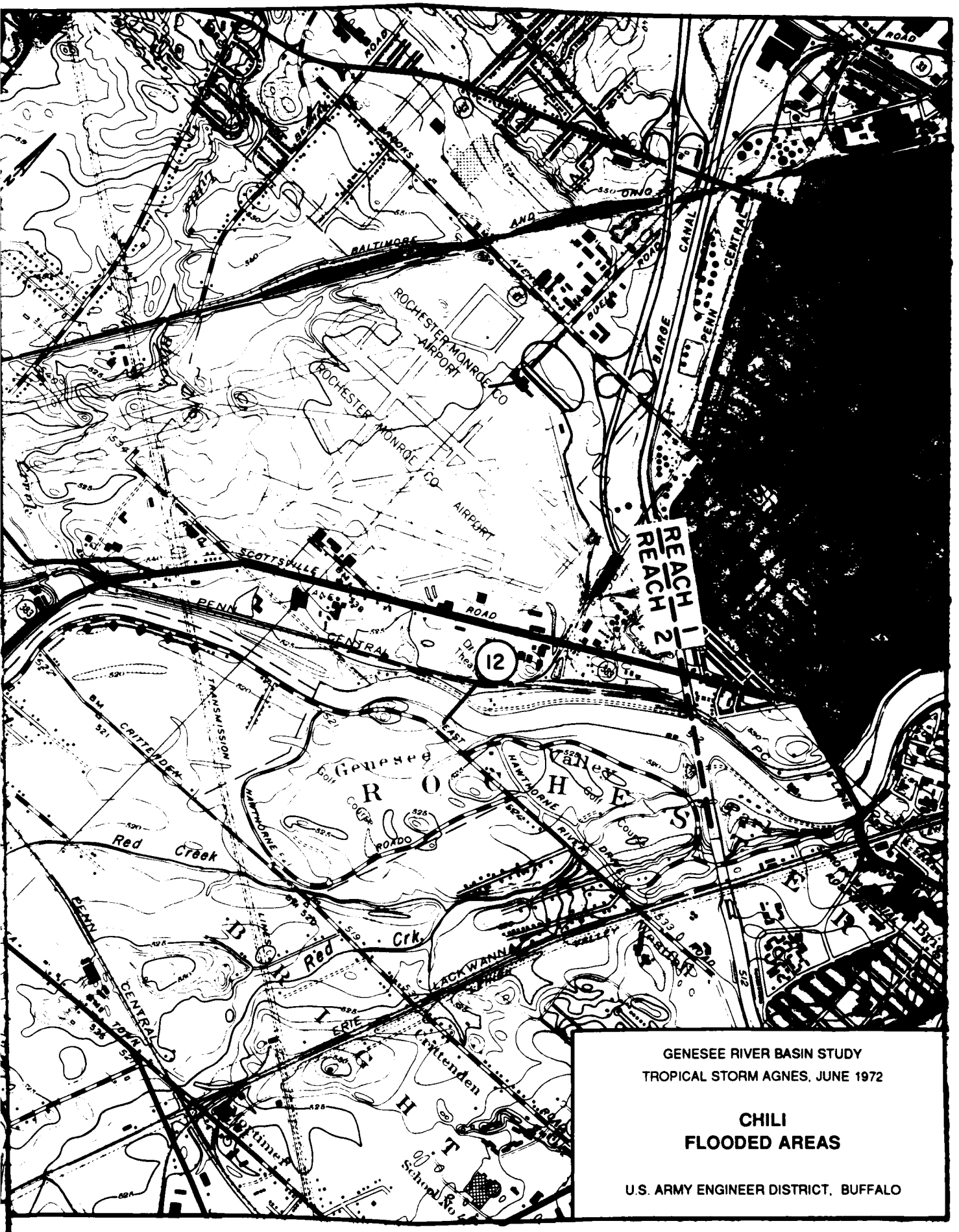
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE 3.1

HUMPHREY
ROAD
20


BLACK
H
I
L
L
BROOK
ROAD
Brookdale
RADIO STA
WHAM
BALTIMORE
ROAD
AND
ABANDONED
PENN
CENTRAL
ARCHER
PENN
BALLANTYNE RD
School
16
RIVER


BLACK
ARCHER
PENN
CENTRAL
PAUL
ROAD
CREEK
OHIO
ROAD
BM
RADIO STA
WHAM
Brooksdale
ROAD
AND
Flow
ABANDONED
CANAL
I.P. 2
16
14
SCOTTSVILLE
Flow
ROAD
ALLANDYNE
BRIDGE
BRIGHTON
West
Br.
HENRIETTA
PENN
RIVER
EMERGENCY
LEVEES
18
NOTES:
FOR LEGEND SEE PLATE 13.
1
0
1 MILE
1000
0
1000
2000
3000
4000
5000
6000
7000 FEET



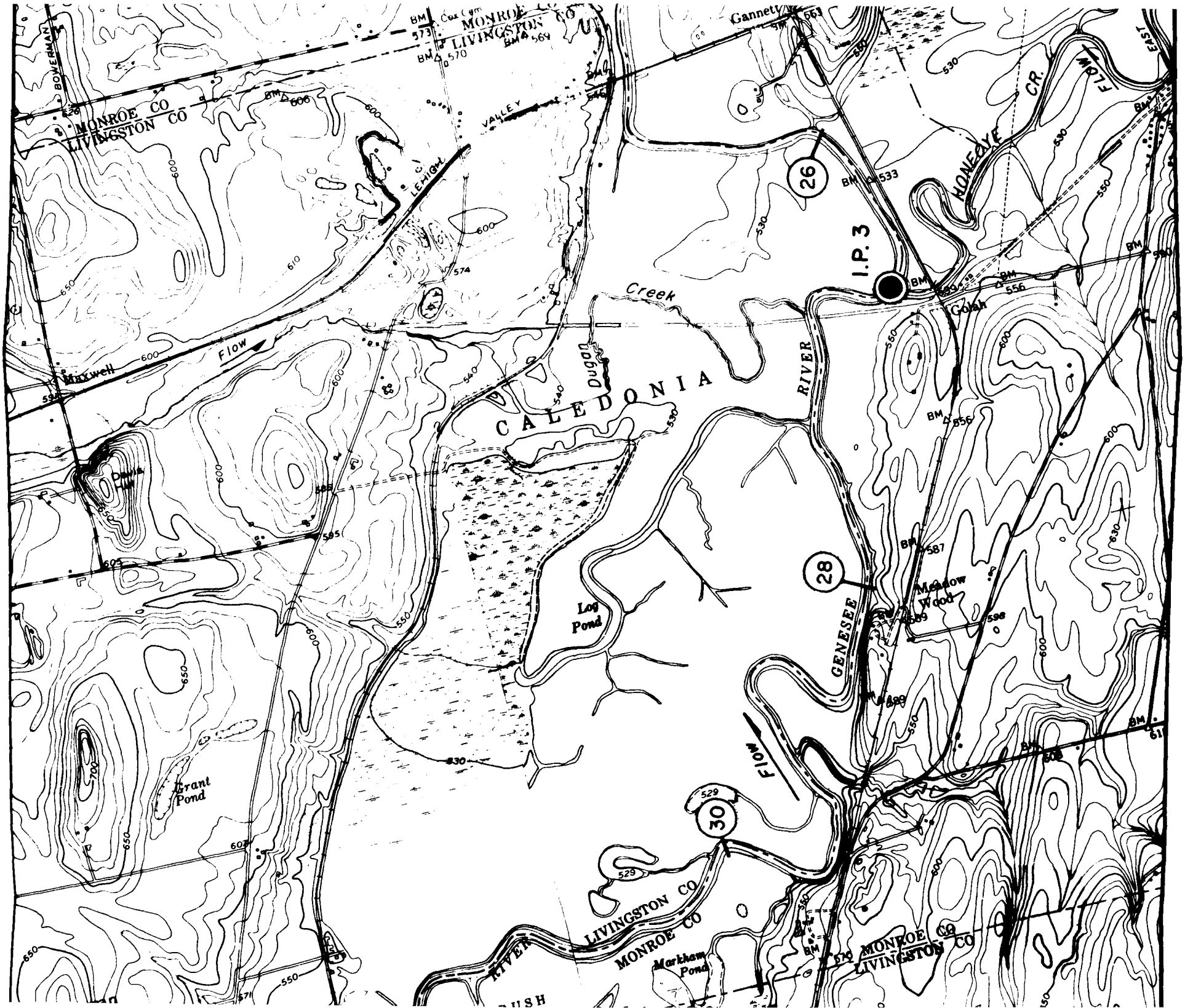
GENESEE RIVER BASIN STUDY
TROPICAL STORM AGNES, JUNE 1972

CHILI
FLOODED AREAS

U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE 3.2

REACH 4
REACH 3
ERIE LACKAWANNA
PENN CENTRAL
GENESEE
RUSH
RIVER
LIVINGSTON CO
MONROE CO
LACKAWANNA
ERIE
Horseshoe Pond
Markham Pond
Canaseraga
BM 552
BM 556
34
32
36
30
AVON (651)


MONROE CO
LIVINGSTON CO
BM 573
BM 569
BM 570
Gannett
BOWERMAN
VALLEY
LEHIGH
Creek
Maxwell
Flow
CALEDONIA
Dugan
RIVER
I.P. 3
Golah
HONEOYE
CR.
EAST
Davis Hill
Log Pond
GENESEE
Meadow Wood
FLOW
Grant Pond
Markham Pond
RUSH
26
28
30
BM 533
BM 556
BM 587
BM 598
BM 608
BM 570

NOTES:

FOR LEGEND SEE PLATE 13.

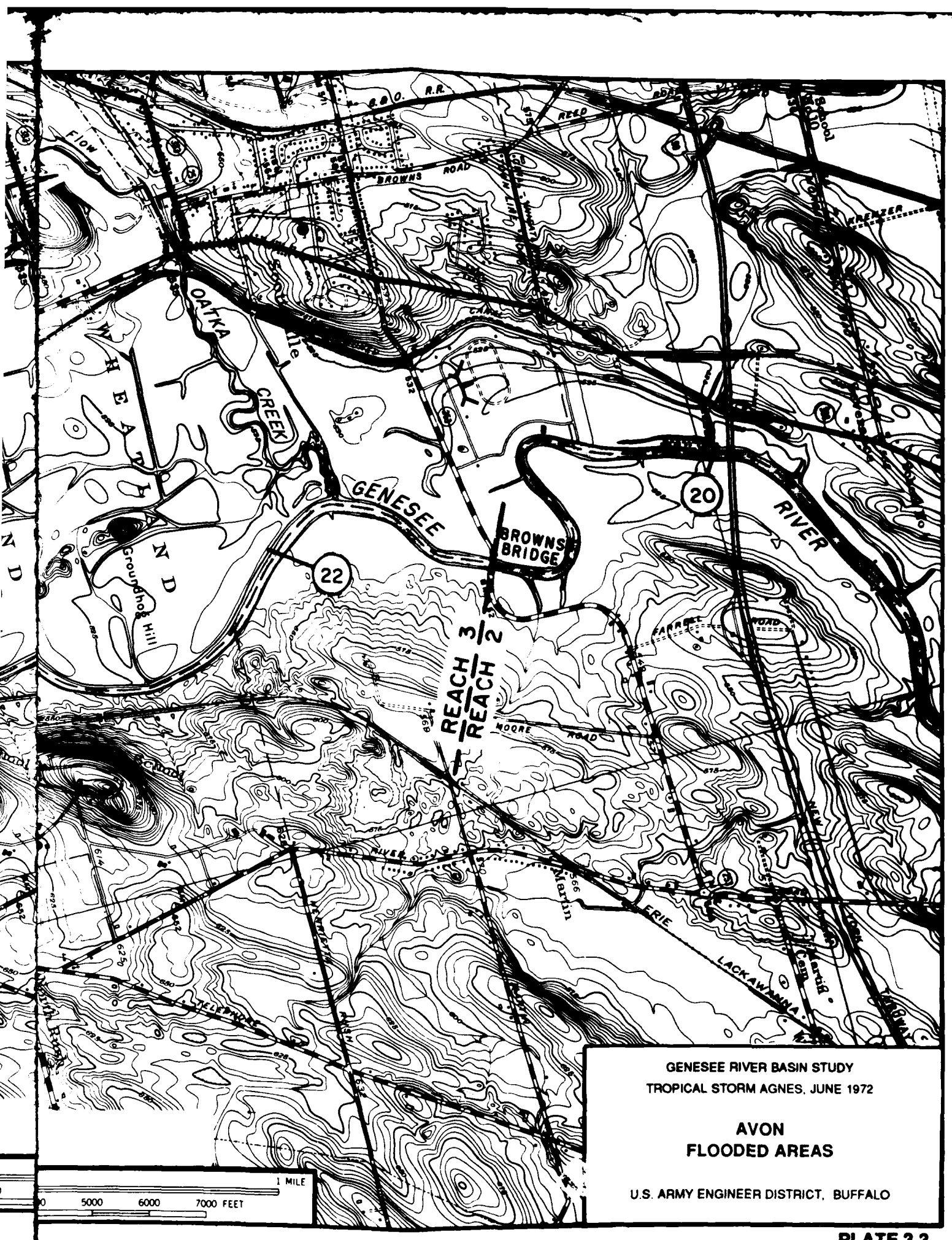
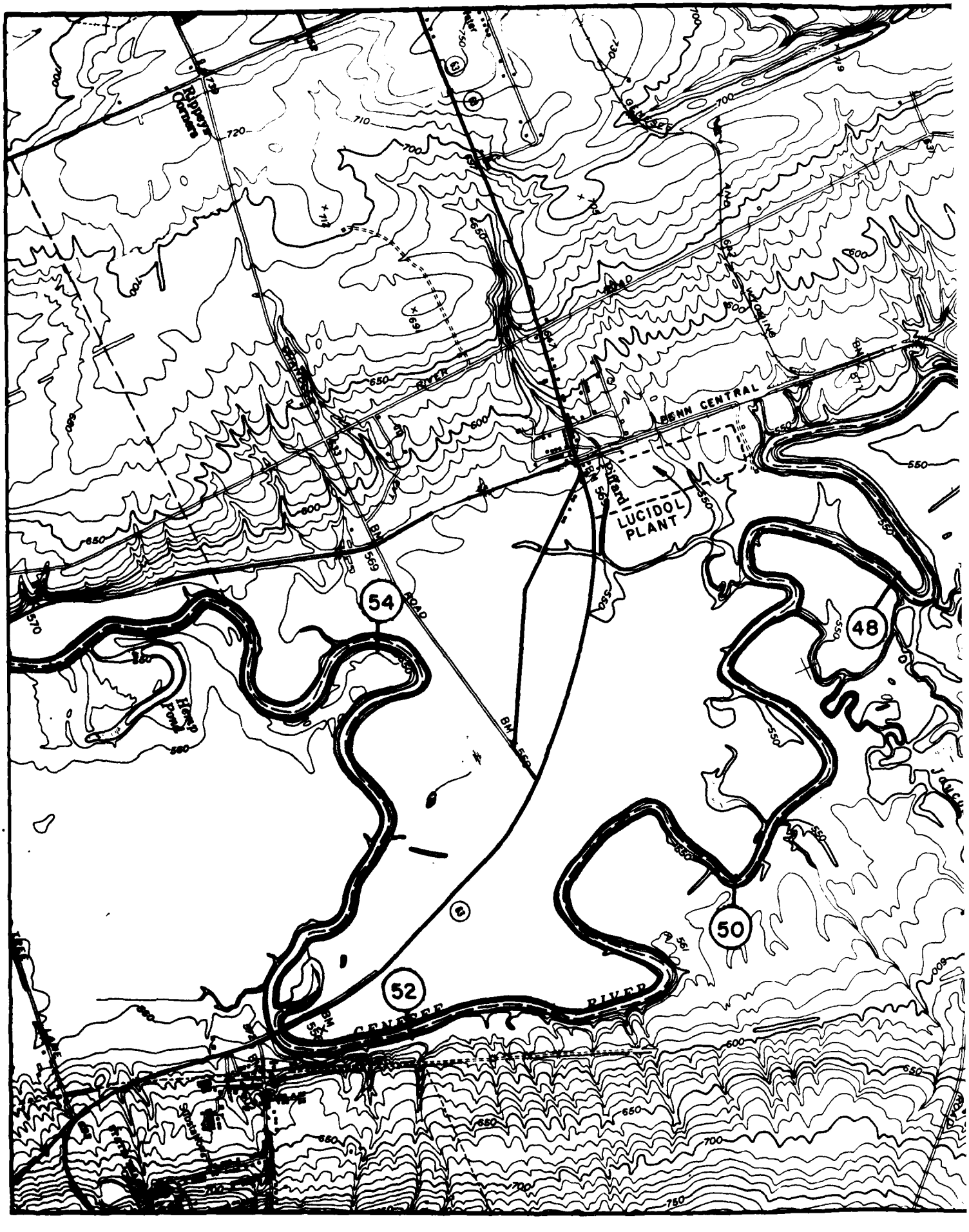
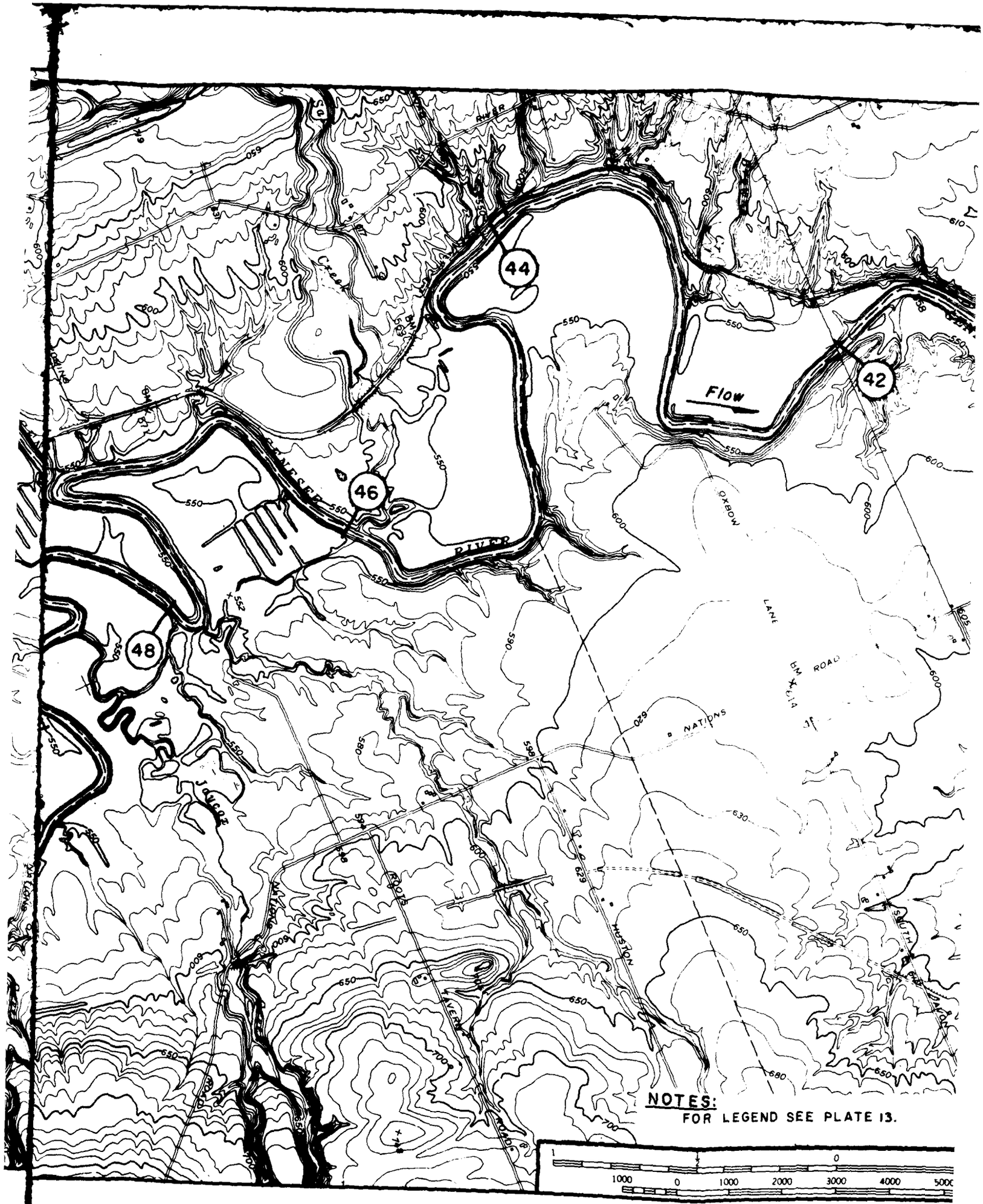
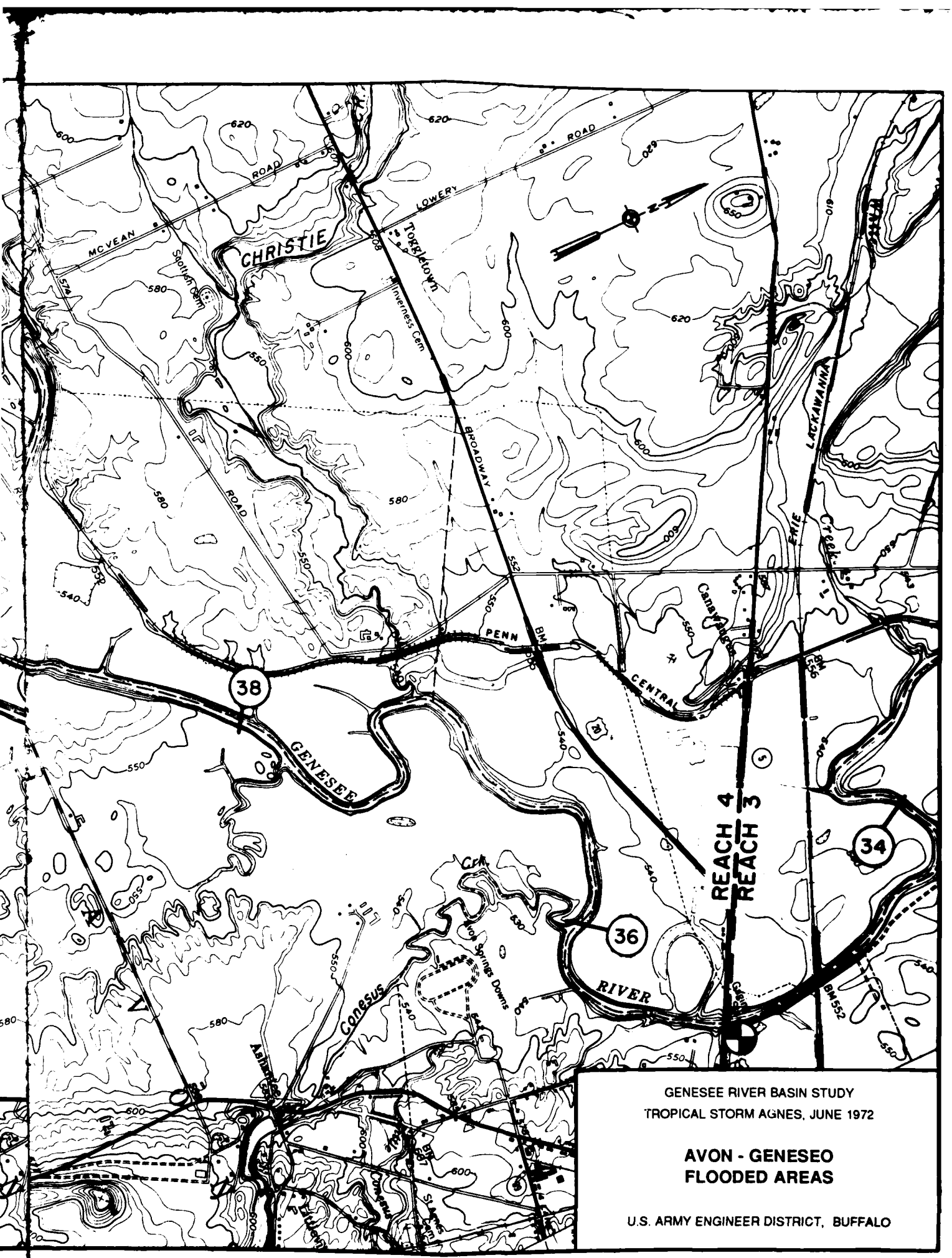

GENESEE RIVER BASIN STUDY
TROPICAL STORM AGNES, JUNE 1972
AVON
FLOODED AREAS
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1 MILE
5000
6000
7000 FEET
GENESEE
RIVER
BROWNS
BRIDGE
REACH 3
REACH 2
OATKA
CREEK
BROWNS ROAD
REED
MOORE ROAD
FARRELL ROAD
KREMER
Groundhog Hill
Martin
ERIE
LACKAWANNA
20
22

PLATE 3.3


Ridge Cemetery
PENN CENTRAL
LUCIDOL PLANT
54
48
50
52
GENESEE RIVER
Horse Pond
BM 569
BM 550


44
42
46
48
Flow
OXBOW
LANE
ROAD
NATIONS
TAVERN
RIVER
Creek
NOTES:
FOR LEGEND SEE PLATE 13.
1000
0
1000
2000
3000
4000


I.P. 4
Flow
42
40
OXBOW LANE
NATIONS ROAD
BM 614
BM 593
MOGMIRE ROAD
BOYD ROAD
SOUTH PENNSYLVANIA
BAYING
MCVEAN
NATIONS
NOTES:
FOR LEGEND SEE PLATE 13.
0
1 MILE
0
1000
2000
3000
4000
5000
6000
7000 FEET

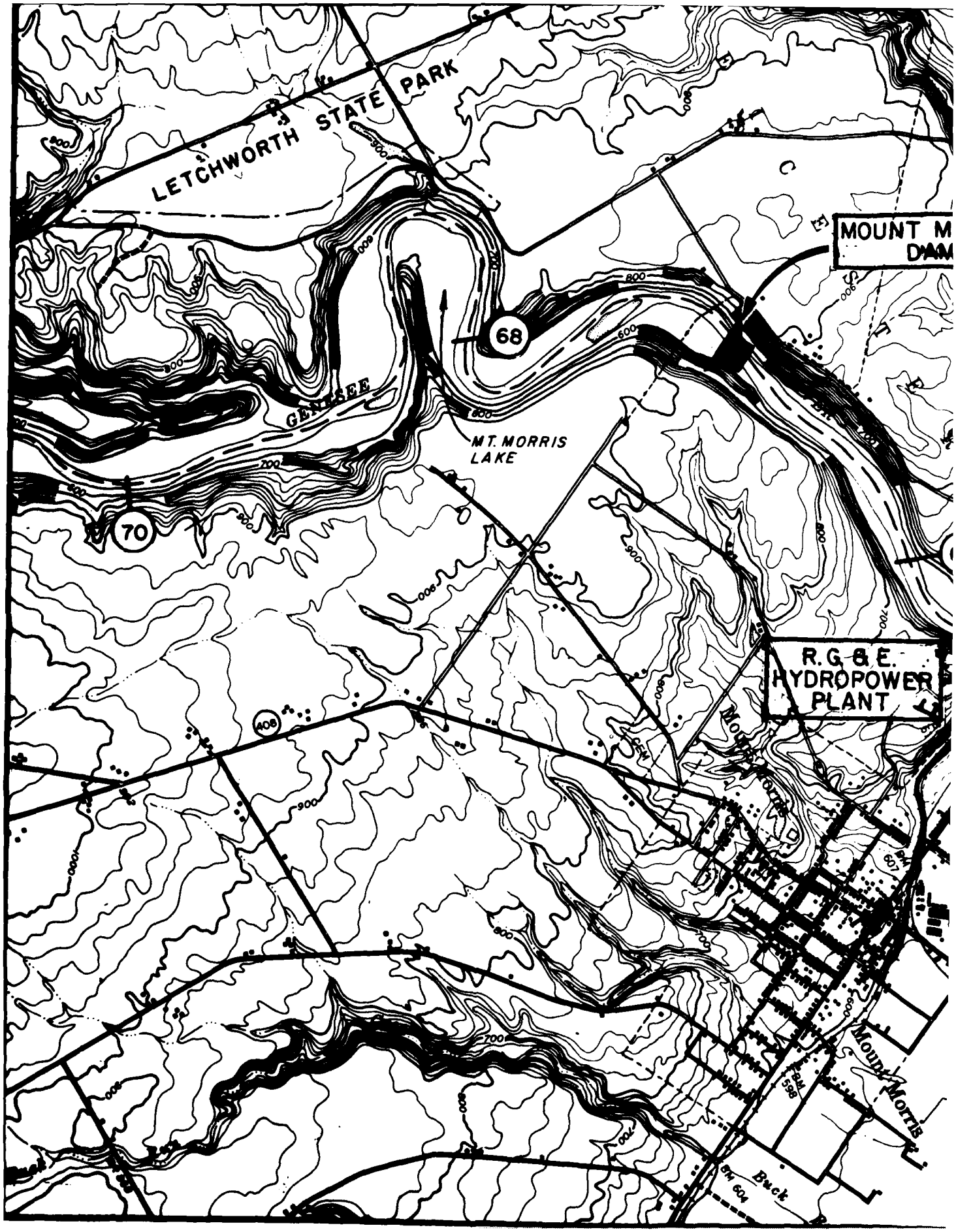


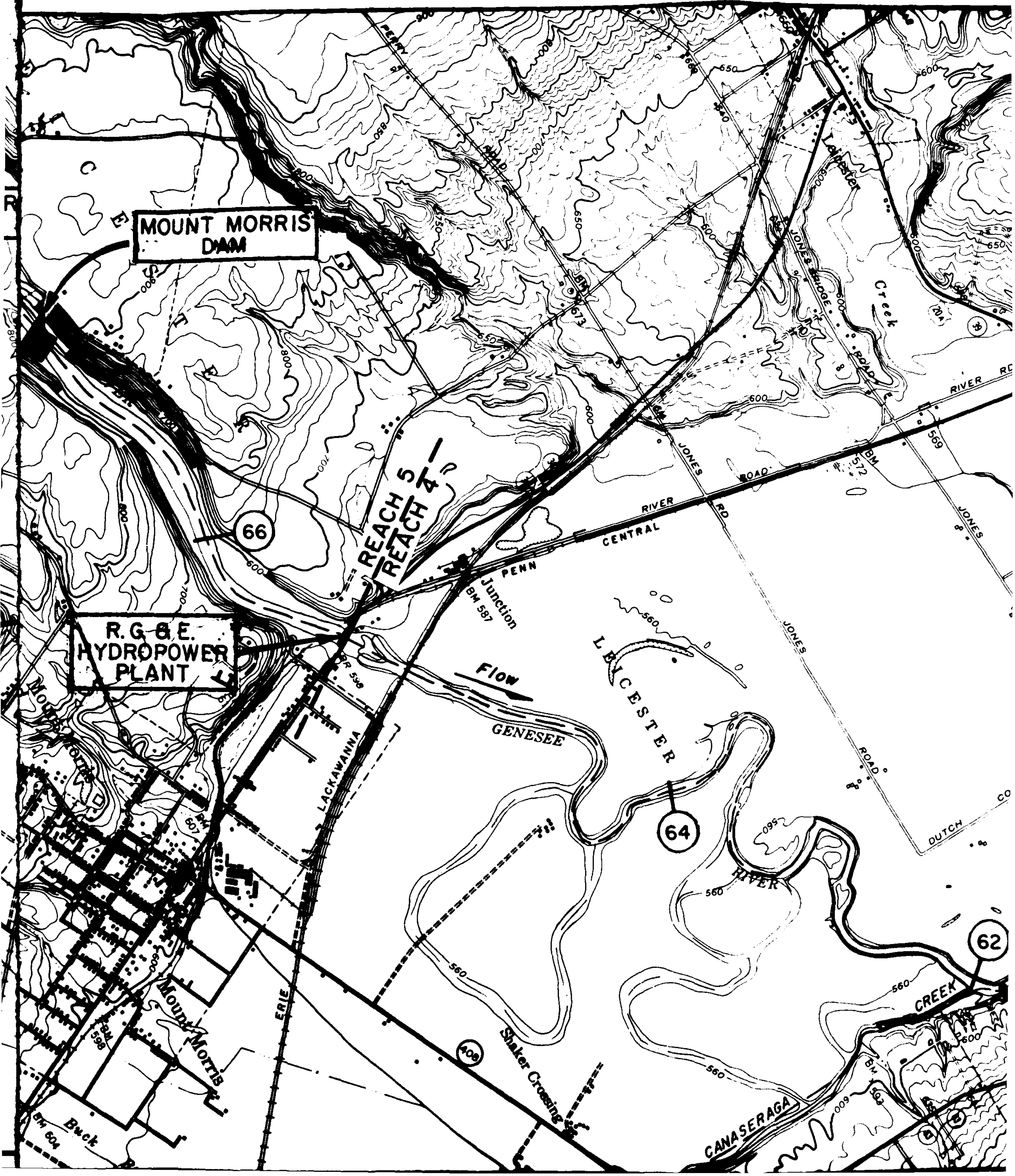
GENESEE RIVER BASIN STUDY
TROPICAL STORM AGNES, JUNE 1972

AVON - GENESEO
FLOODED AREAS

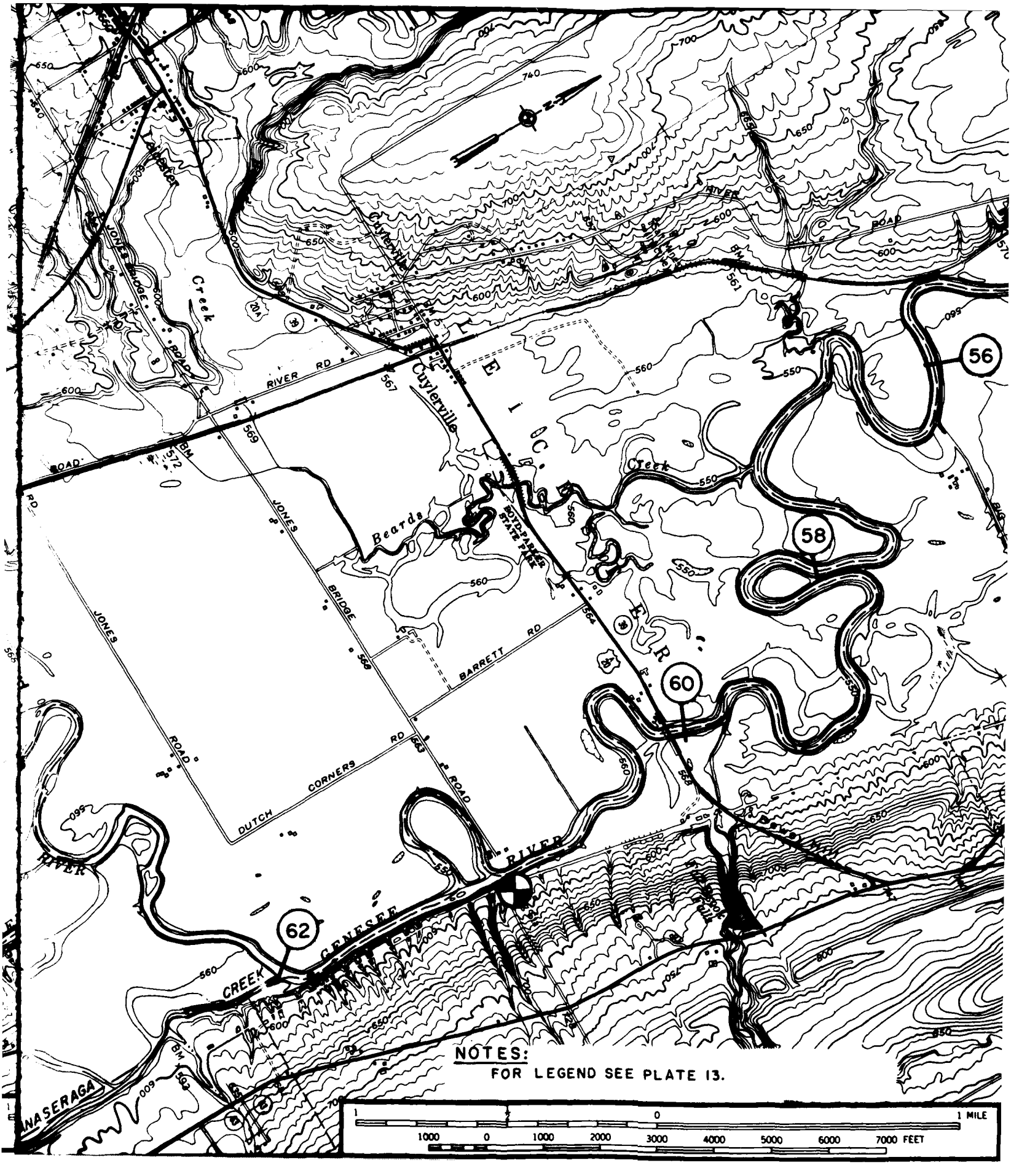
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE 3.4


LETCHWORTH STATE PARK
MOUNT M
DAM
68
GENESEE
MT. MORRIS
LAKE
70
408
R.G.&E.
HYDROPOWER
PLANT
Mount Morris
Mount Morris
Buck

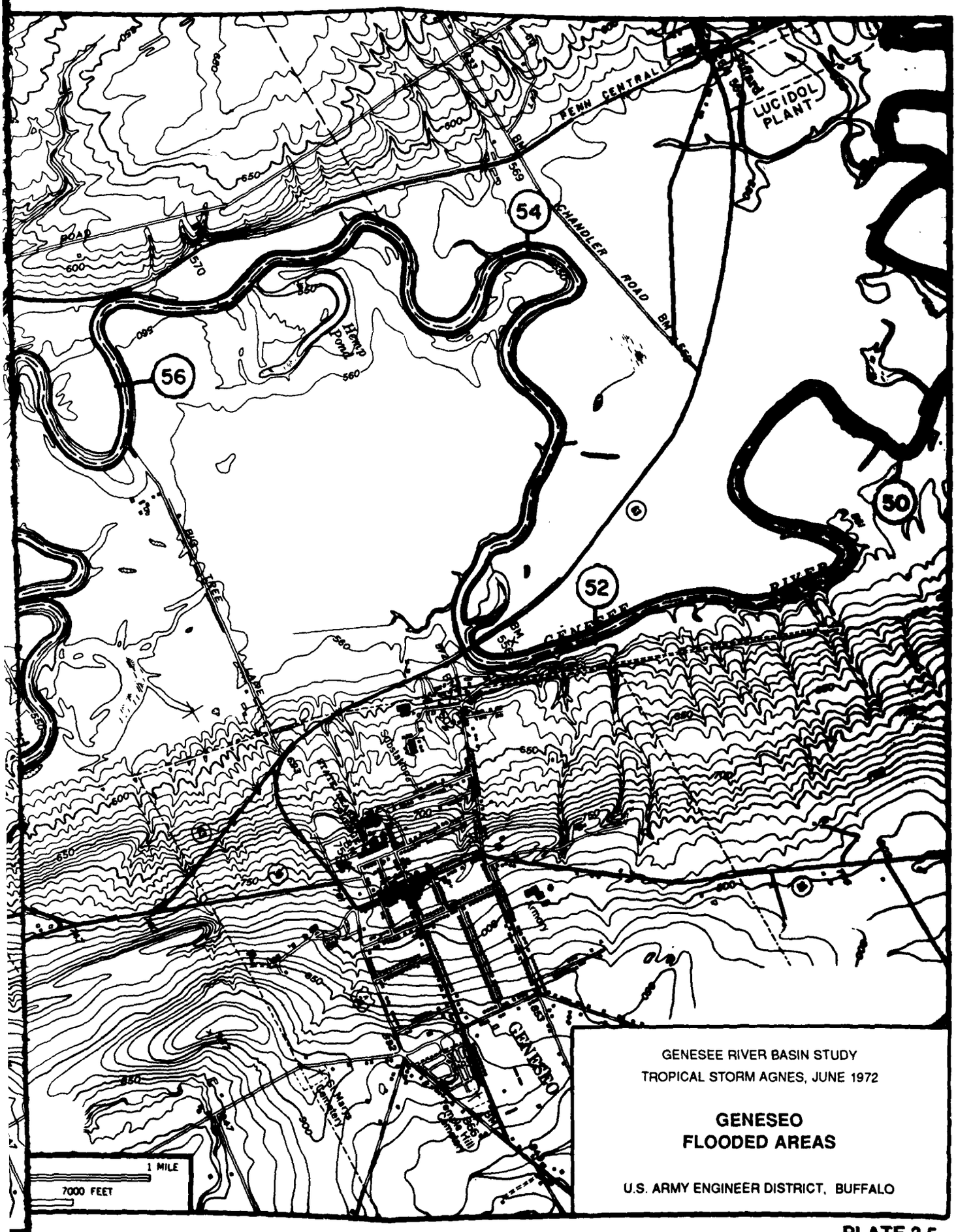


MOUNT MORRIS
DAM
R.G.&E.
HYDROPOWER
PLANT
REACH 5
REACH 4
66
64
62
Flow
GENESEE
RIVER
LEICESTER
Junction
BM 587
PENN
CENTRAL
RIVER
ROAD
RIVER RD
JONES
RD
JONES
ROAD
JONES BRIDGE ROAD
Leicester
Creek
LACKAWANNA
ERIE
Shaker Crossing
Mount Morris
Mount Morris
Buck
CANASERAGA
CREEK
DUTCH
408
PERRY
ROAD
BM 673
BM 572
569
BM 607
BM 598
BM 604
560
600
650
700
800
850
900



NOTES:

FOR LEGEND SEE PLATE 13.



GENESEE RIVER BASIN STUDY
TROPICAL STORM AGNES, JUNE 1972

GENESEO
FLOODED AREAS

U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE 3.5

Table 3.1 - Channel Capacities Downstream of Mt. Morris Dam

Channel Capacity	cfs
Reach 1	33,000
Reach 2	14,000
Reach 3	11,000
Reach 4	12,000

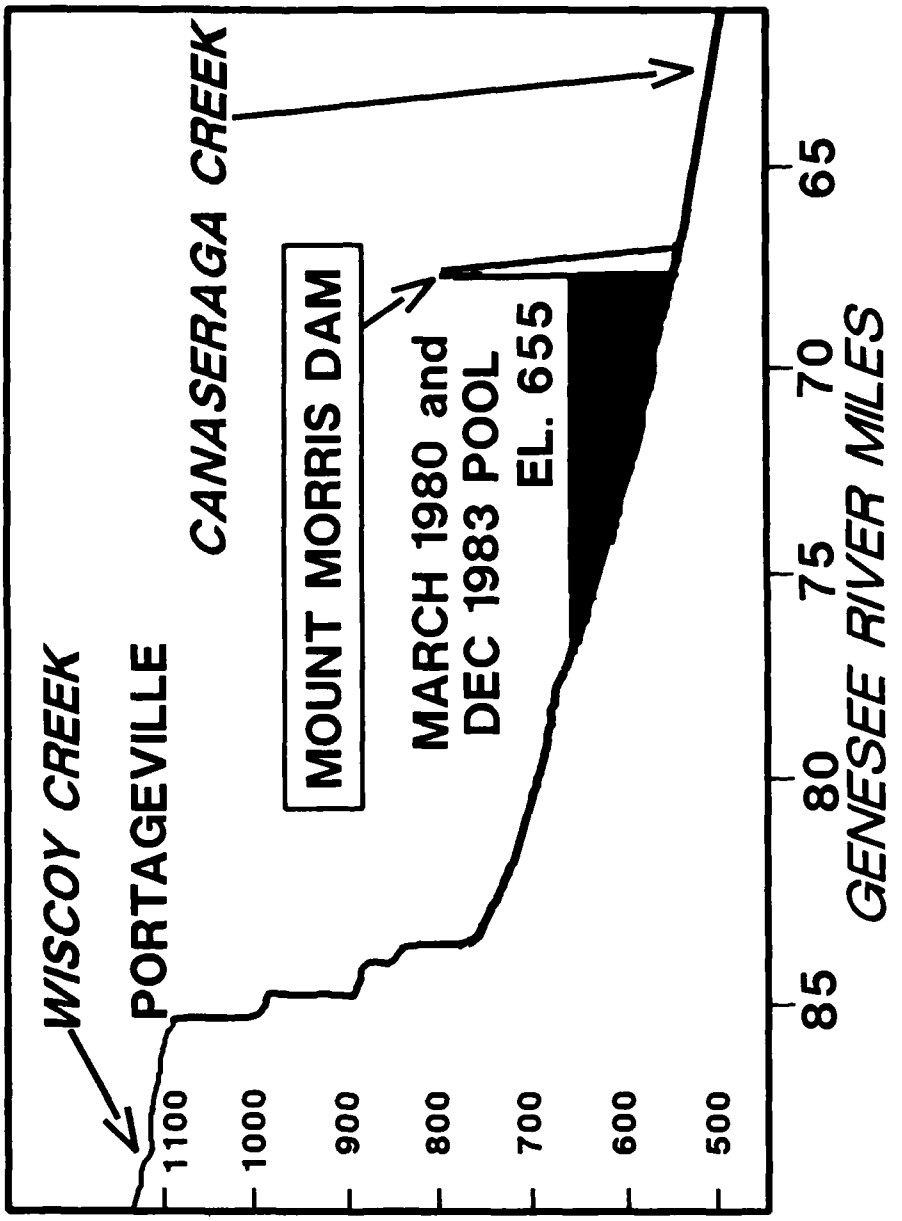

WISCOY CREEK
PORTAGEVILLE
CANASERAGA CREEK
MOUNT MORRIS DAM
MARCH 1980 and
DEC 1983 POOL
EL. 655
1100
1000
900
800
700
600
500
85
80
75
70
65
GENESEE RIVER MILES

FIGURE 3.1

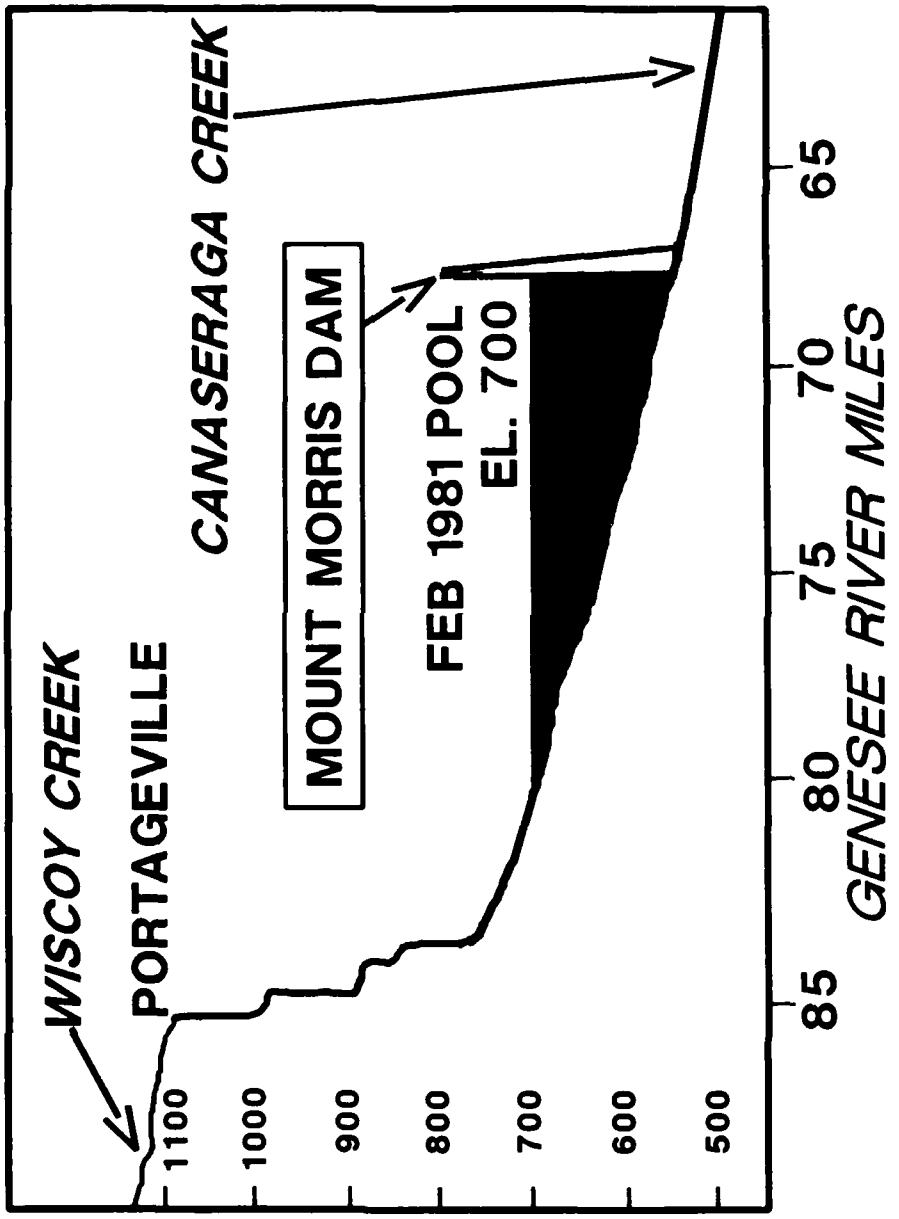

WISCOY CREEK
PORTAGEVILLE
CANASERAGA CREEK
MOUNT MORRIS DAM
FEB 1981 POOL
EL. 700
1100
1000
900
800
700
600
500
85
80
75
70
65
GENESEE RIVER MILES

FIGURE 3.2

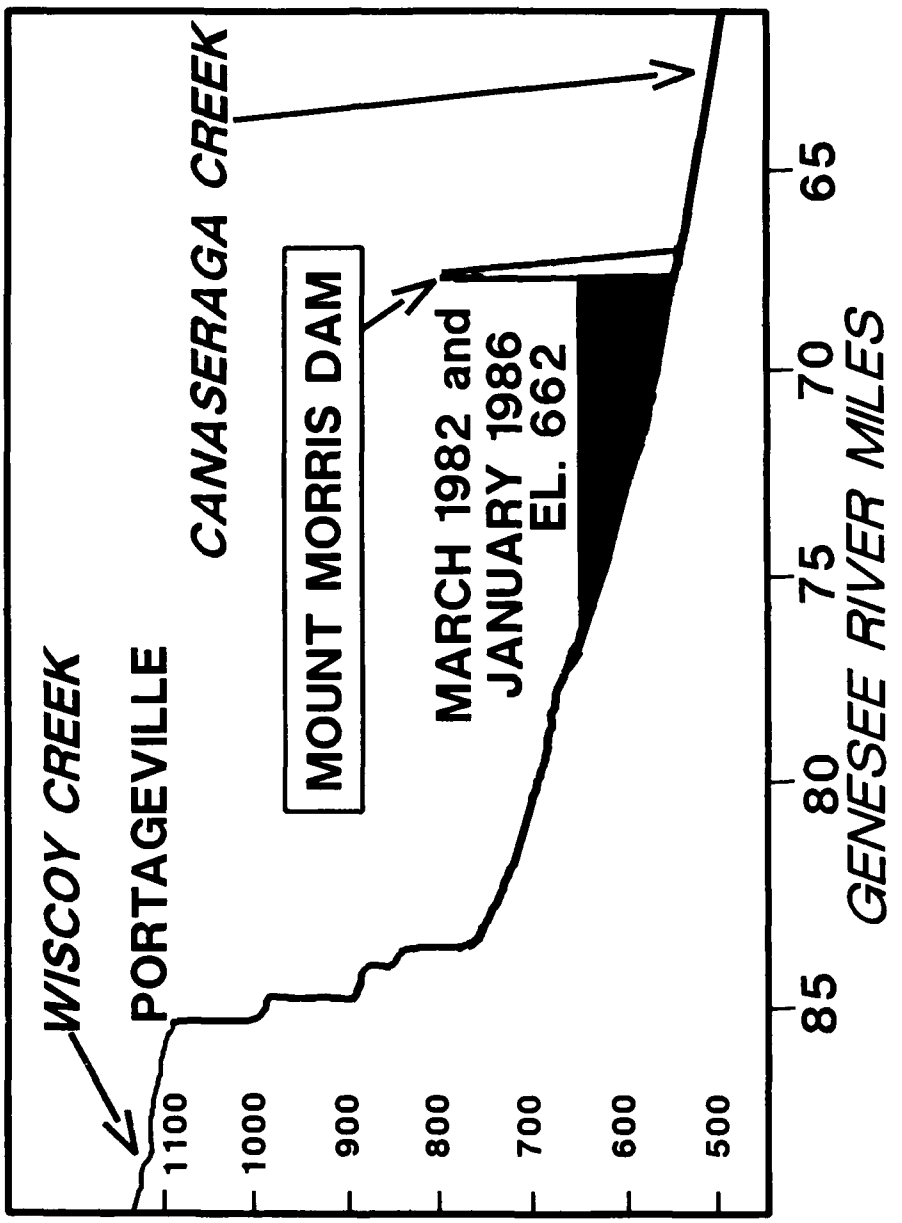

WISCOY CREEK
PORTAGEVILLE
CANASERAGA CREEK
MOUNT MORRIS DAM
MARCH 1982 and
JANUARY 1986
EL. 662
1100
1000
900
800
700
600
500
85
80
75
70
65
GENESEE RIVER MILES

FIGURE 3.3

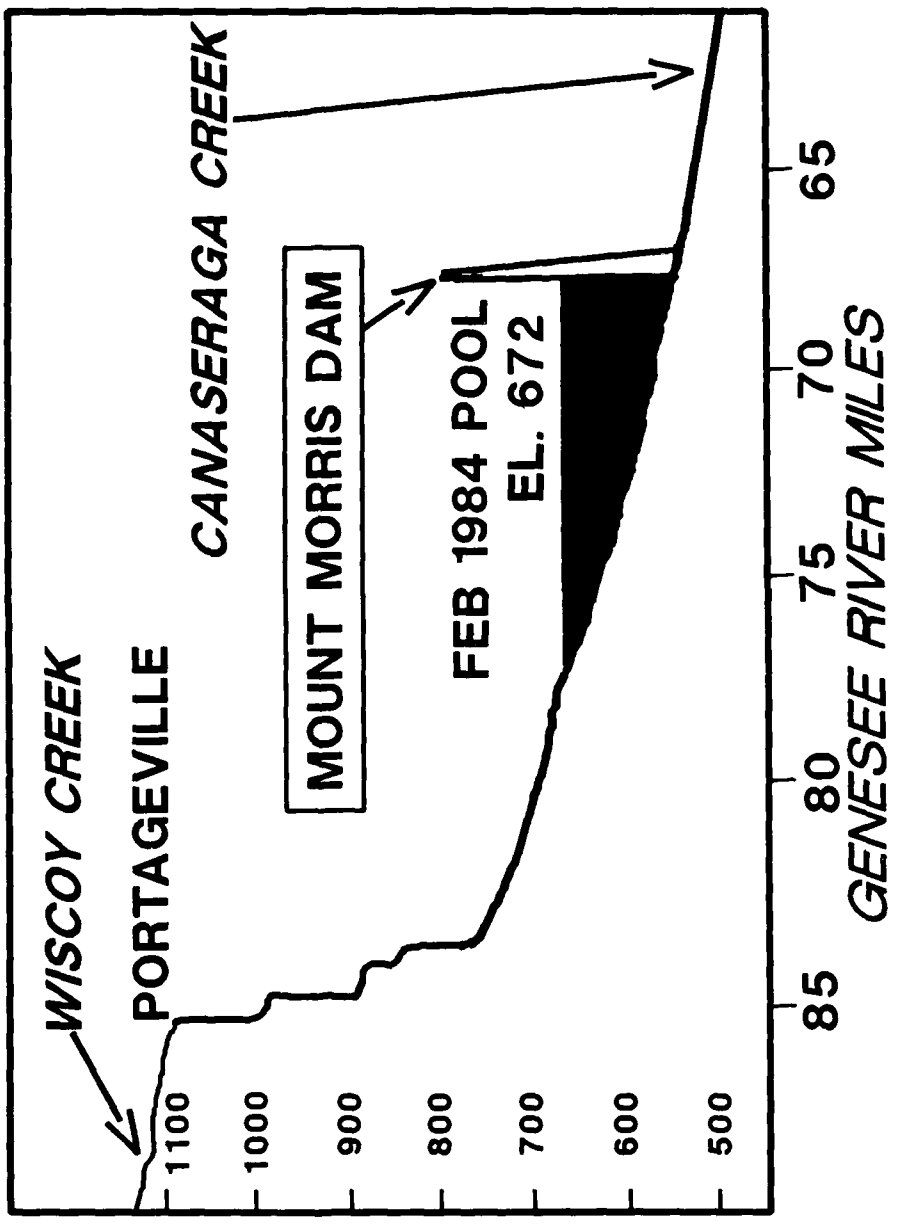

WISCOY CREEK
PORTAGEVILLE
CANASERAGA CREEK
MOUNT MORRIS DAM
FEB 1984 POOL
EL. 672
1100
1000
900
800
700
600
500
85
80
75
70
65
GENESEE RIVER MILES

FIGURE 3.4

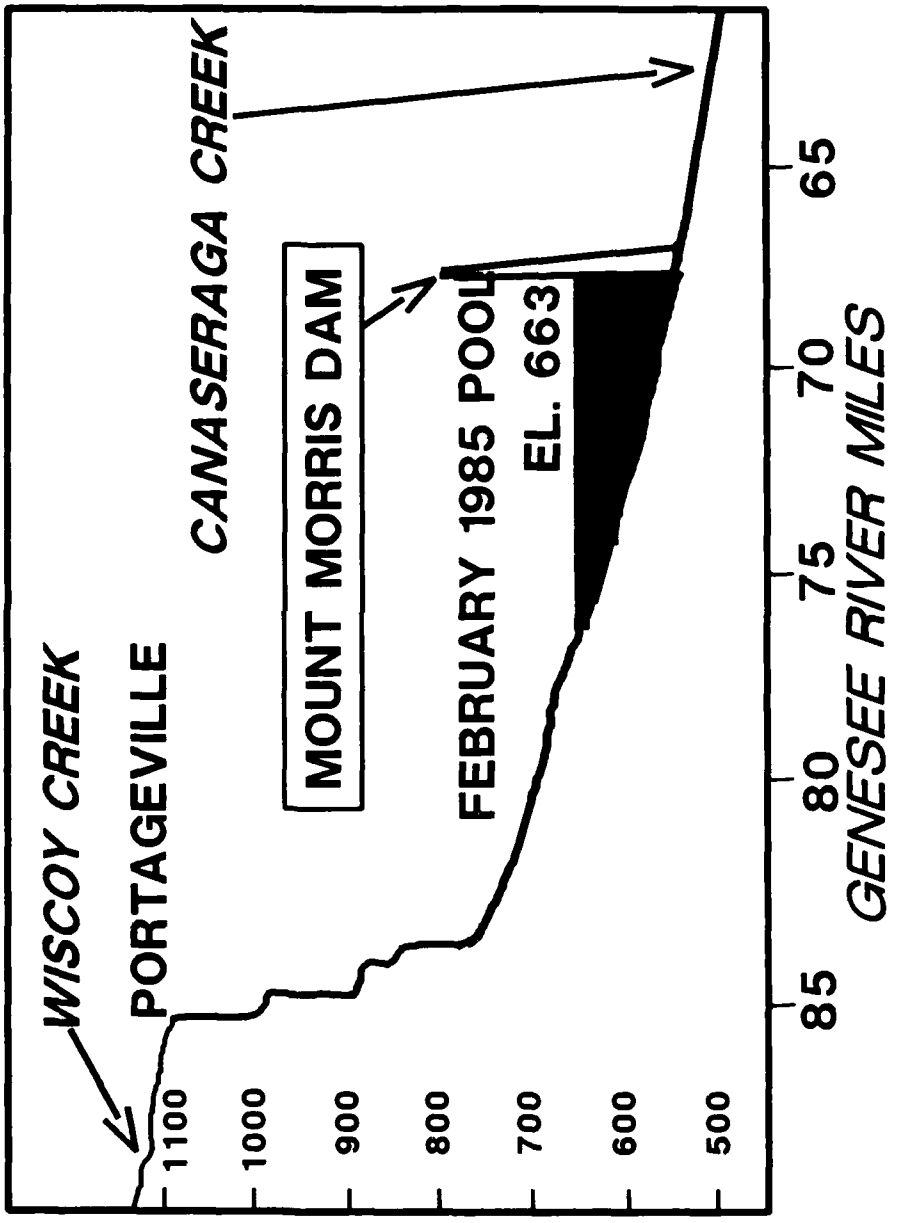

WISCOY CREEK
PORTAGEVILLE
CANASERAGA CREEK
MOUNT MORRIS DAM
FEBRUARY 1985 POOL
EL. 663
1100
1000
900
800
700
600
500
85
80
75
70
65
GENESEE RIVER MILES

FIGURE 3.5

Table 3.2 - Total Estimated Damage from the June 1972 Flood in the Genesee River Basin (1972 Prices)

Location	Non-Agricultural			Agricultural (4)	Total
	Private		Public and Other		
	Residential	Commercial			
	$	$	$	$	$
Genesee River	2,081,000	2,224,000	13,953,000	Included	18,258,000
Canaseraga Creek	27,000	37,000	420,000	in	484,000
Dyke Creek at Wellsville	1,056,000	3,261,000	638,000		4,955,000
Conesus Lake	282,000		3,000	County	285,000
Hemlock Lake	(1)		38,000		38,000
Honeoye Lake	129,000		1,000	Totals	130,000
Allegany County, NY	1,965,000		5,701,000	6,315,000	13,981,000
Genesee County, NY	(1)		27,000	504,000	531,000
Livingston County, NY	501,000		1,458,000	2,769,000	4,728,000
Monroe County, NY	20,000		102,000	1,705,000	1,827,000
Ontario County, NY	34,000		218,000	584,000	836,000
Potter County, PA	(2)		27,000	(2)	27,000
Steuben County, NY	(2)		1,191,000	166,000	1,357,000
Wyoming County, NY	(3)		157,000	2,186,000	2,343,000
TOTALS	11,617,000		23,934,000	14,229,000	49,780,000

(1) Assumed negligible
(2) Not available
(3) Included in the Genesee River damage. Remainder of private damage is assumed to be negligible.
(4) Furnished by U.S. Department of Agriculture, Soil Conservation Service.

Table 3.3 - Summary of Peak Stages and Discharges in the Upper Genesee River Basin

Stream and Place of Termination	Drainage Area (sq. miles)	Period of Record	Maximum Flood Previously Known			Maximum During June 1972 Flood		
			Date	Gage Height (feet)	Discharge (cfs)	Day	Gage Height (feet)	Discharge
Dyke Creek at Wellsville	71.4	1955-60 & 64-69	6-15-60	16.10	5,230			12,000
Genesee River at Wellsville	288.0	1955-58	3-8-56	17.65	15,800	23	14-12	38,500
Genesee River at Scio (1)	308.0	1916-72	11-25-50	11.22	23,300	23		41,300 (2)
Van Campen Creek at Friendship	45.8	1964-68	9-28-67	13.10	13,400		10.92	9,400
Angelica Creek at Transit Br.	86.5	1964-68	9-28-67	10.28	9,560			8,400
Genesee River at Portage-ville (1)	982.0	1908-72	5-17-16	21.70	44,000	23		(3) 90,000 83,900 (2)

(1) Recording gage destroyed during June 1972 flood.
(2) Corps of Engineers estimate.
(3) USGS estimate.

Table 3.4 - Summary of Peak Stages and Discharges in the Lower Genesee River Basin (1)

Stream and Place of Determination	Drainage Area (sq. miles)	Period of Record	Maximum Flood Previously Known			Maximum During June 1972 Flood		
			Date	Gage Height (feet)	Discharge (cfs)	Day	Gage Height (feet)	Discharge
Canaseraga Cr. near Canaseraga	58.2	1964-68	9-28-67	11.10	5,480			12,400
Canaseraga Cr. near Dansville	153.0	1910-12 1915-70	8-23-40	9.93	9,110	23	14.66	9,600
Canaseraga Cr. at Shakers Crossing	333.0	1915-22 1958-70	4-26-61	12.07	4,430	23		11,200(2)
Genesee River at Jones Br.	1,419.0	1903-06 1908-14 1915-72	5-17-16 4-28-54	25.44 17.75	55,100(6) 13,800	25	24.50	17,500
Conesus Lake - Lakeville	69.7	1930-72	3-9-56	11.93 (2)		24	12.44 (2)	
Genesee River at Avon	1,666.0	1955-72	3-7-56	37.2	15,600	25	40.63	16,360(3)
Honeoye Creek at Honeoye	41.1	1963-72	4-15-71	4.72		23	6.94	
Honeoye Cr. at Honeoye Falls	195.0	1945-70	3-28-50	6.42	4,630		6.50	4,800
Oatka Creek at Warsaw	41.9	1963-72	9-28-67	7.28	1,760	23	9.75	4,010
Oatka Creek at Garbutt	204.0	1945-72	3-31-60	8.64	6,920	24	6.80	3,830
Genesee River at Rochester	2,457.0	1904-72	3-30-16 3-31-60	15.30 14.91	48,300(6) 25,800	25	15.89	31,300(4) 25,500(5)
Black Creek at Churchville	123.0	1945-70	3-31-60	9.44	4,880			

(1) Unless otherwise noted, all flows on the lower Genesee River are subsequent to the construction of Mt. Morris Dam.
(2) Corps of Engineers estimate.
(3) Reflects temporary shift in stage-discharge relationship.
(4) Affected by fluctuations in the regulation of Court Street Dam.
(5) Estimated flow assuming no influence from Court Street Dam regulation.
(6) Prior to construction of Mt. Morris Dam.

Streambank Erosion and Agricultural Land Damages.

Streambank erosion is also a significant problem in the Genesee River Basin in that it restrains agricultural development and increases the cost of sediment dredging.

Bank erosion in the upper reaches of the basin consists of erosion of the soft underlying shale causing localized rockfalls. Between Rochester and Mt. Morris (the lower basin), dynamic erosion of valuable agricultural land in the area of Avon and south of Geneseo has resulted in fairly rapid bank migration and cutoffs. The river does redistribute alluvium deposits within the Letchworth State Park-Mt. Morris gorge where erosion is considered insignificant.

However, in several places, the course of the river extends to the valley walls resulting in the erosion of high till bluffs. About 3,500 miles of streambank are eroding, resulting in an average soil loss of almost a million tons per year. Erosion damages are portrayed in Photos 3.16-3.18.

In the Genesee River Basin Study of Sedimentation published in 1968, it was estimated that 220 acres of agricultural land along the river, excluding all tributaries, were lost in a 9-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. This estimate excludes land loss from more severe but less frequent events. For example, Tropical Storm Agnes in June 1972 removed a 75-acre plot of farmland near the village of Mt. Morris and caused extensive agricultural damages ($36 million, 1987 price levels) on the main stem of Genesee River. The Corps of Engineers has no authority to build single-purpose streambank erosion control projects, except for small, emergency projects to protect public land and facilities. However, considerations will be given to reduction in channel flows, wherever possible, to minimize streambank erosion.

Irrigation.

The 1969 report on agricultural studies of the Genesee River Basin documented the need to irrigate vegetable crops on the Lake Ontario plain. That report evaluated 23 feasible structural plans which were designed to irrigate one localized area. As a result, several State, local agricultural authorities, including State universities, were contacted to determine the need for irrigation on the lake plain, possible means of distributing irrigation water, and potential benefits to be obtained from providieng irrigation water to the lake plain. The need remains for more water to irrigate vegetables and selected fruits currently grown on the lake plain. The primary advantage would be to improve the quality of the crops grown and increase the consistency and yield of these crops.

Recreation.

Water-oriented recreation has increased significantly in the State in recent years. This is attributed to the greater demand for outdoor recreation because of increases in population, urbanization, leisure time, income, and mobility.

A 1972 survey of recreational activities conducted by the State of New York Office of Parks and Recreation identified swimming, picnicking, neighborhood activities, and bicycling as recrational activities with the highest ranking in popularity. However, emphasis shifted in the 1980's, and shows boating, camping, picnicking, and swimming as the four major recreational activities in the basin and adjacent communities. The relative steep gradients of the river above Mt. Morris and in several of its main tributaries provided attractive conditions and excellent scenery for canoeists and other outdoor recreation enthusiasts. The lower basin, from Mt. Morris to the outskirts of Rochester, which is largely farmland with gentle topography, offers a pastoral setting from many diversified recreational pursuits.

Hydropower.

Annual use of electric energy in the basin has doubled in each decade from 1940 to 1960 and continues to grow at an accelerated rate. The Planning Committee of the New York Power Pool (NYPP) published a report in April 1985 that forecasted summer peak demands for 1985-2001 at an average annual growth rate of 1.3 percent. Further, the New York State Energy Office, refocusisng its efforts on resolving long-term energy problems, concluded in their "Energy Assessment '87" report that New York's electric utilities are likely to need new sources of capacity by the mid-1990's. The report also concluded that Statewide electric consumpiton is projected to increase at an average annual rate of 1.8 percent, while peak demand will rise by an estimated 1.4 percent per year. However, under high economic growth, peak demand will rise by 2 percent per year, 28,000,000 kilowatts higher than the base case forecast of 29,000,000 kilowatts of demand by the year 2002.

For the Genesee River Basin power market area, three private utilities virtually supply all electric energy. Only Rochester Gas and Electric Corporation has generating facilities located in the basin, including five power plants in the lower basin from Mt. Morris through Rochester. Private hydropower developers, by permit from the Federal Energy Regulatory Commission, may study the feasibility of hydropower power generation by developing plans that meet all existing statutory requirements.

Water Supply.

Water resources in the Genesee River Basin and Lake Ontario are adequate to meet existing and projected municipal and industrial water supply needs through 2020 which are estimated at 290 mgd.

The major water supply systems in the lower part of the basin, the city of Rochester, and the Monroe County Water Authority use lake Ontario as a source of supply. The city of Rochester also uses Hemlock and Canadice Lakes for water supply, and Conesus Lake supplies water for several communities in Livingston County. Silver Lake serves as a source of water for the villages of Mt. Morris and Leichester in Livingston County and for the village of Perry in Wyoming Ckounty.

The ground water yield in the basin is estimated to be about 200 mgd and groundwater is the source for more than half of the municipal water supplies as

well as most farms and rural homes. However, the total withdrawal is only about 12 mgd.

In general, regionalization does not offer a practical solution to the water supply problems of most municipalities in the upper part of the basin because of their scattered location and the great distances between the systems. In the lower part of the basin, consolidation of existing systems is a feasible and economical solution for meeting projected demands. These types of measures, like consolidation of existing system, are non-Federal responsibility; therefore, no further consideration was given to this aspect under this study authority.

Water Quality.

Water varies in quality throughout the basin. The Environmental Protection Agency, however, has issued nationwide discharge standards with the expressed purposes of establishing and maintaining the highest practical water quality in the affected streams. In the Genesee Basin, under the New York State Pure Waters Program, many collection and sewage treatment facilities have been installed with State and Federal assistance. To avoid duplication of effort therefore, no further consideration was given to the water quality aspect of this study.

Summary.

In terms of existing and projected supply and demands on water and related land resources, the Genesee River Basin has needs in the areas of general outdoor and fish and wildlife recreation, supplemental irrigation, and municipal and industrial water supply. The primary needs are in the area of control of streambank and agrucultural land erosion, hydropower generation, and flood control.

The June 1972 flood inundation damages and other post flood damages demonstrated a need for flood plain management measures to regulate land use consistent with the existing and potential flood hazards in the basin. In addition to urban flood damages, agricultural damages are also a major problem for farmers and farm authorities in the basin. One family residing in Henrietta, a suburb of Rochester sums it all up: "Even with the flood protection of the Mt. Morris dam, Federal Flood Insurance was required when we purchased our property in 1986. We want to be sure the Mt. Morris installation is operated and maintained to provide maximum flood protection with or without incidental hydroelectric generation."

Planning Constraints.

Below Portage, the river plunges over three falls of rare scenic beauty. The late William Pryor Letchworth, a private citizen, purchased these falls and about 1,000 acres of land adjoining them on the west bank of the river. Mr. Letchworth converted the land into a park. Around the turn of the 20th Century, the Genesee River Company was being given the right to divert the water from these falls. Alarmed at this broad grant, Mr. Letchworth offered to convey this land to the State, subject to his life tenancy, upon condition that

the State should forever maintain it as a park. The State accepted the gift by Chapter 1, Laws of 1907. The bottom and top of the Lower Falls are about 40 feet and 140 feet, respectively, above the crest elevation of the spillway section of the existing Mt. Morris Dam. Any increase in spillway crest elevation higher than 30 feet would impact on the Lower Falls in the event of a flood higher in magnitude than the 1972 flood. No non-Federal sponsors were identified that indicated an interest in developing the recreation and irrigation potentials in the Upper and Lower Basins. Further, the Corps has no authority to build single-purpose streambank erosion control projects, except for small emergency projects that protect public lands and facilities. Therefore, the Corps feasibility phase of the study was limited to flood control with emphasis on the potential Stannard Reservoir site and considered modification to the Mt. Morris project.

National Objectives.

Current Federal policy, as developed by the President's Water Resources Council, requires that alternative water and related resource plans be formulated in accordance with the national objective of NATIONAL ECONOMIC DEVELOPMENT (NED). For the Genesee River Basin Study, National Economic Development will be achieved through construction of projects where benefits are greater than costs. This will also increase the value of the nation's output of goods and services and improve economic efficiency consistent with protecting the Nation's environment. Therefore, in accordance with the guidance established in Engineering Regulation 1105-2-30, "General Planning Principles," dated 18 October 1985, this study was consistent with the planning requirements of the Water Resources Council "Principles and Guidelines" (P&G) and related policies.

Specific Planning Objectives.

Specific planning objectives are the national, State, and local water and related land resources management needs (opportunities and problems) specific to a study area that can be addressed to enhance National Economic Development. Based on a review of the authorizing legislation for the Genesee River Basin Study, current Federal water resources policy, previous reports for the area, statements by individuals in the private sector, input from officials at many levels of Government, and an analysis of the problems and needs of the study area, the specific planning objectives for this feasibility study have been identified as follows:

a. Enhance National Economic Development by reducing flood damages in the Lower Genesee River Basin during the period 1995-2095.

b. Preserve natural beauty, green space, and historical interests for the enjoyment and education of the people during the period 1995-2095.

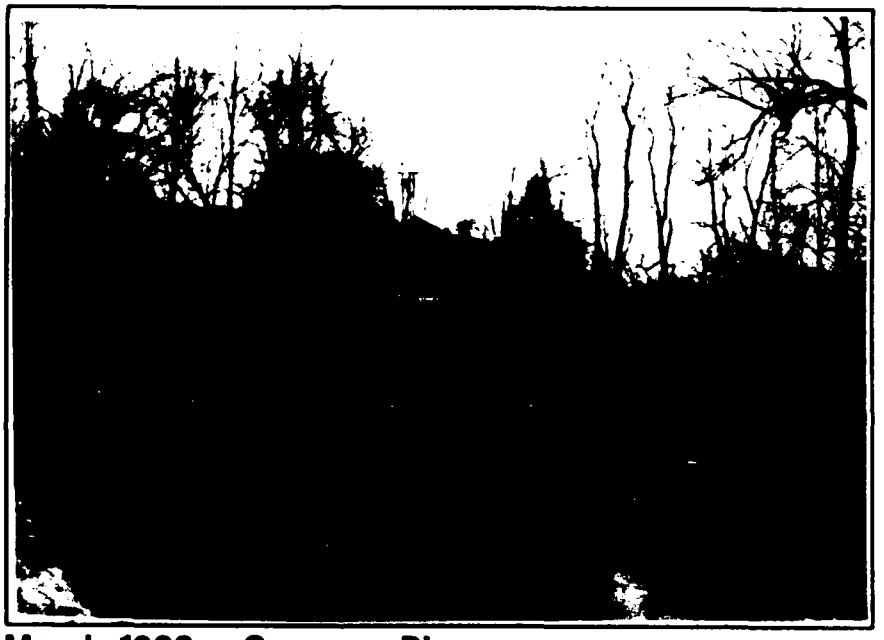
Conditions if no Federal Action Taken (Without Project Conditions).

The conditions that will exist if no Federal action is taken were investigated for this study. As a result, a potential need for change was identified.

Under a no-action plan, flooding in the Genesee River Basin will continue, with average annual damages of more than $1 million. As a result of no Federal action, the trauma and inconvenience experienced by flood victims in the basin would also continue.

New industrial, commercial, and residential developments constructed in the floodprone areas of the surrounding suburbs of the city of Rochester have caused substantial increase in the residual flood damages in the Lower Genesee River Basin. This trend is expected to continue, thus further increasing residual damages in the Lower Basin. Farm lands throughout the basin will continue to suffer from adverse impacts caused by floods and erosion.

March 1988 - Genesee River
Farmland erosion at Geneseo-Livingston County.
Photos 3.16 and 3.17



March 1988 - Genesee River
Streambank erosion endangering residential properties at Chili, Monroe County.
Photo 3.18

SECTION IV

PLAN FORMULATION

SECTION 4

PLAN FORMULATION

This section provides a summary of the plan formulation planning effort made for this study. The section provides a brief review of alternative plans addressed in previous studies and their applicability to this current study: discusses the formulation methodology used in this study; and discusses the development of preliminary and detailed alternative plans.

GENERAL FORMULATION AND EVALUATION CRITERIA

Federal policy on multi-objective planning, derived from both legislative and executive authorities, establishes and defines the national objective for water resources planning, specifies the range of impacts that must be assessed, and sets forth the conditions and criteria which must be applied when evaluating plans. Plans must be formulated to meet the needs of the area with due regard to benefits and costs, both tangible and intangible, and to effects on the ecosystem and social well-being of the community.

The formulation of a plan, including the screening of alternatives, must of necessity be within the context of an appropriate framework and set of criteria. The planning framework is established in the Water Resources Council's "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies," which requires the systematic preparation and evaluation of alternative solutions to problems under the objective of National Economic Development (NED). The process also requires that the impacts of a proposed action be measured and the results displayed or accounted for in terms of contributions to four accounts: NED; Environmental Quality (EQ); Regional Economic Development (RED); and Other Social Effects (OSE). The formulation process must be conducted without bias as to structural and nonstructural measures.

Within the structure of the overall planning framework, specific criteria relative to general policies, technical engineering, economic principles, social and environmental values, and local conditions must be established. These criteria, noted as "Technical," "Economic," and "Socioeconomic and Environmental" are as follows:

a. Technical Criteria.

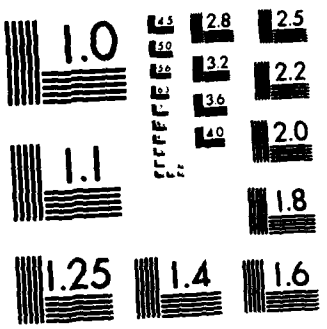
(1) Assume that side slopes of 2.5:1 are adequate for functional design of levees, berms, and riprapped creek banks during the reconnaissance phase of the study. Verify this assumption, as appropriate, during the feasibility phase of the study.

(2) For levee plans considered during the reconnaissance phase of the study, assume that: (a) an acceptable borrow area that contains suitable impervious material is within a 10-mile radius of the construction site; (b) foundation material at the proposed levee site will not present undesirable problems; (c) no consideration will be given to internal drainage; and (d) consideration will be given to diverting overland flow originating outside the site. Investigate these facets in detail during the feasibility phase of the study, if levee plans are carried forward.

AD-A194 985 GENESEE RIVER BASIN STUDY VOLUME 1 MAIN REPORT(U) CORPS 2/2
OF ENGINEERS BUFFALO NY BUFFALO DISTRICT JUN 88

UNCLASSIFIED F/G 13/2 NL

END
DATE FILMED
8 88



b. Economic Criteria.

(1) Tangible benefits should exceed project economic costs.

(2) Each separable unit of improvement or purpose should provide benefits at least equal to its cost unless justifiable on a non-economic basis.

(3) Each plan, as ultimately formulated, should provide the maximum net benefits possible within the formulation framework.

(4) The costs for alternative plans of development should be based on preliminary layouts, estimates of quantities, and comparable unit prices.

(5) The benefits and costs should be in comparable economic terms to the fullest extent possible.

(6) A 50-year economic life is used for the economic evaluation of local protection plans and a 100-year economic life is used for the economic evaluation of dam and reservoir plans. Annual economic values will be determined using an 8-5/8 percent interest rate.

(7) The project evaluation period for local protection plans is a 50-year interval and for dam and reservoir plans is a 100-year interval beyond the estimated implementation date of 1995.

(8) The base case for comparison of alternative plans is the do-nothing ("no-action") plan.

c. Socio-economic and Environmental Criteria.

The criteria for socio-economic and environmental considerations in water resources planning are prescribed by the National Environmental Policy Act of 1969 (PL 91-190) and Section 122 of the River and Harbor Act of 1970, (PL 91-611). These criteria prescribe that all significant adverse and beneficial, economic, social, and environmental effects of planned developments be considered and evaluated during plan formulation.

(1) Cost-Sharing - Project cost-sharing and financing, as specified in the Water Resources Development Act of 1986 (PL 99-662), is as follows:

(a) Flood Control (Structural) - Federal responsibilities include up to a maximum of 75 percent of the cost of the flood control project. Non-Federal interests are required to: pay 5 percent of the cost of the project during construction; provide all lands, easements, rights-of-way, and dredged material disposal areas; relocate all utilities; pay an additional amount during construction such that the total contribution of the non-Federal sponsor is equal to 25 percent of the cost of the project, if required; and operate and maintain the completed project. However, in no instance shall the non-Federal share exceed 50 percent of the cost of the project.

(b) Flood Control (Non-structural) - Federal responsibilities include 75 percent of the cost of the project. Non-Federal interests are required to provide all lands, easements, rights-of-way, and dredged material disposal areas,

and relocate all utilities up to a maximum of 25 percent of the cost of the project; pay an additional amount during construction such that the total contribution of the non-Federal sponsor is equal to 25 percent of the cost of the project, if required; and operate and maintain the project.

(c) Add-On Recreation - Federal responsibilities include 50 percent of the construction cost of separable project features. Non-Federal interests are responsible for providing 50 percent of the cost of separable project features: and operating and maintaining the separable project features. Cost-sharing for the joint project features are as specified above.

(d) Add-On Hydroelectric Power - Local interests are required to repay 100 percent of the construction costs of the joint and separable project features and operate and maintain the completed project or reimburse the Federal Government for such costs.

(2) Local Sponsor - Formal assurances of local cooperation must be furnished by a municipality or other public agency fully authorized under State law to give such assurances and financially capable of fulfilling all items of local cooperation. The New York State Department of Environmental Conservation is the designated local sponsor for Corps-built flood control projects in New York State, and, as such, would be the local sponsor for any proposed flood control project in the Genesee River Basin.

PRELIMINARY ALTERNATIVE PLANS CONSIDERED

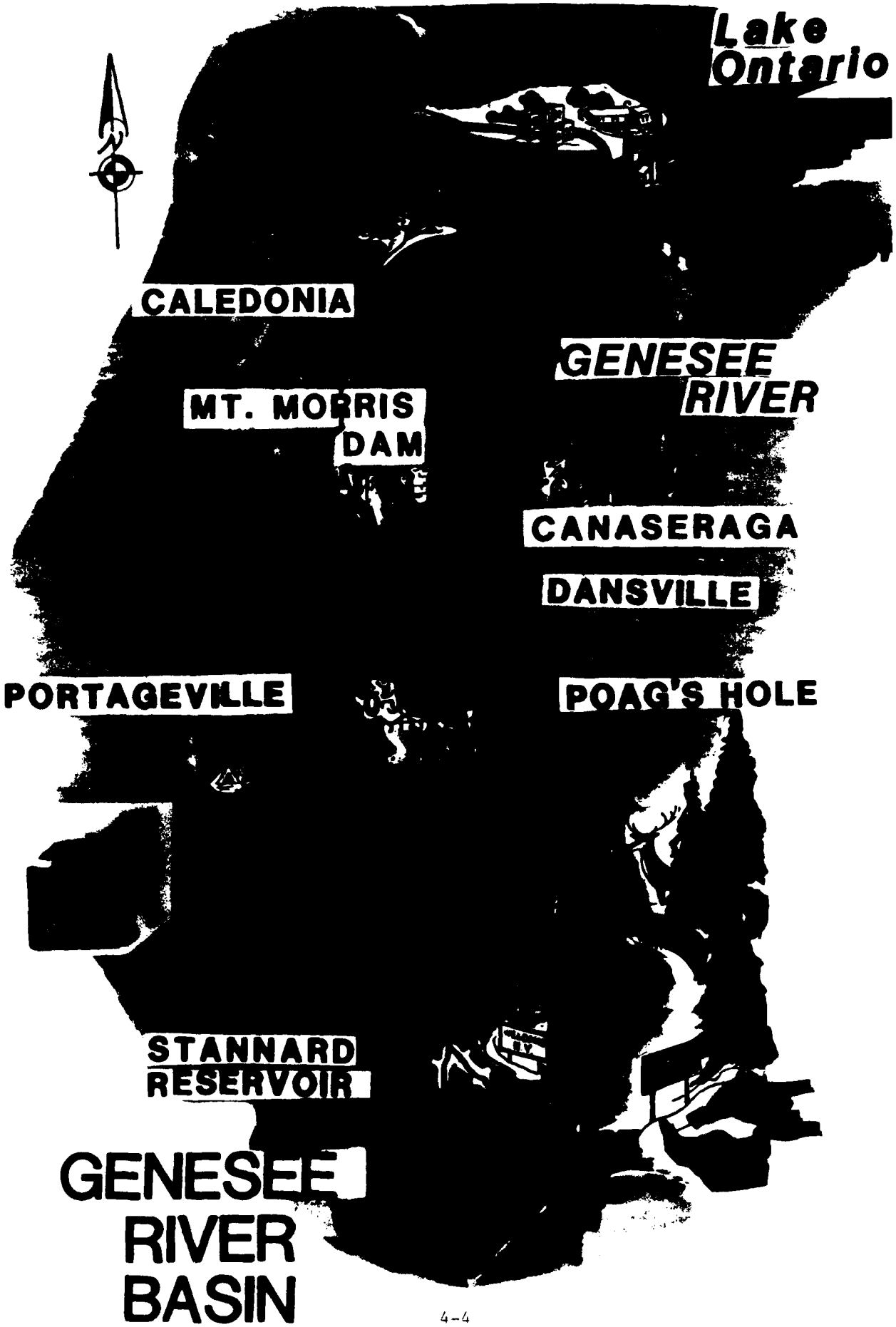
General.

This paragraph presents the results of the reconnaissance phase preliminary evaluation. The level of study performed was consistent with the reconnaissance phase objective of evaluating a broad range of possible solutions and identifying the best general plan (or plans) which warranted further detailed study for satisfying the flood control and other needs of the Genesee River Basin. For location of considered project sites see Basin Map (Plate 4.0).

Consistent with current policies, the primary water resources need for which solutions were sought under this authority was to reduce flood damages in the Genesee River Basin. As possible solutions to address this need, more than two dozen scenarios, including the no-action alternative, were developed and assessed in a preliminary fashion. Projects that were previously authorized for construction were reanalyzed. As a result, two previously authorized local flood protection projects and one previously considerd local protection project in the lower reaches were dropped from further consideration because of lack of economic justification. These projects are:

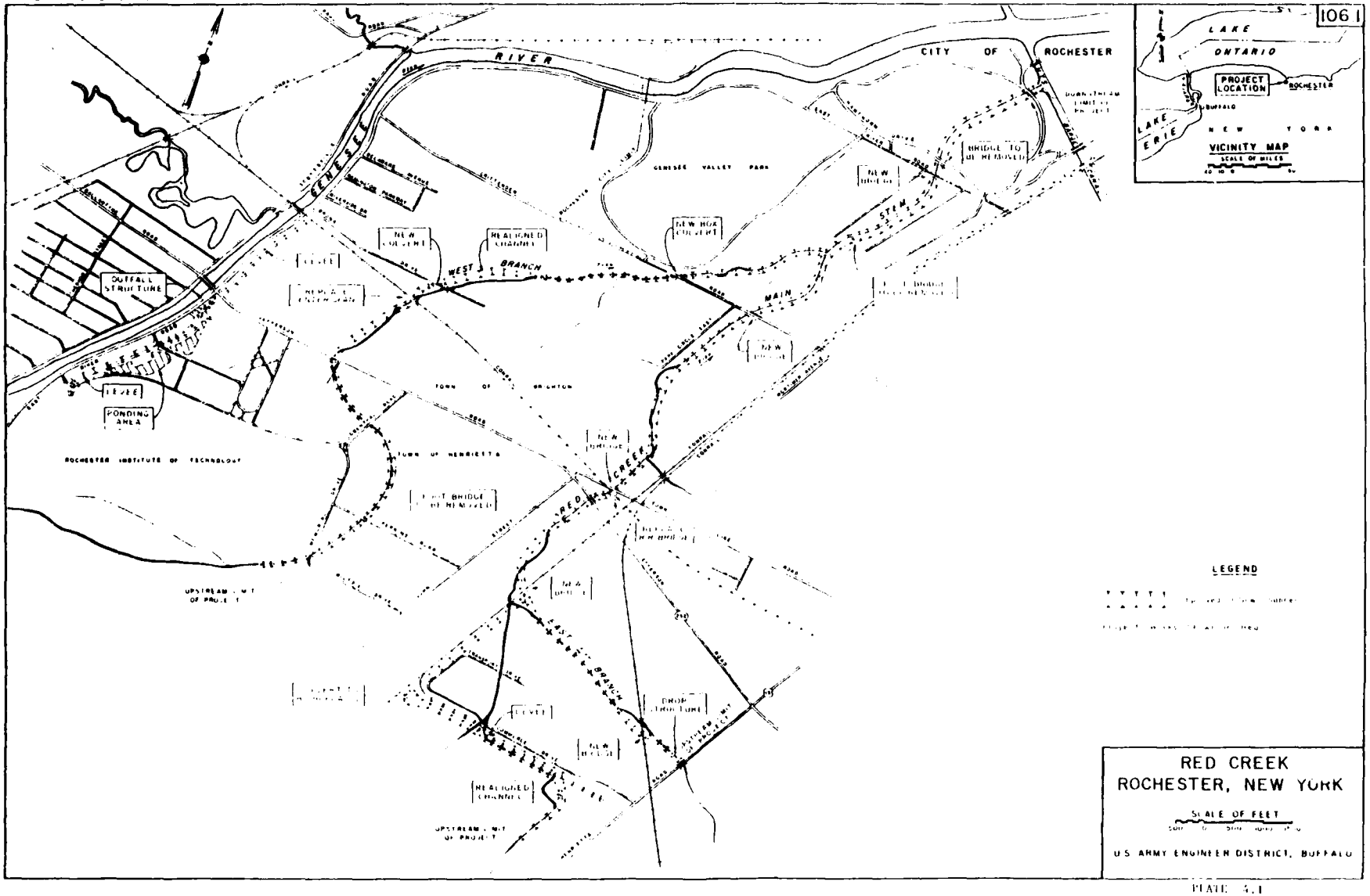
The Red Creek Project (Plate 4.1) in Brighton and Henrietta, was deauthorized.

The Spring Creek Project (Plate 4.2) at Caledonia is on the list of projects eligible for deauthorization which was presented to Congress on November 16, 1987 by the Acting Assistant Secretary of the Army for Civil Works. Lower Canaseraga Creek Project (Plate 4.3) was dropped from further consideration.


Lake Ontario
CALEDONIA
GENESEE RIVER
MT. MORRIS DAM
CANASERAGA
DANSVILLE
PORTAGEVILLE
POAG'S HOLE
STANNARD RESERVOIR
GENESEE RIVER BASIN

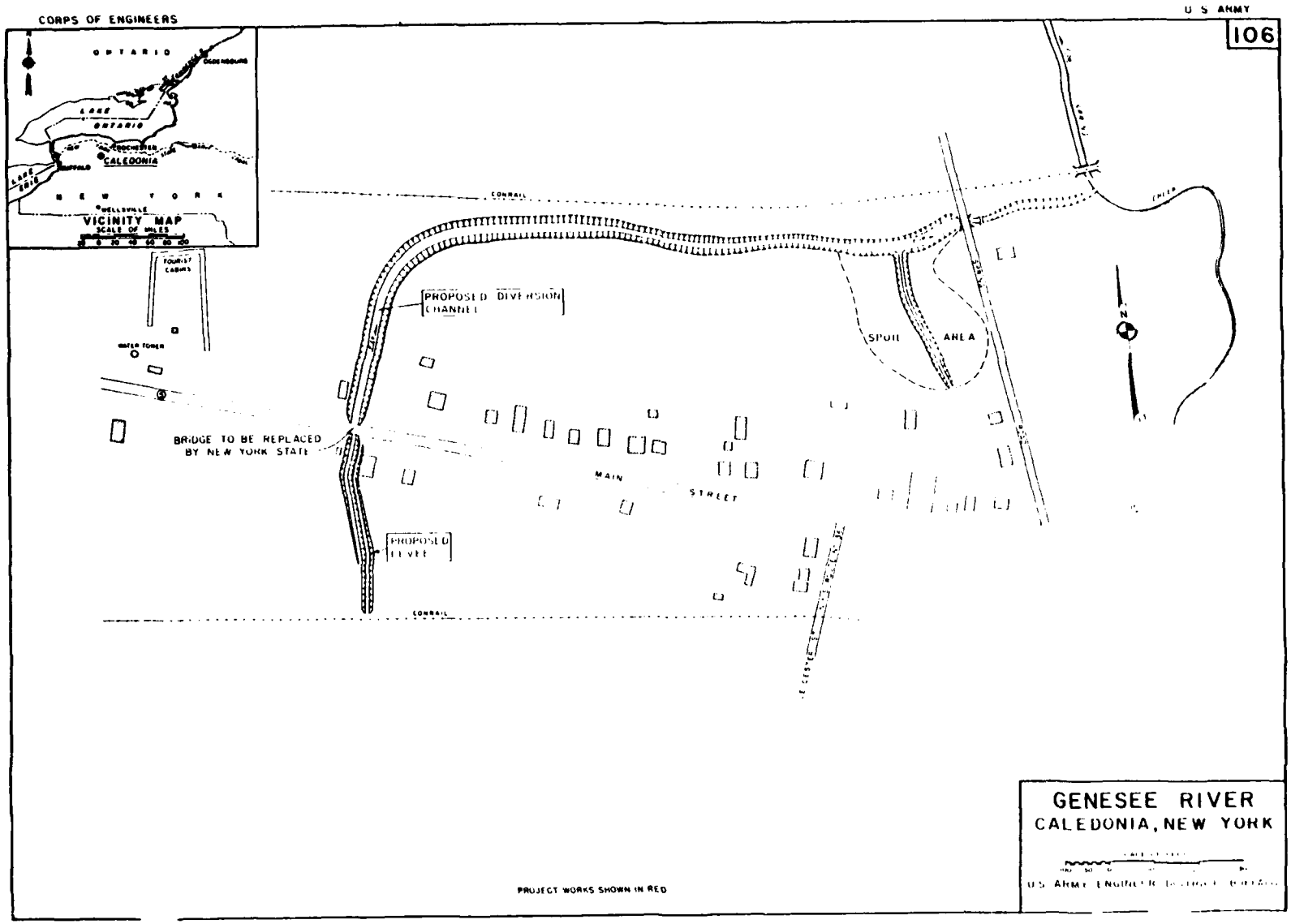
CORPS OF ENGINEERS

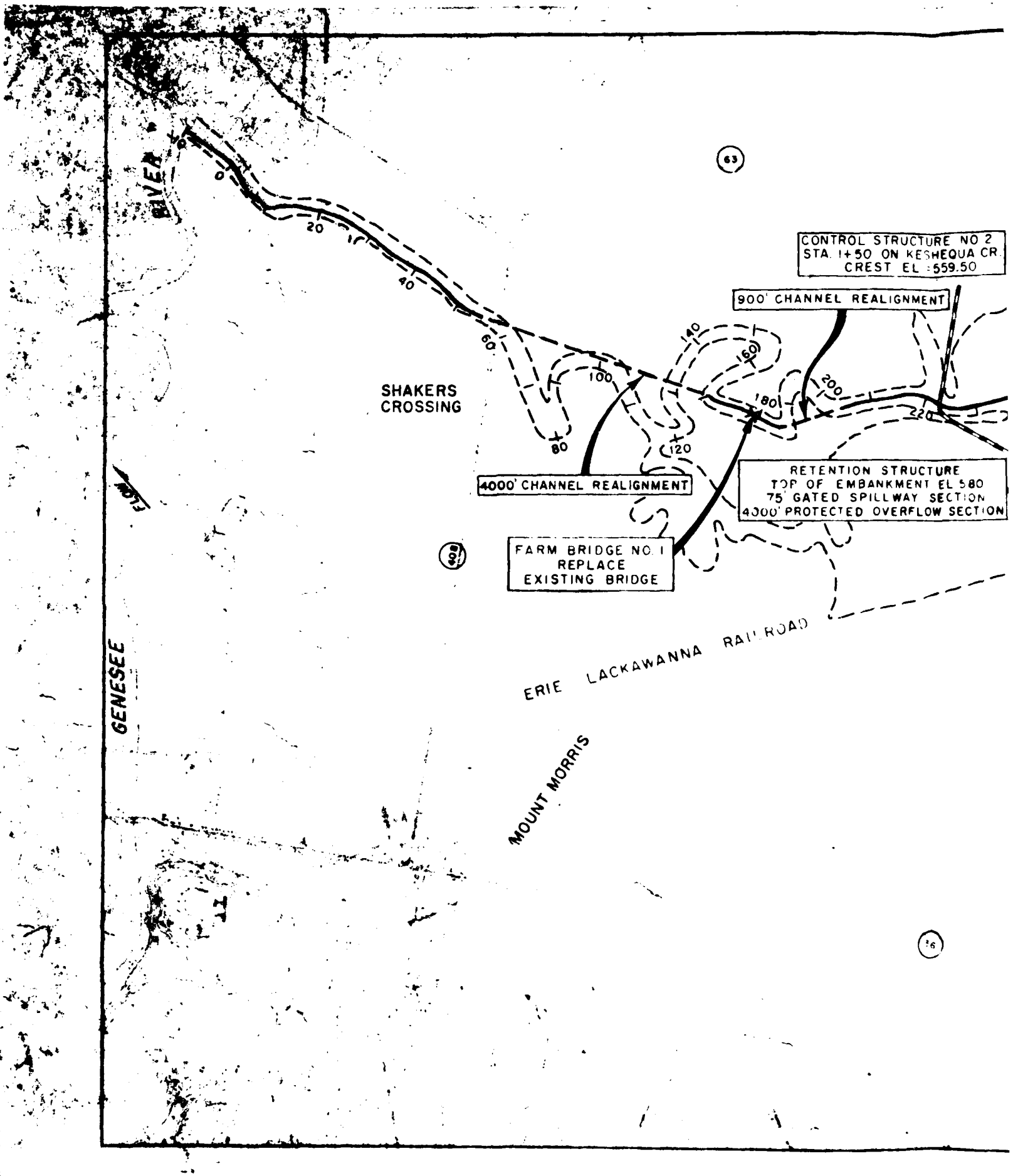
U.S. ARMY

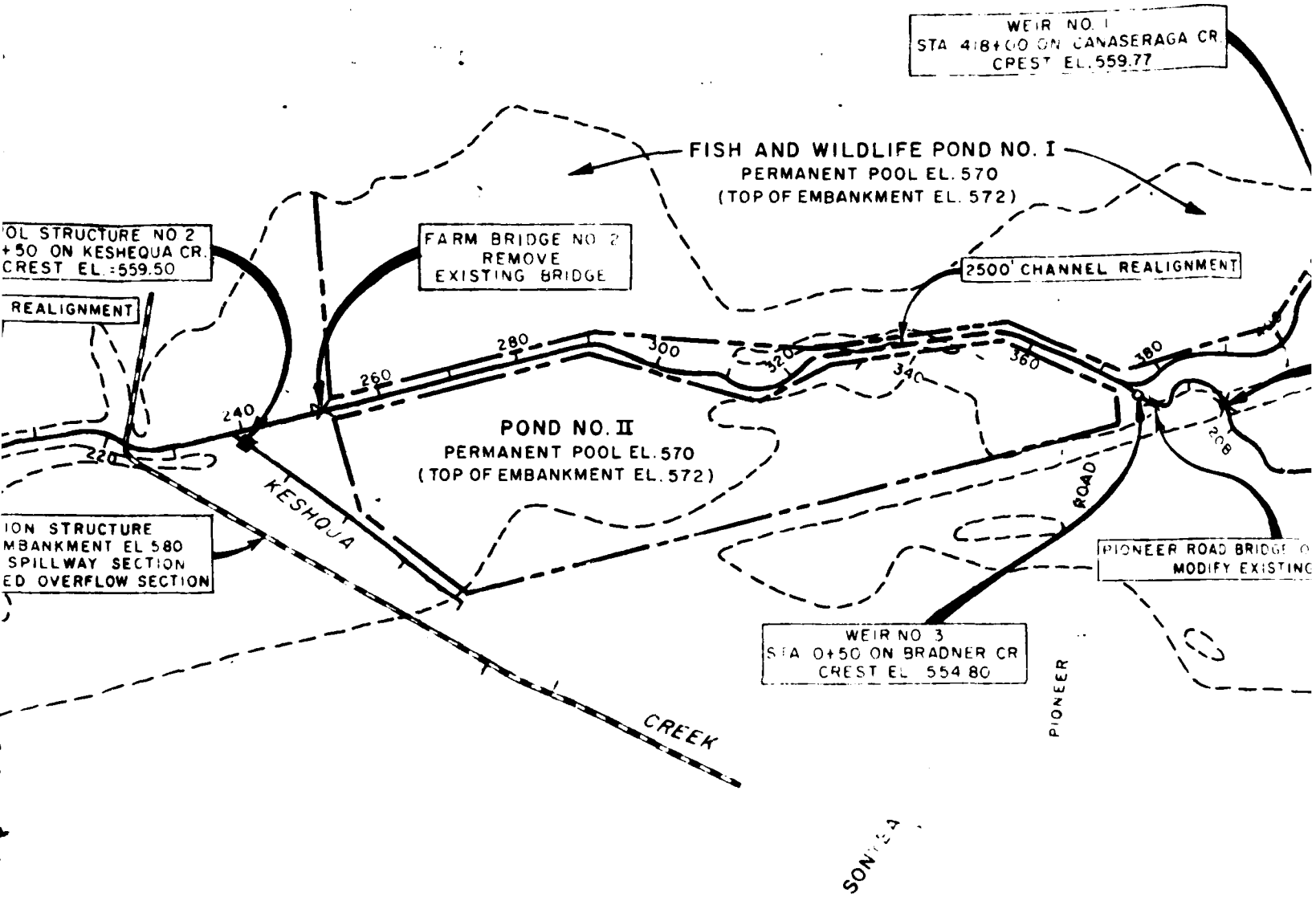


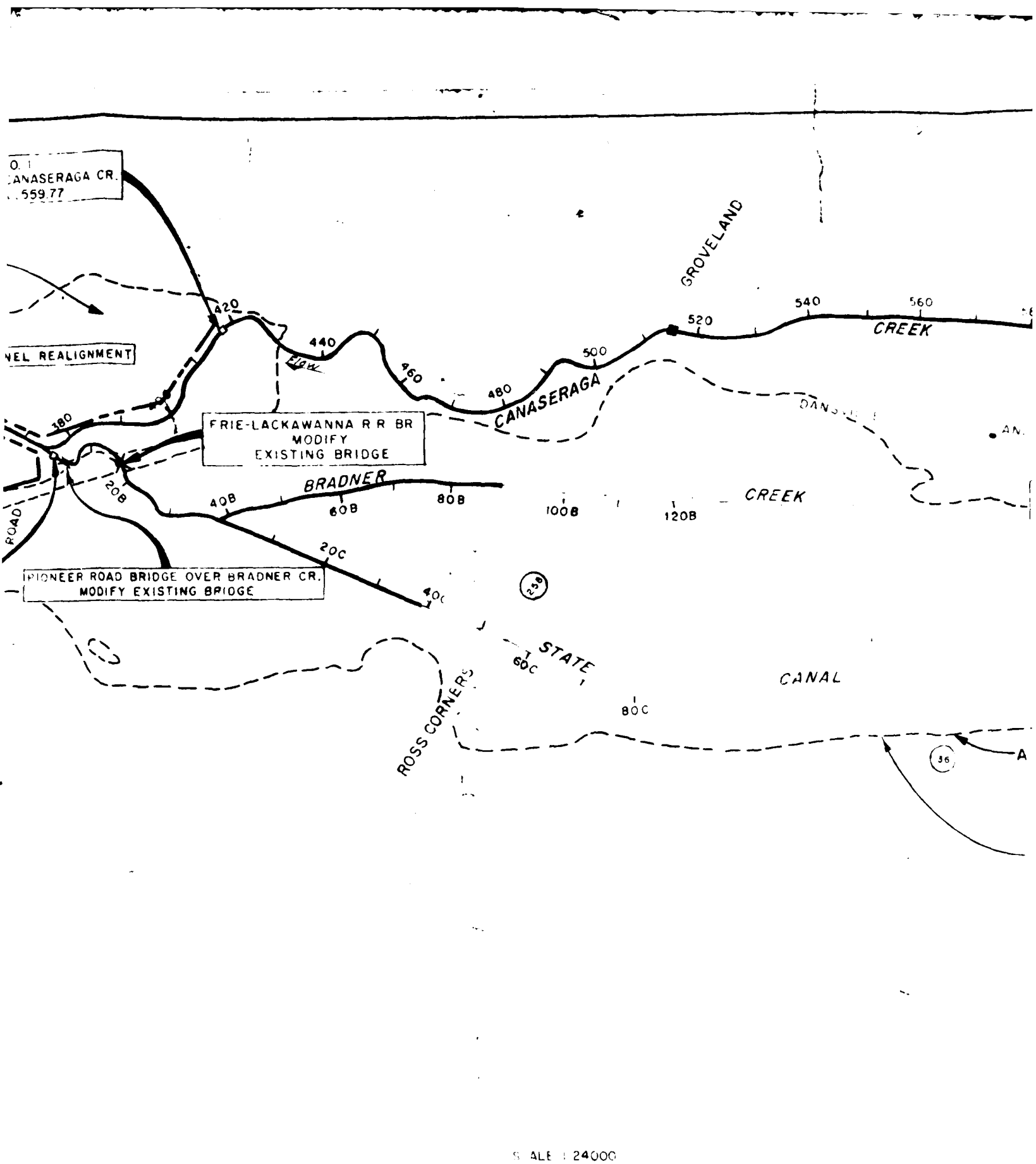
1061

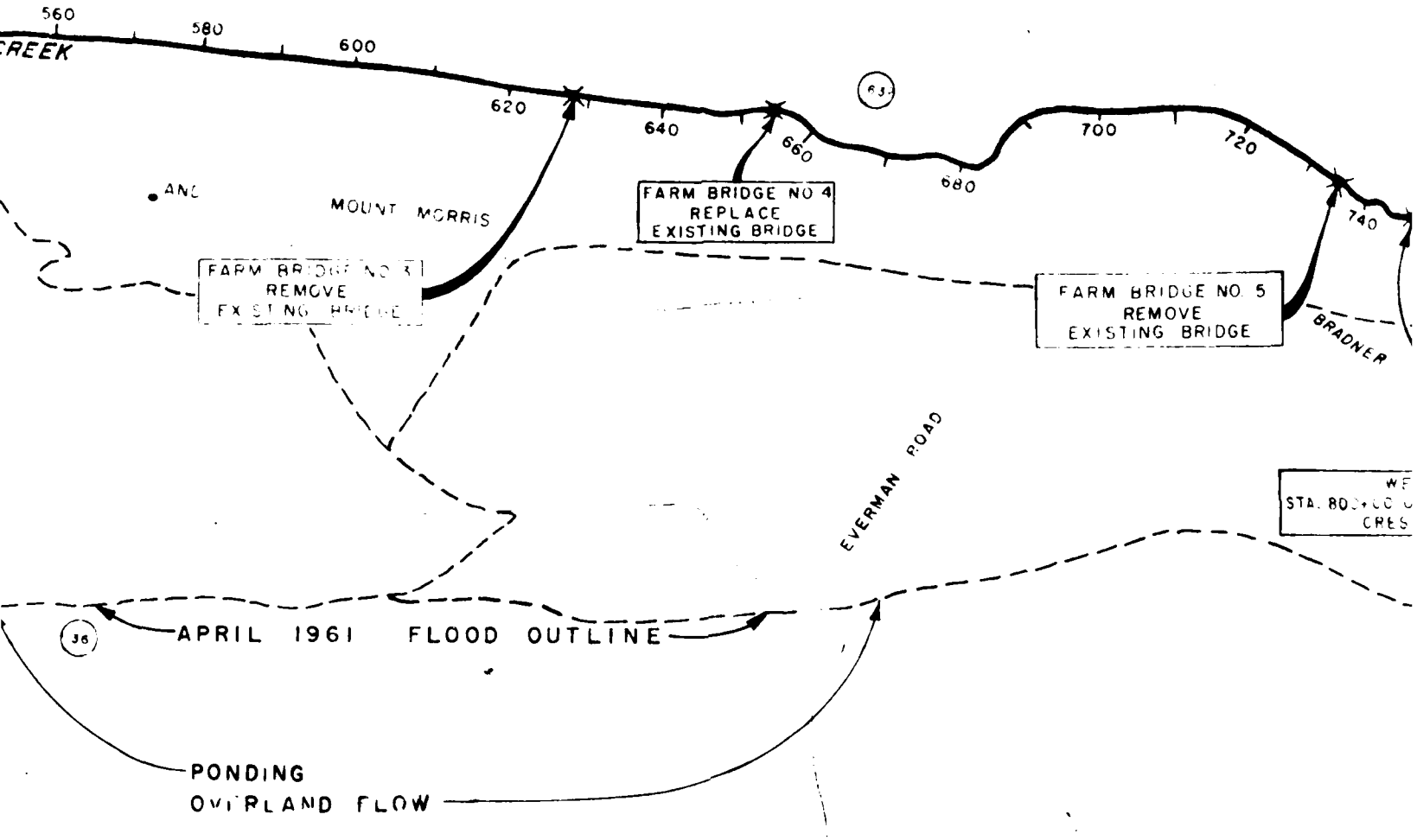
PLATE 4.1

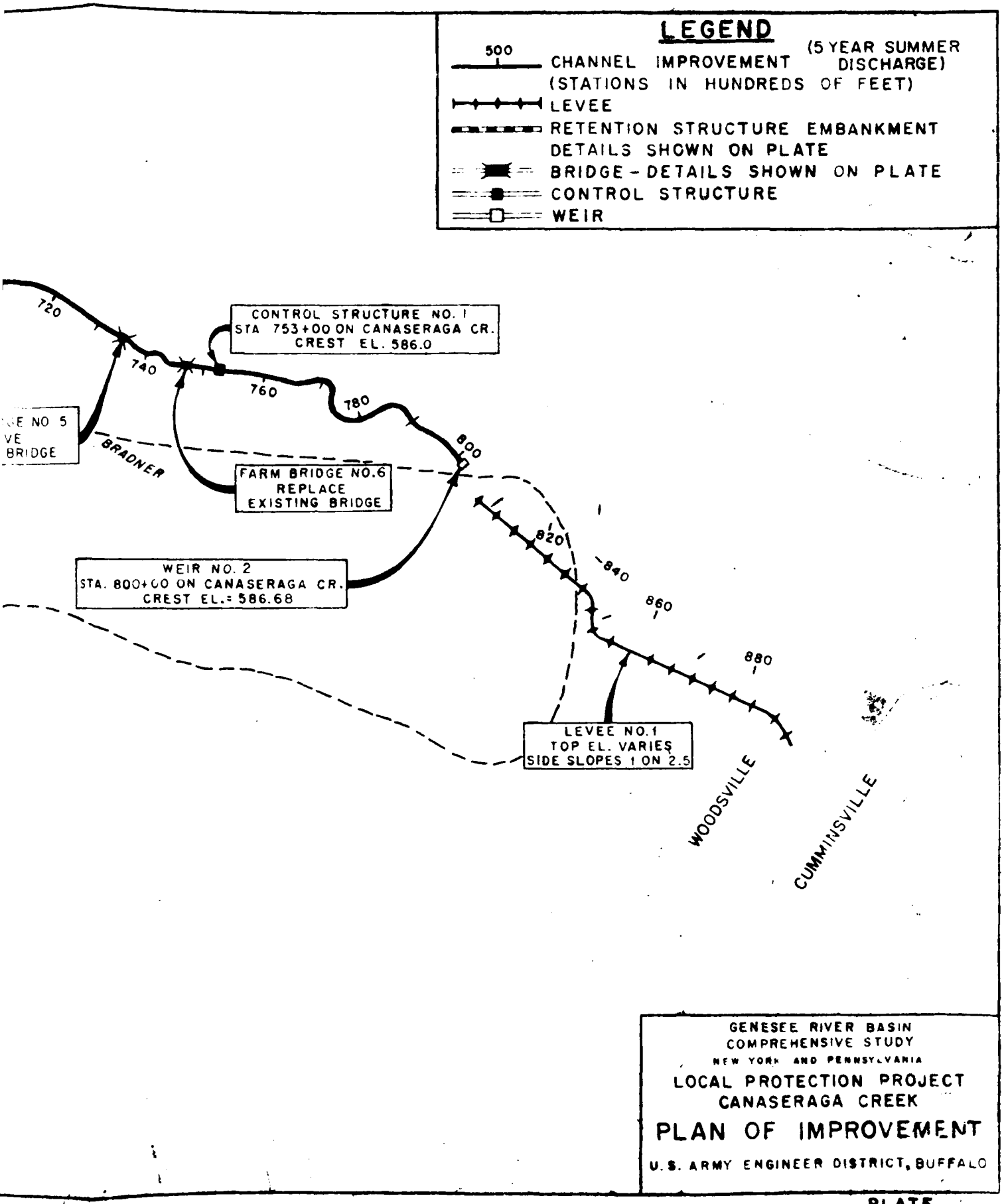

CORPS OF ENGINEERS
U S ARMY
106
ONTARIO
LAKE ONTARIO
ROCHESTER
CALEDONIA
BUFFALO
LAKE ERIE
NEW YORK
BELLEVILLE
VICINITY MAP
SCALE OF MILES
CONRAIL
PROPOSED DIVERSION CHANNEL
SPOIL AREA
FOURIST CABINS
WATER TOWER
BRIDGE TO BE REPLACED BY NEW YORK STATE
MAIN STREET
PROPOSED LEVEE
CONRAIL
N
PROJECT WORKS SHOWN IN RED
GENESEE RIVER
CALEDONIA, NEW YORK
U.S. ARMY ENGINEER


CONTROL STRUCTURE NO 2
STA. 1+50 ON KESHEQUA CR.
CREST EL. 559.50
900' CHANNEL REALIGNMENT
4000' CHANNEL REALIGNMENT
RETENTION STRUCTURE
TOP OF EMBANKMENT EL 580
75' GATED SPILLWAY SECTION
4000' PROTECTED OVERFLOW SECTION
FARM BRIDGE NO. 1
REPLACE
EXISTING BRIDGE
SHAKERS
CROSSING
GENESEE
RIVER
FLOW
ERIE LACKAWANNA RAILROAD
MOUNT MORRIS
0
20
40
60
80
100
120
140
160
180
200
220
63
56


WEIR NO. 1
STA 418+00 ON CANASERAGA CR.
CREST EL. 559.77
FISH AND WILDLIFE POND NO. I
PERMANENT POOL EL. 570
(TOP OF EMBANKMENT EL. 572)
'OL STRUCTURE NO 2
+50 ON KESHEQUA CR.
CREST EL. 559.50
FARM BRIDGE NO 2
REMOVE
EXISTING BRIDGE
2500' CHANNEL REALIGNMENT
REALIGNMENT
280
300
320
340
360
380
260
240
220
POND NO. II
PERMANENT POOL EL. 570
(TOP OF EMBANKMENT EL. 572)
ION STRUCTURE
MBANKMENT EL 580
SPILLWAY SECTION
ED OVERFLOW SECTION
KESHQUA
CREEK
ROAD
PIONEER ROAD BRIDGE
MODIFY EXISTING
WEIR NO 3
STA 0+50 ON BRADNER CR
CREST EL 554 80
PIONEER
SONYEA


0.1
CANASERAGA CR.
559.77
NEL REALIGNMENT
420
440
460
480
500
520
540
560
GROVELAND
CREEK
CANASERAGA
180
FRIE-LACKAWANNA R R BR
MODIFY
EXISTING BRIDGE
BRADNER
CREEK
20B
40B
60B
80B
100B
120B
ROAD
20C
IPIONEER ROAD BRIDGE OVER BRADNER CR.
MODIFY EXISTING BRIDGE
40C
258
STATE
60C
CANAL
ROSS CORNERS
80C
36
SCALE 1:24000
MILE
1000
2000
3000
4000
5000
6000
7000 FEET


560
580
600
620
640
660
680
700
720
740
CREEK
MOUNT MORRIS
FARM BRIDGE NO 4
REPLACE
EXISTING BRIDGE
FARM BRIDGE NO 5
REMOVE
EXISTING BRIDGE
BRADNER
EVERMAN ROAD
APRIL 1961 FLOOD OUTLINE
PONDING
OVERLAND FLOW



GENESEE RIVER BASIN
COMPREHENSIVE STUDY
NEW YORK AND PENNSYLVANIA

LOCAL PROTECTION PROJECT
CANASERAGA CREEK

PLAN OF IMPROVEMENT

U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE

The remaining potential flood damage reduction measures, considered involved: (1) re-regulation and modification of the existing Mt. Morris dam and reservoir, (2) construction of a hydropower facility at Portageville, New York, (3) construction of a reservoir at Poags Hole, New York, and (4) construction of a multi-purpose dam at Stannards, New York. These measures were evaluated individually and in various combinations, to include single and multi-purpose uses for each.

Twelve alternative plans (see Table 4.1) were derived from these scenarios and evaluated in the reconnaissance phase. Six of these alternatives were eliminated from further analysis as summarized below.

The re-analysis of potential reservoirs at Poag's Hole and Portageville indicated either a lack of economic justification, or severe environmental impacts. Therefore, these two considered plans were dropped from further studies (Plans 4 & 12).

Alternative Plans 3, 5, & 9, involving a combination of the considered Stannard, Portageville, and the existing Mt. Morris reservoirs for multi-purpose use including flood control, hydropower, recreation, and irrigation were found to be economically unjustified and had potentials for adverse environmental impacts. They were also dropped from further consideration.

Alternative Plans 7 and 8 were found to be potentially viable from an economic viewpoint. However, implementation of these plans was not a Corps responsibility. Non-Federal hydropower developer, through the Federal Energy Regulatory Commission (FERC), would develop hydropower projects that meet all the regulatory requirements including engineering, social, institutional, legal, and environmental. The holders of the FERC permit are currently performing the feasibility study of hydro electric power.

Any further Corps involvement in the hydropower study will be to primarily insure that the safety and flood control functions of the existing dam are maintained, and all the environmental requirements that fall under its jurisdiction are satisfactorily met.

The five remaining alternatives (1, 2, 6, 10, & 11) were carried into the Corps feasibility stage of the Flood Control study (see Table 4.1).

A brief description of these five plans evaluated in the feasibility phase are as follows:

1. The addition of 27-foot high tainter gates onto the top of the spillway section of the existing Mt. Morris Dam for additional flood control through re-regulation of the reservoir, and for irrigation, recreation, and hydropower (Plan 10).

2. A dam and reservoir at the Stannard site, located 4-1/2 miles south of Wellsville for flood control and recreation (Plan 6).

3. The construction of a dam and reservoir at Stannard, and addition of 27-foot high spillway gates onto the existing Mt. Morris dam for flood control, hydropower generation, and irrigation of the Ontario Lake Plain (Plan 11).

Table 4.1 - Assessment, Evaluation, and Comparison of Alternative Plans

Item	Plan 1 Re-regulation	Plan 2 No-Action Plan
Plan Description	This plan consists of re-regulating the existing Mt. Morris dam/reservoir inflow-outflow. This would reduce the occurrence of full channel flow downstream of the dam and thereby reduce the rate of erosion and agricultural flooding.	No project for flood control and allied purposes would be constructed by the Federal Government. Flooding in the main stem of Genesee River and its tributaries would continue, with average annual damages totaling about $1,300,000. Potential development of other water resources would not occur.
Average Annual Cost	1,300.00	0.0
Average Annual Benefit	37,200.00	0.0
Benefit-to-Cost Ratio	25	N/A
Net Benefit	35,900.00	0.0
Environmental Impact	No significant impact	None
Carry Forward into Feasibility Stage	Yes	Yes

Table 4.1 - Assessment, Evaluation, and Comparison of Alternative Plans (Cont'd)

Item	Plan 3 Stannard - Portage - Mt. Morris w/hydro.	Plan 4 Portage - Mt. Morris (hydro)
Plan Description	This plan calls for the construction of Stannard and Portage Dam/Reservoirs to operate in combination with the existing Mt. Morris Dam to operate together to generate hydropower and provide flood control to the upper reaches of the basin.	This plan calls for construction of a Dam/Reservoir at the Portageville site and a power plant at the existing Mt. Morris Dam/Reservoir. The hydropower storage at Mt. Morris would be equal to flood control storage at Portageville Dam/Reservoir.
Average Annual Cost	49,469,800.00	26,823,700.00
Average Annual Benefit	22,543,000.00	19,436,400.00
Benefit-to-Cost Ratio	0.46	0.72
Net Benefit	-26,926,800.00	-7,387,300.00
Environmental Impact	Impact would occur to wetlands, vegetation, wildlife, and fisheries habitat. Fish mortality could occur at the turbines. Over 300 structures and a cemetery would require relocation, as would families, institutions, businesses, roads, and utilities.	Maximum inundated area at Portage Dam/Reservoirs 7,000 acres. Wetlands, vegetation, wildlife, and fisheries would be severely impacted. A total of approximately 235 structures including the village of Portageville and parts of the villages of Rossburg and Wiscoy. Significant negative social and community cohesion would occur 27 miles of roads and 1 mile of utility lines would require relocation.
Carry Forward Into Feasibility Phase	No.	No.

Table 4.1 - Assessment, Evaluation, and Comparison of Alternative Plans (Cont'd)

Item	Plan 5 Stannard-Portage-Mt. Morris	Plan 6 Stannard-Mt. Morris (Flood Control)
Plan Description	This plan calls for construction of Stannard and Portage Dam/Reservoirs as a system. The system will generate hydropower at all three sites, and provide flood control above Mt. Morris.	This plan calls for construction of a dam/reservoir at Stannard for flood control and other uses. A 54,000 acre-ft, in combination with Mt. Morris, would provide for increased flood control, water supply, recreation, and irrigation.
Average Annual Cost	49,669,800.00	4,203,000.00
Average Annual Benefit	22,193,800.00	4,380,200.00
Benefit-to-Cost Ratio	0.45	1.04
Net Benefit	-27,476,000.00	177,200.00
Environmental Impact	Significant impacts are similar to those described for Plan 3. Some wetlands would be adversely impacted in the conservation pool upstream of the Mt. Morris Dam and Reservoir. Social impacts and effects on community cohesion are similar to those of Plan 3.	Impacts are lesser than those of Plan 3.
Carry Forward Into Feasibility Phase	No	Yes

Table 4.1 - Assessment, Evaluation, and Comparison of Alternative Plans (Cont'd)

Item	Plan 7 15-Foot Spillway Gate (hydro)	Plan 8 27-Foot Spillway Gate (hydro)
Plan Description	This plan calls for the addition of 15-foot high spillway gates onto the existing Mt. Morris Dam. The increased storage would be allocated to hydropower generation. No additional flood control storage capacity would be generated. This plan calls for 375 cfs release for irrigation.	This plan calls for the addition of 27-foot high spillway gates onto the existing Mt. Morris Dam/Reservoir. Increased capacity would be for hydropower generation - not flood control. 375 cfs for irrigation on the Ontario Lake Plain would be released.
Average Annual Cost	847,793.00	1,676,210.00
Average Annual Benefit	3,293,900.00	4,153,700.00
Benefit-to-Cost Ratio	3.89	2.48
Net Benefit	2,446,107.00	2,477,490.00
Environmental Impact	Long-term inundation 1,600 acres, much of which is riparian terrestrial wildlife habitat within the gorge. Warmwater fisheries would be impacted. A variety of wetlands and wetland types would be impacted. Adverse impacts on fish in the forms of turbine mortality, entrainment, or impingement may occur.	The long-term inundation of 2,100 acres from the conservation pool would impact riparian terrestrial wildlife habitat in the gorge. An additional 2,300 acres could be temporarily inundated. Impacts would be similar to those of Plan 7.
Carry Forward Into Feasibility Phase	Yes	Yes

Table 4.1 - Assessment, Evaluation, and Comparison of Alternative Plans (Cont'd)

Item	Plan 9 Stannard - Portage - Mt. Morris w/27-foot spillway gates	Plan 10 Mt. Morris 27-foot gate (Flood Control and Hydro)
Plan Description	This plan calls for the construction of Stannard and Portageville Dam/Reservoirs for flood storage and the addition of 27-foot high gates to the spillway of the existing Mt. Morris dam for hydropower.	This plan calls for the addition of 27-foot high spillway gates into the existing Mt. Morris Dam. The increased storage at Mt. Morris will be allocated to hydropower and flood control. 375 cfs of irrigation water would be released on the Ontario Lake Plain.
Average Annual Cost	50,510,600.00	1,676,300.00
Average Annual Benefit	25,499,900.00	6,296,800.00
Benefit-to-Cost Ratio	0.42	3.8
Net Benefit	-25,010,700.00	4,620,500.00
Environmental Impact	Significant impacts are similar to those of Plan 3. Regarding Mt. Morris, the conservation pool would cause a long-term inundation of 2,100 acres including riparian terrestrial habitat in the gorge, and wetlands upstream.	There could be some environmental impacts for Mt. Morris. There would be impact to upstream wetlands. Fish could be adversely impacted from turbine mortality, entrainment, or impingement.
Carry Forward Into Feasibility Phase	No	Yes

Table 4.1 - Assessment, Evaluation, and Comparison of Alternative Plans (Cont'd)

Item	Plan 11 Stannard-Mt. Morris 27-foot gate (Hydro)	Plan 12 Poag's Hole - Mt. Morris (hydro)
Plan Description	This plan is a combination of Plans 1, 6, and 10, it calls for construction of a Dam/Reservoir at Stannard for flood control, and the addition of 27-foot spillway gates to the existing Mt. Morris Dam for hydropower and flood control. It also calls for the release of 375 cfs for irrigation on the Ontario Lake Plain.	This plan calls for construction of a Dam/Reservoir at the Poag's Hole site, and the construction of a power plant at the existing Mt. Morris Reservoir. Mt. Morris hydropower would equal flood storage capacity at Poag's Hole. The plan also provides for irrigation of the Ontario Lake Plain, as well as erosion and flood damage reduction along Canaseraga Creek.
Average Annual Cost	6,126,500.00	17,772,262.00
Average Annual Benefit	7,193,100.00	3,253,900.00
Benefit-to-Cost Ratio	1.2	0.18
Net Benefit	1,066,600.00	-14,518,362.00
Environmental Impact	No permanent flood control dam and reservoir would be required at Stannard. Temporary flood storage, however, could impact trout feeding/spawning. There would also be wetland and riparian vegetation impacts.	Wildlife habitat would be severely impacted, as would cold water fish habitat. Whitetail deer would be especially impacted. Fish could experience adverse impacts at the two turbine locations.
Carry Forward Into Feasibility Phase	Yes	No

4. The re-regulation of the existing Mt. Morris reservoir inflow-outflow for additional flood control (Plan 1).

5. No Federal action plan (Plan 2).

PLANS ELIMINATED EARLY IN THE FEASIBILITY PHASE

1. Stannard Dam and Reservoir (Plan 6).

This plan would provide flood control to the towns and villages downstream of the project site. Recreation was also considered as an add-on purpose for maximizing net benefits. A storage capacity of 54,000 acre-feet (Photo 4.1) would be available to store flood waters. A seasonal pool occupying a portion of the available storage would be used for recreation purposes. This plan was also analyzed for flood control only. A plan view of the reservoir outline is shown on Photo 4.2.

Early in the feasibility phase, local opposition to both the single-purpose and multi-purpose plans surfaced. Opponents of this alternative cited adverse environmental impacts. Temporary flood pools at the Stannard site would disrupt cold water trout feeding and spawning. Several wetlands would be negatively impacted. Proponents of the plan also recognized potential adverse impacts on fish and wildlife, but believed the beneficial impacts on the economy of Allegany County would outweigh any adverse impacts. Study of the Stannard project was terminated mainly because of lack of economic justification for single-purpose flood control. See Table 4.2 (a, b, c, d, & e). Further, potential development of the Stannard site as a multi-purpose project was also terminated because of lack of a non-Federal sponsor to share in the cost of additional studies, costs of construction, and operation and maintenance. (Operation and maintenance of the project would have been a 100-percent non-Federal responsibility.)

2. Multi-use Plans (10 and 11) for Flood Control, Hydropower, and Irrigation.

The multi-use Plans 10 and 11 would have met the additional flood control needs and provided for further development of hydroelectric power and increased irrigation. The preliminary economic analysis for these plans indicated benefit-to-cost ratios above 1 for multi-purpose use. However, given the social and perceived adverse environmental impacts of such alternatives, a number of basin-wide residents expressed opposition to these alternatives. Further, the probability of implementing these multi-use plans was very low as the Corps of Engineers and the New York State Department of Environmental Conservation could only implement the flood control component of the plans. The irrigation and recreation components of these plans were dropped from further consideration because of lack of non-Federal sponsors to share in the costs of the additional studies, and construction, and operation and maintenance costs of any potential projects.

Overall, these multi-use plans, Plans 10 and 11, were not given any further consideration in the feasibility phase. The feasibility study efforts concentrated on consideration of flood damage reduction measures which involved re-regulation of the existing Mt. Morris reservoir and installation of gates on top of the spillway section of the dam to increase the flood storage potential of the reservoir.

**Considered Stannard dam
Plan view and elevation.
Photo 4.1**

**Stannard Reservoir outline.
Photo 4.2**

Table 4.2a - Estimate of First Cost - Stannard Dam
(January 1988 Price Levels)

Item No.	Description	Estimate Quantity	Unit	Unit Price ($)	Estimated Amount ($)
1	Cofferdam & Care of Water		LS		658,000
2	Excavation	511,500	CY	3.00	1,534,500
3	Rock Excavation	13,900	CY	20.70	287,730
4	Impervious Fill	99,600	CY	19.35	1,927,260
5	Select Perious Fill	85,100	CY	12.05	1,025,455
6	Random Fill	310,600	CY	4.10	1,273,460
7	Bedding Stone	11,760	TONS	34.10	401,016
8	Riprap	35,280	TONS	38.15	1,345,932
9	Concrete Stilling Basin	5,300	CY	221.55	1,174,215
10	Concrete L. Upper Training Wall	2,340	CY	245.00	573,300
11	Concrete Spillway	30,000	CY	105.00	3,150,000
12	Sluice Gate & Accessaries	5	EA	340,000	1,700,000
13	Conduit Lining	5	EA	31,000	155,000
14	Service Bridge		LS		238,000
15	Steel Guardrail	3,900	LF	91.40	75,660
16	Clearing of Reservoir	400	ACRE	3,400	1,360,000
	Subtotal				16,879,528

Table 4.2a - Estimate of First Cost - Stannard Dam (Cont'd)
(January 1988 Price Levels)

Item No.	Description	Estimate Quantity	Unit	Unit Price ($)	Estimated Amount ($)
	Dike (on Marsh Creek)				
1	Excavation - Borrow	320,000	CY	4.20	1,344,000
2	Embankment - Compacted	217,000	CY	0.60	130,200
3	Excavation - Stripping	21,500	CY	2.20	47,300
4	Excavation - Trench	23,000	CY	3.60	82,800
5	Filter Material	10,000	CY	8.60	86,000
6	Rock Fill	30,500	CY	25.85	778,425
7	5' Blanket (Borrow + Compaction)	53,500	CY	4.80	256,800
	Subtotal				2,735,525
	Total Cost of Dam & Dike				19,615,053
	Relocation & Construction of Route 19 & Roads		LS		13,000,000
	Relocation of Utilities		LS		1,600,000
	Subtotal				14,600,000
	Total Contract Earnings				34,215,053
	Contingencies @ 25%				8,784,947
	Total Conractors earnings Plus Contingencies				43,000,000
	Engineering & Design				1,400,000
	Supervision & Administration				2,600,000
	Total Project First Cost				47,000,000

Table 4.2b - Total Investment Costs - Stannard
(January 1988 Price Levels)

Item	Total Cost	Federal	Non-Federal
	($)	($)	($)
Total Project First Cost, Including Lands	48,235,000	35,250,000	12,985,000
Interest During Construction	6,423,200	4,817,400	1,605,800
Investment Costs	54,658,200	40,067,400	14,590,800

Table 4.2c - Average Annual Benefits - Stannard Dam & Reservoir
For Flood Control Only.
(January 1988 Price Levels)

Benefit Catagory	Average Annual Benefits
	($)
Residential	316,100
Commercial	510,200
Municipal & Utility	353,700
Agriculture	126,200
Erosion	3,800
Total	1,310,000

Table 4.2d - Average Annual Costs and Apportionment - Stannard 1/
(January 1988 Price Levels)

Cost Catagory	Total	Federal	Non-Federal
	($)	($)	($)
Interest	4,714,300	3,455,800	1,258,500
Amortization	1,100	800	300
Annual Maintenance	352,500	0	352,500
Total Annual Cost	5,067,900	3,456,600	1,611,300

1/ 100-year economic life and 5-5/8 % interest rate.

Table 4.2e - Economic Efficiency - Stannard
(January 1988 Price Levels)

Total Annual Cost	Total Annual Benefit	Net Benefits	B/C
($)	($)	($)	
5,067,900	1,310,000	-3,757,900	.3

ALTERNATIVE STUDIED IN THE FEASIBILITY PHASE
(Re-regulation, and addition of gates onto the Mt. Morris Dam)

Components of previous plans: Plan 1 (Re-regulation), and Plan 10 (adding gates to Mount Morris for flood control only), were combined to address the flood control needs of the lower basin. This alternative considered various gate heights (12 to 30 feet). The two main components of this plan follow.

The Re-regulation Component of the plan (Plan 1) would result in periodic pools, as shown in Figures 3.1-3.5, that are temporary in nature as they vary with the inflows to and outflow from the reservoir. The problem is that these pools would periodically reduce the storage capacity available for flood control, and, therefore, reduce the level of flood protection being provided by the existing dam. Thus, an increase in the existing storage capacity through modification to the dam will compensate for the momentary loss of storage capacity, and provide for additional flood protection by reducing the recurrence of the more frequent, but less severe floods. It would also provide greater protection from the less frequent, but more severe flood events like the 1972 floods.

The second component of the plan (Plan 10A) involving modification to the dam, calls for addition of tainter gates on top of the spillway section of the existing Mt. Morris Dam for flood control only (see Plates 4.4 and 4.5). A total of 10 tainter gates, 42 feet wide and considered height varying from 12 to 30 feet, would be attached to 11 new 8-foot wide concrete piers. A service bridge would span the spillway section of the dam. The bridge would be 16 feet wide and consist of precast box beams, 36 inches deep. The height of the gate would vary with the degree of the desired flood damage reduction in the damage reach downstream from the dam. Several schemes were evaluated for estimating the degree of reduction in average annual damages. The Buffalo District performed overturning and stability analyses for the existing dam for various flood and earthquake loading conditions. It was found that the dam is stable and meets all the required stability criteria. Also, an overturning stability analysis of the dam, with 30-foot high tainter gates, and upper pool to the top of the gate, resulted in 100 percent compression of the base of the dam. The stability analysis resulted in high safety factors against sliding; therefore, it was assumed that a gated dam would meet all sliding stability requirements. These gates (see Photo 4.3) would substantially increase the storage capacity currently available for flood control. For instance, the addition of 30-foot gates would increase by 1/3 (100,000 acre-feet) the existing flood storage capacity (See Figure 4.1, Area-Capacity Curve). Further, it will allow for the release of lesser flows (maximum 4,000 cubic feet per second) to the downstream reaches than is called for under the established reservoir pool evacuation in effect (Maximum 8,000 cubic feet per second). As stated earlier, the occurrence of the more frequent, but less severe floods would be reduced, and downstream erosion rates reduced. Also, the less frequent, but more severe floods like the 1972 "Agnes" flood would be more effectively controlled.

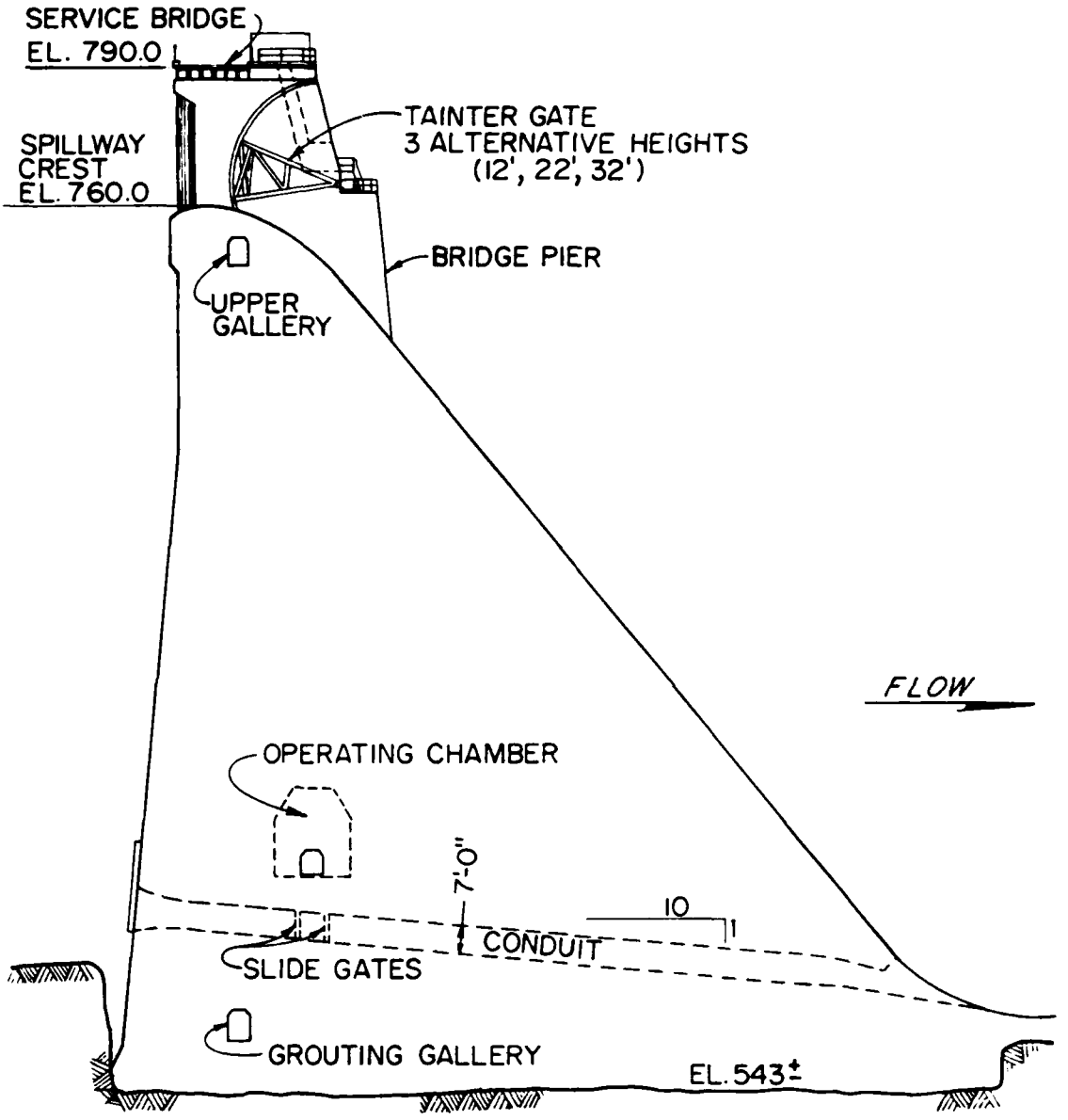
Costs and benefits were derived for a range of spillway gate heights (that is, 12 feet, 22 feet, and 30 feet gate heights) to ascertain if providing additional flood control storage through installation of the gates would be economically justified. This evaluation was performed on the bases that the addition of intermediate piers on the spillway would not adversely affect the

structure for Spillway Design Flood conditions. First costs investment costs, and average annual costs for the three gate heights (12, 22, and 30 feet) are shown in Tables 4.3a, 4.3b, and 4.3c. Average annual benefits for these three scenarios are summarized in Table 4.3d with benefit-to-cost ratios varying between 0.5 to 0.8 (Table 4.3e). None of these scenarios are economically justified. On this basis, plans that incorporate spillway modifications to include gates of varying heights are not implementable from the Federal perspective.

Subsequent to completing this evaluation, it was determined that the top of the dam would have to be raised 13 feet to ensure safety and operational integrity of the structure during an occurrence of the Spillway Design Flood. No refined designs or cost estimates were prepared as the added cost would just further reduce the already negative benefit-to-cost ratios.

NATIONAL ECONOMIC DEVELOPMENT PLAN

None of the variations of the considered structural and nonstructural alternatives would simultaneously meet the basic test of economic viability and environmental soundness for flood control only. Therefore, no single-purpose Flood Control Plan was identified that would satisfy the National Economic Development (NED) account.



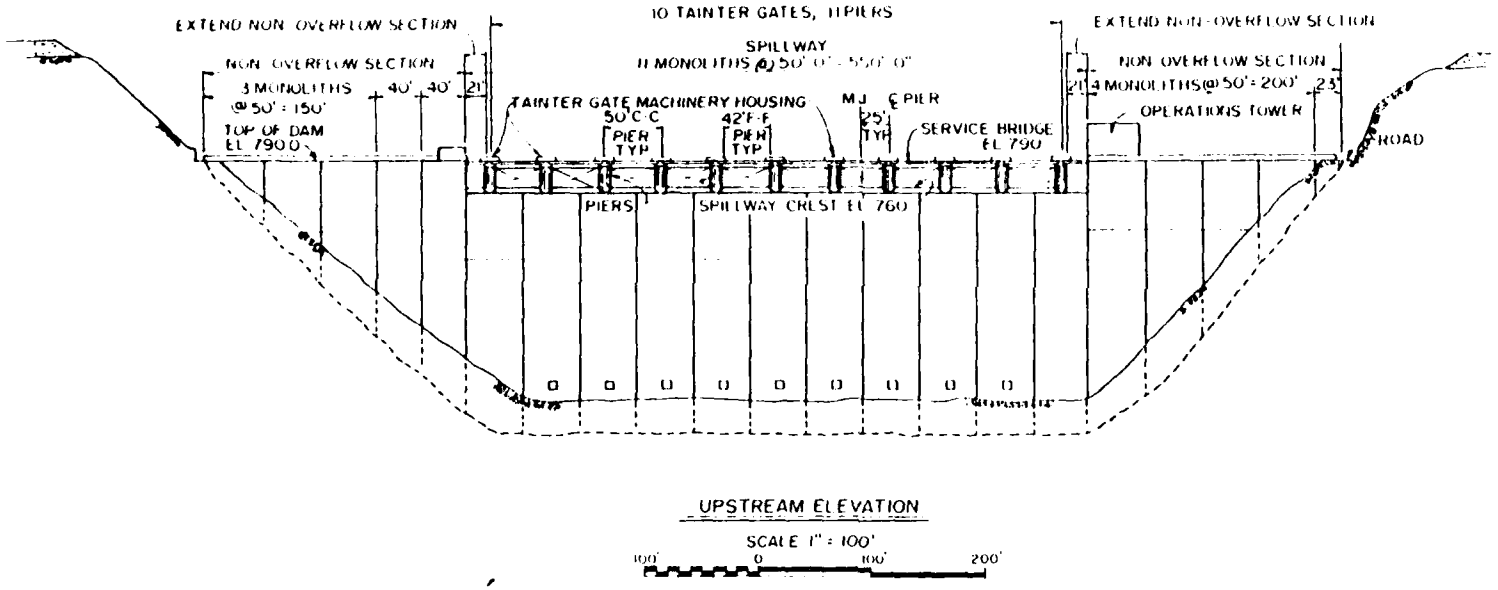
SOUTH ELEVATION
(NOT TO SCALE)

GENESEE RIVER BASIN STUDY
NEW YORK

MODIFICATION TO MT. MORRIS
DAM ALTERNATIVE

U.S. ARMY ENGINEER DISTRICT, BUFFALO
JUNE 1988

PLATE 4.4



UPSTREAM ELEVATION

SCALE 1" = 100'

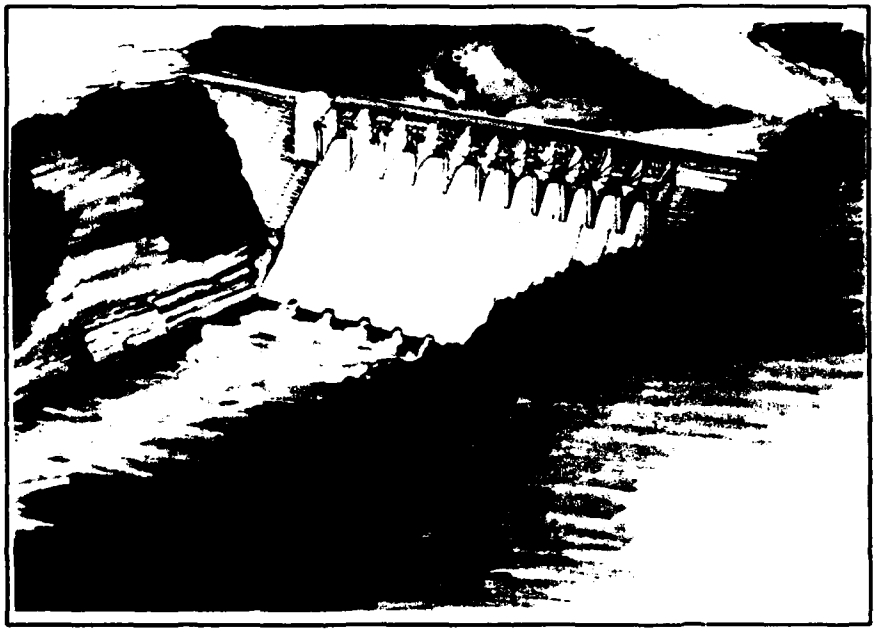
100' 0 100' 200'

GENESEE RIVER BASIN STUDY
NEW YORK

MODIFICATION TO MT. MORRIS DAM ALTERNATIVE

U.S. ARMY ENGINEER DISTRICT, BUFFALO
JUNE 1988

PLATE 4.5



Considered gated Mt. Morris Dam.
Photo 4.3

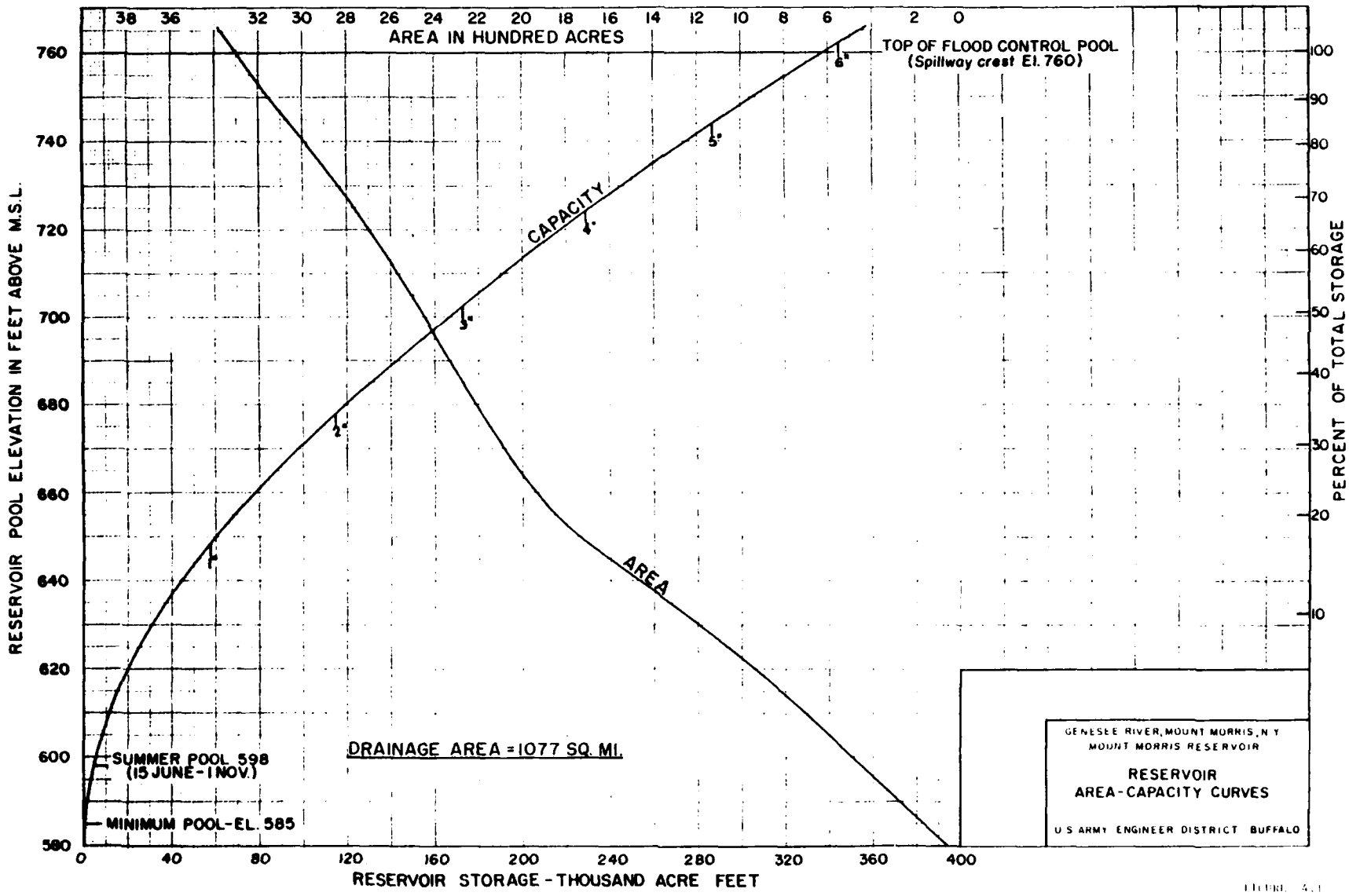

AREA IN HUNDRED ACRES
38 36 32 30 28 26 24 22 20 18 16 14 12 10 8 6 2 0
TOP OF FLOOD CONTROL POOL
(Spillway crest El. 760)
CAPACITY
AREA
RESERVOIR POOL ELEVATION IN FEET ABOVE M.S.L.
760 740 720 700 680 660 640 620 600 580
PERCENT OF TOTAL STORAGE
100 90 80 70 60 50 40 30 20 10
SUMMER POOL 598
(15 JUNE - 1 NOV.)
MINIMUM POOL-EL. 585
DRAINAGE AREA = 1077 SQ. MI.
0 40 80 120 160 200 240 280 320 360 400
RESERVOIR STORAGE - THOUSAND ACRE FEET
GENESEE RIVER, MOUNT MORRIS, N.Y.
MOUNT MORRIS RESERVOIR
RESERVOIR
AREA-CAPACITY CURVES
U.S. ARMY ENGINEER DISTRICT BUFFALO

Table 4.3a - Estimate of First Cost for 12' High Gates - Mt. Morris Spillway (January 1988 Price Levels) 1/

Item No.	Description	Estimate Quantity	Unit	Unit Price ($)	Estimated Amount ($)
1	Tainter Gates 12' high X 42' w/Cable Drum Hoists, Embedment	10.00	EA	189,000	1,890,000
2	Concrete & Reinforcement				
	a. Concr. Pier, Reinf. & Formwork	6,500	CY	600.00	3,900,000
	b. Extension of Non-overflow Section	1,000	CY	600.00	600,000
	c. Filling Upper Gallery & Portion of 3' Vent	728	CY	310.00	225,680
3	Service Bridge				
	a. Precast Concr. Box Beams				
	20 Footers	12	EA	4,000	48,000
	30 Footers	66	EA	9,900	653,400
	b. Concrete Deck	10,000	SF	5.25	52,500
	c. Concrete Curbing	1,100	LF	9.55	10,505
	d. Steel Guard Railing	1,420	LF	46.55	66,101
4	Rerouting Existing 3' Vent in Dam	2,400	CF	18.65	44,760
5	Electrical - Cable, Conduits		LS		61,500
6	Miscellaneous Metals - Handrailings Embedded Metals		LS		26,000
7	Doweling into Existing Concr. for Attachment to New Concr.		LS		5,200
	Total Contract Earnings				7,583,646
	Contingencies @ 25%				1,916,354
	Total Contractors Earnings Plus Contingencies				9,500,000
	Engineering & Design				280,000
	Supervision & Administration				320,000
	Total Project First Cost				10,100,000

1/ Does not include the cost for raising the top of the dam 13 feet to safely pass the Spillway Design Flood.

Table 4.3a - Estimate of First Cost for 22' High Gates - Mt. Morris Spillway (Cont'd) 1/
(January 1988 Price Levels)

Item No.	Description	Estimate Quantity	Unit	Unit Price ($)	Estimated Amount ($)
1	Tainter Gates 22' high X 42' w/Cable Drum Hoists, Embedment	10.00	EA	346,000	3,460,000
2	Concrete & Reinforcement				
	a. Concr. Pier, Reinf. & Formwork	6,500	CY	600.00	3,900,000
	b. Extension of Non-overflow Section	1,000	CY	600.00	600,000
	c. Filling Upper Gallery & Portion of 3' Vent	728	CY	310.00	225,680
3	Service Bridge				
	a. Precast Concr. Box Beams				
	20 Footers	12	EA	4,000	48,000
	30 Footers	66	EA	9,900	653,400
	b. Concrete Deck	10,000	SF	5.25	52,500
	c. Concrete Curbing	1,100	LF	9.55	10,505
	d. Steel Guard Railing	1,420	LF	46.55	66,101
4	Rerouting Existing 3' Vent in Dam	2,400	CF	18.65	44,760
5	Electrical - Cable, Conduits		LS		61,500
6	Miscellaneous Metals - Handrailings Embedded Metals		LS		26,000
7	Doweling into Existing Concr. for Attachment to New Concr.		LS		5,200
	Total Contract Earnings				9,153,646
	Contingencies @ 25%				2,246,354
	Total Contractors Earnings Plus Contingencies				11,400,000
	Engineering & Design				330,000
	Supervision & Administration				370,000
	Total Project First Cost				12,100,000

1/ Does not include the cost for raising the top of the dam 13 feet to safely pass the Spillway Design Flood.

Table 4.3a - Estimate of First Cost for 30' High Gates - Mt. Morris Spillway (Cont'd) 1/
(January 1988 Price Levels)

Item No.	Description	Estimate Quantity	Unit	Unit Price ($)	Estimated Amount ($)
1	Tainter Gates 30' high X 42' w/Cable Drum Hoists, Embedment	10.00	EA	472,400	4,724,000
2	Concrete & Reinforcement				
	a. Concr. Pier, Reinf. & Formwork	6,960	CY	600.00	4,176,000
	b. Extension of Non-overflow Section	1,000	CY	600.00	600,000
	c. Filling Upper Gallery & Portion of 3' Vent	728	CY	310.00	225,680
3	Service Bridge				
	a. Precast Concr. Box Beams				
	20 Footers	12	EA	4,000	48,000
	30 Footers	66	EA	9,900	653,400
	b. Concrete Deck	10,000	SF	5.25	52,500
	c. Concrete Curbing	1,100	LF	9.55	10,505
	d. Steel Guard Railing	1,420	LF	46.55	66,101
4	Rerouting Existing 3' Vent in Dam	2,400	CF	18.65	44,760
5	Electrical - Cable, Conduits		LS		61,500
6	Miscellaneous Metals - Handrailings Embedded Metals		LS		26,000
7	Doweling into Existing Concr. for Attachment to New Concr.		LS		5,200
	Total Contract Earnings				10,693,646
	Contingencies @ 25%				2,138,729
	Total Contractors Earnings Plus Contingencies				12,800,000
	Engineering & Design				380,000
	Supervision & Administration				420,000
	Total Project First Cost				13,600,000

1/ Does not include the cost for raising the top of the dam 13 feet to safely pass the Spillway Design Flood.

Table 4.3b - Total Investment Cost and Apportionment - Mt. Morris 1/

Item	12-Foot Gate ($)	22-Foot Gate ($)	30-Foot Gate ($)
Total Project First Cost, Including Lands	10,100,000	12,100,000	13,600,000
Interest During Construction	712,700	853,800	959,700
Total Investment Cost	10,812,700	12,953,800	14,559,700
Federal	8,109,500	9,715,300	10,919,800
Non-Federal	2,703,200	3,238,500	3,639,900

NOTE: All costs and benefits are based on January 1988 prices, interest rate of 8-5/8 percent, and 100-year project life.

1/ Does not include the cost for raising the top of the dam 13 feet to safely pass the Spillway Design Flood.

Table 4.3c - Average Annual Costs - Mt. Morris (Spillway Gates)

Cost Catagory	12-Foot Gate ($)	22-Foot Gate ($)	30-Foot Gate ($)
Interest	932,600	1,117,300	1,255,800
Amortization	200	300	300
Annual Maintenance	10,000	10,000	10,000
Total Annual Cost	942,800	1,127,600	1,266,100
Federal	699,600	838,200	942,100
Non-Federal	243,200	289,400	324,000

NOTE: All costs and benefits are based on January 1988 prices, interest rate of 8-5/8 percent, and 100-year project life.

1/ Does not include the cost for raising the top of the dam 13 feet to safely pass the Spillway Design Flood.

Table 4.3d - Average Annual Benefits - Mt. Morris (Spillway Gates)

Benefit Catagory	12-Foot Gate ($)	22-Foot Gate ($)	30-Foot Gate ($)
Residential	137,400	207,700	327,200
Commercial	149,700	222,900	307,200
Municipal & Utility	87,300	127,700	164,400
Agriculture	117,000	158,500	222,700
Erosion	2,000	2,000	2,000
Total	493,400	718,800	1,023,500

NOTE: All costs and benefits are based on January 1988 prices, interest rate of 8-5/8 percent, and 100-year project life.

Table 4.3e - Economic Efficiency - Mt. Morris (Spillway Gates)

	12-Foot Gates	22-Foot Gates	30-Foot Gates
Total Annual Cost 1/	$ 942,800	$ 1,127,600	$ 1,266,100
Total Annual Benefit	$ 493,400	$ 718,800	$ 1,023,500
Net Benefits	$ -449,400	$ -408,800	$ -242,600
B/C	.5	.6	.8

NOTE: All costs and benefits are based on January 1988 prices, interest rate of 8-5/8 percent, and 100-year project life.

1/ Does not include the cost for raising the top of the dam 13 feet to safely pass the Spillway Design Flood.

SECTION V

FINDINGS AND CONCLUSIONS

SECTION 5

FINDINGS AND CONCLUSIONS

This section provides a summary of the significant findings and conclusions on the Genesee River Basin Feasibility Study.

The primary water resources need for which a solution was sought was to reduce flood damages within the Genesee River Basin. As possible solutions, more than two dozen scenarios, including the "No-Action" option, were developed and assessed. Two local protection projects that were previously authorized for construction and one previously considered local protection project were dropped from further consideration. The remaining potential flood damage reduction measures considered involved re-regulation and modification of the existing Mt. Morris Dam and consideration of dam and reservoir plans. The main conclusions of this formulation and assessment process were:

a. Single-purpose flood control projects were not economically justified and were eliminated from further consideration.

b. There was a lack of non-Federal sponsors to share in the cost of additional studies, construction, and operation and maintenance costs for multi-purpose projects.

c. Re-regulation of inflow/outflow at the existing Mt. Morris Dam would reduce the flood storage capacity of the dam at times when larger storage capacity would be needed.

d. Raising the spillway section of the existing Mt. Morris Dam for additional flood control was not economically justified and was eliminated from further consideration. Benefit-to-cost ratios vary from 0.5 to 0.8 for various size gates.

e. The potential Stannard Reservoir project was not economically justified for single-purpose flood control (BCR = .3). As a multi-purpose project there was a lack of a non-Federal sponsor to share in the cost of additional studies, construction, and operation and maintenance costs. The potential flood control sponsor, New York State Department of Environmental Conservation, did not support construction of the Stannard project because of the high non-Federal cost to construct and operate and maintain the project.

Additional conclusions reached are as follows:

a. Flooding, streambank and farmland erosion remain the major problems in the Genesee River Basin. These problems restrain industrial, agricultural, and commercial development; and increase the amount of high cost of sediment dredging.

b. The erosion and flooding problem will continue as there is no regional approach or cohesive plan to abate the rate of erosion or reduce existing flood damages. Small flood and emergency streambank erosion projects to protect specific public land and facilities are local in nature and will not satisfy the benefit-cost criteria established for Corps of Engineers projects.

c. There was overwhelming opposition to any dam and reservoir project in the basin. This opposition, particularly the opposition to any changes to the existing Mt. Morris Dam, that would affect the gorge at Letchworth State Park, includes all levels of government and the general public.

d. Basin residents have shown a preference for, and seem likely to accept, projects of a more local nature, which do not meet current Corps criteria for economic viability.

e. Specific planning objectives of National, State, and local water-related and land resource management needs, problems, and opportunities (specific to the basin), cannot be simultaneously met to enhance National Economic Development (NED).

f. New residential and industrial developments in the flood plain in the suburbs surrounding the city of Rochester will cause substantial increase in residual flood damages. Continuation of this trend will further increase residual damages in the Lower Genesee River Basin.

SECTION VI

RECOMMENDATIONS

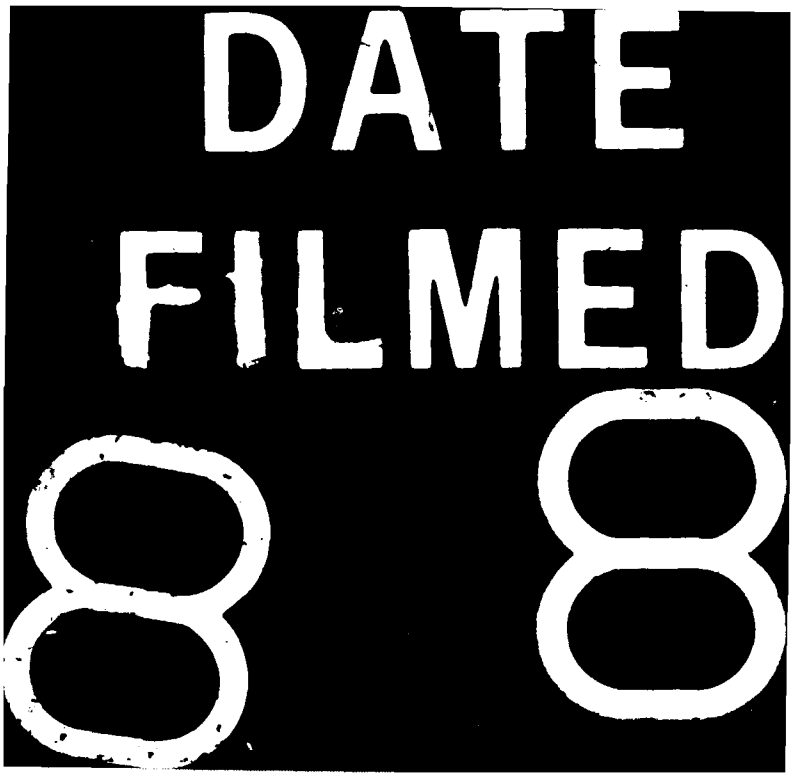
SECTION 6

RECOMMENDATION

As a result of the study findings and conclusions, I recommend no further Federal action be taken under this study authority. I further recommend that this study be terminated.

Daniel R. Clark

DANIEL R. CLARK
Colonel, U.S. Army
Commanding


DATE
FILMED
8 8