DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
THE NORTHEASTERN ILLINOIS METROPOLITAN
AREA PLANNING COMMISSION

HYDROLOGIC INVESTIGATIONS
ATLAS HA-68

FLOODS IN ELMHURST QUADRANGLE ILLINOIS

This report presents hydrologic data for the evaluation of flood conditions to minimize the flood hazard in the economic development of flood plains. The data provide a technical basis for making sound decisions concerning the use of flood-plain lands. No recommendations or suggestions for land-use regulations are made and no solutions of existing flood problems are proposed. This is the third of many such reports planned for northeastern Illinois.

The approximate areas inundated by floods are delineated along streams in the Elmhurst 7 1/2-minute quadrangle. Location of the Elmhurst quadrangle is shown in figure 1.

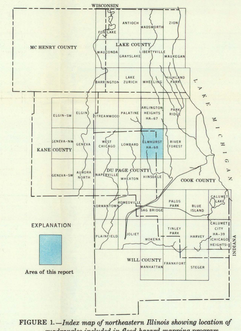

FIGURE 1.—*Index map of northeastern Illinois showing location of quadrangles included in flood-hazard mapping program*

Inundated areas are shown along Silver Creek, Bensenville Ditch, and Addison Creek below mile 6 for the flood of March 1948; along Crystal Creek and Salt Creek for the flood of October 1954; and along Willow Creek and Addison Creek above mile 6 for the flood of July 1957. These floods are not necessarily the highest expected along those streams. Greater floods are possible, but definition of their probable overflow limits is not within the scope of this report.

Flood limits are not defined in Crystal Creek basin above Mannheim Road because the drainage pattern was altered by expansion of the Chicago O'Hare International Airport. Flood limits also are not defined in areas where streams are located in underground storm drains—in the upper reaches of Bensenville Ditch and Addison Creek, and in the area east of York Road and south of the Chicago and Northwestern Railway in the southeast corner of the Elmhurst quadrangle. Street and basement flooding owing to backup in storm drains occurs in several areas in the Elmhurst quadrangle but limits of such flooding are not defined in this report.

The flood limits shown on the map reflect channel conditions that existed when the floods occurred and no attempt is made to appraise the effect of channel changes that may have been made later. Protective works built after the floods of 1948, 1954, and 1957 may reduce the frequency of flooding in the area but will not necessarily eliminate all future flooding. The inundation pattern of future floods may be affected by new highways and bridges, relocation and improvements of stream channels, and other cultural changes.

Cooperation and acknowledgment— The preparation of this report is part of an extensive flood-mapping program financed through a cooperative agreement between the Northeastern Illinois Metropolitan Area Planning Commission and the U. S. Geological Survey whereby flood maps will be prepared for the 7 1/2-minute quadrangles shown in figure 1. Areal limits of the program include parts of Cook, Kane, McHenry, and Will Counties, and all of Du Page and Lake Counties. The six counties cooperate financially in the program through separate agreements with the Planning Commission. Financial support for the preparation of this report was provided by Du Page County.

The cooperative program is administered on behalf of the Planning Commission by Paul Oppermann, Executive Director, and is directly managed by John R. Sheaffer, Chief Planner.

The flood maps are prepared by the Geological Survey under the administrative direction of William D. Mitchell, district engineer, and under the immediate supervision of Davis W. Ellis, engineer-in-charge of the project. The Elmhurst flood map was prepared by Howard E. Allen and Allen W. Noehre.

The following agencies supplied some of the flood data on which this report is based: Illinois Division of Waterways, Department of Public Works and Buildings, and the Department of Highways, Cook County. The Division of Waterways also furnished maps with a 2-foot contour interval along Salt Creek, Addison Creek, and parts of Willow Creek.

Additional data were obtained from personal interviews with municipal officials and many private citizens.

Flood height— The height of a flood at a gaging station usually is stated in terms of gage height, or stage, which is the elevation of the water surface above a selected datum plane. Elevations shown on the map are in feet above mean sea level. Gage heights for crest-stage gages located in the Elmhurst quadrangle can be converted to elevations above mean sea level by adding the gage height to the appropriate datum of gage listed in the table below. Size of drainage area for each gage also is shown in the table. Drainage divides are shown on the map.

Crest-stage gage	Datum of gage above mean sea level (feet)	Drainage area (sq mi)
Willow Creek at Elk Grove Village (Devon Avenue)	663.71	2.40
Willow Creek at Orchard Place (Higgins Road)	629.85	18.3
Crystal Creek near Schiller Park (Mannheim Road-new location)	634.21	2.66
Bensenville Ditch near Bensenville (Irving Park Road)	648.74	3.87
Silver Creek at Franklin Park (Grand Avenue)	638.03	6.79
Salt Creek near Wood Dale (Devon Avenue)	677.40	54.0
Salt Creek at Addison (Lake Street)	665.06	83.5
Salt Creek at Elmhurst (State Highway 83)	660.49	90.3
Addison Creek at Bensenville (George Street)	651.86	3.44
Addison Creek at North Lake (Wolf Road)	638.59	6.92

Gage height and year of occurrence of each annual flood (highest peak discharge in each calendar year) above 632-foot elevation at the gaging station on Salt Creek at Western Springs during the period 1946-61 are shown in figure 2.

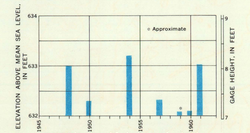

FIGURE 2.—*Annual floods above 632-foot elevation, 1946-61, Salt Creek at Western Springs.*

The Western Springs gaging station is located at Wolf Road, about 3 1/2 miles south of the Elmhurst quadrangle, and at mile 8.8. Figure 2 illustrates graphically the irregular distribution of floods experienced on Salt Creek at Western Springs.

Flood frequency— Frequency of floods at the Geological Survey gaging stations on Willow Creek at Orchard Place, Salt Creek at Addison, and Addison Creek at Bellwood, was derived from streamflow records at the stations combined with the regional flood-frequency relation for streams in northern Illinois (Mitchell, 1954). The Bellwood gaging station is located at Washington Boulevard, about 0.3 mile east of the Elmhurst quadrangle, and at mile 3.2. Extrapolation of the flood-frequency curves beyond the limits shown is not recommended because of the possibility of large errors. The relation between flood height and frequency is dependent on the relation of flood height to discharge which is affected by changes in physical conditions of channels and constrictions. The frequency curves are based on channel conditions existing in 1962. Longer records and future changes in channel conditions may define somewhat different flood-frequency curves.

Recurrence intervals— As applied to flood events, recurrence interval is the average interval of time within which a given flood height will be equaled or exceeded once. Frequencies of floods may be stated in terms of their probabilities of occurrence (reciprocals of their recurrence intervals). For example, a flood with a 25-year recurrence interval would have a 4 percent chance of being equaled or exceeded in any given year, or a flood with a 50-year recurrence interval would have a 2 percent chance of being equaled or exceeded in any given year.

The general relation between recurrence interval and flood height at gaging stations on Willow Creek at Orchard Place, Salt Creek at Addison, and Addison Creek at Bellwood is shown graphically in figures 3-5, respectively, and is tabulated below:

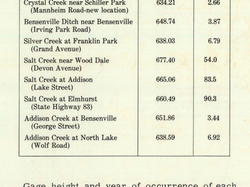

FIGURE 3.—*Frequency of floods on Willow Creek at Orchard Place (Higgins Road).*

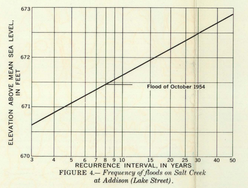

FIGURE 4.—*Frequency of floods on Salt Creek at Addison (Lake Street).*

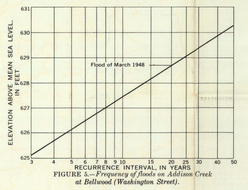

FIGURE 5.—*Frequency of floods on Addison Creek at Bellwood (Washington Street).*

Recurrence interval (years)	Elevation above mean sea level (feet)		
	Willow Creek at Orchard Place	Salt Creek at Addison	Addison Creek at Bellwood
50	635.2	672.9	630.3
40	635.1	672.7	629.9
30	635.0	672.5	629.4
20	634.8	672.2	628.7
10	634.6	671.6	627.4
5	634.1	671.1	626.1
3	633.7	670.6	625.1

It is emphasized that recurrence intervals are average figures--the average number of years that will elapse between occurrences of floods that equal or exceed a given magnitude. The fact that a major flood was experienced in one year, such as the flood of July 1957 on Willow Creek, does not reduce the probability of that flood being exceeded in the next year or in the next week.

Flood profiles— Profiles of the water surface, based primarily on elevations of marks left by floods, are shown in figures 6-9. Where definite floodmarks could not be identified, the profiles were constructed on basis of elevations of lower floods and streambeds, and the extent of overflows determined from flood-damage reports, newspaper articles, and from local residents. River miles used for the profiles correspond to those marked along the streams on the flood map.

The abrupt changes in the profiles, shown at some road crossings, indicate the difference in water-surface elevations at the upstream and downstream sides of bridges. These differences reflect the relative capacities of waterway areas of bridge openings and those of channels and flood plains. The drop in water-surface elevation through bridge openings during future floods may be different from those shown on the profiles. An increase in channel capacity through a bridge opening would reduce the flood height on the upstream side. An accumulation of debris at a bridge would reduce the channel capacity and tend to increase the upstream flood height. Channel changes through bridge openings may also change the overflow pattern of future floods.

Flood depths— Depth of flooding at any point can be estimated by subtracting the ground elevation from the water-surface elevation indicated by the profiles in figures 6-9. The approximate ground elevation can be determined from information indicated by contours on the map, although more accurate elevations can be obtained by leveling to nearby bench marks.

Additional data— Other information pertaining to floods in the Elmhurst quadrangle may be obtained at the office of the U.S. Geological Survey, Oak Park, Ill., and from the following published reports:

Mitchell, W. D., 1954, Floods in Illinois, magnitude and frequency: Illinois Div. Waterways, Dept. Public Works and Buildings.

Daniels, W. S. and Hale, M. D., 1958, Floods of October 1954 in the Chicago area, Illinois and Indiana: U. S. Geol. Survey Water-Supply Paper 1370-B.

Ramey, H. P., 1959, Storm water drainage in the Chicago area: Am. Soc. Civil Engineers Proc., v. 85, no. HY 4, p. 11-37.

Illinois Div. of Waterways, Dept. of Public Works and Buildings, 1950, Survey report for flood control, Addison Creek.

_____1955, Survey report for flood control, Silver Creek.

_____1958, Report on plan for flood control and drainage development, Salt Creek.

_____1961, Report on plan for flood control and drainage development, Willow-Higgins Creek.

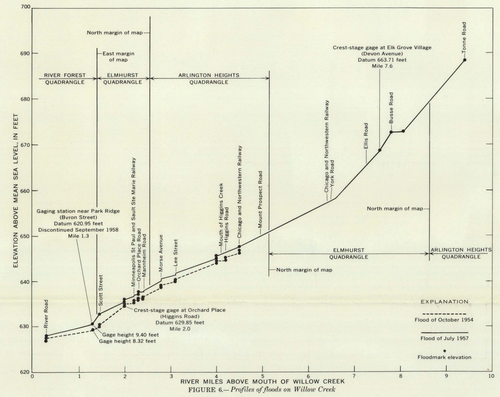

FIGURE 6.—*Profiles of floods on Willow Creek*

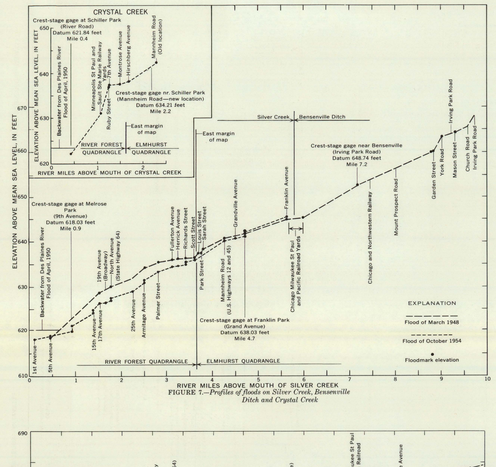

FIGURE 7.—*Profiles of floods on Silver Creek, Bensenville Ditch and Crystal Creek*

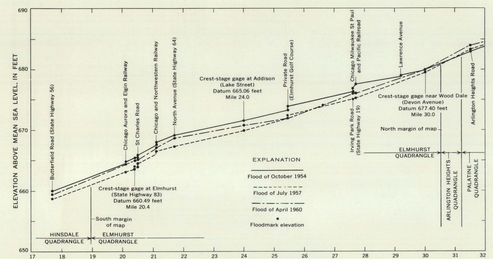

FIGURE 8.—*Profiles of floods on Salt Creek*

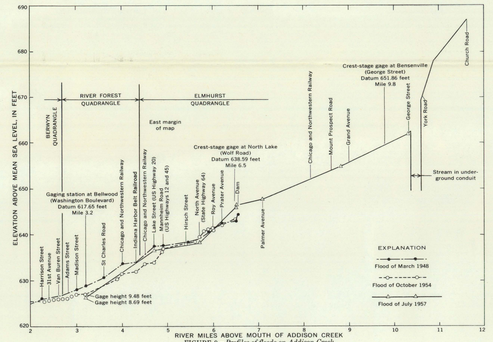

FIGURE 9.—*Profiles of floods on Addison Creek*

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By
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