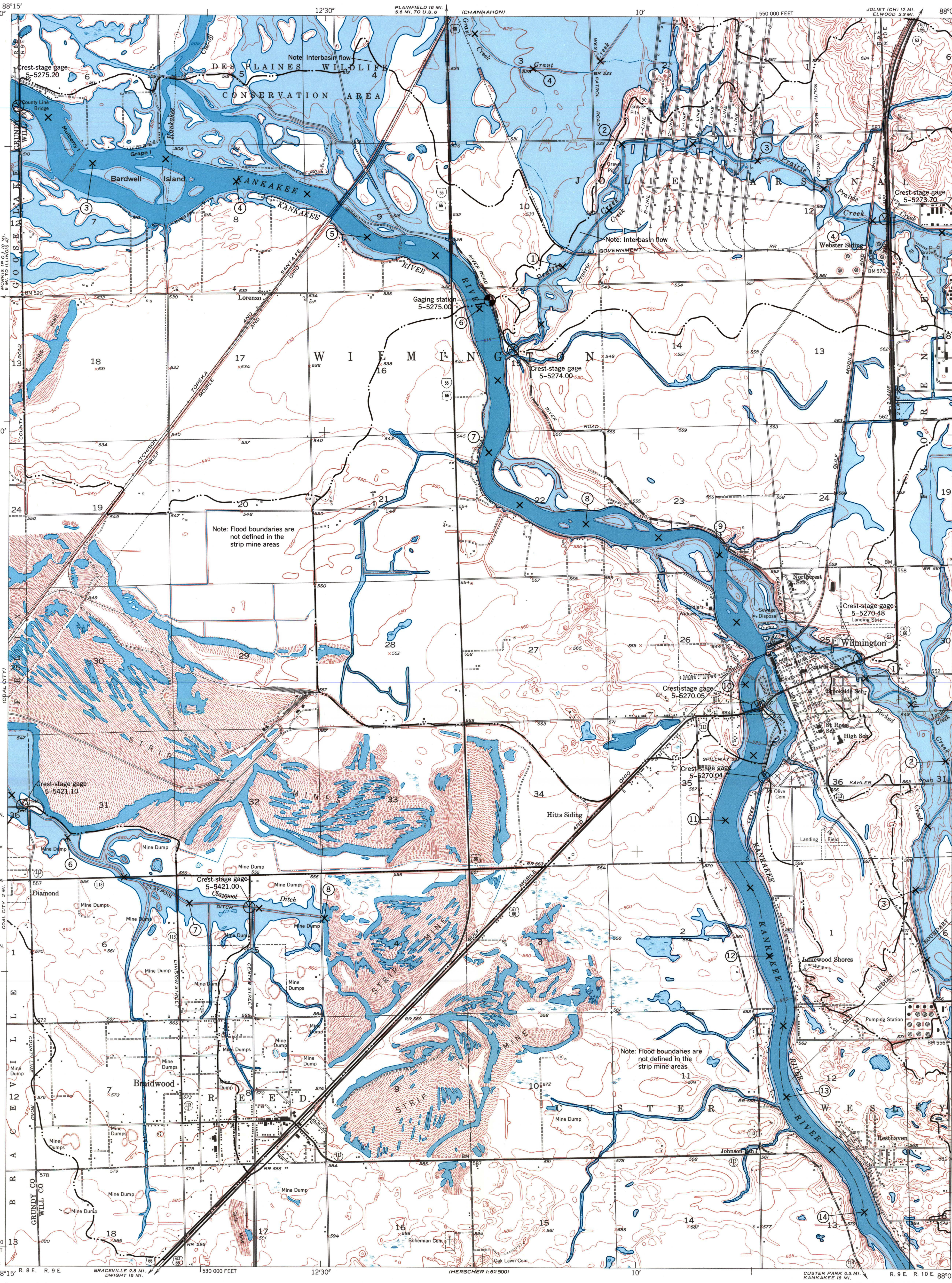
PREPARED IN COOPERATION WITH THE
STATE OF ILLINOIS
DEPARTMENT OF PUBLIC WORKS AND BUILDINGS
DIVISION OF WATERWAYS



Base by U.S. Geological Survey, 1954

SCALE 1:24 000

CONTOUR INTERVAL 5 FEET
DATUM IS MEAN SEA LEVEL

QUADRANGLE LOCATION

EXPLANATION

Area flooded
Boundary of 1957 flood
Drainage divide
River mile measured along stream channel

FLOODS IN WILMINGTON QUADRANGLE NORTHEASTERN ILLINOIS

This report presents hydrologic data that can be used to evaluate the extent, depth, and frequency of flooding that affect the economic development of flood plains in the Wilmington quadrangle, northeastern Illinois. It will aid individuals, government agencies, and others responsible for solving existing flood problems and for formulating effective flood-plain regulations that will minimize the creation of new flood problems. The report will also be useful for preparing building and zoning regulations, locating waste disposal facilities, developing recreational areas, and managing surface water in relation to ground-water resources.

The areas inundated by floods along streams in the Wilmington 7½-minute quadrangle are delineated on a topographic map. The quadrangle location is shown in figure 1. Inundated areas for the flood of July 1957 are shown along Kankakee River, Forked Creek, Prairie Creek, Grant Creek, Claypool ditch, and several unnamed streams.

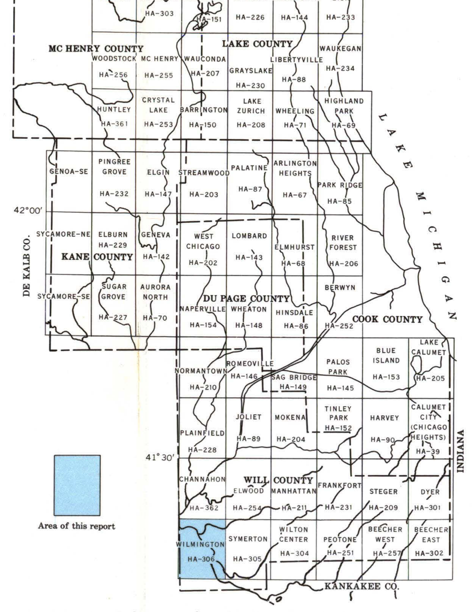


FIGURE 1.—*Index map of northeastern Illinois showing location of quadrangles included in flood-hazard mapping program.*

Local residents reported that the flood of July 1957 was the highest observed in the past 60 years on streams throughout the Wilmington quadrangle except for some reaches along the Kankakee River. Records at the gaging station on Kankakee River near Wilmington, which is at mile 5.97 on the Kankakee River, are also indicative of the relative magnitude of the July 1957 flood in the area. At the Kankakee River gage, the July 1957 flood exceeded the estimated 50-year flood stage by 2.1 feet. At times reaches along the Kankakee River are affected by flooding from backwater because of ice jams. At the Kankakee River gage the flood stage during February 1949 was 0.17 foot higher than in July 1957 although the 1957 flood discharge was much greater than in 1949.

Greater floods than the flood whose boundaries are shown on the map are possible. The flood boundaries shown provide a record of historic fact that reflect channel conditions existing when the floods occurred. Changes in channel conditions, in waterway openings at highways and railroads, or changes in runoff characteristics of the streams caused by increased urbanization that may take place subsequent to the flood represented on the map could affect the height reached by a future flood of comparable discharge. Protective works built after the flood shown 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 improvement of stream channels, and other cultural changes.

The general procedure used in defining the flood boundaries was to construct flood profiles from elevations of floodmarks identified in the field and from data available from other agencies. The extent of flooding delineated on the topographic map was derived from the profiles by interpolation between contours (lines of equal ground elevations) and by plotting overflow limits identified during field investigations and surveys. The portrayal of flood boundaries is consistent with the scale of the map (1 inch = 2,000 feet; contour interval, 5 feet).

There are several depressions or lowland areas in the Wilmington quadrangle where surface water accumulates because of inadequate drainage into the streams. Frequency and depth of flooding in these areas are unrelated to the water-surface elevation along the streams. Some areas are flooded only briefly after periods of heavy rainfall or snowmelt, whereas others remain inundated continuously, depending largely upon the rates of evaporation and seepage into the ground. Flood boundaries are shown for all such areas that were detected in this investigation. Flood boundaries are not shown for the strip mine areas.

Cooperation and acknowledgment.— The preparation of this report is a part of a flood-mapping program financed through a cooperative agreement between the State of Illinois, Department of Public Works and Buildings, Division of Waterways, and the U.S. Geological Survey. The agreement with the Division of Waterways includes the flood-mapping of the following 7½-minute quadrangles: Beecher East, Wilton Center, Symerton, Wilmington, and Channahon. Under separate agreements with the Northeastern Illinois Planning Commission, the flood-mapping program in northeastern Illinois includes the remainder of the 7½-minute quadrangles shown in figure 1. The total program includes parts of Cook and McHenry Counties, nearly all of Kane and Will Counties, and all of Du Page and Lake Counties.

The cooperative program for this report is administered on behalf of the Division of Waterways by John C. Guillou, Chief Waterway Engineer.

This report was prepared by the U.S. Geological Survey under the administrative direction of William D. Mitchell, district chief, and under the immediate supervision of Allen W. Noehre, hydrologist-in-charge of the project.

Acknowledgment is made to the following agencies that supplied some of the flood data on which this report is based: the State of Illinois, Department of Public Works and Buildings, Division of Waterways; Engineering Department of the Joliet Army Ammunition Plant; and Corps of Engineers, U.S. Army.

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 in this report are in feet above mean sea level. Gage heights at gaging stations in the Wilmington quadrangle can be converted to elevations above mean sea level by adding the gage height to the appropriate datum of gage listed in the following table:

Gaging station	Type of gage[1]	Station number	Datum of gage above mean sea level (feet)	Drainage area (square miles)
Kankakee River:				
Above Wilmington (420 ft upstream from dam)	C	5-5270.04	534.58	5,050*
At Wilmington (State Highway 53)	C	5-5270.05	525.92	5,050*
Near Wilmington (0.35 mile upstream from Interstate Highway 55)	R	5-5275.00	510.86	5,250*
Near Lorenzo (County Line Road)	C	5-5275.20	505.50	5,260*
Forked Creek at Wilmington (State Highway 53)	C	5-5270.48	535.60	127
Prairie Creek:				
Near Lorenzo (State Highway 53)	C	5-5273.70	558.09	45.1
Near Wilmington (River Road)	C	5-5274.00	524.05	49.4
Claypool ditch:				
At Braidwood (Center Street)	C	5-5421.00	549.67	2.5*
Near Braidwood (County road)	C	5-5421.10	543.06	6.2*

[1] C, Crest-stage gage; R, Water-stage recorder. *Approximate.

Size of the drainage basin for each station also is given in the table. The subbasin divides from which the areas were determined are shown on the flood map. The divides were defined in the usual manner of following the ridge line or highest ground elevation between adjacent streams. Relief in parts of the quadrangles is slight and at times some of the divides may become submerged during floods. When this occurs water may flow in either direction across the divide, depending upon the relative elevation of the streams and the conveyance of their channels. For example, note the interbasin flow between Prairie Creek and Grant Creek in the northern part of the map.

Gage height and year of occurrence of each annual flood (highest peak stage in a calendar year) above 517-foot elevation at the gaging station, Kankakee River near Wilmington, during the period 1934-67 are shown in figure 2. The gaging station is at mile 5.97 on the Kankakee River. The graph shows the history of floods at the gage and illustrates the irregular occurrence of floods on Kankakee River.

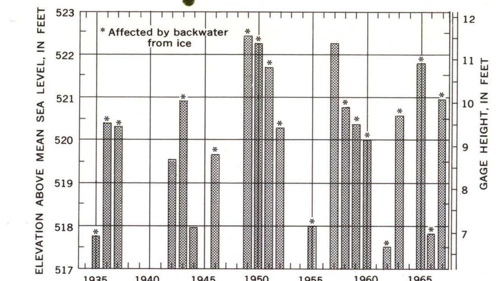


FIGURE 2.—*Annual floods above 517-foot elevation, 1934-67, Kankakee River near Wilmington.*

Flood discharge.— The rate of discharge of a stream is the volume of flow that passes a particular location in a given period of time. Discharge rates usually are expressed in units of cubic feet per second (cfs). Peak discharge, the maximum discharge attained by a flood, generally occurs at the time of the maximum height (stage) of the flood, but if a stream is affected by variable backwater, the time of the peak discharge may not coincide with that of the maximum stage. For example, backwater from an ice or debris jam may cause a high stage during a period of relatively low discharge.

Flood frequency.— Frequency of floods at the U.S. Geological Survey gaging station on Kankakee River near Wilmington was derived from streamflow records of this station using the log-Pearson Type III method. The relation between discharge and frequency is shown in figure 3 and the relation between stage and frequency is shown in figure 4. The relation between stage and frequency is dependent on the relation of stage to discharge, which is affected by changes in the physical conditions of stream channels and constrictions. The frequency curve shown in figure 4 applies only to open-water periods. During the period of record at the Wilmington gaging station, 1934-67, the open-water flood stage for the 50-year flood has been exceeded 12 times by ice-affected flood peaks. Ice jams could happen at any point along the Kankakee River, and the resulting flood peak could be even higher, owing to a different combination of ice jam and discharge.

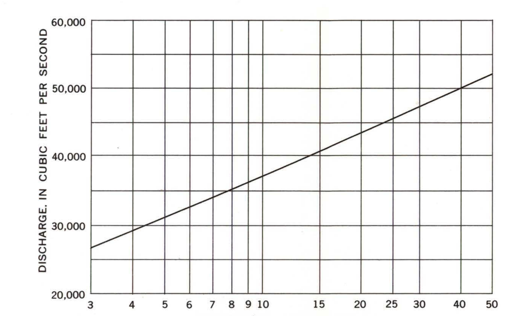


FIGURE 3.—*Frequency of flood discharges on Kankakee River near Wilmington.*

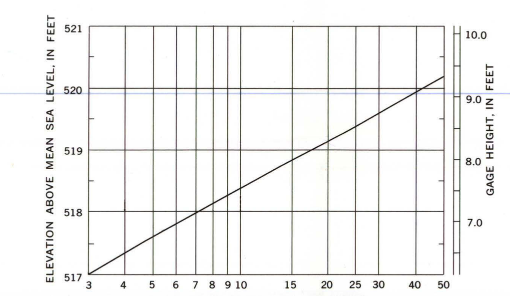


FIGURE 4.—*Frequency of flood stages on Kankakee River near Wilmington.*

Recurrence intervals.— As applied to flood events, recurrence interval is the average interval of time within which a given flood will be equaled or exceeded once. Frequencies of floods can be stated in terms of their probabilities of occurrence (virtually reciprocals of their recurrence intervals for floods with recurrence intervals greater than 10 years). 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 the gaging station on Kankakee River near Wilmington (fig. 4) is tabulated below:

Recurrence interval (years)	Elevation above mean sea level (feet)
50	520.2
30	519.6
20	519.2
10	518.4
5	517.6
3	517.0

It is emphasized that recurrence intervals are average figures—the average number of years between occurrences of floods that equal or exceed a given magnitude. The fact that a major flood is experienced in one year does not reduce the probability of that flood being exceeded during the next year or even during the next week.

Flood profiles.— Profiles of the water surface, based primarily on elevations of marks left by floods of July 1957, December 1965, and June 1968, are shown in figures 5-9. Where floodmarks could not be identified, the profiles were constructed on the basis of flood crests determined from reports by local residents, and on elevations of streambeds and lower flood stages. 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 that produce channel constrictions. The drop in water surface through bridge openings during future floods may be different from that 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.

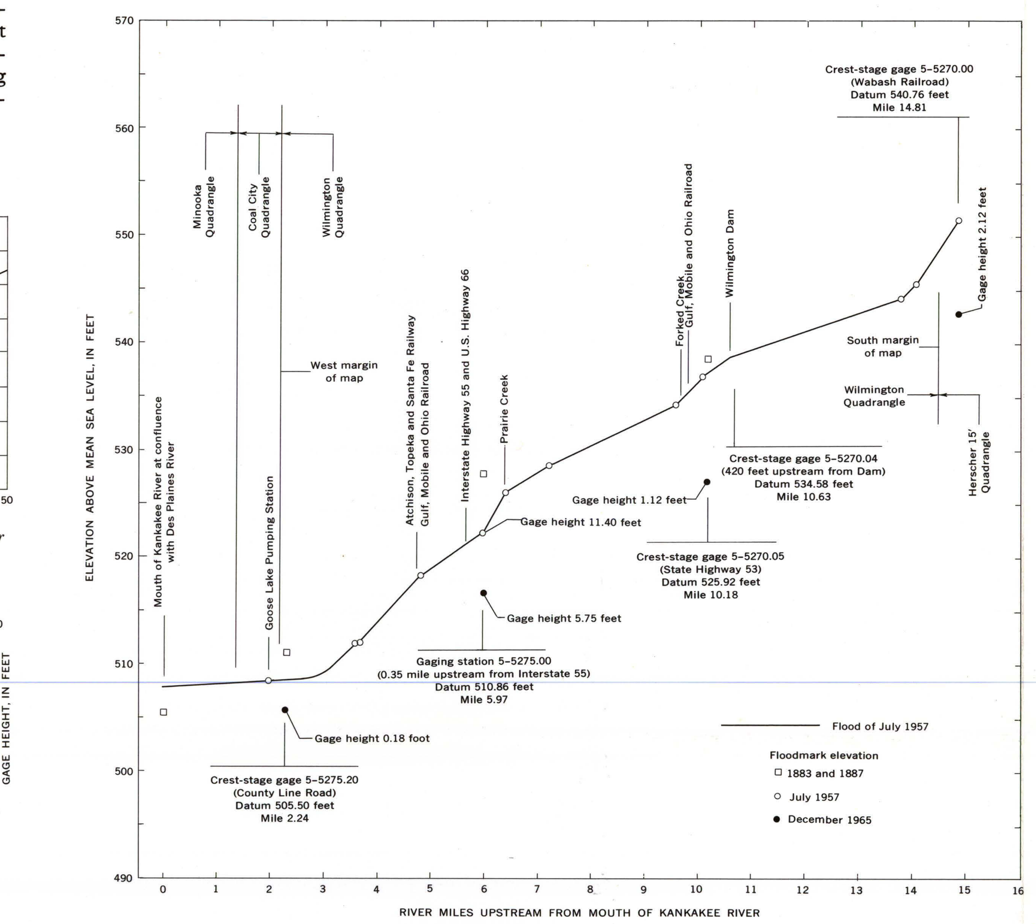


FIGURE 5.—*Profile of flood on Kankakee River.*

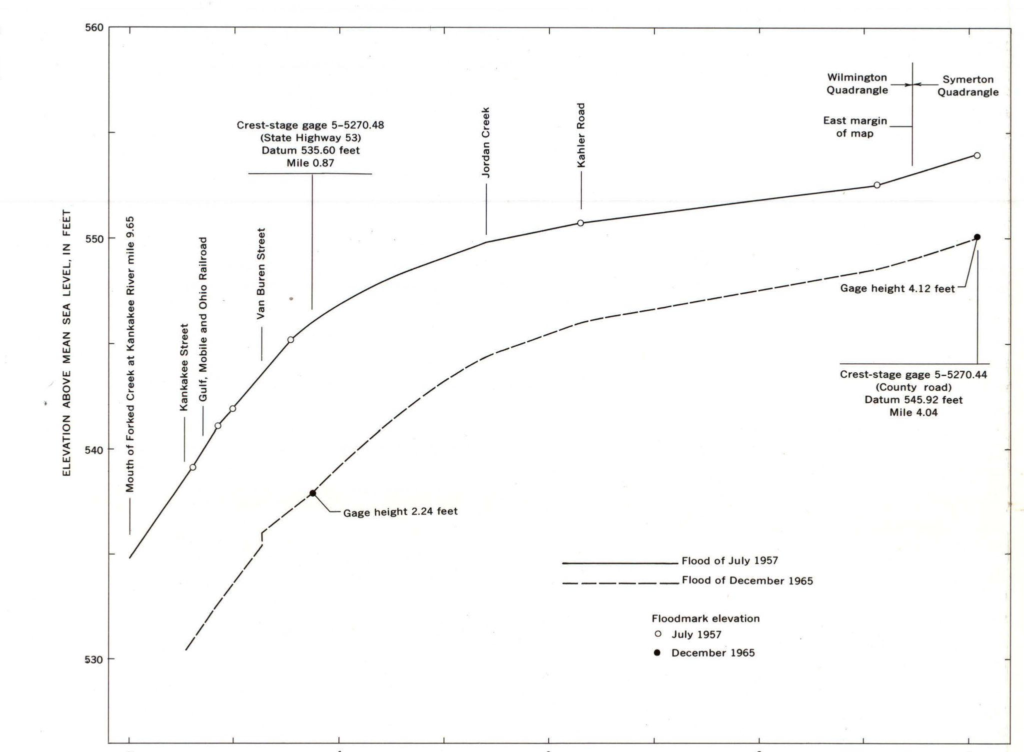


FIGURE 6.—*Profiles of floods on Forked Creek.*

Flood depths.— Depth of flooding at any point can be estimated by subtracting the ground elevation from the water-surface elevation at the same point, indicated by the profiles in figures 5-9. The approximate ground elevation can be determined from contours on the map, although more accurate elevations can be obtained by leveling from nearby bench marks.

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

Barker, Bruce, Carlisle, J. B., and Nyberg, Raymond, 1967, Kankakee River basin study, a comprehensive plan for water resources development: Illinois Dept. Public Works and Bldgs., Div. of Waterways, 77 p.

Mitchell W. D., 1954, Floods in Illinois, magnitude and frequency: Illinois Dept. Public Works and Bldgs., Div. of Waterways, 386 p.

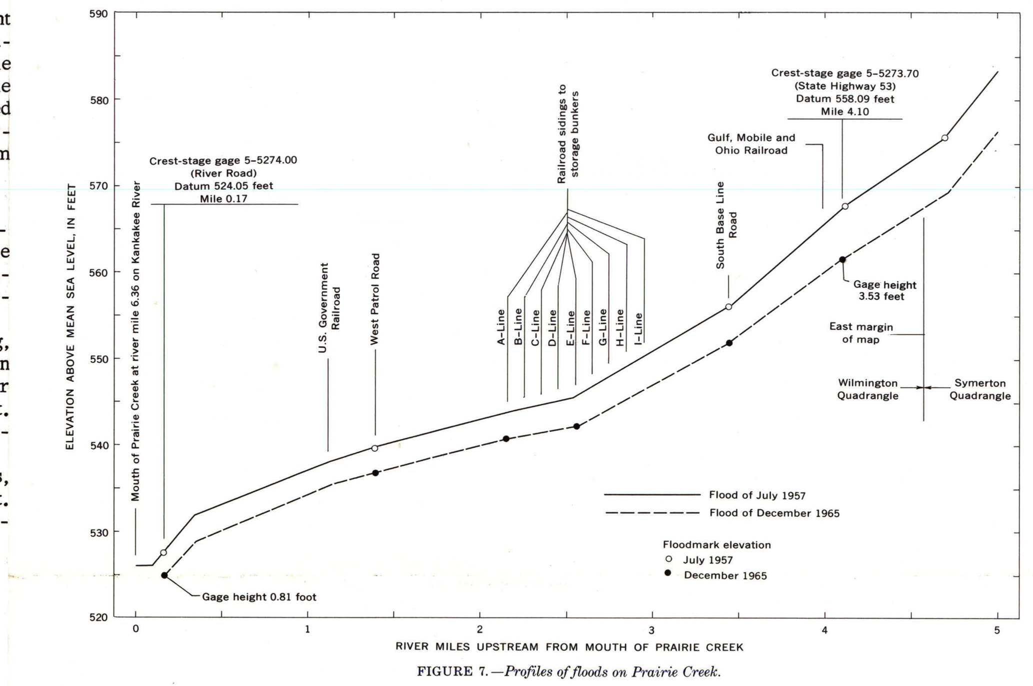


FIGURE 7.—*Profiles of floods on Prairie Creek.*

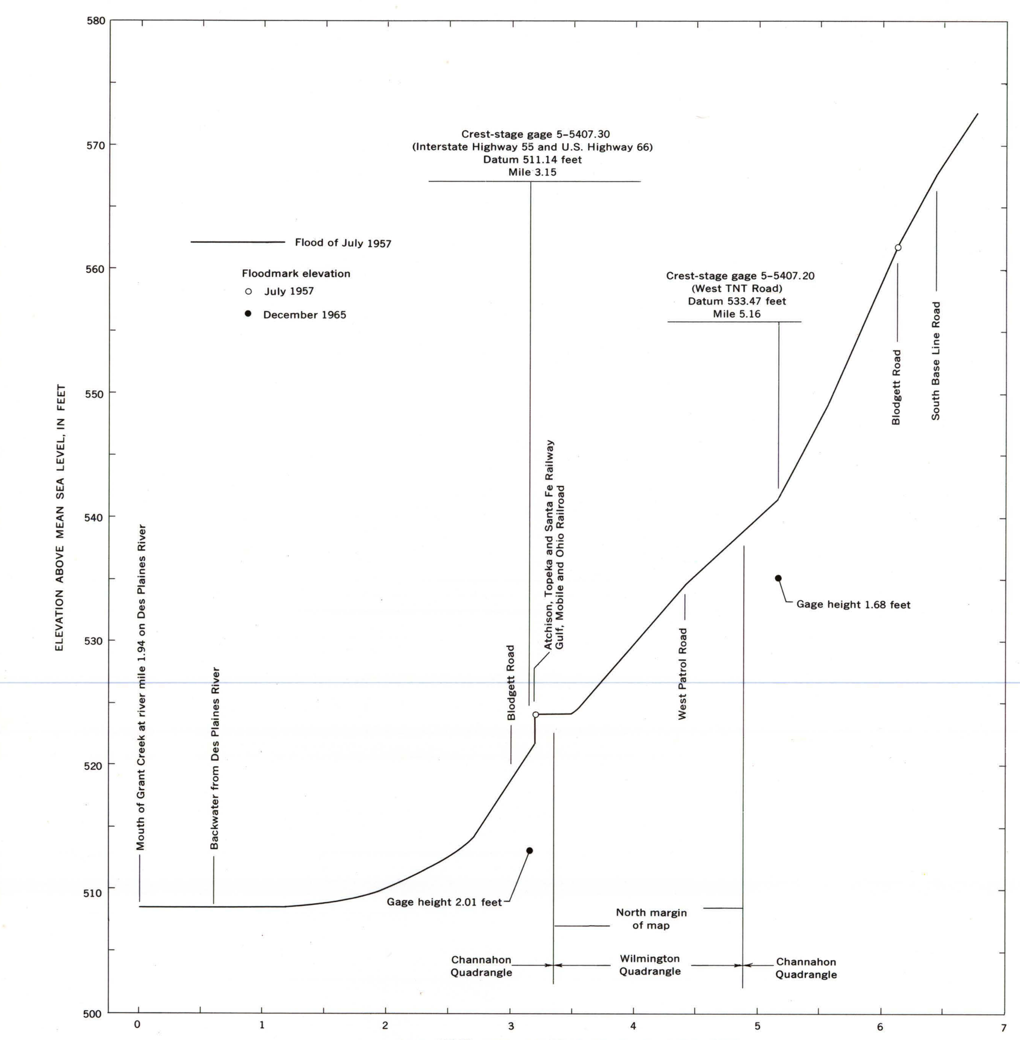


FIGURE 8.—*Profile of flood on Grant Creek.*

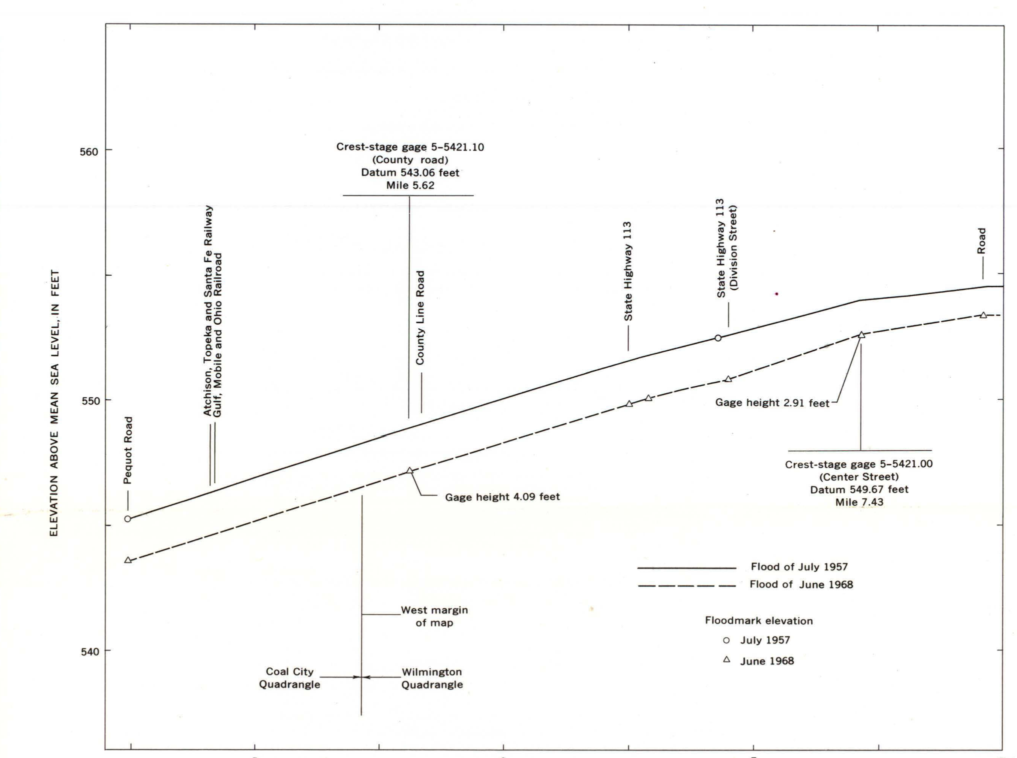


FIGURE 9.—*Profiles of floods on Claypool ditch.*

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By

Howard E. Allen and Allen W. Noehre

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