

In cooperation with the Federal Emergency Management Agency

Floods of August 21–24, 2007, in Northwestern and North-Central Ohio



Open-File Report 2009–1094

Cover image: Downtown Findlay, Ohio, on August 21, 2007 (photo by Pat Gibson, reproduced with permission).

Floods of August 21–24, 2007, in Northwestern and North-Central Ohio

By David E. Straub, Andrew D. Ebner, and Brian M. Astifan

In cooperation with the Federal Emergency Management Agency

Open-File Report 2009–1094

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
KEN SALAZAR, Secretary

U.S. Geological Survey
Suzette M. Kimball, Acting Director

U.S. Geological Survey, Reston, Virginia: 2009

For more information on the USGS—the Federal source for science about the Earth, its natural and living resources, natural hazards, and the environment, visit <http://www.usgs.gov> or call 1-888-ASK-USGS

For an overview of USGS information products, including maps, imagery, and publications, visit <http://www.usgs.gov/pubprod>

To order this and other USGS information products, visit <http://store.usgs.gov>

Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Although this report is in the public domain, permission must be secured from the individual copyright owners to reproduce any copyrighted materials contained within this report.

Suggested citation:

Straub, D.E., Ebner, A.D., and Astifan, B.M., 2009, Floods of August 21–24, 2007, in northwestern and north-central Ohio: U.S. Geological Survey Open-File Report 2009–1094, 76 p.

Contents

Abstract.....	1
Introduction.....	1
Purpose and Scope	4
Meteorological Events Associated With the Flood.....	4
Antecedent Climatic Conditions.....	4
The Storm of August 19–22, 2007	4
General Description of the Floods	8
High-Water Marks.....	8
Flood Stages and Streamflows.....	10
Recurrence Intervals.....	12
Flood and Storm Damages Associated With FEMA–1720–DR.....	12
Summary.....	12
Acknowledgments.....	12
References Cited.....	12

Figures

1. Map showing location of nine communities within disaster area in northwestern and north-central Ohio in which the U.S. Geological Survey collected high-water-elevation data.....	2
2. Map showing Ohio counties declared as disaster areas under FEMA declaration 1720.....	3
3. Maps showing regionally averaged monthly total precipitation and percentage of normal precipitation for the 10 climatic regions and the monthly hyetograph of Ohio by National Weather Service for July and August 2007	5
4. Isohyetal map of 7-day rainfall totals for August 19–25, 2007, in northwest Ohio, from National Weather Service rain gages	7
5. Photographs showing examples of lines used as high-water marks at selected locations in the flooded area	9
6–14. Maps showing locations of high-water marks along studied streams—	
6. Riley Creek in and near the village of Bluffton, Ohio	52
7. Sandusky River in and near the city of Bucyrus, Ohio	53
8. Spring Run in and near the village of Carey, Ohio.....	54
9. Plum Creek in and near the village of Columbus Grove, Ohio.....	55
10. East and west unnamed tributaries of Paramour Creek in and near the village of Crestline, Ohio.....	56
11. Blanchard River in and near the city of Findlay, Ohio	57
12. Rocky Fork Mohican River and Touby Run in and near the city of Mansfield, Ohio	58
13. Blanchard River in and near the city of Ottawa, Ohio	59
14. Black Fork Mohican River in and near the city of Shelby, Ohio.....	60

15–25.	High-water mark profiles:	
15.	Riley Creek in and near the village of Bluffton, Ohio	61
16.	Sandusky River in and near the city of Bucyrus, Ohio	61
17.	Spring Run in and near the village of Carey, Ohio.....	62
18.	Plum Creek in and near the village of Columbus Grove, Ohio.....	62
19.	East unnamed tributary to Paramour Creek in and near the village of Crestline, Ohio	63
20.	West unnamed tributary to Paramour Creek in and near the village of Crestline, Ohio	63
21.	Blanchard River in and near the city of Findlay, Ohio	64
22.	Rocky Fork Mohican River in and near the city of Mansfield, Ohio	64
23.	Touby Run in and near the city of Mansfield, Ohio	65
24.	Blanchard River in and near the city of Ottawa, Ohio	65
25.	Black Fork Mohican River in and near the city of Shelby, Ohio.....	66
26–35.	Maps showing estimated flood-inundation areas:	
26.	Riley Creek in and near the village of Bluffton, Ohio	67
27.	Sandusky River in and near the city of Bucyrus, Ohio	68
28.	Spring Run in and near the village of Carey, Ohio.....	69
29.	Plum Creek in and near the village of Columbus Grove, Ohio.....	70
30.	East and west unnamed tributaries of Paramour Creek in and near the village of Crestline, Ohio.....	71
31.	Blanchard River in and near the city of Findlay, Ohio	72
32.	Rocky Fork Mohican River and Touby Run in and near the city of Mansfield, Ohio	73
33.	Blanchard River in and near the city of Ottawa, Ohio	74
34.	Black Fork Mohican River in and near the city of Shelby, Ohio.....	75
35.	Map showing location of selected USGS streamgages, with recurrence- interval ranges, in and around the designated disaster area for the flood of August 21–24, 2007	76

Tables

1.	Precipitation totals and recurrence intervals for selected National Weather Service rain gages in Ohio, August 19–25, 2007	6
2.	Extent of high-water-mark profiles within nine communities in affected disaster area FEMA–1720–DR.....	8
3.	Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007	14
4.	Peak stages, peak streamflows, and estimated recurrence-interval ranges at selected U.S. Geological Survey streamgage stations near communities in and around the affected flooded area in Ohio, August 21–24, 2007.....	50
5.	Peak streamflows and estimated recurrence-interval ranges at selected communities in the flooded area in Ohio, August 21–24, 2007	11

Conversion Factors, Datums, and Abbreviations

Multiply	By	To obtain
Length		
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
kilometer (km)	0.621	mile (mi)
Area		
square mile (mi ²)	2.590	square kilometer (km ²)
Flow rate		
cubic foot per second (ft ³ /s)	0.02832	cubic meter per second (m ³ /s)
foot per second (ft/s)	0.3048	meter per second (m/s)
meter per second (m/s)	2.237	mile per hour (mi/h)
knot (kts)	1.15	mile per hour (mi/h)

Vertical coordinate information is referenced to North American Vertical Datum of 1988 (NAVD 88), unless otherwise noted.

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Elevation, as used in this report, refers to distance above the vertical datum.

Abbreviations

FEMA – Federal Emergency Management Agency

GIS – Geographical Information System

GPS – Global Positioning System

HEC-RAS – Hydrologic Engineering Center - River Analysis System

NOAA – National Oceanic and Atmospheric Administration

NWS – National Weather Service

Ohio EMA – Ohio Emergency Management Agency

ODNR – Ohio Department of Natural Resources

TIN – Triangulated Irregular Network

USACE – United States Army Corps of Engineers

USGS – U.S. Geological Survey

Floods of August 21–24, 2007, in Northwestern and North-Central Ohio

By D.E. Straub¹, A.D. Ebner¹, and B.M. Astifan²

Abstract

Heavy rains in northwestern and north-central Ohio on August 19–22, 2007, caused severe flooding and widespread damages to residential, public, and commercial structures in the communities of Bluffton, Bucyrus, Carey, Columbus Grove, Crestline, Findlay, Mansfield, Ottawa, and Shelby. On August 27, 2007, the Federal Emergency Management Agency (FEMA) issued a notice of a Presidential declaration of a major disaster affecting Allen, Crawford, Hancock, Hardin, Putnam, Richland, Seneca, and Wyandot Counties as a result of the severe flooding. Rainfall totals for most of the flooded area were 3 to 5 in., with some locations reporting as much as 8 to 10 in. Three National Weather Service (NWS) gages in the area indicated a rainfall recurrence interval of greater than 1,000 years, and two indicated a recurrence interval between 500 and 1,000 years. Total damages are estimated at approximately \$290 million, with 8,205 residences registering for financial assistance.

The U.S. Geological Survey (USGS) computed flood recurrence intervals for peak streamflows at 22 streamgages and 8 ungaged sites in and around the area of major flooding. The peak streamflows at Sandusky River near Bucyrus streamgage and at seven of the eight ungaged sites had estimated recurrence intervals of greater than 500 years. The USGS located and surveyed 421 high-water marks and plotted high-water profiles for approximately 44.5 miles of streams throughout the nine communities.

Introduction

Heavy rains on August 19–22, 2007, caused severe flooding in northwestern and north-central Ohio. The flooding was the result of rain generated from the remnants of Tropical Storm Erin, combined with an east-west-oriented stationary front that stalled over northern Ohio. Waves of slow-moving thunderstorms continued across the area for 5 days, causing rivers to flood several communities in the area. The flooding was concentrated in the headwaters of three watersheds: the Maumee River, the Sandusky River, and the Muskingum River (fig. 1). Flood

damages to residential, commercial, and public buildings were particularly severe in nine communities within these watershed areas. The cities of Findlay and Ottawa were severely damaged by floodwaters from the Blanchard River. The village of Bluffton was flooded by Riley Creek, a tributary to the Blanchard River. The village of Columbus Grove was flooded by Plum Creek, a small tributary to the Ottawa River. The Blanchard and Ottawa Rivers flow into the Auglaize River, a tributary to the Maumee River. The city of Bucyrus was flooded by the Sandusky River. The village of Carey was flooded by Spring Run, a tributary to Tymochtee Creek, which is a tributary to the Sandusky River. The city of Crestline was flooded by two tributaries to Paramour Creek, which is the head of the Sandusky River. The city of Mansfield was flooded by Touby Run, a tributary to Rocky Fork Mohican River, and by the Rocky Fork Mohican River. The city of Shelby was flooded by Black Fork Mohican River. The Rocky and Black Forks of the Mohican River are part of the Muskingum River watershed.

Because of the magnitude of and damages from this flood, a Presidential Disaster Declaration, FEMA–1720–DR (Federal Emergency Management Agency, 2007), was declared for eight counties (fig. 2) on August 27, 2007. Seven counties required both Individual³ and Public⁴ Assistance, and one required only Individual Assistance. A Presidential Disaster Declaration puts into motion long-term Federal recovery programs to assist individuals, businesses, and public entities.

The U.S. Geological Survey (USGS), in cooperation with the Federal Emergency Management Agency (FEMA), completed a study to document this historic flood by describing pertinent flood information including high-water marks, peak-streamflow and stage data, estimated recurrence intervals⁵,

³ “Individual Assistance” is defined as assistance to individuals and households (Federal Emergency Management Agency, 2008a).

⁴ “Public Assistance” is defined as assistance to state and local governments and certain private nonprofit organizations for emergency work and the repair or replacement of disaster-damaged facilities (Federal Emergency Management Agency, 2008b).

⁵ Recurrence interval is the average length of time within which the magnitude of a given flood or rainfall event will be equaled or exceeded (Riggs, 1968). It is determined as the reciprocal of the probability that a given event will be equaled or exceeded in any given year. For example, the 100-year flood has a 0.01 (1 percent) probability of being equaled or exceeded in any given year. Rainfall recurrence intervals are reported as a function of both magnitude and storm duration, whereas flood recurrence intervals are reported only as a function of magnitude.

¹U.S. Geological Survey, Columbus, Ohio.

²National Weather Service, Cleveland, Ohio.

2 Floods of August 21–24, 2007, in Northwestern and North-Central Ohio

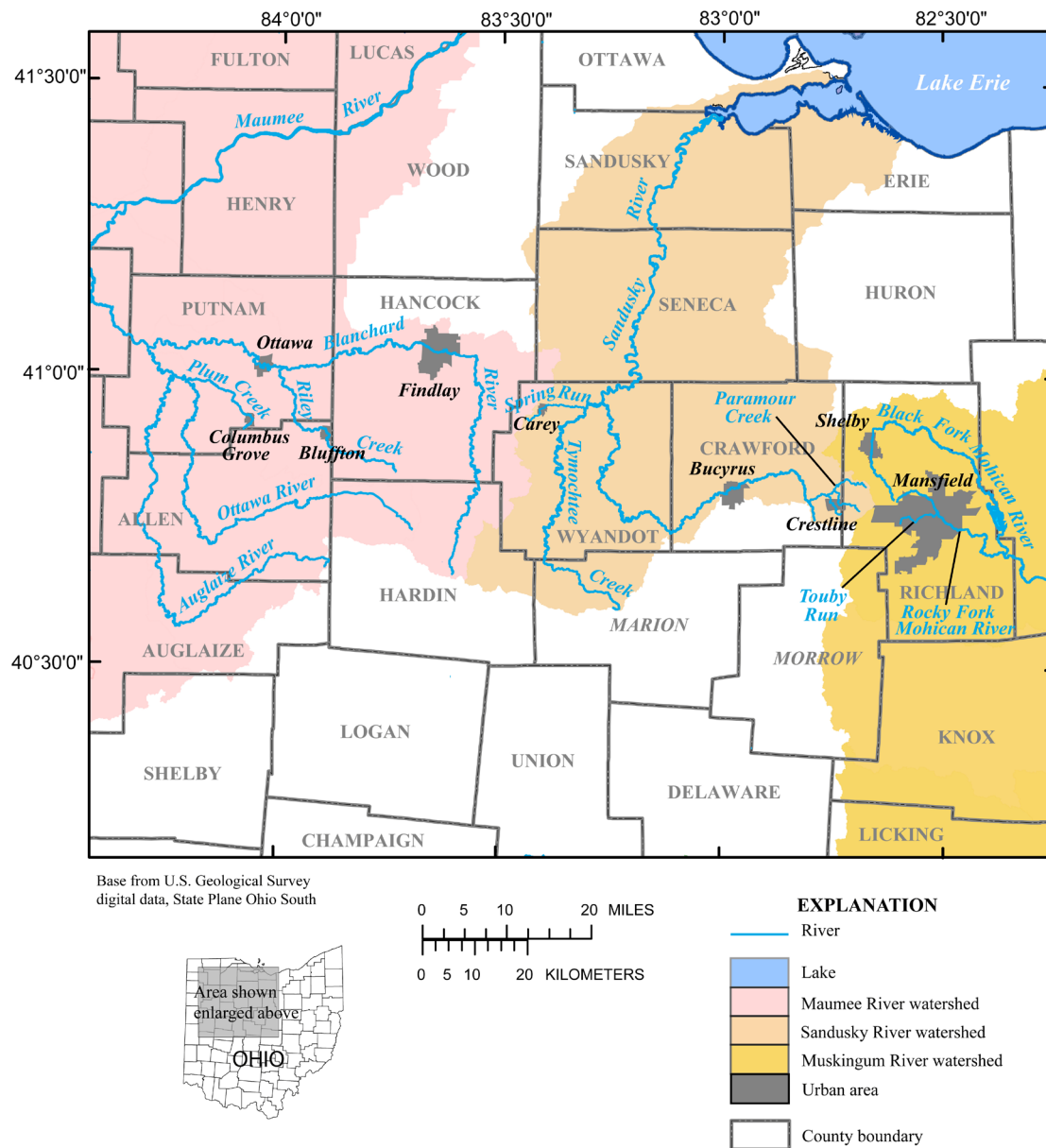
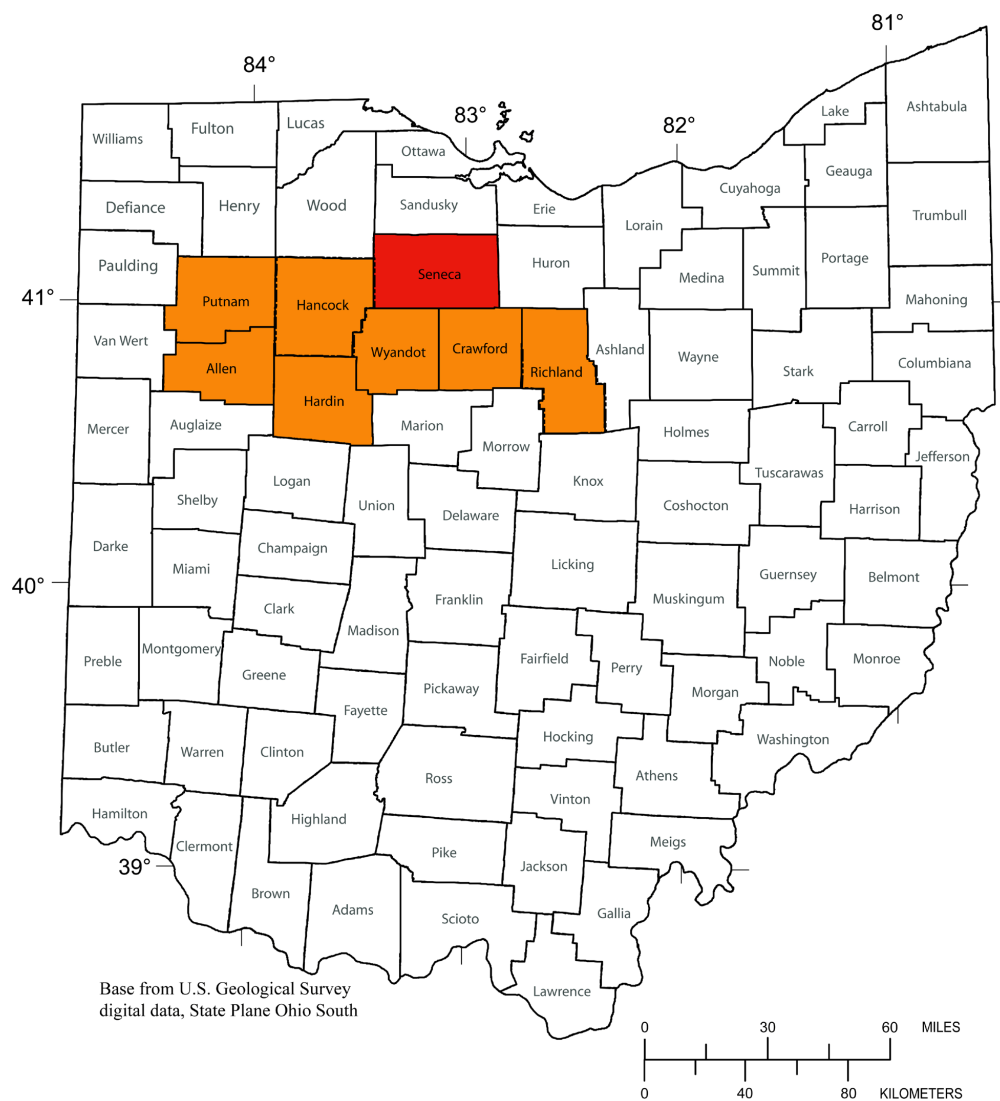


Figure 1. Location of nine communities within disaster area in northwestern and north-central Ohio in which the U.S. Geological Survey collected high-water-elevation data.



EXPLANATION

- Individual Assistance (includes damage to private property)
- Individual and Public Assistance (includes damage to private and public property)

Figure 2. Ohio counties declared as disaster areas under FEMA declaration 1720 (modified from Federal Emergency Management Agency, 2008).

and maps of estimated flood inundation. Documentation of flood events can assist Federal, State, and local agencies in making informed decisions on flood-plain management and flood-emergency practices.

Purpose and Scope

This report describes the meteorological and hydrologic conditions leading to the floods, magnitude and frequency estimates for selected rainfall and stream sites, and damage estimates for the affected communities. The USGS located 421 high-water marks along approximately 44.5 mi of streams through the nine communities affected by the floods. The affected communities, main flooding source, extent of the high-water marks, and number of high-water marks within each community are described herein. Peak-streamflow and recurrence-interval estimates were determined for the main flooding source within each of the nine communities. Peak gage-height, streamflow, and recurrence-interval estimates were determined at 22 streamgages in and around the flooded area, 3 of which are located within the 9 communities.

Meteorological Events Associated With the Flood

The National Oceanic and Atmospheric Administration (NOAA) divides Ohio into 10 regions based on similar climatological characteristics. The storm of August 19–22, 2007, mainly affected parts of five regions in the northwest quarter of the State. The state and regional rainfall totals are summarized from the “Monthly Water Inventory Report for Ohio” from the Ohio Department of Natural Resources (ODNR). The conditions for the 3 months before the August 2007 storm are summarized in the May, June, and July 2007 reports (Kirk, 2007a, b, and c). The monthly report for August 2007 (Kirk, 2007d) includes the rainfall data from this storm and associated flood.

Antecedent Climatic Conditions

In general, the weather leading up to the storm was dry. Precipitation in the area was below normal⁶ for May, June, and July. The State average precipitation amounts for these months in 2007 were 1.60, 2.92, 3.72 in., respectively. These State averages were 41, 76, and 91 percent of normal, respectively. May 2007 ranked as the third driest May over 125 years of record (Kirk, 2007a). June was also dry, with Putnam County receiving the least amount of precipitation in the State at 0.41 in. (Kirk, 2007b). In July, Ohio received some precipitation from scattered showers and thunderstorms. Much of Ohio received 0.25 to 0.50 in. of rain from July 4 through 6 and another 0.25 to 0.50 in. on July 10 and 11. Most of the State

also received 1 to 3 in. between July 17 and July 28. During late July, the greatest amount of rain fell in an area from northwestern to east-central and southeastern Ohio (Kirk, 2007c). The 10 climatic regions of Ohio, the average precipitation and percent of normal of each region, and an isohyetal plot of the total precipitation for July are shown in figure 3A.

The “Monthly Water Inventory Report” for August (Kirk, 2007d) includes the rainfall during August 19–25 in the monthly totals. The precipitation for August was above normal for most of Ohio except the southern part of the State (fig. 3B). The statewide average was 5.75 in., 2.31 in. above normal. Precipitation was heaviest in the Northwest climatic region with a total of 10.10 in., which was 6.91 in. above normal. August 2007 was the seventh-wettest August during 125 years of record for the State as a whole. Regionally, this was the wettest August of record for the Northwest, North-Central, and Northeast climatic regions of Ohio. Upper Sandusky (Wyandot County) reported 13.77 in. and Pandora (Putnam County) reported 13.61 in. of precipitation in August. Radar estimates show that localized areas in Wyandot County probably received more than 15 in. of rain for the month, and unofficial reports indicated more than 17 in. (Kirk, 2007d).

The precipitation fell as showers and thunderstorms and varied greatly across the State. The first significant rain of the month occurred on August 5. Approximately 0.5–1.5 in. fell from northwestern to southeastern Ohio as showers and thunderstorms. During August 7–9, another storm generally dropped 1.5–3.0 in. of rain, with as much as 5.0 in. in some locations in northern Ohio. The most significant precipitation fell during August 19–22, with the northeastern two-thirds of Ohio receiving 1 to 3 in. of rain. A large area in northwestern and north-central Ohio received 3–5 in. of rain, with as much as 8–10 in. reported at some locations (Kirk, 2007d).

The Storm of August 19–22, 2007

The flooding that affected northwestern and north-central Ohio was caused primarily by the interaction between tropical moisture associated with the remnants of Tropical Storm Erin and an east-west-oriented stationary front that stalled over northern Ohio. Several waves of slow-moving thunderstorms moved across northwestern and north-central Ohio from the evening of Saturday, August 18, through the morning of Wednesday, August 22, producing widespread rainfall totals in excess of 4 in. across much of northwestern and north-central Ohio. The heaviest rainfall during the 5-day storm event fell from the evening of August 20 through the morning of August 21, with as much as 10 in. in 10 hours near the Upper Sandusky area (National Climatic Data Center, 2008). The 7-day precipitation totals for the area from August 19–25, 2007, based on data from 68 NWS rainfall stations (National Oceanic and Atmospheric Administration, 2007), are shown in figure 4. Rainfall intensities and recurrence intervals for selected National Weather Service (NWS) stations (National Weather Service, 2008) from the storms that affected Ohio from August

⁶ “Normal” refers to the average value for the period 1951–2000 (Kirk, 2007 a, b, c, and d).

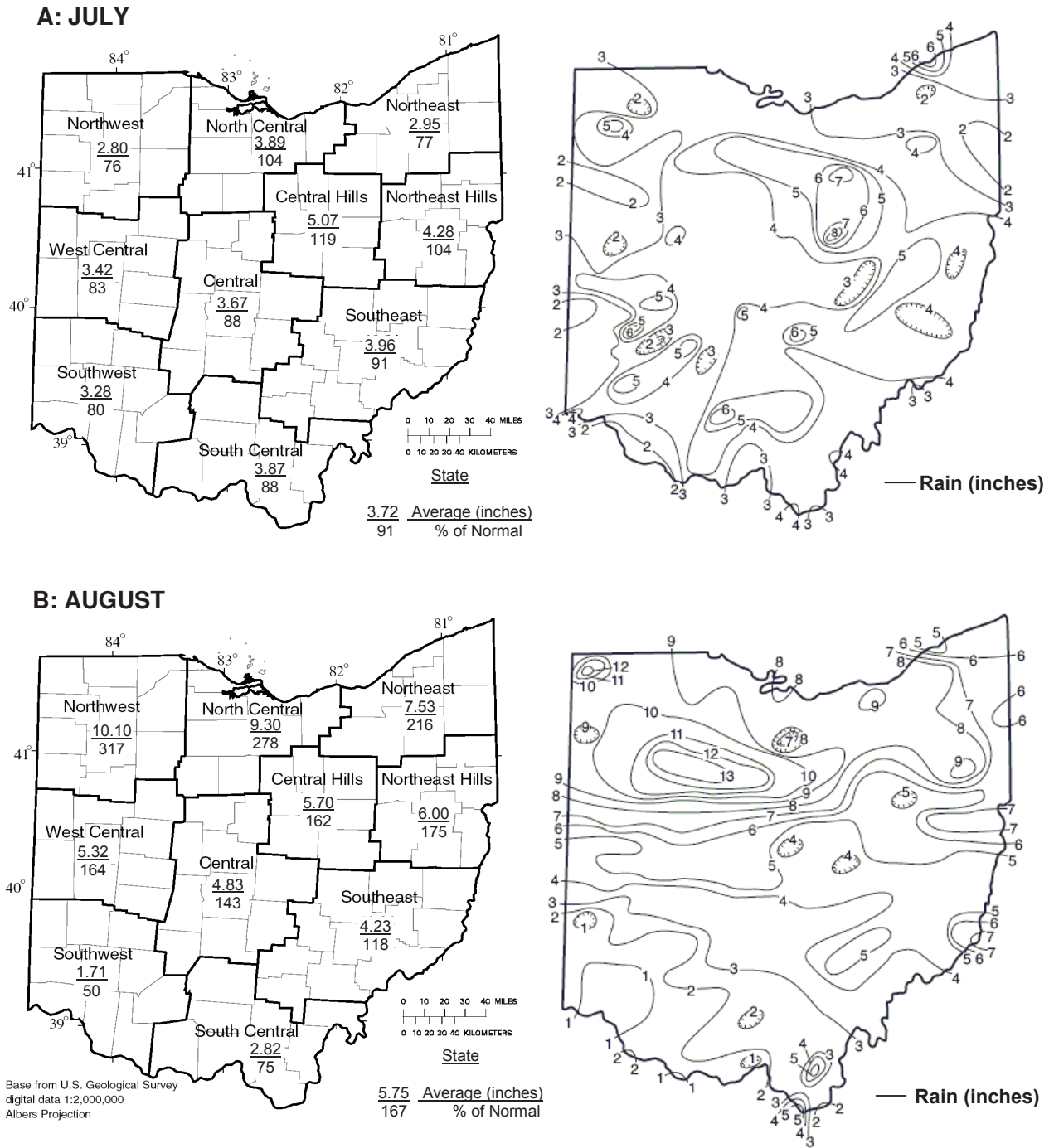


Figure 3. Regionally averaged monthly total precipitation and percentage of normal precipitation for the 10 climatic regions and the monthly hyetograph of Ohio by National Weather Service for July and August 2007 (from Kirk, 2007c, d).

6 Floods of August 21–24, 2007, in Northwestern and North-Central Ohio

19 to August 25 are listed in table 1. The time period used in table 1 is varied in order to show the most intense period of rainfall at each of the selected rain-gage sites. The 1-day precipitation totals at the Upper Sandusky, Bucyrus, and Ottawa rain gages correspond to a greater than 1,000-year recurrence interval.

The meteorological origins of the floods can be traced back to August 16, when Tropical Storm Erin made landfall along the Texas coastline while a cold front was moving southward through Ohio. This front eventually stalled on August 18 near the Tennessee River Valley before moving back north across Ohio on August 19 as a warm front and stalling once again just south of Lake Erie on August 20. As the front retreated, a subtropical high-pressure system strengthened over the southeastern United States. The clockwise circulation around this large high-pressure area brought the copious amounts of tropical moisture associated with the remnants of Tropical Storm Erin from Texas northward through the Mississippi River Valley then eastward across the Ohio River Valley.

Rainfall began across extreme northwestern Ohio on the evening of August 18 ahead of the warm front and slowly spread south and east through the rest of northern Ohio as the front stalled during the day on August 19. Following a lull during the evening of the 19th, thunderstorms redeveloped across northern Indiana in the early morning of August 20 and moved eastward across northern Ohio along the frontal

boundary. These storms intensified during the late morning as they reached north-central Ohio, with as much as 4 in. of rain falling in less than an hour and a half from Medina County east to Mahoning County.

These storms dissipated along the eastern border of Ohio during the early afternoon as sunshine returned across Indiana and western Ohio, destabilizing the tropical airmass now in place and leading to yet another round of thunderstorms. These storms again tracked eastward along the frontal boundary, which had sagged slightly southward during the day and focused the heaviest rainfall along the U.S. 30 corridor through Ohio.

During the evening, a westerly nocturnal low-level jet⁷ formed in the wake of the afternoon storms, once again triggering new thunderstorm development in western Indiana. This low-level jet intensified and pushed into northwest Ohio during the early morning, creating a moisture-rich breeding ground for continual thunderstorm development. Storms repeatedly moved over the same areas overnight, resulting in rainfall totals of 6 to 10 in. across a wide area stretching from northwest to north-central Ohio.

⁷ A nocturnal low-level jet is defined as a jet stream (relatively strong winds concentrated within a narrow band in the atmosphere) that forms at night, typically near the Earth's surface below an altitude of about 2 km, and usually attains speeds of less than 60 knots (Ahrens, 2003).

Table 1. Precipitation totals and recurrence intervals for selected National Weather Service rain gages in Ohio, August 19–25, 2007.

[Data from National Oceanic and Atmospheric Administration, 2007; >, greater than]

Station Name	County	Dates (2007)	Period (days)	Precipitation (inches)	Recurrence interval ¹ (years)
Upper Sandusky	Wyandot	August 21	1	9.35	> 1,000
Upper Sandusky	Wyandot	August 19–25	7	10.30	200–500
Pandora	Putnam	August 19–25	7	10.03	500–1,000
Bucyrus	Crawford	August 19–25	7	9.14	200–500
Bucyrus	Crawford	August 21	1	8.68	> 1,000
Ottawa	Putnam	August 19	1	8.14	> 1,000
Van Wert 1 S	Van Wert	August 19–25	7	9.98	500–1,000
Grover Hill	Paulding	August 21	1	6.76	200–500
Findlay WPCC	Hancock	August 19–25	7	7.61	100–200
Findlay FAA Airport	Hancock	August 19–25	7	6.42	25–50
Galion Water Works	Crawford	August 21	1	6.11	100–200
Lima WWTP	Allen	August 19–25	7	7.75	50–100
Mansfield WSO AP	Richland	August 19–25	7	6.78	25–50

¹From National Weather Service (2008).

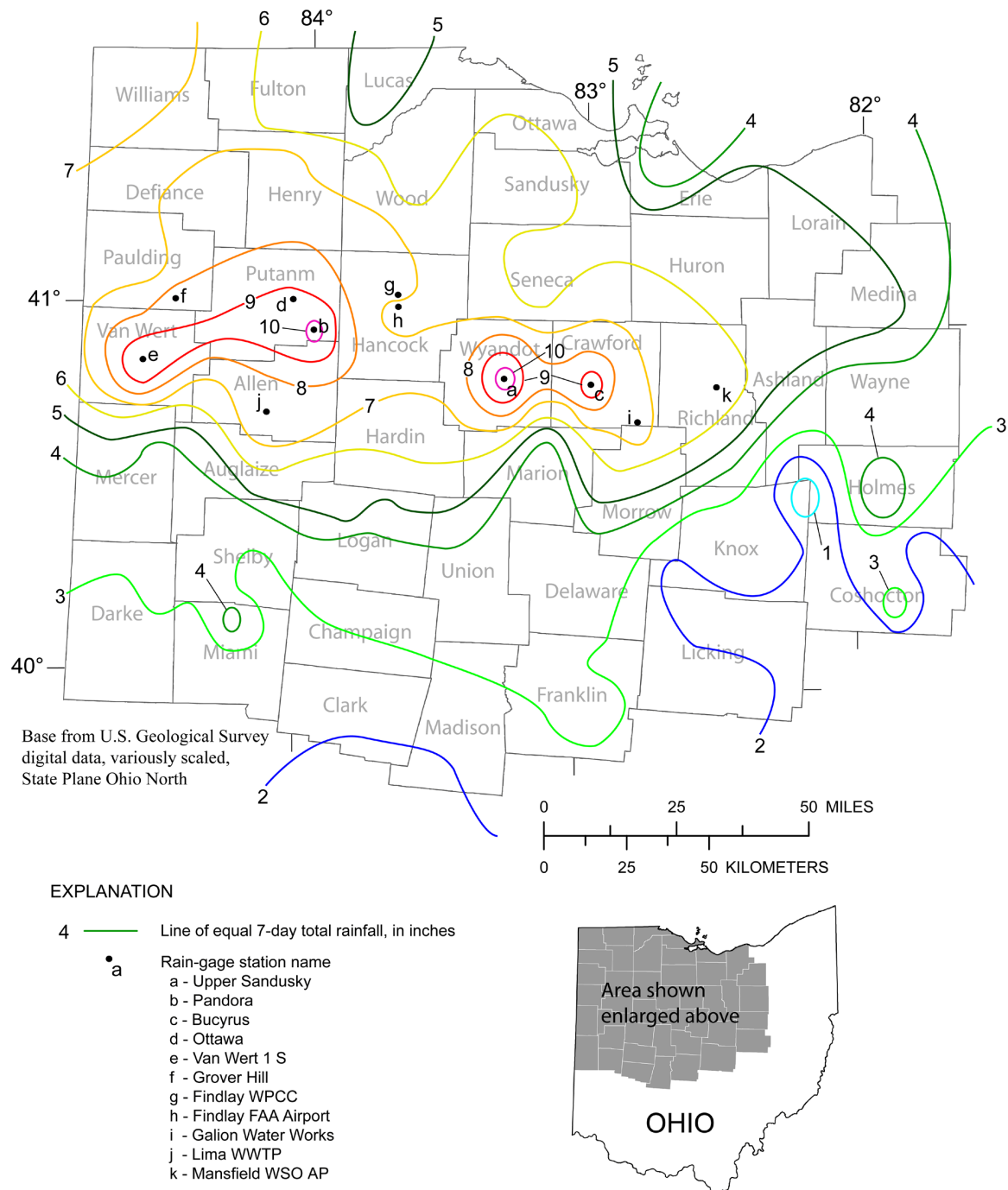


Figure 4. Isohyetal map of 7-day rainfall totals for August 19–25, 2007, in northwest Ohio, from National Weather Service rain gages.

General Description of the Floods

Water levels rose in many streams throughout the eight counties (fig. 2) as a result of the severe rain during August 19–24, 2007. Many homes, businesses, and structures were affected by floodwaters, particularly within nine communities of these counties (table 2). The USGS analyzed data from selected streamgages in and around the flooded counties to determine the extent of the flooding. Streamgage records and other streamflow-estimation techniques were used to determine the frequency and magnitude of this flood event within the disaster area. Data from streamgages in and around the disaster area are presented to show that the rivers outside and downstream from the flooded area were able to convey the water safely with minimal damages to residences and structures. The omission from this report of any rivers or communities that experienced flooding is not a reflection of the severity of the flooding or the impact on those communities but rather is due to the lack of available streamflow data and/or high-water-elevation data.

High-Water Marks

High-water marks are an indication of the water level at peak stage of a river during a flood event. They can be used to determine the peak streamflow or to calibrate peak-flow models used to determine flood-inundation areas. High-water marks are usually determined from mud, seed, or debris lines (or a combination thereof) left behind as the floodwaters receded. Examples of seed, mud, and or debris lines that indicated water elevations for this flood are shown in figure 5. Trees are generally a good place to find high-water marks because seeds and small debris get caught in the bark. Several distinct lines can be left after an event as floodwaters recede. For example, a flood with a secondary peak or an upstream bank failure can leave a distinct debris or mud line below the actual peak high-water mark (right picture figure 5B). The accuracy of the high-water marks is subjectively rated by the USGS personnel locating the mark, as outlined in Lumia and others (1986). High-water marks can be rated “excellent” (within 0.02 ft of the true high-water mark), “good” (within 0.05 ft), “fair” (within 0.10 ft), or “poor” (greater than 0.10 ft).

Table 2. Extent of high-water-mark profiles within nine communities in affected disaster area FEMA–1720–DR.

[Abbreviations: I, Interstate; SR, State Route; CR, County Road; TR, Township Road]

Community	County	Flooding source	Downstream limit	Upstream limit	Stream miles	Number of high-water marks
Maumee River Watershed						
Bluffton	Allen	Riley Creek	Bentley Road	I–75	2.4	30
Columbus Grove	Putnam	Plum Creek	Road 11	TR 11R	2.9	27
Findlay	Hancock	Blanchard River	CR 140 (04189000) ¹	TR 241	7.6	87
Ottawa	Putnam	Blanchard River	Road I–9	CR 8	7.5	32
Sandusky River Watershed						
Bucyrus	Crawford	Sandusky River	Kerstetter Road , CR 121 (04196000) ²	SR 30	4.6	44
Carey	Wyandot	Spring Run	TR 100A	SR 15	2.9	30
Crestline	Crawford	West unnamed tributary to Paramour Creek	West Main Street, SR 30 N	West Bucyrus Street, CR 35	1.1	6
		East unnamed tributary to Paramour Creek	Oldfield Road, SR 61	Norfolk Southern Railroad	1.9	18
Muskingum River Watershed						
Mansfield	Richland	Rocky Fork Mohican River	Lucas Road, SR39	Bowman Street	6.4	53
		Touby Run	Mouth	Home Road	4.3	51
Shelby	Richland	Black Fork Mohican River	London West Road/CR58	Mickey Road	2.9	43

¹ USGS streamgage Blanchard River near Findlay, Ohio.

² USGS streamgage Sandusky River near Bucyrus, Ohio.

A



B



C



Figure 5. Examples of lines used as high-water marks at selected locations in the flooded area. *A*, Seed line on buildings or trees. *B*, Mud lines on buildings. *C*, Debris lines on fence or ground.

The USGS located and surveyed 421 high-water marks along approximately 44.5 mi of streams within the 9 communities flooded in this event (figs. 6–14, at back of report). All high-water marks (table 3, at back of report) were surveyed and referenced to the North American Vertical Datum of 1988 (NAVD 88) and the North American Datum 1983 (NAD 83). The elevations of the high-water marks were determined by use of a Global Positioning System (GPS) and differential leveling. The initial horizontal position of each mark was determined by handheld GPS units and then repositioned directly on aerial photographs in a Geographical Information System (GIS).

To determine the high-water profile, a reference distance and elevation must be associated with each high-water mark. The reference distance is usually estimated by the distance along each stream's main channel from a selected location, usually the mouth or a bridge. Flood profiles were determined for each stream in the nine communities by this method (figs. 15–25, at back of report) except for the city of Ottawa. In and near Ottawa, the main channel of the Blanchard River has a high degree of meandering relative to the flood plain and, at several locations, the main-channel flow is against the general direction of the floodflow; therefore, the horizontal distance was estimated to align with the majority of the floodflow across the flood plain.

The USGS created maps of estimated flood inundation superimposed on aerial photographs for the nine communities (figs. 26–34, at back of report). The estimated flood-inundation areas were determined by the high-water-mark elevation data placed on a Triangulated Irregular Network (TIN) generated from LIDAR⁸ data. The extent of this flood on the tributaries to the main flooding source may be greater than shown in the figures because high-water marks were not collected on the tributaries.

Flood Stages and Streamflows

The USGS examined the streamflow data from 22 streamgages (table 4 and fig. 35, at back of report) that were in and around the area affected by this storm. The USGS located and surveyed high-water marks around four streamgages in the flooded area: two active streamgages (Blanchard River near Findlay 04189000 and Sandusky River near Bucyrus 04196000); one discontinued (Touby Run at Mansfield 03130500); and one stage-only⁹ (Blanchard River at Ottawa 04189260). Two more streamgages (Sandusky River near Upper Sandusky 04196500 and Tymochtee Creek at Crawford 04196800) are within the counties of the disaster declaration, but no high-water marks were collected. The remaining streamgages are listed to present the areal extent of the flooding.

⁸ LIDAR (Light Detection and Ranging) is an optical remote-sensing technique used to determine ground elevations. The data were collected as part of the Ohio Geographically Referenced Information Program (OGRIP).

⁹ A stage-only streamgage records the water level only; streamflow is not computed.

Streamflow at a streamgage is generally determined by a rating curve, which is the relation between river stage, or gage height, and streamflow. Rating curves are usually developed by mathematically relating measured gage heights and corresponding measured streamflows—collectively termed “input points”—over a range of flows (Rantz and others, 1982). Streamflow between or beyond the input points is then determined by interpolation or extrapolation. Ideally, the measurements should span the entire probable range of flows at the gage, but high-flow data are sometimes difficult or unsafe to collect. Extrapolating the rating curve beyond the highest data point can lead to large errors in streamflow estimates (Rantz and others, 1982). Techniques to define high-streamflow data points on a rating curve are available by applying the energy and continuity equations at specific locations when direct measurements are not possible, practical, or safe. By indirectly determining the streamflow on the basis of high-water marks, the rating curve can be defined for extreme floodflows without physically measuring the flow during dangerous measurement conditions. Indirect methods also can be used to determine streamflow at ungaged locations where streamflow data are unavailable. Streamflows for the August 2007 Ohio event were determined by the rating-curve method at 20 of the 22 streamgages and are presented in table 4 (at back of report).

The USGS was able to directly measure the streamflow and gage height at several different water levels at both the Blanchard River near Findlay and Sandusky River near Bucyrus gages during the August 2007 flood. Direct measurements of stage and flow were made at the Blanchard River near Findlay streamgage at the peak gage height of 18.46 ft (772.22 ft, NAVD 88) and a streamflow of 14,500 ft³/s at about 1:00 p.m. on August 22, 2007. Only once, during the 1913 flood, was there a higher estimated stage and streamflow (18.50 ft and 22,000 ft³/s) in the 81 years of record¹⁰. Unfortunately, conditions at the Sandusky River near Bucyrus streamgage were considered unsafe when the streamgage and roadway were submerged by the flood; thus, field crews were unable to directly measure the peak streamflow. Measurements before and after the peak gage height, as well as high-water marks at the Bucyrus streamgage, helped to define the flood hydrograph for this event. As derived from surveyed high-water marks and indirect methods, the gage height and streamflow estimated for the Sandusky River near Bucyrus streamgaging station were 12.17 ft (967.21 ft, NGVD 29) and 15,800 ft³/s. The peak streamflow was estimated to have occurred at about 10:00 p.m. on August 21, 2007; these were the highest recorded gage height and streamflow estimate at this site for the 55 years of record¹¹. Because the Touby Run at Mansfield streamgage was not active and the Blanchard River at Ottawa streamgage was

¹⁰ The Blanchard River at Findlay streamgage was operated from October 1923 until present day. The 1913 flood information was determined by indirect methods for this gage site and was not part of the continuous systematic record.

¹¹ The Sandusky River near Bucyrus streamgage was operated from August 1925 to November 1935, July 1938 to December 1951, December 1963 to September 1981, and October 1995 to present day.

a stage-only gage, direct measurements were not done at these locations. Surveyed high-water marks on the upstream and downstream side of the concrete weir at the Touby Run at Mansfield streamgage site indicated a peak gage height of 5.29 ft. The streamflow was estimated to be 1,200 ft³/s and was based on extrapolating the rating curve and an indirect method using a weir equation (Hulsing, 1967). The peak streamflow was estimated to have occurred on August 21, 2007; the recorded gage height and the streamflow estimate at this site were the highest for the 33 years of record¹². The Blanchard River at Ottawa streamgage recorded a gage height of 31.70 ft¹³ on August 23, 2007. No streamflow information was available for the Blanchard River at Ottawa streamgage; however, by use of an

indirect method, the streamflow was estimated to be between 25,600 and 49,400 ft³/s.

An estimated streamflow was computed by an indirect method at seven of the nine communities, owing to the lack of streamflow data (table 5). Selection of the most appropriate indirect method was based on the quality of the high-water marks, required stream-geometry data, and channel characteristics associated with the particular indirect method. Four indirect methods were used to determine streamflow at the selected locations in the seven communities: (1) the slope-area method, which uses a uniform-flow equation based on channel geometry, water-surface profiles, and roughness coefficients (Dalrymple and Benson, 1968); (2) the contracted-opening method, which uses the energy equation to compute the drop in water surface at bridges or channel contractions (Matthai, 1967); (3) the Manning's equation method, which uses channel characteristics and roughness coefficients (Chow, 1959); and (4) the routing method using a Hydrologic Engineering Centers River Analysis System (HEC-RAS) model to match the water-surface profile based on high-water-mark elevations (U.S. Army Corps of Engineers, 2005).

¹² The Touby Run at Mansfield streamgage was operated from August 1946 to September 1978. A peak flow was also estimated for the July 2, 1987, event.

¹³ The Blanchard River at Ottawa streamgage is a stage-only station operated from November 1995 to present. This station is a river forecast site for the National Weather Service. Historical stage data from before 1995 were obtained from the NWS Web page (National Weather Service, 2007).

Table 5. Peak streamflows and estimated recurrence-interval ranges at selected communities in the flooded area in Ohio, August 21–24, 2007.

[mi², square miles; ft, feet (above streamgage datum); ft³/s, cubic feet per second; >, greater than; N/A, not available]

Streamflow determined at selected communities by indirect methods					
Community	Stream	Drainage area (mi ²)	Method for determining streamflow	Streamflow (ft ³ /s)	Estimated recurrence-interval range (years) ¹
Bluffton	Riley Creek	35.8	Slope-area	10,300	> 500
Carey	Spring Run	3.51	Contracted-opening	597 ²	> 500
Columbus Grove	Plum Creek	17.1	Contracted-opening	1,780	100–500
Crestline	West Unnamed Tributary to Paramour Creek	5.29	Manning's Equation	3,000	> 500
Crestline	East Unnamed Tributary to Paramour Creek	1.76	Routing method (using HEC-RAS), Manning's Equation	698	> 500
Mansfield	Rocky Fork Mohican River	10.3	Contracted-opening	2,030	> 500
Ottawa	Blanchard River	625	Manning's Equation	25,600 to 49,400 ³	> 500
Shelby	Black Fork Mohican River	30.4	Contracted-opening	6,340	> 500

¹ Recurrence-interval estimated from StreamStats (Koltun and others, 2006).

² Spring Run overflowed its banks upstream from the contracted-opening site at the Toledo Street bridge. An undetermined quantity of that overflow may have escaped into the unnamed tributary to the north, thereby bypassing the contracted-opening site. Flow from the unnamed tributary enters Spring Run approximately 300 feet downstream from Toledo Street.

³ Range based on Manning's equations at two different locations.

Recurrence Intervals

The recurrence intervals at each streamgage were estimated by comparing the peak streamflow of this event with the gage-weighted streamflow estimates as published in Koltun and others (2006). For streamgages where record was insufficient to compute a reliable recurrence-interval estimate and also for the ungaged sites, recurrence intervals were estimated by means of Ohio StreamStats (U.S. Geological Survey, 2008). Peak stage, peak streamflow, and recurrence-interval range for selected USGS streamgages for this flood event are listed in table 4 (at back of report). For stations on regulated streams, a recurrence interval is not given.

Record peak streamflow occurred on Touby Run at Mansfield (station 03130500), Sandusky River near Bucyrus (station 04196000), and Sandusky River near Upper Sandusky (station 04196500). The streamgage at Bucyrus indicated a greater than 500-year peak floodflow. At the Findlay streamgage, peak floodflow slightly exceeded the 100-year recurrence interval. Peak flows at the streamgages at Mansfield and Upper Sandusky were in the 50–100 year flood range. Recurrence intervals at the other streamgages were smaller.

The peak floodflows for the ungaged sites were compared to estimates from Ohio StreamStats to establish approximate recurrence intervals for this flood. At eight of the nine ungaged locations, the estimated recurrence interval was greater than 500 years. At the Plum Creek site in Columbus Grove, the estimated recurrence interval was between 100 and 500 years.

Flood and Storm Damages Associated With FEMA–1720–DR

Although it was not possible to determine an exact value of the damages caused by the flooding, Ohio Emergency Management Agency (Ohio EMA) was able to obtain some estimates of the extent of the damage. According to the Ohio EMA (Drew Whitehair, written commun., 2008), 8,205 households registered for assistance as a result of this flood. Damages to public property were estimated to be in excess of \$290 million. FEMA approved nearly \$124 million of assistance to aid in the repair of both public and private properties. The Small Business Administration approved an additional \$114 million in loans to aid with repair of local businesses affected by the flooding.

Summary

A severe storm swept across northwestern and north-central Ohio during August 19–22, 2007, with as much as 10 in. of rain reported in some areas. Rainfall recorded at some National Weather Service sites exceeded a 1,000-year

recurrence interval. Because of the intensity of the rainfall, several streams flooded homes and businesses in nine communities throughout the area. Eight counties were declared a Federal disaster area on August 27, 2007.

The USGS located 421 high-water marks and generated peak flood profiles on 11 streams throughout the nine communities. Peak streamflows, stages, and recurrence intervals were estimated by high-water marks and/or streamgage data at 30 locations in and around the flooded area.

The highest peak streamflow of record occurred at three streamgages: the Sandusky River near Bucyrus, the Sandusky River near Upper Sandusky, and Touby Run at Mansfield. The streamgage on the Blanchard River near Findlay recorded the second highest streamflow for the 81 years of record. Many of the streams in the selected communities of the flooded area had a peak-streamflow recurrence interval of greater than 500 years. Damage was estimated by the Ohio Emergency Management Agency at more than \$290 million.

Acknowledgments

The authors thank the many citizens of the flooded communities for their descriptions of the flood and their cooperation in helping field crews locate high-water marks.

References Cited

- Ahrens, C.D., 2003, *Meteorology today—An introduction to weather, climate, and the environment* (7th ed.): Pacific Grove, Calif., Thomson/Brooks/Cole Publishing Company, 544 p.
- Chow, V.T., 1959, *Open-channel hydraulics*: New York, McGraw-Hill Civil Engineering Series, 680 p.
- Dalrymple, Tate, and Benson, M.A., 1968, *Measurement of peak discharge by the slope-area method*: U.S. Geological Survey Techniques of Water-Resources Investigations, book 3, chap. A2, 12 p.
- Federal Emergency Management Agency, 2007, *Ohio severe storms, flooding, and tornadoes: FEMA–1720–DR*, accessed February 5, 2009, at <http://www.fema.gov/news/event.fema?id=8725>
- Federal Emergency Management Agency, 2008a, *Apply for Assistance*, accessed February 5, 2009, at <http://www.fema.gov/assistance/index.shtm>
- Federal Emergency Management Agency, 2008b, *Public Assistance Grant Program*, accessed February 5, 2009, at <http://www.fema.gov/government/grant/pa/index.shtm>

- Hulsing, Harry, 1967, Measurement of peak discharge at dams by indirect methods: U.S. Geological Survey Techniques of Water-Resources Investigations, book 3, chap. A5, 29 p.
- Kirk, S.C., compiler, 2007a, Monthly water inventory report for Ohio, May 2007: Ohio Department of Natural Resources Division of Water, 4 p.
- Kirk, S.C., compiler, 2007b, Monthly water inventory report for Ohio, June 2007: Ohio Department of Natural Resources Division of Water, 4 p.
- Kirk, S.C., compiler, 2007c, Monthly water inventory report for Ohio, July 2007: Ohio Department of Natural Resources Division of Water, 4 p.
- Kirk, S.C., compiler, 2007d, Monthly water inventory report for Ohio, August 2007: Ohio Department of Natural Resources Division of Water, 4 p.
- Koltun, G.F., Kula, S.P., and Puskas, B.M., 2006, A stream-flow statistics (StreamStats) Web application for Ohio: U.S. Geological Survey Scientific Investigations Report 2006–5312, 62 p.
- Lumia, Richard, Burke, P.M., and Johnston, W.H., 1986, Flooding of December 29, 1984 through January 2, 1985, in northern New York State, with flood profiles of the Black and Salmon Rivers: U.S. Geological Survey Water-Resources Investigations Report 86–4191, 53 p.
- Matthai, H.F., 1967, Measurement of peak discharge at width contractions by indirect methods: U.S. Geological Survey Techniques of Water-Resources Investigations, book 3, chap. A4, 44 p.
- National Climatic Data Center, 2008, Annual climatological summary for station Upper Sandusky (2007): Asheville, N.C., accessed February 2008 at <http://cdo.ncdc.noaa.gov/ancsum/ACS>
- National Oceanic and Atmospheric Administration, 2007, Climatological data, Ohio, August 2007: Asheville, N.C., v. 112, no. 8, 30 p.
- National Weather Service, 2007, Automated flood warning system: Accessed February 5, 2007, at <http://afws.net/state/oh/oh.htm>
- National Weather Service, 2008, National Weather Service Hydrometeorological Design Studies Center Precipitation Frequency Data Server: Accessed February 5, 2008, at http://hdsc.nws.noaa.gov/hdsc/pfds/orb/oh_pfds.html
- Rantz, S.E., and others, 1982, Measurement and computation of streamflow—Volume 1, Measurement of stage and discharge, and Volume 2, Computation of discharge: U.S. Geological Survey Water-Supply Paper 2175, 631 p.
- Riggs, H.C., 1968, Frequency curves: U.S. Geological Survey Techniques of Water-Resources Investigations, book 4, chap. A2, 15 p.
- Sherwood, J.M., Ebner, A.E., Koltun, G.F., and Astifan, B.M., 2007, Flood of June 22–24, 2006, in north-central Ohio, with emphasis on the Cuyahoga River near Independence: U.S. Geological Survey Scientific Investigations Report 2007–5161, 18 p.
- U.S. Army Corps of Engineers, Hydrologic Engineering Center, 2005, HEC-RAS River Analysis System application guide, Version 3.1: Davis, Calif., 356 p.
- U.S. Geological Survey, 2008, Ohio StreamStats: Accessed January 2008 at <http://streamstats.usgs.gov/ohstreamstats/>

Tables 3 and 4, High-Water-Mark Location Maps, Flood Profiles, and Inundation Maps

[On following pages]

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
Riley Creek near Bluffton, Ohio (distances referenced to a point 93 ft downstream from Bentley Road)							
LB17	Left	Fair	40° 54' 25"	-83° 53' 55"	433	810.62	Debris line on 8 in.-diameter locust tree, 7.0 ft above ground, 40 ft from stream, and 60 ft in from soybean field.
RB14	Right	Poor	40° 54' 27"	-83° 53' 53"	645	810.71	Seed line on tree, 6.3 ft above ground, at edge of channel, about 400 ft upstream from bridge.
LB16	Left	Fair	40° 54' 24"	-83° 53' 42"	1,548	811.50	Debris line on 6-in.-diameter hackberry tree, 5.6 ft above ground, about 20 ft in from soybean field, 90 ft from stream.
RB13	Right	Good	40° 54' 18"	-83° 53' 38"	2,772	812.62	Seed line on tree, 5 ft above ground, 25 ft from channel, about 300 ft upstream from powerlines.
LB15	Left	Fair	40° 54' 11"	-83° 53' 40"	3,653	812.99	Debris line on 6-in.-diameter elm tree, 5.0 ft above ground, about 40 ft from stream, in flood plain just below 2-ft culvert, in field opposite Hillcrest Dr., about 200 ft upstream from 450 Riley St.
LB14	Left	Fair	40° 54' 03"	-83° 53' 32"	4,641	813.15	Debris line on 6-in.-diameter hackberry tree, 6.2 ft above ground, 20 ft from stream in flood plain, behind 280 Riley Street, across from Pinebrook.
RB12	Right	Good	40° 54' 02"	-83° 53' 30"	4,805	813.89	Seed line on tree, about 4 ft above ground, about 15 ft from right edge of channel, behind Legion, adjacent to sewage-treatment plant.
LB13	Left	Poor	40° 53' 55"	-83° 53' 26"	5,554	815.75	Debris line on yellow pole cable stay, 2.9 ft above ground, at southeast corner of Riley and Spring Streets.
RB11	Right	Good	40° 53' 57"	-83° 53' 23"	5,637	816.04	Seed line on tree, 6 ft above ground, on streamward side of pond and gravel path, across pond (Buckeye Lake) from picnic pavilion, about 300 ft upstream from closed truss bridge at Bluffton Legion Post.
LB12	Left	Fair	40° 53' 52"	-83° 53' 17"	6,357	816.44	Debris line on apple tree, 3.8 ft above ground, 40 ft from stream, behind 112 Riley St., behind gray shed.
LB11	Left	Poor	40° 53' 50"	-83° 53' 15"	6,540	816.52	Abrasion on 6-in.-diameter hackberry tree, 30 ft from stream, 300 ft downstream from Main St. bridge, between 106 and 108 Riley St., behind red shed.
RB10	Right	Fair	40° 53' 50"	-83° 53' 10"	6,917	817.52	Drift line on ground, 150 ft upstream of Main St. bridge.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
RB09	Right	Fair	40° 53' 37"	-83° 53' 13"	8,372	821.48	Seed line on tree, 1.5 ft above ground, 75 ft downstream from SR 103 bridge.
LB10	Left	Fair	40° 53' 36"	-83° 53' 17"	8,674	823.88	Debris line on wood fence, 3.5 ft above ground, 5 ft from end of fence, at northeast corner parking lot of community market.
RB08	Right	Good	40° 53' 29"	-83° 53' 19"	9,374	824.14	Mud line on back corner (downstream side) of red feed store (Kent), just downstream of Cherry St. bridge (building will be destroyed after harvest, end of Nov.).
LB09	Left	Good	40° 53' 33"	-83° 53' 25"	9,374	824.34	Mark on left doorframe by owner of M&R Plumbing and Heating, 0.8 ft above ground, on Cherry St.
RB07	Right	Fair	40° 53' 28"	-83° 53' 33"	10,513	825.25	Seed line on large tree, about 7 ft above ground, downstream side of Harmon football field, 100 ft upstream from bridge.
LB08	Left	Good	40° 53' 29"	-83° 53' 35"	10,513	825.29	Mud/seed line on inside of entrance door to Moreys, at corner of College and Triplett Dr.
LB07	Left	Fair	40° 53' 24"	-83° 53' 36"	10,919	823.84	Debris line on base of utility pole #711C2135, 0.8 ft above ground, on Triplett Dr.
RB06	Right	Good	40° 53' 23"	-83° 53' 29"	10,919	825.36	Mud line on Harmon Field football scoreboard support I-beam, 4.55 ft above ground, streamward side.
LB06	Left	Fair	40° 53' 17"	-83° 53' 35"	11,584	826.29	Debris line on chain-link fence, behind school soccer field near southeast corner, off Triplett Dr.
LB05	Left	Fair	40° 53' 16"	-83° 53' 36"	11,684	827.05	Debris line on upstream railroad tie, 180 ft west of railroad abutment.
RB04	Right	Fair	40° 53' 16"	-83° 53' 29"	11,997	827.55	Seed line on pine tree, 4.7 ft above ground, in small grove behind barn and pond, at end of South Mound St.
LB04	Left	Good	40° 53' 15"	-83° 53' 30"	11,997	827.39	Seed line on 6-in.-diameter mulberry tree, 7.9 ft above ground, 15 ft north of 2.5-ft-diameter cottonwood tree.
LB03	Left	Good	40° 53' 11"	-83° 53' 26"	12,558	828.62	Seed line on 5-in.-diameter hackberry tree, 2.4 ft above ground.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
RB03	Right	Fair	40° 53' 13"	-83° 53' 23"	12,558	828.76	Drift line along bank on left side of gravel access drive at 192 Geiger St.
LB02	Left	Fair	40° 53' 08"	-83° 53' 23"	12,940	830.07	Seed line on 1-ft-diameter boxelder tree, 3.8 ft above ground, 30 ft from left bank.
RB02	Right	Good	40° 53' 08"	-83° 53' 21"	13,008	830.26	Seed line on 10-in.-diameter Buckeye tree, 40 ft downslope from yard edge, behind 30 Sara Ln.
LB01	Left	Fair	40° 53' 05"	-83° 53' 23"	13,286	829.92	Drift line along left bank, 20 ft from edge, 10 ft northwest of 8-in.-diameter locust tree, 120 ft downstream of bridge.
RB01	Right	Good	40° 53' 04"	-83° 53' 21"	13,372	830.84	Seed line on bridge abutment, 2 ft above gravel, 5 ft under bridge deck from downstream side of bridge.
Sandusky River near Bucyrus, Ohio (distances referenced to a point 90 ft downstream from County Road 121)							
L01	Left	Fair	40° 48' 13"	-83° 00' 20"	100	967.14	Mark observed by resident of Kerstetter Rd., on centerline of road, left bank, about 7 ft past end of guardrail.
L02	Left	Fair	40° 48' 13"	-83° 00' 21"	119	NA ³	Debris line on left upstream bank of bridge, on ground, between 8th and 9th wooden guardrail-support post.
R01	Right	Fair	40° 48' 15"	-83° 00' 22"	190	967.18	Seed/mud line on tree, 6 ft above ground, upstream from small tributary, 75 ft west of river.
L03	Left	Good	40° 48' 14"	-83° 00' 21"	226	963.49	Mud line on tree, 2.5 ft above ground, 50 ft from left bank, 200 ft upstream from bridge.
R02	Right	Poor	40° 48' 15"	-83° 00' 22"	247	967.19	Mud line on 6-in.-diameter tree, 5 ft above ground, 50 ft upstream from R01.
L04	Left	Fair	40° 48' 13"	-82° 59' 52"	2,637	970.31	Seed line on 10-in.-diameter tree, 50 ft from river bank, about even with western fence line of Bucyrus sewage-treatment plant.
L05	Left	Good	40° 48' 09"	-82° 59' 32"	4,345	972.24	Mud line on vertical 6 in. x 6 in. post, next to main vertical pole for cable bridge, on left bank, upstream side of bridge.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
R06	Right	Fair	40° 48' 12"	-82° 59' 28"	4,525	972.82	Mud line on tree, 5 ft above ground, in small grove at edge of flood plain, just below shelterhouse, 500 ft downstream from HWM R05.
R05	Right	Excellent	40° 48' 11"	-82° 59' 23"	4,964	973.05	Mud line on back side of circular "Rotary International" sign, 0.94 ft above bottom of sign, at "Field of Dreams" baseball complex.
R04	Right	Excellent	40° 48' 11"	-82° 59' 19"	5,758	972.98	Mud line on red entry door to red brick concession-stand building, 4.01 ft above metal weatherstripping, at baseball field in Aumiller park.
R03	Right	Excellent	40° 48' 11"	-82° 59' 18"	5,758	973.00	Mud line on red entry door to red brick concession-stand building, 4.05 ft above metal weatherstripping, at baseball field in Aumiller park.
L06	Left	Good	40° 48' 02"	-82° 59' 12"	5,988	973.08	Seed line on 24-in.-diameter double-trunk tree, in ravine of cemetery, cemetery side of tree, on path toward river.
L07	Left	Good	40° 48' 11"	-82° 59' 09"	6,615	973.22	Seed line on 11-in.-diameter black walnut tree, in park, stream side of tree.
R07	Right	Fair	40° 48' 12"	-82° 59' 15"	6,723	973.18	Mud line on "WRONG WAY" sign, at upstream end of baseball field, near ford across Blanchard River.
L08	Left	Excellent	40° 48' 16"	-82° 59' 09"	7,134	973.22	Seed line on twin tree, on left bank next to grass field near pedestrian bridge and ford, about 400 ft from river.
L09	Left	Excellent	40° 48' 25"	-82° 59' 02"	8,798	974.16	Mud line on screen of small shed behind 706 West Warren St., upstream side of shed.
R08	Right	Fair	40° 48' 33"	-82° 59' 03"	9,374	974.70	Seed line on tree, 3 ft above base, at edge of flood plain just upstream from Victory Lane.
11	Left	NR	40° 48' 31"	-82° 58' 58"	9,738	975.59	Mud line on house trailer, downstream from W. Mansfield Rd. bridge.
12	Left	NR	40° 48' 32"	-82° 58' 55"	9,947	975.71	Mud/seed line on sign, just downstream from W. Mansfield Rd. bridge, on left bank.
13	Right	NR	40° 48' 33"	-82° 58' 56"	9,947	975.69	Seed line on downstream right bank abutment.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
16	Left	NR	40° 48' 32"	-82° 58' 54"	9,977	975.73	Seed line on downstream left bank abutment.
15	Right	NR	40° 48' 33"	-82° 58' 55"	10,092	976.03	Seed line on right upstream abutment.
10	Left	NR	40° 48' 32"	-82° 58' 52"	10,092	976.80	Seed line on house with blue painted block and white vinyl siding.
14	Right	NR	40° 48' 35"	-82° 58' 56"	10,442	976.56	Seed line on blue door on upstream right bank.
17	Right	NR	40° 48' 35"	-82° 58' 52"	10,480	976.48	Seed line on tree upstream right bank, just downstream from railroad bridge.
21	Right	Excellent	40° 48' 39"	-82° 58' 46"	11,015	977.81	Seed line on downstream right low steel of West Mary St. bridge, about 0.3 ft higher than low steel.
22	Right	Excellent	40° 48' 39"	-82° 58' 46"	11,075	977.89	Seed line on upstream right low steel of West Mary St. bridge, about 0.4 ft higher than low steel.
20	Right	Excellent	40° 48' 40"	-82° 58' 48"	11,107	978.59	Seed line on rear support and lattice of balcony, behind 400 West Mary St.
23	Left	Excellent	40° 48' 40"	-82° 58' 43"	11,257	978.67	Mud line on concrete block of loading area, under concrete overhang, behind Quinn's Rental at upstream left side of West Mary St. bridge.
24	Left	Excellent	40° 48' 41"	-82° 58' 40"	11,494	978.84	Seed line on left door frame of shed with "OPEN" sign above door, on downstream left bank of Tiffin St. bridge.
26	Left	Poor	40° 48' 42"	-82° 58' 39"	11,643	980.04	Debris line on root of a 2-ft-diameter pine tree, about 2 ft above ground, about 30 ft upstream from Tiffin St. bridge.
27	Right	Fair	40° 48' 45"	-82° 58' 42"	11,667	979.73	Seed line on right brown support pole of deck, 3 ft above ground, south side of building, under deck, at southernmost apartment of River View Apartments, on southeast corner of Tiffin and River Sts.
25	Left	Fair	40° 48' 43"	-82° 58' 39"	11,713	979.90	Debris line on double-trunked, V-shaped, 7-in.-diameter tree, 4 ft above ground, about 110 ft upstream from Tiffin St. bridge.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
28	Right	Good	40° 48' 47"	-82° 58' 42"	11,777	980.71	Seed line on utility pole #781B4172, about 210 ft east of intersection of Tiffin and River Streets, between houses 320 and 322 on River St.
29	Right	Excellent	40° 48' 47"	-82° 58' 41"	11,866	980.70	Debris line on fencepost at end of fence between houses 316 and 320 River St.
R10	Right	Excellent	40° 48' 48"	-82° 58' 35"	12,175	981.02	Mud line on window, 1.32 ft above bottom of glass, building at corner of River St. and N. Sandusky Ave., about 100 ft upstream from R09.
L10	Left	Fair	40° 48' 46"	-82° 58' 33"	12,271	980.32	Debris line on ground near bottom of gasoline marker on downstream left bank of SR 4 bridge, about 30 ft downstream from bridge.
R09	Right	Excellent	40° 48' 49"	-82° 58' 33"	12,271	980.74	Seed/mud line on window, 1.18 ft above bottom of glass, building at corner of River St. and N. Sandusky Ave.
R11	Right	Excellent	40° 48' 49"	-82° 58' 32"	12,378	981.24	Mud line on window of Good Eats restaurant on River St.
L11	Left	Good	40° 48' 46"	-82° 58' 31"	12,438	980.83	Seed line on corner fencepost of North Bucyrus Power Co., upstream side of SR 4 bridge, near 2nd strap from bottom, on fencepost nearest bridge.
R13	Right	Excellent	40° 48' 50"	-82° 58' 30"	12,578	981.07	Mud line on front entry door, 0.78 ft above bottom of glass, Home City ice plant.
R12	Right	Excellent	40° 48' 50"	-82° 58' 29"	12,640	981.08	Mud line on side of entry door, 1.04 ft above bottom of glass, Home City Ice plant.
R15	Right	Good	40° 48' 54"	-82° 58' 26"	12,794	981.39	Seed line on downstream side landward corner of tan pole barn, 2.17 ft above ground, behind old block barn, 100 ft landward from playground at 153 Plymouth St.
R14	Right	Fair	40° 48' 53"	-82° 58' 25"	12,875	981.38	Mud/seed line on side of blue stairs to playground slide, 8 ft above ground, in small park just upstream from Home City Ice.
R16	Right	Fair	40° 48' 53"	-82° 58' 23"	13,053	977.78	Mud line on utility pole 78102-110, 3 ft above ground, adjacent to park and 202 Blicke St.
R17	Right	Excellent	40° 48' 49"	-82° 58' 19"	13,600	981.57	Mud line on window, 2.2 ft above bottom of glass, streamward side of house at 519 N. Lane Ave.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
L12	Left	Excellent	40° 48' 42"	-82° 58' 19"	13,620	976.56	Seed line under North Lane St. bridge left bank, 10 ft upstream from downstream side of bridge.
R18	Right	Good	40° 48' 49"	-82° 58' 18"	13,712	981.55	Mud line on plywood door cover, 5.48 ft above door sill, in brick building across road from 519 N. Lane Ave.
L13	Left	Good	40° 48' 41"	-82° 58' 18"	13,779	982.14	Mud line on 30-in.-diameter tree, 75 ft upstream side of N. Lane St. bridge.
R19	Right	Excellent	40° 48' 43"	-82° 58' 16"	13,891	981.80	Mud line on sid- entry door, right window, 0.60 ft from bottom of glass, at 315 Clinton St.
R20	Right	Excellent	40° 48' 44"	-82° 58' 14"	14,071	981.71	Mud line on downstream end of white pole barn, 3.87 ft above base of siding, on Clinton St. across from small brick house and just downstream from water-treatment plant.
R22	Right	Excellent	40° 48' 45"	-82° 58' 13"	14,300	981.77	Seed line on inside wall, 3.68 ft above door sill, of Bucyrus Water Treatment Plant warehouse, at upstream entry door.
L14	Left	Good	40° 48' 38"	-82° 58' 13"	14,337	982.35	Seed line on rear side of front right wheel of old wagon in front yard of house on E. Mary St.
R21	Right	Excellent	40° 48' 46"	-82° 58' 12"	14,618	981.09	Mud line on guardrail support wall, 1.41 ft above floor, inside entrance to Bucyrus Water Treatment plant, at right stairwell.
R23	Right	Good	40° 48' 55"	-82° 58' 00"	15,650	983.77	Seed line on downstream side of Waterford Glenn Office garage, 4.15 ft above ground, downstream streamward corner at Sherman and Cedar Lake.
L15	Left	Good	40° 48' 36"	-82° 57' 56"	16,326	984.46	Seed line on smallest of 3 trees, no bark, across street from 139 Hall Street
L16	Left	Good	40° 48' 43"	-82° 57' 45"	16,957	984.93	Seed line on detached shed/garage, on stream side, at house 212 Highland Ave.
L17	Left	Excellent	40° 48' 42"	-82° 57' 34"	17,521	985.30	Seed line on 10-in.-diameter crabapple tree, 10 ft from fence away from stream, behind house 1214 E. Mansfield Rd.
L18	Left	Excellent	40° 48' 49"	-82° 57' 31"	18,324	985.27	Mud line on cart path on hole #10, next to 4-ft-diameter sycamore tree next to white OB marker.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
L19	Left	Excellent	40° 48' 56"	-82° 57' 32"	19,360	985.72	Mud line on cart path on hole #11 just upstream from tee box.
L20	Left	Fair	40° 49' 08"	-82° 57' 31"	20,979	986.13	Seed/mud line on tree with crack in base upstream side of hole #13 green.
R25	Right	Good	40° 49' 14"	-82° 57' 31"	21,630	986.32	Seed line in tree overhanging dirt road at 3229 Plymouth Rd.
L21	Left	Good	40° 49' 16"	-82° 57' 59"	24,044	987.95	Seed/mud line on 24-in.-diameter tree down hill from hole #3 green.
L22	Left	Good	40° 49' 19"	-82° 57' 48"	24,888	988.45	Seed/mud line on 36-in.-diameter sycamore tree, 75 ft downstream from SR 30.
R24	Right	Good	40° 49' 22"	-82° 57' 52"	24,888	988.33	Seed line on 18-in.-diameter sycamore tree, near fenceline at SR 30, 100 ft from stream.
West unnamed tributary to Paramour Creek near Crestline, Ohio (distances referenced to a point 91 ft downstream from State Route 30)							
W1	Left	Fair	40° 47' 38"	-82° 45' 15"	156	1121.95	Seed line on tree, 2.87 ft above ground, about 60 ft streamward of mailbox for 7620 SR30 N., about 40 ft straight in from telephone pole 11008, on upstream side of road.
W2	Right	Fair	40° 47' 28"	-82° 45' 11"	947	1123.10	Seed line on tree, about 3 ft above ground, near back edge of white garage, at house behind WreckCarsOnline, near 20-ft-high dirt pile.
W4	Left	Fair	40° 47' 15"	-82° 45' 09"	2,886	1126.38	Drift/debris line on small tree, 3 ft above ground, near edge of field west of lake, near waterpark, near where powerline passes overhead, 30 ft from stream.
W5	Left	Poor	40° 47' 15"	-82° 45' 03"	3,345	1127.43	Wash line on left bank of stream on northwest corner of lake.
W3	Left	Good	40° 47' 14"	-82° 44' 52"	4,197	1130.86	Water mark, 1.97 ft above wood stake, on right side of steps leading to 324 Park Rd.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
W6	Left	Fair	40° 47' 07"	-82° 44' 49"	5,168	1132.15	Drift line on fence, 1.38 ft above ground, at end of first base line.
East unnamed tributary to Paramour Creek near Crestline, Ohio (distances referenced to a point 74 ft downstream from State Route 61/Old Field Road)							
E17	Left	Good	40° 47' 52"	-82° 44' 06"	500	1131.29	Seed line on garage door, 0.52 ft above mark on sill, near left edge of door, at south side of streamward storage unit.
E1	Right	Poor	40° 47' 43"	-82° 44' 04"	1,541	1133.38	High-water location on edge of grass/walkway in front of 107F Crestline North Apartment (reported by resident who was eyewitness).
E2	Left	Good	40° 47' 38"	-82° 44' 08"	2,031	1134.51	Seed line on north side of shed, 1.88 ft above wooden stake, at 831 Crestline St.
E3	Left	Good	40° 47' 37"	-82° 44' 07"	2,147	1134.55	Seed line on fence, 1.8 ft above wooden stake, behind house south of 831 Crestline St.
E4	Left	Fair	40° 47' 29"	-82° 44' 07"	3,201	1136.59	Seed line on picnic-table leg, 0.22 ft above wooden stake, behind 705 N. Crestline St.
E5	Left	Poor	40° 47' 25"	-82° 44' 07"	3,584	1137.69	Debris line on chain, 0.85 ft above wooden hub.
E7	Left	Poor	40° 47' 21"	-82° 44' 09"	4,031	1140.31	Debris pile near streambank near abandoned bridge behind 529 Seltzer Rd., near North St.
E6	Left	Fair	40° 47' 18"	-82° 44' 09"	4,359	1142.22	Seed line on telephone pole, 6 in. above ground, near Marathon gas station.
E8	Right	Excellent	40° 47' 07"	-82° 44' 05"	5,568	1146.39	Seed line on shed, 2.85 ft above wooden hub, at 124 N Pierce St.
E9	Right	Excellent	40° 47' 06"	-82° 44' 04"	5,655	1146.48	Seed line on shed door, 1.29 ft above wooden hub, at 118 N Pierce St.
E10	Right	Poor	40° 47' 05"	-82° 44' 05"	5,750	1146.36	Drift line on fence, 2.13 ft above ground, on corner post.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
E11	Right	Good	40° 47' 03"	-82° 43' 57"	6,530	1150.68	Seed line on garage door, 1.18 ft above ground, at 402 E. Bucyrus St.
E12	Right	Excellent	40° 47' 02"	-82° 43' 53"	6,809	1151.06	Seed line on east side of white shed, 0.92 ft above wooden hub, behind 424 E. Bucyrus St.
E13	Left	Poor	40° 47' 00"	-82° 43' 50"	7,175	1153.34	Debris line near top of bank on Law the Florest property.
E14	Left	Poor	40° 47' 04"	-82° 43' 38"	8,289	1157.16	Mark on road near west edge of driveway at 809 Bucyrus St. (identified by owner).
E15	Left	Good	40° 47' 07"	-82° 43' 36"	8,561	1158.64	Seed line on sign at front of shop of Jon's Auto Repair.
E16	Right	Excellent	40° 47' 10"	-82° 43' 35"	8,969	1158.71	Seed line on house, 3.02 ft above wooden stake, at 822 South St., left side of large front porch.
Blanchard River near Findlay, Ohio (distances referenced to a point 194 ft upstream from County Road 140)							
LB26	Left	Fair	41° 02' 45"	-83° 42' 28"	-7,624	768.52	Seed/mud line on 7-in.-diameter tree, 7 ft above ground, about 20 ft downstream from downstream right wing wall.
RB25	Right	Good	41° 03' 27"	-83° 41' 17"	-95	771.23	Mud line on slide in playground, 0.25 ft above second metal coupling holding slide, about 10.5 ft above ground, 13 steps up slide, at 10055 SR 224/15, "The Lighthouse," on slide behind picnic shelters.
LB27	Left	Excellent	41° 03' 20"	-83° 41' 09"	545	772.57	Mud line on "Adopt-A-Road" and "Environmental Awareness next 2 miles" sign, 0.01 ft below top of signpost mark on back of sign, sign on south side of road, drive heading east along river and Kohl's distribution center chain-link fence.
RB24	Right	Good	41° 03' 30"	-83° 41' 03"	1,060	772.59	Mud line on rear of Ace Hardware store, 1.10 ft above concrete floor, at 10205 SR224/15, southeast corner of building, stream side of garage doorframe.
LB28	Left	Fair	41° 03' 21"	-83° 41' 00"	1,262	772.61	Debris line on sign that reads "Kohl's Distribution Center Fence is Armed and Monitored," 5.6 ft above ground, 2.44 ft below top of chain-link fence, about 160 ft east of gravel drive, about 160 ft south of main road along chain link fence.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
RB23	Right	Excellent	41° 03' 29"	-83° 40' 55"	1,506	772.93	Mud line on south east corner of green Jeep semi trailer, 3.05 ft above wooden block under trailer, behind Chrysler dealership on SR 224/15.
LB29	Left	Excellent	41° 03' 19"	-83° 40' 44"	2,613	773.54	Mud line on south east corner of shed, 2.62 ft above bottom of corner molding, at 10566 Twp. Rd. 89, on north side of road, just west of two-car garage, just east of another shed.
RB22	Right	Fair	41° 03' 25"	-83° 40' 40"	2,793	773.65	Mud line on semi trailer next to garage, 1.80 ft above asphalt, behind house at 7650 Howard St.
LB30	Left	Good	41° 03' 13"	-83° 40' 42"	3,309	774.42	Mud line on siding, 4.63 ft above concrete, about 0.02 ft higher than bottom of siding, most southeast loading bay, about 18 ft northwest of walkthrough door.
RB21	Right	Good	41° 03' 16"	-83° 40' 29"	4,194	774.55	Mud line on yellow-sided garage, 4.43 ft above bottom of siding, at 7793 Howard St., just east of electric meter, south side of Howard St., south of Wal-Mart entrance.
LB31	Left	Good	41° 03' 13"	-83° 40' 29"	4,308	772.59	Mud line on yellow and black "<" sign, 0.05 ft below top of sign, on north side of TWP 89/S. River Rd., at the bend, just west of petroleum pipeline, 180 ft east of Coldwell Banker sign.
LB32	Left	Excellent	41° 03' 10"	-83° 40' 24"	4,920	775.04	Mud line on "Caution High Water" sign, 0.015 ft above T in water, on TWP 89/S. River Rd., north side of road; sign is facing to the east, about 180 ft west of intersection of Stanford Parkway and S. River Rd.
RB20	Right	Excellent	41° 03' 08"	-83° 40' 19"	5,327	774.97	Mud line on "HIGH WATER" sign, 0.07 ft below top of second "H," on Howard St., just downstream from I-75 bridge.
LB33	Left	Good	41° 03' 05"	-83° 40' 18"	5,498	775.21	Mud line on west red gate-support post, 0.95 ft below top of steel pipe, at south entrance of W.P.C. truck entrance, 70 ft east of I-75 overpass, about 80 ft south of River St.
RB19	Right	Excellent	41° 03' 06"	-83° 40' 08"	6,182	775.21	Mud line on southwest corner of house, 3.81 ft above bottom of siding, at 916 Howard St., near downspout.
LB34	Left	Good	41° 02' 53"	-83° 40' 06"	6,782	775.82	Mark on second crack in top of concrete-block sidewalk from front door, about 10 ft from front door of City of Findlay Water Pollution Control Center, at 1201 S. River St.
RB18	Right	Excellent	41° 03' 04"	-83° 39' 58"	6,967	775.28	Mud line on glass in doorframe of A-frame shed, 3.68 ft below top of door, behind 833 Howard St.
RB08	Right	Excellent	41° 03' 03"	-83° 39' 54"	7,281	775.37	Mud line on white vinyl doorframe, 0.87 ft above concrete-block foundation, behind 802 Broad Ave.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
LB07	Left	Poor	41° 02' 56"	-83° 39' 54"	7,453	775.14	Mud line on tree, 8.5 ft above bike-trail pavement, 110 ft downstream from Broad St. bridge.
RB09	Right	Fair	41° 02' 59"	-83° 39' 48"	7,900	775.51	Mud line on upstream center of footbridge over Howard Run, 4.25 ft above wooden deck, about 300 ft east of Broad Ave.
RB10	Right	Excellent	41° 02' 58"	-83° 39' 44"	8,075	775.50	Mud line on walk-in doorframe, 5.52 ft below top of doorframe, on doorframe of four-bay garage, past playground at River Landings Maintenance Center entrance off Broad St.
RB11	Right	Poor	41° 02' 49"	-83° 39' 36"	9,095	775.57	Mud line on small tree, 6 ft above ground, across river from Geotech grass, 50 ft northeast of bike path.
RB12	Right	Fair	41° 02' 51"	-83° 39' 26"	9,546	775.95	Mud line on inside east wall next to baseball-bat rack, 2.08 ft above concrete floor, in southwest dugout on third-base line at Swale Park baseball diamond.
LB06	Left	Fair	41° 02' 38"	-83° 39' 30"	10,105	776.35	Mud line on deck board, 0.04 ft below top of front porch deck, below mailbox at 504 River St.
RB13	Right	Excellent	41° 02' 46"	-83° 39' 18"	10,386	776.29	Mud line on metal siding, 7.15 ft below horizontal seam, 4 ft from northeast corner of northmost building at the west end of City of Findlay maintenance building on W. High St.
LB05	Left	Good	41° 02' 38"	-83° 39' 23"	10,613	776.40	Mud line on northwest corner of wooden shed, 0.22 ft below vertical brown siding, along intersection of Hurd and River St., at 430 Hurd Ave, about 40 ft east of Hurd River St. sign.
RB14	Right	Good	41° 02' 42"	-83° 39' 10"	11,100	776.39	Mud line on doorframe on walkthrough door, 0.77 ft above concrete, on City of Findlay maintenance building closest to river, at 330 N. Cory St.
LB04	Left	Excellent	41° 02' 34"	-83° 39' 17"	11,205	776.56	Mud line on northeast corner molding of house, 1.14 ft above bottom of blue vinyl siding, near garage at 111 Liberty St.
LB03	Left	Excellent	41° 02' 31"	-83° 39' 13"	11,656	777.19	Mud line on concrete-block front porch, 0.13 ft lower than bottom of vinyl siding, even with concrete porch floor, at 300 Washington St.
RB15	Right	Excellent	41° 02' 35"	-83° 39' 07"	11,939	777.18	Mud line on northeast corner of building, 4.94 ft above concrete step, 6.06 ft above sidewalk, at 133 Meeks St., on southwest corner of Meeks and Cory Sts.
LB02	Left	Good	41° 02' 31"	-83° 39' 07"	12,002	777.22	Mud line on upstream left wing wall, 2 ft upstream from upstream side of N. Cory St. bridge, near intersection of N. Cory St. and Washington St.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
RB16	Right	Excellent	41° 02' 33"	-83° 39' 06"	12,037	777.28	Mud line on southeast corner of building, 4.29 ft above bottom of siding, 2 ft south of electric meter, at 131 N. Cory St.
LB01	Left	Good	41° 02' 27"	-83° 39' 03"	12,352	777.51	Mud line on PVC downspout, 1.03 ft above asphalt, 8 ft northeast of Campbell, Inc. door, behind 104 S. Main St.
RB17	Right	Good	41° 02' 31"	-83° 39' 00"	12,621	777.41	Mud line on right doorframe, 2.13 ft above gray doorstep, on building closest to upstream right side of Main St. bridge, at 115 ½ Main St.
112	Right	Excellent	41° 02' 33"	-83° 39' 00"	12,621	777.35	Mud line on left side doorframe, 3.76 above concrete, at 131 N. Main St.
100	Left	Excellent	41° 02' 27"	-83° 38' 59"	12,679	777.70	Mud line on the Sign Shack, 2.65 ft above ground.
101	Left	Excellent	41° 02' 28"	-83° 38' 57"	12,806	776.38	Mud line on inside of door to stone-block pumphouse, 3.12 ft above door threshold.
111	Right	Excellent	41° 02' 34"	-83° 38' 55"	13,028	777.81	Mud line on left side of garage doorframe, 4.74 ft above ground, north side, at 135 Clinton St.
102	Left	Excellent	41° 02' 26"	-83° 38' 53"	13,120	777.83	Mud line on right edge of window, 4.05 ft above ground, at south side of Direct TV building.
103	Left	Excellent	41° 02' 27"	-83° 38' 49"	13,448	777.86	Mud line on side garage door, 4.88 ft above ground, on north side of MCS Industrial Solutions building.
110	Right	Excellent	41° 02' 33"	-83° 38' 45"	13,703	778.00	Mud line on eaves drain, 4.22 ft above ground, on east side of Community Action Commission building.
105	Left	Excellent	41° 02' 23"	-83° 38' 48"	13,774	778.19	Mud line on right side door, 5.28 ft above ground, on south side of recreation department building.
104	Left	Excellent	41° 02' 23"	-83° 38' 47"	13,800	777.98	Mud line on corner of building, 5.72 ft above ground, on east side of recreation department building.
109	Right	Excellent	41° 02' 35"	-83° 38' 40"	13,939	777.14	Mud line on wall buttress, 2.95 ft above ground, at east side of white building, northwest corner of Clinton Ct. and Factory St.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
106	Left	Excellent	41° 02' 21"	-83° 38' 42"	14,324	778.29	Mud line on right side of right window frame, 5.39 ft above windowsill, on south side of La Riche used car lot.
108	Right	Excellent	41° 02' 33"	-83° 38' 32"	14,831	778.58	Mud line on right-side doorframe, 1.95 ft above ground, east side of City of Findlay Plumbing Department building.
107	Left	Excellent	41° 02' 21"	-83° 38' 31"	14,831	778.51	Mud line on metal siding, 4.77 ft above ground, on east side of west building of Findlay Central Storage, at 465 E. Main Cross St.
120	Left	Good	41° 02' 23"	-83° 38' 26"	15,219	778.53	Mud line on left doorframe of north garage door, 5.57 ft above ground, at 507 Sandusky St.
113	Right	Excellent	41° 02' 30"	-83° 38' 22"	15,590	778.64	Mud line on left edge of window, 3.68 ft above sill, on north side of 539 Cross Ave.
119	Left	Excellent	41° 02' 26"	-83° 38' 16"	15,958	778.34	Mud line on northwest corner on downspout, 5.27 ft above gravel, at 625 Sandusky St.
118	Left	Excellent	41° 02' 27"	-83° 38' 07"	16,675	778.87	Mud line on doorframe, 2.62 ft above step, on east side of garage, at 801 Sandusky St.
114	Right	Excellent	41° 02' 32"	-83° 38' 08"	16,740	778.78	Mud line on east side of blue shed, 1.81 ft above trim, behind 705 Clinton Ct.
116	Right	Poor	41° 02' 33"	-83° 38' 02"	17,159	778.86	Mud line on right side of basement window, 2.73 ft above ground, east side of 131 Carnahan Ave.
117	Left	Good	41° 02' 28"	-83° 38' 01"	17,195	778.93	Seed line on southwest-corner downspout, 2.43 ft above ground, at 845 Sandusky St.
115	Right	Good	41° 02' 33"	-83° 38' 01"	17,223	778.86	Seed line on northeast-corner pillar of picnic shelter #2, 0.88 ft above wall, behind 131 Carnahan Ave.
127	Left	Excellent	41° 02' 28"	-83° 37' 51"	17,901	778.77	Mud line on northwest-corner downspout, 1.63 ft above ground, at 923 E. Main Cross St.
121	Right	Good	41° 02' 38"	-83° 37' 49"	18,690	779.10	Seed line on deck, 4.18 ft above ground, next to third guardrail support, at Riverside Landings boat livery.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
122	Right	Fair	41° 02' 42"	-83° 37' 47"	18,800	779.06	Seed line on wooden restraining wall, 1.75 ft above ground, at scenic overlook.
LB41	Left	Good	41° 02' 34"	-83° 37' 43"	19,071	779.20	Mud line on first bollard in roundabout drive, 1.80 ft above concrete sidewalk, at 1000 E. Main Cross St., southeast of Riverview State Farm sign.
126	Left	Good	41° 02' 27"	-83° 37' 32"	20,136	779.17	Mud line on left garage doorframe, 1.61 ft above ground, at 1315 E. Main Cross St.
RB42	Right	NR	41° 02' 39"	-83° 37' 32"	20,158	779.30	Mud line on sixth vertical I-beam support on upstream side of bridge, 4.7 ft below wooden rail, on golf course.
123	Left	Good	41° 02' 40"	-83° 37' 24"	21,243	779.17	Mud line on 13th guardrail support from left bank downstream edge of bridge
125	Left	Good	41° 02' 27"	-83° 37' 21"	22,539	779.17	Mud line on left doorframe of left door, 0.4 ft below top, at 1434 E. Main Cross St.
124	Left	Poor	41° 02' 22"	-83° 37' 08"	23,573	778.92	Seed line on speed-limit signpost, 4.74 ft above ground, across road from 1535 E. Main Cross St.
128	Left	Poor	41° 02' 14"	-83° 36' 40"	25,825	780.28	Seed line on left doorframe of garage, 0.37 ft above ground.
129	Right	Poor	41° 02' 24"	-83° 36' 33"	26,754	780.80	Mud line on black walnut tree, 4.01 ft above ground, between 1979 and 1989 Old Mill St.
130	Right	Excellent	41° 02' 28"	-83° 36' 18"	27,891	780.96	Mud line on screen of gazebo, 3.50 ft above sill, behind 407 Lynshire Ln.
131	Right	Fair	41° 02' 23"	-83° 36' 11"	28,462	781.63	Seed line on top stone step, 0.41 ft above second step of patio, behind 401 Scarlet Oak Dr.
132	Right	Excellent	41° 02' 17"	-83° 35' 59"	29,731	781.51	Seed line on northeast corner of shed, 2.62 ft above ground, behind 2209 Honeytree Ct.
LB35	Left	Good	41° 02' 12"	-83° 35' 52"	30,607	781.82	Seed/mud line on low steel of SR 568 bridge, 0.85 ft below bottom of concrete deck of bridge, 1.70 ft above low steel, near left upstream abutment, just west of State of Ohio plate on low steel.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
LB36	Left	Good	41° 02' 06"	-83° 35' 39"	31,507	782.16	Seed line on concrete block, 0.76 ft below white wooden siding of barn, at 9056 Twp Rd. 208, about 16 ft east of large sliding door.
133	Right	Excellent	41° 02' 16"	-83° 35' 37"	31,672	782.00	Mud line on northwest corner door, 1.59 ft above threshold, at Riverside Railroad Co. Hancock Historical Museum.
143	Left	Good	41° 02' 08"	-83° 35' 30"	32,288	782.39	Seed line on left doorframe of small concrete-block shed, 2.13 ft above ground.
134	Right	Excellent	41° 02' 08"	-83° 35' 27"	32,583	782.35	Seed line on northwest side of gas-well shed, 3.16 ft above ground, behind 15145 SR 568.
142	Left	Poor	41° 02' 04"	-83° 35' 14"	33,570	782.90	Seed line on tree, about 6 ft above ground.
135	Right	Poor	41° 02' 10"	-83° 35' 09"	33,998	783.11	Mud line on northeast door of barn, 1.86 ft above ground, at 15377 SR 568.
141	Left	Excellent	41° 02' 00"	-83° 35' 00"	36,655	784.62	Seed line on concrete wall, 0.96 ft below concrete overhang, at water-intake structure for Findlay Reservoir, 7 ft north of southwest corner.
140	Left	Fair	41° 01' 59"	-83° 34' 22"	37,743	785.61	Observed mark on road surface in middle of Twp Rd. 208, 105 ft west of 16067 Twp Rd. 208.
139	Left	Fair	41° 01' 59"	-83° 34' 17"	38,202	785.75	Observed mark on ground in middle of driveway at 16115 Twp Rd. 208.
RB40	Right	Excellent	41° 02' 11"	-83° 34' 00"	39,537	786.47	Seed/mud line purple-martin birdhouse support, 5.22 ft below bottom of birdhouse, on east edge, by driveway of 16314 SR 568, 60 ft east of edge of driveway.
RB37	Right	Good	41° 02' 10"	-83° 34' 00"	39,569	781.37	Seed/mud line on northwest concrete face of box culvert, 4.10 ft below top of culvert headwall, on north side of SR 568, 50 ft east of 16314 mailbox.
RB38	Right	Good	41° 02' 10"	-83° 34' 00"	39,569	785.18	Seed/mud line on northwest concrete face of box culvert, 0.28 ft below top of culvert headwall, on north side of SR 568, 50 ft east of 16314 mailbox.
RB39	Right	Good	41° 02' 11"	-83° 34' 00"	39,569	785.43	Mud line on orange right-of-way boundary marker, 1.26 ft below top, on north side of north end of concrete headwall.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
137	Left	Good	41° 02' 03"	-83° 33' 58"	39,747	786.49	Seed line on left side sliding-door frame, 1.79 ft above concrete block, on back of red barn.
138	Left	Excellent	41° 02' 03"	-83° 33' 58"	39,747	786.57	Seed line on right side of open doorframe, 2.35 ft above ground, on front of red barn.
136	Left	Fair	41° 02' 00"	-83° 33' 51"	40,316	786.56	Mud line on north side signpost, 1.18 ft above ground, on Meadow Trail.
Plum Creek near Columbus Grove, Ohio (distances referenced to a point 205 ft downstream of Township Road 11)							
RB11	Right	Good	40° 55' 45"	-84° 04' 19"	227	754.63	Seed/mud line on telephone pole, on upstream right bank from Road 11 bridge, 20 ft northeast on northmost guardrail.
LB10	Left	Excellent	40° 55' 42"	-84° 04' 10"	1,111	755.70	Seed line on 1.2-ft-diameter tree, 5.4 ft above ground, in far rear vacant lot, between 803 and 804 Sunny Day Dr.
LB09	Left	Good	40° 55' 41"	-84° 04' 07"	1,535	756.23	Seed/mud line on northwest corner of small gray wooden shed, 2.04 ft above concrete block, at far northwest corner of 302 Linwood Dr. property.
LB08	Left	Fair	40° 55' 36"	-84° 03' 56"	3,212	757.58	Debris line on 6-in.-diameter tree with large thorns, 4.2 ft above ground, behind vacant lot, between 204 & 205 Briarwood Ct.
LB07	Left	Fair	40° 55' 35"	-84° 03' 53"	3,519	758.09	Debris line on small tree, 3.28 ft above ground, 12 ft northwest of bird feeder, 4 ft northwest of white bench, behind 211 Timber Creek Ct.
RB12	Right	Good	40° 55' 32"	-84° 03' 48"	4,099	761.31	Seed line on 10th post north of southwest corner of chain-link fence, 2.02 ft below bottom of barbed wire, near southwest corner of Sewage Treatment Plant.
LB06	Left	Good	40° 55' 30"	-84° 03' 50"	4,099	759.05	Debris line on 8-in.-diameter tree with three trunks, just east of mulch bed, in tiger lily bed, behind 227 Willow Bend Dr.
LB05	Left	Good	40° 55' 25"	-84° 03' 46"	4,642	760.40	Observed mark at seam in concrete drive, south side of central drive, 4.8 ft east of mulch bed, at 526 Wayne St.
LB04	Left	Fair	40° 55' 24"	-84° 03' 42"	5,024	759.95	Observed mark at ground level, northwest of corner of yard, just southwest of northernmost fencepost of split rail fence, behind 509 Wayne St.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
RB13	Right	Fair	40° 55' 22"	-84° 03' 40"	5,319	760.61	Mud/debris line on the third of a group six pine trees, 2.8 ft above ground along the channel bank, behind lot of Indian Trail landscape.
RB03	Right	Excellent	40° 55' 17"	-84° 03' 34"	5,958	761.51	Mud line on southeast corner of southmost greenhouse, 1.61 ft above bottom of corner molding, at Indian Trail landscape, just west of SR 65.
LB02	Left	Excellent	40° 55' 16"	-84° 03' 36"	6,129	761.38	Mud line on northeast corner of garage, 0.34 ft above bottom of corner molding, north face of molding, across street from 314 W. Sycamore St.
LB01	Left	Good	40° 55' 13"	-84° 03' 37"	6,446	762.35	Mud line on garage overhead door frame, 1.84 ft above concrete slab, northwest corner of garage, at 314 W. Sycamore St.
LB14	Left	Good	40° 55' 12"	-84° 03' 38"	6,630	762.60	Mud line on metal frame to sliding door, 0.76 ft above concrete, southwest corner of sunroom, south side of 104 Glancy St.
RB27	Right	Good	40° 55' 10"	-84° 03' 40"	6,831	762.72	Seed line on tree, about 6 ft west of west edge of driveway, in line with center of large two-car garage overhead door, at 111 West St.
LB15	Left	Good	40° 55' 10"	-84° 03' 41"	6,909	763.13	Seed line on downstream low steel, 0.08 ft above low steel, 0.97 ft below side walk, of West St. bridge.
RB16	Right	Excellent	40° 55' 09"	-84° 03' 40"	6,980	763.09	Seed line on north side of house, 1.19 ft above bottom of siding, behind large bushes, 5.5 ft from northwest corner of house, at 110 West St.
LB17	Left	Good	40° 55' 04"	-84° 03' 45"	7,611	763.25	Observed mark in center of road, 20 ft south of mailbox #203, at 203 Alna Dr.
LB18	Left	Excellent	40° 54' 59"	-84° 03' 50"	8,173	763.72	Seed line on southwest corner of shed, 2.13 ft above bottom of corner molding, shed behind dog kennel, behind 500 Pine St.
RB19	Right	Excellent	40° 54' 55"	-84° 03' 49"	8,675	763.93	Seed line on downstream right abutment, 0.54 ft below top of abutment, of Delphos Rd. bridge.
LB20	Left	Excellent	40° 54' 50"	-84° 03' 54"	9,404	764.87	Seed line on metal siding, 0.74 ft above bottom of corner molding, south face of southeast corner of white metal shed, behind 308 Delphos Rd.
RB26	Right	Fair	40° 54' 48"	-84° 03' 52"	9,475	765.14	Seed line on 5-in.-diameter thorny tree on channel bank, northwest of northwest corner of house at 707 Veterans Dr.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
LB21	Left	Poor	40° 54' 48"	-84° 04' 02"	10,395	767.75	Observed mark in grass, 54 ft southeast of telephone/light pole, 66 ft southwest of neighbor's split-rail fence, in line with and 120 ft southeast of southeast corner of house, behind 10735 Delphos Rd.
RB24	Right	Poor	40° 54' 36"	-84° 04' 20"	12,414	768.21	Seed/debris line on a 1.2-ft-diameter dead stag tree, 4.4 ft above ground, at top of right bank, 90 ft northeast of tree stand.
LB23	Left	Poor	40° 54' 36"	-84° 04' 26"	12,856	768.18	Mud line on 2 ft by 4 ft wooden sign post, 0.97 ft below top of sign, northeast post.
RB25	Right	Fair	40° 54' 30"	-84° 04' 31"	13,635	768.95	Seed line on southeast side of a 1.0-ft-diameter tree, about 25 ft northwest of a cluster of three pine trees.
RB22	Right	Fair	40° 54' 25"	-84° 04' 41"	15,078	769.69	Seed line on downstream wooden guardrail support post, southeastmost wooden post, of Road 11R bridge.
Blanchard River near Ottawa, Ohio (distances referenced to a point 150 ft downstream of Township Road I-9/Blanchard Avenue)							
LB17	Left	Fair	41° 01' 49"	-84° 04' 08"	313	727.30	Mud/debris line on left bank, near 1-in.-diameter ash and 2-in.-diameter apple trees, 5 ft from mowed grass edge, about 80 ft upstream from Blanchard Rd. bridge.
RB14	Right	Poor	41° 01' 50"	-84° 04' 07"	313	727.29	Mud/debris line on right bank, 10 ft upstream from road edge, 15 ft landward from abutment of Blanchard Rd. bridge.
RB13	Right	Fair	41° 02' 05"	-84° 03' 48"	1,595	728.03	Seed line on tree, 6.7 ft above ground, about 50 ft streamward from edge of road, at bend in Blanchard Rd.
RB12	Right	Fair	41° 01' 52"	-84° 03' 21"	3,576	728.59	Seed line on tree, 6.5 ft above ground, behind STP, between river and chain link fence, about 45 ft downstream of second yellow well casing, at back edge of property.
RB11	Right	Fair	41° 01' 43"	-84° 02' 58"	5,057	728.25	Seed line on tree, 6.3 ft above ground, behind Ohio Farmer's Union, between stream and parking lot.
LB15	Left	Fair	41° 01' 23"	-84° 03' 38"	5,057	728.70	Mud/debris on northeast corner post of chain-link fence around transmission tower, 2.95 ft above ground, behind Stonehenge Apartment complex on Riverview Dr.
LB16	Left	Fair	41° 01' 33"	-84° 03' 24"	NA ³	NA ³	Mud line on multistemmed mulberry tree, 5.6 ft above ground, 10 ft from field edge, about 1,200 ft northeast of LB15.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
RB10	Right	Fair	41° 01' 32"	-84° 02' 58"	6,292	728.51	Seed line on tree, 4.5 ft above ground, about 50 ft streamward from McDonald's parking lot (near dumpster).
LB14	Left	Fair	41° 01' 13"	-84° 03' 38"	7,687	728.77	Mud/debris line of 3-in.-diameter sugar maple, 5.85 ft above ground, about 30 ft from river, 20 ft behind log pile, on yard edge for 210 Ottawa-Glandorf Rd.
RB09	Right	Good	41° 01' 13"	-84° 03' 14"	7,687	727.06	Mud line on left side garage door of white garage by road, 3.7 ft above ground, at 172 Third St., upstream side of garage.
LB13	Left	Good	41° 01' 10"	-84° 03' 28"	7,982	728.88	Mud line on yellow fiberglass wall panel, 3.7 ft above ground, on back (north side) of abandoned shop building, north side of SR 224, west of bridge over Blanchard.
LB12	Left	Fair	41° 01' 07"	-84° 03' 27"	8,296	726.93	Mud line on 12-in.-diameter hackberry tree, 5.1 ft above ground, about 100 ft upstream from SR 224 bridge, at edge of Sts. Peter & Paul Cemetery, 5 ft down slope from mowed lawn.
LB11	Left	Fair	41° 01' 02"	-84° 03' 23"	8,884	728.90	Mud line on 6-in.-diameter elm tree, 2.8 ft above ground, at far northeast corner of Sts. Peter & Paul Cemetery, near edge of dropoff, about 100 ft north of "Lammers" grave.
LB09	Left	Fair	41° 00' 53"	-84° 03' 15"	9,769	729.20	Mud line on base of 12-in.-diameter elm tree, 1.0 ft above ground, 10 ft beyond concrete piles behind westernmost storage building along river.
LB10	Left	Good	41° 00' 54"	-84° 03' 05"	10,320	729.21	Mud line on black air conditioner unit, about 5 ft above ground, 1.1 ft above concrete base, at northeast corner of 406 Blanchard St.
RB08	Right	Good	41° 01' 04"	-84° 03' 02"	10,320	729.19	Mud line on downstream side of white garage by window, about 5.5 ft above ground, first house downstream from bridge, at 315 Second St.
LB08	Left	Fair	41° 00' 57"	-84° 02' 59"	10,704	728.32	Debris line on 5-in.-diameter boxelder, 5.25 ft above ground, about 80 ft into woods from edge of mowed highway embankment, on east side of SR 65.
LB07	Left	Fair	41° 00' 59"	-84° 02' 49"	11,418	727.71	Mud line on rock, about 8 ft from southeast end of bridge rail.
RB07A	Right	Good	41° 01' 02"	-84° 02' 45"	NA ³	NA ³	Mud line on green vertical steel rack, 2.1 ft above ground, 15 ft from staff gage behind county garage building B, on E. Second St., east of S. Oak St.
RB07B	Right	Good	41° 01' 03"	-84° 02' 43"	11,822	730.28	Mud line on right side of east door entrance frame, 1.55 ft above ground, at building B of county garage on E. Second St., east of S. Oak St.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
RB06	Right	Good	41° 01' 03"	-84° 02' 34"	12,252	729.77	Mud line on door of white shed, 6.1 ft above ground, northwest corner, behind new gray house (no address) on E. Second St., near S. Cox St.
LB06	Left	Fair	41° 00' 37"	-84° 02' 34"	13,242	730.28	Debris line on 6-in.-diameter hackberry tree, 2.1 ft above ground, 20 ft from stream on steep bank, about 60 ft from road, west of Sugar Mill Dr. and E. Williamstown Rd. intersection.
RB05	Right	Good	41° 00' 56"	-84° 02' 21"	13,881	730.26	Mud line on doorstop inside garage at 375 S. Thomas St.
LB05	Left	Good	41° 00' 31"	-84° 02' 12"	14,755	730.68	Mud line on signpost, 2.7 ft above ground, "Steel Technologies" receiving signpost, near road.
RB04	Right	Fair	41° 01' 01"	-84° 02' 05"	15,484	730.29	Seed line in tree, 5.5 ft above ground, 75 ft upstream from railroad bridge.
RB03	Right	Poor	41° 00' 53"	-84° 01' 34"	17,353	731.01	Seed line in tree, 3 ft above ground, behind fairgrounds, 100 ft downstream of end of Gate 1 drive.
LB04	Left	Fair	41° 00' 29"	-84° 01' 52"	17,353	730.45	Debris on 8-in.-diameter locust tree, 4.0 ft above ground, at northwest corner of grove, about 70 ft from gravel access drive, 10 ft from plowed field, off K-6 Rd.
LB03	Left	Fair	41° 00' 22"	-84° 01' 27"	19,075	730.72	Debris line of 3-in.-diameter hackberry tree, 1.0 ft above ground, on top of bank, about 30 ft from stream, about 60 ft from road edge.
RB02	Right	Fair	41° 00' 41"	-84° 01' 19"	19,788	730.40	Seed line on tree, 8 ft above ground, just downstream of small box culvert, about 200 ft upstream from small brick building.
LB02	Left	Fair	41° 00' 35"	-84° 01' 12"	20,021	731.45	Debris line on 4-in.-diameter walnut tree, 3.0 ft above ground, on edge of field, about 180 ft upslope from corner of woods.
RB01	Right	Fair	41° 00' 46"	-84° 00' 56"	21,531	731.36	Debris line on ground, about 12 ft downstream from road edge, 10 ft landward from bridge abutment.
LB01	Left	Fair	41° 00' 43"	-84° 00' 56"	21,531	731.47	Debris/mud line on ground, 10 ft from guardrail, 30 ft south of utility pole #153213D, near left downstream abutment.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
Rocky Fork Mohican River near Mansfield, Ohio (distances referenced to a point 237 ft downstream of State Route 39 / Lucas Road)							
RB32	Right	Good	41° 44' 27"	-82° 27' 45"	271	1,127.37	Seed/mud line, on upstream right abutment, 2.4 ft below low concrete, at SR 39 bridge.
RB29	Right	Poor	41° 44' 43"	-82° 28' 38"	5,067	1,133.98	Mud line on V-shaped tree, 0.4 ft above ground, along sludge field service road of Sewage Treatment Plant.
LB31	Left	Fair	41° 44' 59"	-82° 28' 44"	6,574	1,134.75	Mud line in poison-ivy-covered beech tree, 0.55 ft above ground, across from mailbox #1039 Hickory Ln., southeast of drive, 7 ft southeast of most southeast fencepost.
RB28	Right	Good	41° 44' 53"	-82° 28' 56"	6,850	1,135.07	Mud line on vertical fence post, 2.36 ft below bottom of barbed wire fence bracket, at Sewage Treatment Plant, 5 ft west of bushy, multitrunk tree.
LB30	Left	Fair	41° 45' 04"	-82° 28' 57"	7,628	1,135.41	Mud line on 3-ft-diameter oak tree, 0.7 ft above ground, 6 ft west of west edge of drive, halfway between edge of drive and house, at 932 Hickory Ln.
LB26	Left	Excellent	41° 45' 04"	-82° 29' 03"	8,057	1,136.36	Mud line on downstream left abutment, 0.6 ft lower than top of concrete, 4.5 ft north of edge of abutment, at Illinois Ave. bridge.
LB27	Left	Excellent	41° 45' 04"	-82° 29' 04"	8,104	1,136.56	Mud line on upstream left wing wall, 0.36 ft below top of wing wall, northwest corner of wing wall, at Illinois Ave. bridge.
RB22	Right	Excellent	41° 45' 02"	-82° 29' 10"	8,629	1,136.98	Mud line on left side loading bay #10, 2.35 ft above concrete drive, beside downspout at northwest corner of Smurfit-Stone building.
RB21	Right	Fair	41° 45' 02"	-82° 29' 16"	8,966	1,137.45	Mud line on 2-ft-diameter cottonwood tree, 1.5 ft above ground, northwest corner of gravel lot, 60 ft west of west edge of Smurfit-Stone lot on Illinois Ave.
LB25	Left	Excellent	41° 45' 07"	-82° 29' 23"	9,672	1,138.05	Mud line on 2.5-ft-diameter cottonwood tree, 4.1 ft above ground, along rear of lot, southeast of white school bus, at Tucker Bros. Auto Wrecking.
LB24	Left	Excellent	41° 45' 20"	-82° 29' 38"	11,615	1,141.00	Mud line on fencepost, 3.46 ft above bottom horizontal pipe, 40 ft northeast of easternmost dugout, at St. Peters Spartans ball field.
LB23	Left	Good	41° 45' 25"	-82° 29' 47"	12,365	1,141.04	Mud line on west face of blue metal-sided building, 1.52 ft above bottom of siding, southwest corner of building, 5.7 ft north of southernmost garage bay.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
RB20	Right	Good	41° 45' 25"	-82° 29' 50"	12,557	1,141.09	Mud line on fourth guardrail post northwest, 1.03 ft above ground, southeast corner of parking lot, east edge of blacktop, at City of Mansfield Maintenance Area.
RB19	Right	Good	41° 45' 28"	-82° 29' 54"	12,995	1,141.71	Mud line on a V-shaped locust tree, 1.03 ft above ground, about 50 ft downstream from Park Ave. East bridge.
RB18	Right	Excellent	41° 45' 36"	-82° 29' 59"	13,881	1,142.71	Mud line on third fencepost northwest, 2.13 ft below bottom of barbed wire bracket, most southeast corner of fence, at outer fenced area of the National Guard.
RB13	Right	Fair	41° 45' 42"	-82° 30' 02"	14,589	1,142.72	Mud line on upstream right wing wall, 2.35 ft below bottom of concrete deck, 0.12 ft above concrete abutment, of SR 42 bridge.
LB14	Left	Excellent	41° 45' 49"	-82° 30' 08"	15,307	1,143.76	Mud line on 6-in.-diameter metal pipe, 0.39 ft below top of pipe, between third-baseline bleachers, south of semi trailers, at Tappen ballpark, off Laird Ave.
RB12	Right	Excellent	41° 45' 44"	-82° 30' 14"	15,581	1,143.81	Mud line on right door frame, 1.8 ft above concrete, far east side of glass front doors, at 320 E. Fifth St. (SR 39), Smoke Less America.
LB15	Left	Excellent	41° 45' 49"	-82° 30' 13"	15,654	1,143.82	Mud line on east face of galvanized steel siding, 0.58 ft above top of steel threshold, near southeast corner of building, just south of Laird Ave.
LB16	Left	Excellent	41° 45' 50"	-82° 30' 18"	16,100	1,144.29	Mud line on concrete porch, 1.1 ft below top of concrete step by red walkthrough door, near southeast corner of red brick building, at 200 Wayne St.
RB11	Right	Good	41° 45' 50"	-82° 30' 23"	16,373	1,144.78	Seed/mud line on northeast face of concrete drop box or sewer box, near downstream right abutment of Wayne St. bridge.
RB09	Right	Good	41° 45' 52"	-82° 30' 29"	16,949	1,145.87	Seed line on downstream right abutment, 1.99 ft above low concrete, 2.33 ft below top of concrete bridge rail, at Newman St. bridge.
LB17	Left	Fair	41° 45' 54"	-82° 30' 28"	16,949	1,145.26	Mud line on foundation stone, 1.68 ft above ground, in rear of white concrete-block auto-repair building, at 250 Newman St.
RB10	Right	Excellent	41° 45' 52"	-82° 30' 30"	17,031	1,146.17	Seed/mud line on white metal building, 1.33 ft above bottom of siding, northeast corner, southeast of Schneider's Bakery.
RB07	Right	Excellent	41° 45' 55"	-82° 30' 34"	17,376	1,146.16	Seed line on downstream right wing wall, 1.06 ft above top of concrete footing, 6.11 ft below top of wing wall, 7.5 ft downstream of abutment, at Orange St. bridge.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
RB08	Right	Excellent	41° 46' 00"	-82° 30' 37"	17,913	1,147.26	Mud line on most northeast set of concrete steps, 0.61 ft below top of concrete platform, northeast corner of northernmost building of Timber Roots Co., at 143 Orange St.
RB06	Right	Excellent	41° 46' 04"	-82° 30' 37"	18,252	1,147.41	Mud line on east side of doorframe, 1.06 ft above bottom of walkthrough door, on southwest corner of building.
RB05	Right	Excellent	41° 46' 11"	-82° 30' 36"	18,983	1,148.06	Seed/mud line on concrete block, 0.92 ft above steel flange, on west side of easternmost loading dock at Shellmer Assemblies.
RB04	Right	Fair	41° 46' 17"	-82° 30' 36"	19,606	1,148.60	Mud/drift line on wooden support beams, downstream side of old railroad bridge, 20 ft west of concrete abutment, 20 ft downstream from tracks.
RB03	Right	Excellent	41° 46' 14"	-82° 30' 39"	19,678	1,150.08	Seed/mud line on southeast corner of beige metal building, 0.47 ft above bottom of corner siding, at C&P Manufacturing Adventure Trailers.
RB02	Right	Excellent	41° 46' 24"	-82° 30' 46"	20,679	1,149.97	Mud line on northwest corner of red metal shed, 0.66 ft above concrete floor, near stream at Citation Mansfield lot.
LB01	Left	Excellent	41° 46' 29"	-82° 30' 49"	21,364	1,150.34	Mud line on south side of fuel tank #1993, 3.63 ft above steel floor, 2.66 ft below top of tank, in Kokosing lot at 606 Main St. (SR 13).
100	Right	Good	41° 46' 28"	-82° 30' 52"	21,364	1,150.30	Seed line on back of guardrail, 1.99 ft above ground, between second and third post from right abutment, upstream right side of SR 13 bridge.
101	Left	Excellent	41° 46' 33"	-82° 30' 52"	21,830	1,150.96	Seed line on metal siding, 2.52 ft above ground, in alcove on east side of Moritz International, Inc. (trailers) building.
103	Right	Excellent	41° 46' 37"	-82° 31' 00"	22,346	1,150.50	Mud line on inside left wall of entrance, 1.55 ft above ground, at Longview Metal Recycling, Inc., at 57 W. Longview Ave.
102	Left	Excellent	41° 46' 37"	-82° 30' 54"	22,417	1,150.46	Seed line on right garage doorframe, 2.57 ft above ground, south side of D&S Distribution.
104	Right	Good	41° 46' 39"	-82° 31' 02"	22,627	1,150.56	Mud line on northwest corner roof support, 1.14 ft above ground, on Custom Control Technologies building, at 60 W. Longview Ave.
115	Left	Excellent	41° 46' 41"	-82° 30' 51"	22,751	1,150.60	Mud line on concrete pier, 4.91 ft above ground, on south side of southwest pier of U.S. 30 bridge over southbound SR 13.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
114	Left	Excellent	41° 46' 43"	-82° 30' 51"	22,962	1,150.58	Mud line on concrete pier, 4.76 ft above ground, on north side of northwest pier of U.S. 30 bridge over southbound SR 13.
105	Right	Poor	41° 46' 49"	-82° 31' 09"	23,875	1,150.49	Mud line on ground, 9.5 ft east of east rail of railroad, about 850 ft upstream from SR 30.
113	Left	Excellent	41° 46' 55"	-82° 30' 51"	23,984	1,150.69	Mud line on concrete wall, 1.37 ft above ground, east side of north steps to Empire Affiliates (credit union).
112	Left	Excellent	41° 46' 56"	-82° 30' 57"	24,199	1,150.75	Mud line on white handrail for steps, 3.1 ft above ground, of a playset at south end of ballpark.
106	Right	Poor	41° 46' 56"	-82° 31' 12"	24,613	1,150.75	Mud line on north side of tree, 0.5 ft above rail, east side of railroad tracks.
111	Left	Excellent	41° 47' 00"	-82° 30' 59"	24,749	1,150.80	Seed line on metal siding, 4.03 ft above ground, on northwest corner of white metal shed at ballpark.
107	Right	Good	41° 47' 07"	-82° 31' 16"	25,724	1,150.98	Seed line on siding, 1.24 ft above ground, on north side of tan shed at Mansfield Railyard, north of control tower.
108	Right	Poor	41° 47' 16"	-82° 31' 21"	26,700	1,151.38	Seed line on west side of large maple tree, 4.1 ft above ground.
109	Right	Fair	41° 47' 22"	-82° 31' 24"	27,378	1,151.81	Oil line on culvert headwall, 1.18 ft from top, north side of east end of culvert.
110	Right	Fair	41° 47' 35"	-82° 31' 32"	28,858	1,154.27	Mud line on south side of telephone pole, 1.9 ft above ground, south of AK Steel access road.
122	Left	Good	41° 47' 39"	-82° 31' 50"	30,568	1,157.84	Mud line on east side of old brown booth, 2.9 ft above ground, in middle of scrub field.
121	Left	Excellent	41° 47' 46"	-82° 31' 54"	31,462	1,158.43	Mud line at southeast corner of brown block building, 1 ft above ground, at Safe Guard gravel plant.
119	Left	Excellent	41° 47' 49"	-82° 31' 58"	32,127	1,158.71	Mud line on right windowframe, 0.80 ft above windowsill, of north window of Omnisource on Bowman Rd.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
120	Left	Poor	41° 47' 49"	-82° 32' 07"	32,453	1,158.88	Seed line on northern side of tree, 4.5 ft above ground, on upstream left bank of railroad bridge.
118	Left	Good	41° 47' 56"	-82° 32' 14"	33,471	1,159.66	Mud line on western side of black and yellow caution sign 3.34 ft above ground, for Wilging Rd bridge.
116	Left	Fair	41° 48' 00"	-82° 32' 18"	34,082	1,160.49	Mud line on board nailed to tree, 5 ft above ground, 180 ft downstream from bridge.
117	Left	Fair	41° 48' 01"	-82° 32' 22"	34,434	1,161.09	Seed line on southwestern side of tree, 5 ft above ground, 180 ft upstream from bridge side.
Touby Run near Mansfield, Ohio (distances referenced to mouth at confluence with Rocky Fork Mohican River)							
LT01	Left	Good	40° 46' 17"	-82° 30' 39"	148	1149.24	Mud line on 4-in.-diameter tree, 40 ft towards stream from railroad tracks midway between bridge over Rocky Fork and power pole.
RM01	Right	Excellent	40° 46' 16"	-82° 30' 40"	289	1149.84	Mud/seed line on overhead-door frame on north side of boat trailer factory, east side of overhead door.
RM02	Right	Excellent	40° 46' 15"	-82° 30' 42"	445	1150.08	Seed line on inside north wall next to overhead door entrance to 95 Ohio Brass Rd, Mid Ohio Lumber; overhead door is on west side at northwest corner.
RM03	Right	Fair	40° 46' 14"	-82° 30' 47"	896	1150.26	Mud line on 8-in.-diameter tree, 50 ft east of railroad track, 30 ft south of stream, very close to concrete railroad bridge.
LT02	Left	Fair	40° 46' 14"	-82° 30' 48"	942	1150.01	Mud line on wing wall, on downstream side of bridge.
LT03	Left	Good	40° 46' 12"	-82° 30' 50"	1,201	1151.27	Mud/seed line on 8-in.-diameter tree, next to parking lot, near parking spot #184, 100 ft downstream from building on right bank.
RM04	Right	Excellent	40° 46' 12"	-82° 30' 50"	1,201	1151.24	Seed line on 4-in.-diameter tree, 30 ft north of brick warehouse, 15 ft east of stream, Ohio Brass warehouse.
RM05	Right	Excellent	40° 46' 09"	-82° 30' 50"	1,459	1151.37	Seed line on overhead-door frame at south entrance to Ohio Brass warehouse, 25 ft north of gazebo and concrete footbridge.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
LT04	Left	Good	40° 46' 08"	-82° 30' 51"	1,627	1151.61	Mud line on vertical post in parking lot, 0.49 ft below top of pole; pole is directly across sidewalk from black light pole; parking lot is downstream from Brass Office Center.
RM06	Right	Poor	40° 46' 05"	-82° 30' 51"	1,870	1151.90	Drift line on ground, 10 ft from stream, 80 ft downstream from bridge, 8 ft upstream from fifth tree from Ohio Brass Office.
LT05	Left	Good	40° 46' 05"	-82° 30' 52"	1,948	1152.19	Seed line on downstream side of bridge beam, 0.5 ft above abutment, near left abutment.
RM07	Right	Poor	40° 46' 04"	-82° 30' 52"	2,009	1152.23	Drift line at right upstream abutment of N. Diamond St. bridge.
LT06	Left	Poor	40° 46' 04"	-82° 30' 53"	2,046	1152.45	Drift line near upstream side of bridge midway between N. Main and SR13, 10 ft downstream on manhole cover
RM08	Right	Excellent	40° 46' 04"	-82° 30' 54"	2,096	1152.62	Seed line on downstream concrete parapet span at right abutment on N. Main St. bridge.
RM09	Right	Fair	40° 46' 04"	-82° 30' 54"	2,148	1152.74	Seed line on upstream bridge span at right abutment of N. Main St.
RM10	Right	Good	40° 46' 01"	-82° 30' 55"	2,403	1154.28	Seed line on inside of railroad guardrail at right downstream side of railroad bridge, just upstream from Main St.
RM11	Right	Good	40° 46' 01"	-82° 30' 55"	2,415	1154.36	Mud line on inside of railroad guardrail at right upstream side of railroad bridge, just upstream from Main St.
RM12	Right	Excellent	40° 46' 01"	-82° 30' 55"	2,479	1154.66	Seed line on north side of Special Touch Salon, 8 ft from northwest corner of building, at 309 N. Main St.
LT07	Left	Excellent	40° 46' 01"	-82° 30' 57"	2,632	1155.94	Mud line on stream side of rusted metal railroad building, 20 ft downstream from tracks; building has a worn "S Main" sign.
RM13	Right	Excellent	40° 45' 59"	-82° 30' 56"	2,632	1154.16	Mud line on north-facing entry door to Minnich Manufacturing, at 277 N. Main St.
RM14	Right	Excellent	40° 45' 56"	-82° 31' 02"	3,178	1158.43	Mud line on center entry door to Goettl Bros at 254 N. Mulberry St.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
LT08	Left	Good	40° 45' 57"	-82° 31' 04"	3,304	1158.67	Mud line on doorframe, about 0.05 ft above bottom door hinge, of U WASH car wash, next to gas meter.
RM15	Right	Excellent	40° 45' 55"	-82° 31' 03"	3,453	1159.14	Seed line on wall just left of entry door to H&H supply, 243 N Mulberry.
LT10	Left	Good	40° 45' 55"	-82° 31' 06"	3,562	1159.70	Mud line on downspout of gray building with red and blue stripe, southeast corner of building at 90 W. Sixth St.
LT09	Left	Excellent	40° 45' 56"	-82° 31' 07"	3,617	1160.16	Mud line on right side of loading dock, 1.38 ft above concrete, of Metzger Gleisinger company, at 100 W. Sixth St.
LT11	Left	Excellent	40° 45' 54"	-82° 31' 06"	3,721	1160.24	Seed line on beige house across W. Sixth St. from gray building; mark is above door to cellar, about even with bottom of windows.
LT14	Left	Fair	40° 45' 53"	-82° 31' 14"	4,401	1161.57	Debris line on fence; mark is on corner post of fence, 4 ft from front of building of Rable Machine.
LT12	Left	Excellent	40° 45' 52"	-82° 31' 15"	4,538	1162.86	Mud/seed line on left doorjamb, 2.82 ft above pavement, of large shed door on back of building of Rable Machine.
LT13	Left	Fair	40° 45' 52"	-82° 31' 15"	4,560	1163.30	Debris line on fence; mark is on corner post near "shipping and receiving and office" sign of Rable Machine.
LT15	Left	Poor	40° 46' 00"	-82° 31' 23"	5,725	1170.78	Seed line on upstream side of bridge, 4.92 ft below parapet, 10 ft from left edge of bridge of Bowman St.
RM16	Right	Excellent	40° 46' 03"	-82° 31' 30"	6,336	1172.92	Seed line on concrete-block stairwell just inside two-story overhead door #5 at east-facing wall of Gorman Rupp Manufacturing plant.
RM17	Right	Excellent	40° 46' 04"	-82° 31' 35"	6,785	1173.51	Mud line on north wall of Gorman Rupp building, adjacent to Hoffman Box, next to an overhead door, across from a small building with brown entry door.
LT17	Left	Poor	40° 46' 02"	-82° 31' 43"	7,724	1179.13	Debris line on fence near corner next to gasoline marker near southeast corner of back building of Gorman Rupp Pump Company.
LT16	Left	Poor	40° 46' 01"	-82° 31' 50"	8,466	1183.28	Debris line on fence at Gorman Rupp Pump Company back building, 50 ft upstream from retention basin, third post from slight corner post, in line with west edge of building.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
RM18	Right	Fair	40° 46' 02"	-82° 32' 15"	10,486	1197.52	Drift line at top of bank, 6 ft from utility pole, 90 ft upstream from octagonal shelterhouse at western end of lake at North Lake Park.
RM19	Right	Fair	40° 46' 01"	-82° 32' 24"	11,168	1202.52	Drift line on top of bank, 100 ft upstream from concrete dam and at small weir in North Lake Park.
RT90	Right	Fair	40° 45' 54"	-82° 32' 40"	12,696	1215.93	Seed line on 16-in.-diameter tree stump, about 5 ft above ground, about 100 ft downstream from concrete weir.
LT19	Left	Good	40° 45' 53"	-82° 32' 42"	12,843	1221.25	Mud/seed line on 6-in.-diameter tree leaning towards creek, about 40 ft downstream from W. Fourth St. bridge, 50 ft upstream from weir and old gage site.
LT20	Left	Fair	40° 45' 49"	-82° 32' 49"	13,502	1227.29	Seed line on 6-in.-diameter tree, 50 ft downstream from footbridge in woods.
RM20	Right	Poor	40° 45' 47"	-82° 32' 55"	14,093	1231.69	Drift/wash line, 80 ft downstream from bike-trail bridge, just below fence to Kingwood Estate.
LT21	Left	Good	40° 45' 48"	-82° 32' 56"	14,250	1236.22	Seed line on 10-in.-diameter tree, 70 ft upstream from bikepath bridge.
LT22	Left	Excellent	40° 45' 44"	-82° 33' 06"	15,174	1242.87	Seed line on stream side of left bridge pier, about 1 ft above ground, under Trimble Rd.
LT23	Left	Poor	40° 45' 35"	-82° 33' 22"	16,807	1257.03	Debris line on ground, 40 ft downstream from SR 430 bridge, 10 ft toward stream from manhole.
LT24	Left	Fair	40° 45' 21"	-82° 33' 31"	18,387	1269.15	Seed line on 6-in.-diameter tree, next to creek, 50 ft upstream from basketball court at Park Avenue West Apartment complex.
RT91	Right	Fair	40° 45' 17"	-82° 33' 50"	20,535	1283.46	Seed line on 12-in.-diameter leaning tree, 10 ft from gasoline marker, about 18 in. above ground, 15 ft upstream from driveway bridge, at 137 Alpine Dr.
LT25	Left	Excellent	40° 45' 18"	-82° 33' 50"	20,535	1283.29	Seed line on back of white barrel on stream side of driveway of 172 Alpine Dr.
RM23	Right	Fair	40° 45' 18"	-82° 33' 53"	20,801	1283.40	Mud line on base of tree, 50 ft upstream from driveway bridge to 172 Brookwood Way S.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
RM24	Right	Excellent	40° 45' 28"	-82° 34' 02"	22,464	1299.29	Mud line on streamward side of garden shed behind the house at 1426 Hardin Ave.
LM92	Left	Poor	40° 45' 30"	-82° 34' 06"	22,965	1304.02	Debris line on ground, directly across Touby Run from RM22.
RM22	Right	Poor	40° 45' 30"	-82° 34' 07"	22,965	1303.23	Debris line on ground, 75 ft below downstream end of culvert under car dealership at Home Rd. and SR 430.
LM91	Left	Excellent	40° 45' 36"	-82° 34' 15"	23,839	1327.58	Fine debris line on south-facing stone wall on building across from pizza parlor.
RM21	Right	Excellent	40° 45' 36"	-82° 34' 17"	23,941	1327.57	Seed line on north wall of East of Chicago Pizza Co. on SR 430 and Home Rd.
LM90	Left	Excellent	40° 45' 39"	-82° 34' 19"	24,323	1327.57	Seed line on utility pole 86EC2B-70, located behind 309 N. Home Rd.
Black Fork Mohican River near Shelby, Ohio (distances referenced to a point 128 ft downstream of London West Road)							
LS01	Left	Good	40° 54' 29"	-82° 39' 27"	258	1,069.55	Mud line on 3-in.-diameter tree, between house trailers 8 and 9, upstream side of tree.
RS01	Right	Excellent	40° 54' 28"	-82° 39' 16"	359	1,070.24	Seed line on utility pole 2A14 opposite red barn on Broadway St. just south of London West Rd.
LS02	Left	Excellent	40° 54' 25"	-82° 39' 26"	700	1,071.09	Seed line on vertical concrete slab, about 50 ft from creek, behind Shelby Welded Tube building.
RS02	Right	Fair	40° 54' 22"	-82° 39' 19"	954	1,071.51	Mud line on base of tree adjacent to abandoned shed about 100 yd south of RS01.
RS03	Right	Fair	40° 54' 15"	-82° 39' 19"	1,566	1,072.28	Mud line on base of tree about 150 ft north of driveway to private residence.
RS04	Right	Fair	40° 54' 11"	-82° 39' 23"	2,048	1,072.58	Drift line on 20-in.-diameter black cherry tree on flood plain behind 5425 Broadway St.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
LS04	Left	Good	40° 54' 13"	-82° 39' 31"	2,632	1,072.32	Mud line on railroad tie, 5 ft below tracks on downstream side of railroad tracks.
LS03	Left	Excellent	40° 54' 13"	-82° 39' 33"	2,747	1,074.28	Mud/seed line on gutter downspout and telephone network interface box on downstream side of Beer's Lawn and Garden shop.
LS05	Left	Excellent	40° 54' 03"	-82° 39' 33"	3,113	1,075.08	Mud line on end of last gravel bin partition at Moritz Concrete, behind building.
LS06	Left	Excellent	40° 53' 54"	-82° 39' 35"	3,926	1,076.51	Seed line on maple tree, in clump of trees, downstream from railroad tracks, 500 ft from road along tracks.
LS07	Left	Excellent	40° 53' 48"	-82° 39' 38"	4,413	1,077.25	Mud line on column for Sportman's Den, rightmost column, left of new addition, on upstream side of column.
RS05	Right	Fair	40° 53' 48"	-82° 39' 27"	4,684	1,077.28	Seed line on utility pole 767 at right downstream side of State St. bridge.
RS06	Right	Excellent	40° 53' 46"	-82° 39' 29"	4,951	1,077.91	Mud line on guardrail support of bridge, right upstream third vertical support.
LS08	Left	Excellent	40° 53' 39"	-82° 39' 45"	5,889	1,079.48	Seed line on telephone pole ID445, behind The Moody Senior Community Building.
LS09	Left	Excellent	40° 53' 31"	-82° 39' 40"	6,598	1,079.86	Mud line on lightpole of ball diamond, first-base line near home plate.
LS10	Left	Excellent	40° 53' 31"	-82° 39' 40"	6,598	1,079.86	Mud line on cut-off pole near LS09.
LS12	Left	Excellent	40° 53' 31"	-82° 39' 39"	6,598	1,079.86	Mud line on small building behind home plate, upstream side of building.
LS11	Left	Excellent	40° 53' 31"	-82° 39' 40"	6,598	NA ³	Mud line on lightpole of ball diamond, on third-base line near home plate.
RS07	Right	Good	40° 53' 11"	-82° 39' 32"	8,723	1,084.99	Seed line on utility pole at overhead door at factory across from Glens Surplus Sales at corner of E. Smiley Ave. and Mohican St.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
LS13	Left	Excellent	40° 53' 09"	-82° 39' 37"	8,963	1,084.96	Mud line on blue siding of first-base dugout, on north side, center of block portion of building.
RS08	Right	Excellent	40° 53' 08"	-82° 39' 31"	8,963	1,085.00	Mud line on downstream north wall in ramp entry to Glens Surplus Sales, 3 ft from entrance.
RS09	Right	Excellent	40° 53' 03"	-82° 39' 33"	9,541	1,085.17	Mud line at entrance to B&B Amish Furniture, south of Glens Surplus Sales, on Mohican St.
RS10	Right	Excellent	40° 53' 00"	-82° 39' 35"	9,854	1,085.33	Mud/seed line on southwest corner of United Steel Workers Union Hall building on Mohican St.
LS14	Left	Poor	40° 52' 59"	-82° 39' 37"	9,932	1,085.43	Seed line on downstream side of corner fencepost behind 15 West Whitney Ave.
RS11	Right	Excellent	40° 52' 58"	-82° 39' 34"	10,054	1,085.61	Seed/mud line on west side of building, 50 ft from road, at 11 E. Whitney Ave.
RS12	Right	Excellent	40° 52' 58"	-82° 39' 33"	10,054	1,085.64	Mud line on northwest corner of Kuttan Korner building, at 13 E. Whitney Ave.
LS15	Left	Excellent	40° 52' 56"	-82° 39' 35"	10,264	1,086.04	Mud line on corner of garage near gutter downspout of Calvary Baptist Church.
RS13	Right	Excellent	40° 52' 54"	-82° 39' 33"	10,487	1,086.32	Mud line on window, 0.78 ft from bottom of glass, at 6 Mohican St. near intersection of Mohican St. and E. Main St.
RS14	Right	Excellent	40° 52' 52"	-82° 39' 33"	10,691	1,087.51	Mud line on west window of fire station.
LS16	Left	Excellent	40° 52' 51"	-82° 39' 38"	10,691	1,088.56	Seed/mud line on back door of Britt's Crafts Occasions store.
LS17	Left	Excellent	40° 52' 46"	-82° 39' 41"	11,604	1,088.72	Seed/mud line on northeast corner of Shelby school building on west side of football stadium, left side of door.
RS16	Right	Excellent	40° 52' 43"	-82° 39' 34"	11,604	1,088.69	Seed line on south-facing red overhead door and doorframe on northernmost school building.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
RS15	Right	Excellent	40° 52' 43"	-82° 39' 34"	11,613	1,088.65	Mud line on west-facing double door on school building.
RS17	Right	Excellent	40° 52' 43"	-82° 39' 35"	11,663	1,088.68	Mud line on west-facing door at southernmost school building, overlooking south end zone.
RS18	Right	Good	40° 52' 42"	-82° 39' 36"	11,778	1,088.62	Seed line on vertical upright upstream side of bridge on footbridge by flag pole, eighth vertical upright from right bank.
RS19	Right	Excellent	40° 52' 37"	-82° 39' 35"	12,215	1,088.79	Seed line on north side of detached garage below window behind 34 Park Ave.
LS18	Left	Excellent	40° 52' 37"	-82° 39' 41"	12,215	1,088.80	Mud line on northeast corner of Tucker Car Wash on Tucker Ave.
RS20	Right	Good	40° 52' 32"	-82° 39' 36"	12,683	1,089.30	Seed line on base of tree on crest of hill behind white picket fence behind 50 Park Ave.
LS19	Left	Excellent	40° 52' 31"	-82° 39' 44"	12,964	1,089.16	Seed line on southeast white PVC post of small compost structure at 83 S. Gamble St.
RS21	Right	Excellent	40° 52' 29"	-82° 39' 36"	12,964	1,089.45	Seed line on northeast corner of storage shed behind 60 Park Ave.
RS22	Right	Excellent	40° 52' 26"	-82° 39' 35"	13,411	1,089.45	Seed line on north side of parking shed, second pole from back wall at 70 Park Ave.
LS20	Left	Excellent	40° 52' 25"	-82° 39' 45"	13,411	1,089.52	Seed line on back of red shed behind house at 107 S. Gamble St.
RS23	Right	Good	40° 52' 22"	-82° 39' 39"	13,823	1,089.93	Debris line on southwest corner fencepole of chain-link fence of brick municipal building on lane that leads to river from south end of Park Ave.
LS21	Left	Excellent	40° 52' 17"	-82° 39' 47"	14,487	1,091.85	Seed line on right side of glass window of green door on downstream side of First Baptist Church.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
RS24	Right	Good	40° 52' 11"	-82° 39' 38"	14,911	1,092.18	Mud/seed line on base of 3-ft-diameter tree, 300 ft downstream from upland reservoir parking lot.
LS22	Left	Good	40° 52' 03"	-82° 39' 44"	15,845	1,093.28	Seed line on 10-in.-diameter tree, 80 ft from stream channel, 50 ft upstream from Mickey Rd.
RS25	Right	Good	40° 52' 03"	-82° 39' 40"	15,845	1,093.55	Seed/mud line on 18-in.-diameter tree, 150 ft south of Mickey Rd.
Spring Run near Carey, Ohio (distances referenced to a point 51 ft downstream of Township Road 100-A)							
RB30	Right	Good	40° 57' 11"	-83° 21' 47"	112	806.74	Seed/debris line on 2-ft-diameter fencepost, 1.9 ft above ground, 3.4 ft below top of post, 18 ft west of southeast corner of fence, near Township Highway 100A bridge.
RB29	Right	Fair	40° 57' 03"	-83° 22' 05"	2,201	809.60	Seed/debris line on small bush-like tree, 4.1 ft above ground, next to channel, northwest of mailbox 729, off Township Highway 100B.
RB28	Right	Fair	40° 57' 04"	-83° 22' 14"	2,863	810.01	Seed line on white wooden shed, 0.57 ft above bottom of corner molding, southwest corner of red molding, on west face, behind 668 E. Findlay St.
RB27	Right	Poor	40° 57' 08"	-83° 22' 26"	3,945	811.73	Mud line on downstream right wing wall, 1.08 ft below top of wing wall, of Ogg St. bridge.
LB08	Left	Fair	40° 57' 09"	-83° 22' 35"	4,679	814.31	Seed line on downstream right side of eastern face of low-steel decking of footbridge, 0.58 ft below top of concrete decking, about 8 ft east of Toledo St. bridge.
LB07	Left	Excellent	40° 57' 10"	-83° 22' 38"	4,888	815.13	Mud line on northeast corner of wooden shed, 0.45 ft above bottom of corner molding, on east side of 337 E. North St.
RB09	Right	Good	40° 57' 09"	-83° 22' 41"	5,142	815.53	Mud line on north face of westernmost post, 0.59 ft above top of green metal base of backyard playset, behind 322 Findlay St.
LB06	Left	Good	40° 57' 10"	-83° 22' 42"	5,242	815.63	Seed/mud line on south side of chain-link fence, 2.75 ft below bottom of fencepost cap, 8 ft west of southeast corner, behind 315 E. North St.
LB05	Left	Excellent	40° 57' 09"	-83° 22' 53"	6,110	821.06	Seed/mud line on east doorframe, 0.57 ft above stone step, of the Peiffer Accounting Tax building, at 134 E. Findlay St. (SR 103).

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
RB10	Right	Good	40° 57' 08"	-83° 22' 51"	6,110	821.70	Mud line on south side of flagpole, 0.94 ft above blacktop, next to a 2.5-ft-high brick wall, in parking lot of Kiwanis International building.
RB11	Right	Good	40° 57' 06"	-83° 22' 53"	6,335	822.30	Seed/mud line on southwest corner of two-car garage with white siding, 0.7 ft above concrete floor, behind Kiwanis International building.
LB04	Left	Excellent	40° 57' 07"	-83° 22' 55"	6,368	822.27	Seed/mud line on southeast corner of white wooden shed, 3.94 ft above bottom of corner molding, behind VFW building.
LB03	Left	Good	40° 57' 07"	-83° 22' 57"	6,543	822.32	Mud line on east walkthrough door, 3.27 ft above concrete step, north side of Splinters Café & Spirits building, 27 ft west of northeast corner of building, at 117 S. Vance St.
RB12	Right	Fair	40° 57' 06"	-83° 22' 58"	6,543	822.32	Mud/debris line on chain-link fence, 2.03 ft above concrete, fourth post west from southeast edge of fence, 117 Vance St. (SR 23), just south of Splinters.
LB01	Left	Good	40° 57' 07"	-83° 22' 58"	6,543	822.32	Mud line on vinyl siding of northern door frame, 1.46 ft above concrete step, of Pieracini's Barber Shop, just south of 1981 Historical Flood plaque.
LB02	Left	Excellent	40° 57' 07"	-83° 22' 59"	6,658	822.39	Mud line on glass walkthrough doorframe, 1.19 ft above green outdoor carpet, of Baker Apartments, at 114 S. Vance St.
RB26	Right	Excellent	40° 57' 05"	-83° 23' 05"	7,143	822.51	Mud line on northeast corner molding of garage overhead-door frame, 3.95 ft above asphalt, west side of house, at 129 W. South St.
RB25	Right	Good	40° 57' 06"	-83° 23' 09"	7,472	822.92	Mud line on northeast corner molding of garage door, 1.64 ft above concrete threshold, 3 ft west of northeast corner of garage, east side of house, at 225 W. South St.
RB24	Right	Excellent	40° 57' 08"	-83° 23' 14"	7,954	823.46	Mud line on north face, 4.13 ft above bottom of corner molding, northeast corner of wooden shed, behind 130 West St.
LB23	Left	Good	40° 57' 09"	-83° 23' 17"	8,166	823.71	Seed/mud line on overhead-door weatherstripping, 2.04 ft above floor, on southwest corner of garage, at 121 S. Lake St.
LB22	Left	Good	40° 57' 09"	-83° 23' 19"	8,361	823.61	Mud line on back of brown private fence, 2.05 ft below top of fencepost, behind and below Notre Dame sign, at 120 S. Lake St.
LB21	Left	Good	40° 57' 09"	-83° 23' 23"	8,607	823.75	Seed/mud line on wood siding, 2.26 ft above bottom of corner molding, southwest corner of one-car garage, behind 125 S. Munice St.

Table 3. Elevation of high-water marks for selected locations in communities flooded on August 21–24, 2007.—Continued

[Data collected and compiled by the U.S. Geological Survey, Ohio Water Science Center unless otherwise noted. Abbreviations: HWM ID, high-water-mark identifier; NAVD 88, North American Vertical Datum of 1988; ft, feet; NR, not rated; SR, State Route; U.S., U.S. Route]

HWM ID	Bank ¹	HWM Rating ²	Latitude	Longitude	Distance from reference point of river (ft)	Elevation (ft NAVD 88)	Description and location of high-water mark
LB17	Left	Excellent	40° 57' 10"	-83° 23' 25"	8,814	824.57	Mud line on siding, 0.83 ft above bottom of siding, just north of downspout, southwest corner of garage, behind 122 Munice St.
RB18	Right	Excellent	40° 57' 09"	-83° 23' 27"	8,955	824.59	Mud line on garage siding, 0.7 ft above bottom of corner molding, just south of downspout, northeast corner of garage, at 512 W. South St.
LB16	Left	Fair	40° 57' 10"	-83° 23' 31"	9,271	824.76	Mud line on 7-in.-diameter pine tree, 4.1 ft above ground, along property line between 613 & 609 W. Findlay St. (SR 568).
RB19	Right	Fair	40° 57' 06"	-83° 23' 39"	10,117	824.88	Mud line on small ornamental tree, 2.42 ft above ground, in Shrine Park, along north drive, north of northernmost shelter house, 10 ft west of Shrine III.
RB20	Right	Poor	40° 57' 07"	-83° 23' 47"	10,752	824.52	Seed/mud line on chain-link fencepost, 3.49 ft above concrete base, westernmost edge of Shrine Park.
LB15	Left	Poor	40° 56' 58"	-83° 23' 54"	11,860	827.18	Mud line on fencepost, 6.71 ft below top of fencepost, of green chain-link fence on walkthrough gate towards stream, behind Carey Plant.
LB14	Left	Poor	40° 56' 52"	-83° 24' 01"	12,757	829.23	Mud/debris line on most southeast fencepost, 1.71 ft below bottom of fencepost cap of chain-link fence, 30 ft north of north edge of parking lot for Carey Plant.
LB13	Left	Fair	40° 56' 42"	-83° 24' 35"	15,486	830.63	Mud line on double-trunk V-shaped tree, 3.1 ft above ground, in line with southeast corner of fence, 50 ft downstream from corner post, 15 ft left of left edge of stream.

¹Bank is designated right or left by facing downstream.

² A high-water mark rating is subjectively rated by the U.S. Geological Survey personnel locating the mark as outlined in Lumia and others (1986). High-water marks rated as "excellent" are within 0.02 ft of the true high-water mark, "good" are within 0.05 ft, "fair" are within 0.10 ft, and "poor" are greater than 0.10 ft.

³High-water mark was destroyed before it could be surveyed.

Table 4. Peak stages, peak streamflows, and estimated recurrence-interval ranges at selected U.S. Geological Survey streamgage stations near communities in and around the affected flooded area in Ohio, August 21–24, 2007.[ft, feet (above gage datum); ft³/s, cubic feet per second; <, less than; N/A, not available]

Permanent station number	Stream and place of determination	Drainage area (square miles)	Gage datum (ft) ¹	Period of record (annual peak flows)	Maximum prior to August 20, 2007			Maximum during August 20–24, 2007			Estimated recurrence-interval range ³ (years)
					Water year ²	Stage (ft)	Streamflow (cubic feet per second)	Date	Stage (ft)	Streamflow (ft ³ /s)	
03130500	Touby Run at Mansfield	5.44	1,215.96 ⁴	1947–78 1987	1987	4.45	1,030	August 21 ⁵	5.29	1,200	50–100
03131500	Black Fork Mohican River at Loudonville	349	929.16	1913 1932–2007	1969	14.116	8,460	August 22	12.37	6,690	Regulated ⁷
03136500	Kokosing River at Mount Vernon	202	984.16	1954–2007	1959	18.19	38,000	August 22	6.02	1,190	<2
03219500	Scioto River near Prospect	567	886.90 ⁸	1913 1915–2007	1913	21.10	27,000	August 25	7.34	2,590	<2
03220000	Mill Creek near Bellepoint	178	865.14 ⁸	1913 1943–2007	1997	14.45	21,800	August 23	4.63	1,080	<2
03223000	Olentangy River at Claridon	157	961.72	1947–2001	1959	16.77	14,900	August 22	12.43	N/A ⁹	N/A ⁹
03223425	Whetstone Creek at Mt Gilead	37.9	1,074.00	1997–2007	1998	13.64	5,650	August 21	8.65	1,760	2–5 ¹⁰
03266560	Mad River at West Liberty	36.6	1,078.00	1996–2007	2005	8.85	1,690	August 22	5.97	633	<2 ¹⁰
04186500	Auglaize River near Fort Jennings	332	713.60	1922–1936 1941–2007	1992	19.76	12,800	August 21	12.66	3,890	<2
04189000	Blanchard River near Findlay	346	753.76 ⁴	1913 1924–1936 1941–2007	1913	18.50	22,000	August 22	18.46	14,500	100–500
04189260	Blanchard River at Ottawa ¹¹	628	699.00	1995–2007	1913	33.30	N/A	August 23	31.70	N/A	N/A
04191500	Auglaize River near Defiance	2,318	659.70	1913 1915–2007	1913	38.80	120,000	August 23	23.13	38,700	5–10
04192500	Maumee River near Defiance	5,545	658.56	1925–1936 1939–1975 1979–2007	1982	15.87	104,000	August 23	9.92	57,900	2–5
04195500	Portage River at Woodville	428	614.75	1913 1929–1935 1940–2007	1913	17.00	17,000	August 21	11.51	7,330	2–5

Table 4. Peak stages, peak streamflows, and estimated recurrence-interval ranges at selected U.S. Geological Survey streamgage stations near communities in and around the affected flooded area in Ohio, August 21–24, 2007.[ft, feet (above gage datum); ft³/s, cubic feet per second; <, less than; N/A, not available]

Permanent station number	Stream and place of determination	Drainage area (square miles)	Gage datum (ft) ¹	Period of record (annual peak flows)	Maximum prior to August 20, 2007			Maximum during August 20–24, 2007			Estimated recurrence-interval range ³ (years)
					Water year ²	Stage (ft)	Streamflow (cubic feet per second)	Date	Stage (ft)	Streamflow (ft ³ /s)	
04196000	Sandusky River near Bucyrus	88.8	955.04	1926–1935 1939–1951 1959 1964–1981 1987 1996–2007	1959	11.90	13,500	August 21	12.17	15,800	>500
04196500	Sandusky River near Upper Sandusky	298	792.25	1922–1936 1938–1981 2001–2007	1959	15.00 ¹¹	10,000	August 22	13.89	11,200	50–100
04196800	Tymochtee Creek at Crawford	229	785.86	1961–2007	1991 2006	9.77	6,700	August 21	9.38	6,050	25–50
04197100	Honey Creek at Melmore	149	818 ¹²	1961–2007	1981	11.00	4,400	August 22	7.56	1,780	<2
04197170	Rock Creek at Tiffin	34.6	740 ¹²	1983–2007	1998	8.96	2,640	August 21	7.77	1,630	2–5
04198000	Sandusky River near Fremont	1,251	626.30 ⁸	1924–1936 1939–2007	1978	13.57	36,500	August 23	9.01	19,400	2–5
04199000	Huron River at Milan	371	573.26	1950–1981 1988–2007	1969	31.10	49,600	August 20	22.70	12,700	5–10
04199500	Vermilion River near Vermilion	262	595.14	1950–1981 2001–2007	1969	17.14	40,800	August 21	8.70	9,530	5–10

¹ Streamgage datum is NGVD 1929 unless otherwise noted.² A water year is a 12-month period from October 1 through September 30 and is designated by the calendar year in which it ends.³ Based on weighted estimates from Koltun and others (2006).⁴ Streamgage datum is 1,216.42 ft COE1912; however, for this report it is converted to NAVD 1988.⁵ Streamgage was discontinued in 1978. The date of the peak streamflow is estimated from other gage data. The stage was determined from high-water marks near the station.⁶ Highest peak stage of record was 20.50 for the 1913 flood but a peak flow was not determined.⁷ Flow is regulated from operations at Charles Mill Lake on Black Fork Mohican River beginning in 1937.⁸ U.S. Army Corps of Engineers 1912.⁹ Olentangy River at Claridon was converted to a continuous–record annual–peak station in 1998 and a stage-only station in 2001.¹⁰ Based on frequency estimates from Ohio StreamStats (U.S. Geological Survey, 2008).¹¹ Blanchard River at Ottawa is a stage only station operated for the National Weather Service, data from the Advanced Hydrologic Prediction Service web page.¹² Streamgage height affected by backwater.¹³ Streamgage datum from topographic map.

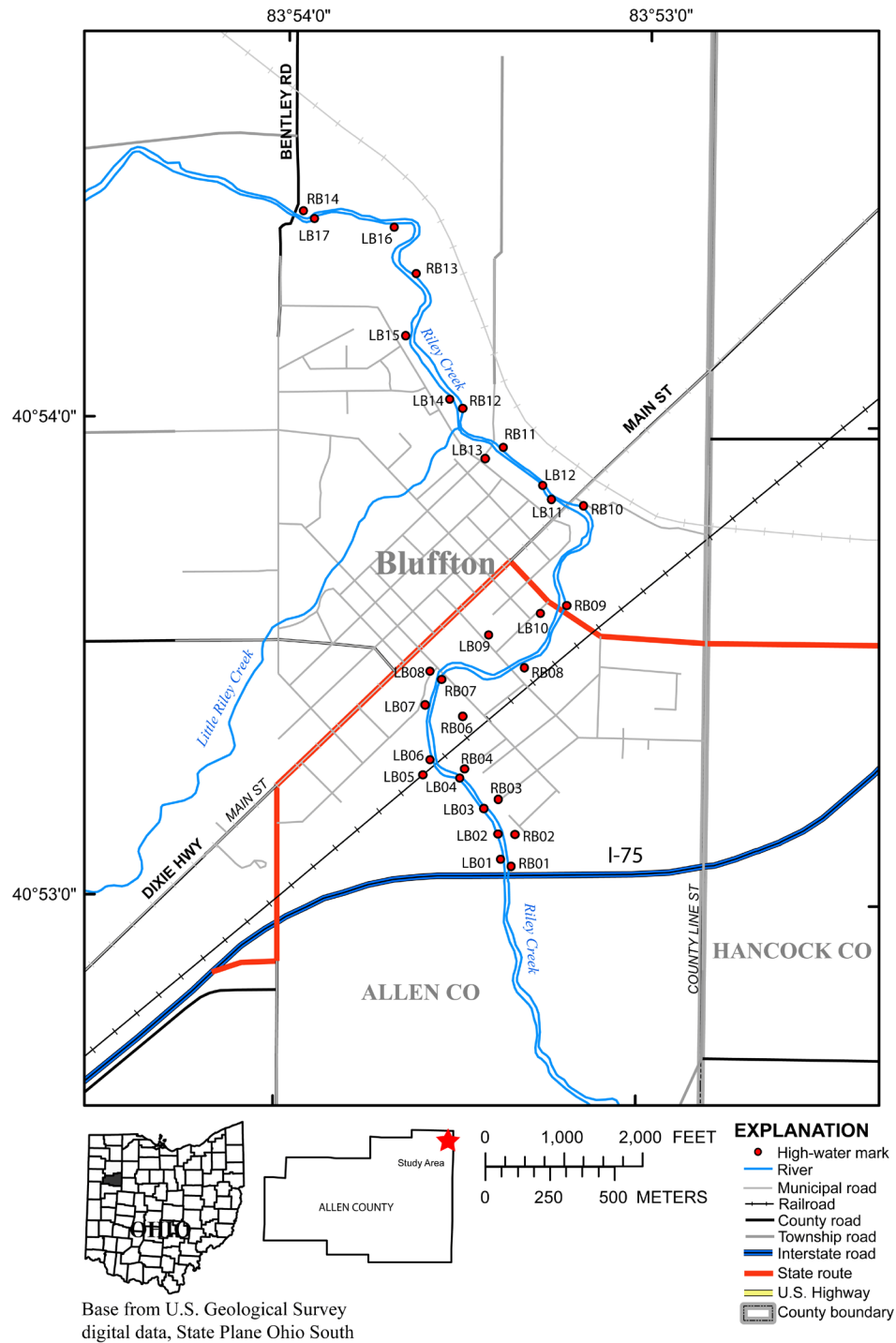


Figure 6. Locations of high-water marks along Riley Creek in and near the village of Bluffton, Ohio.

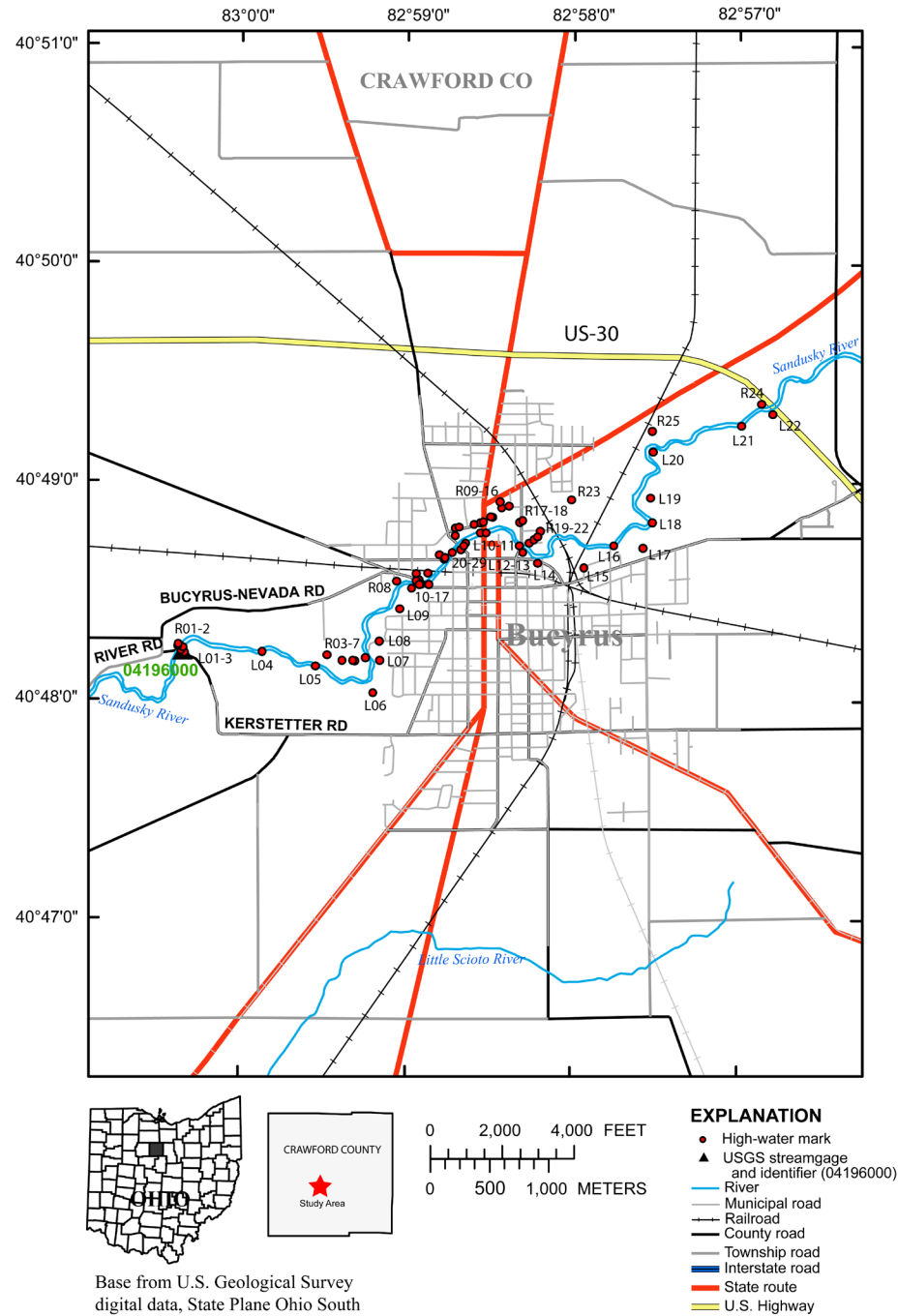


Figure 7. Locations of high-water marks along the Sandusky River in and near the city of Bucyrus, Ohio.

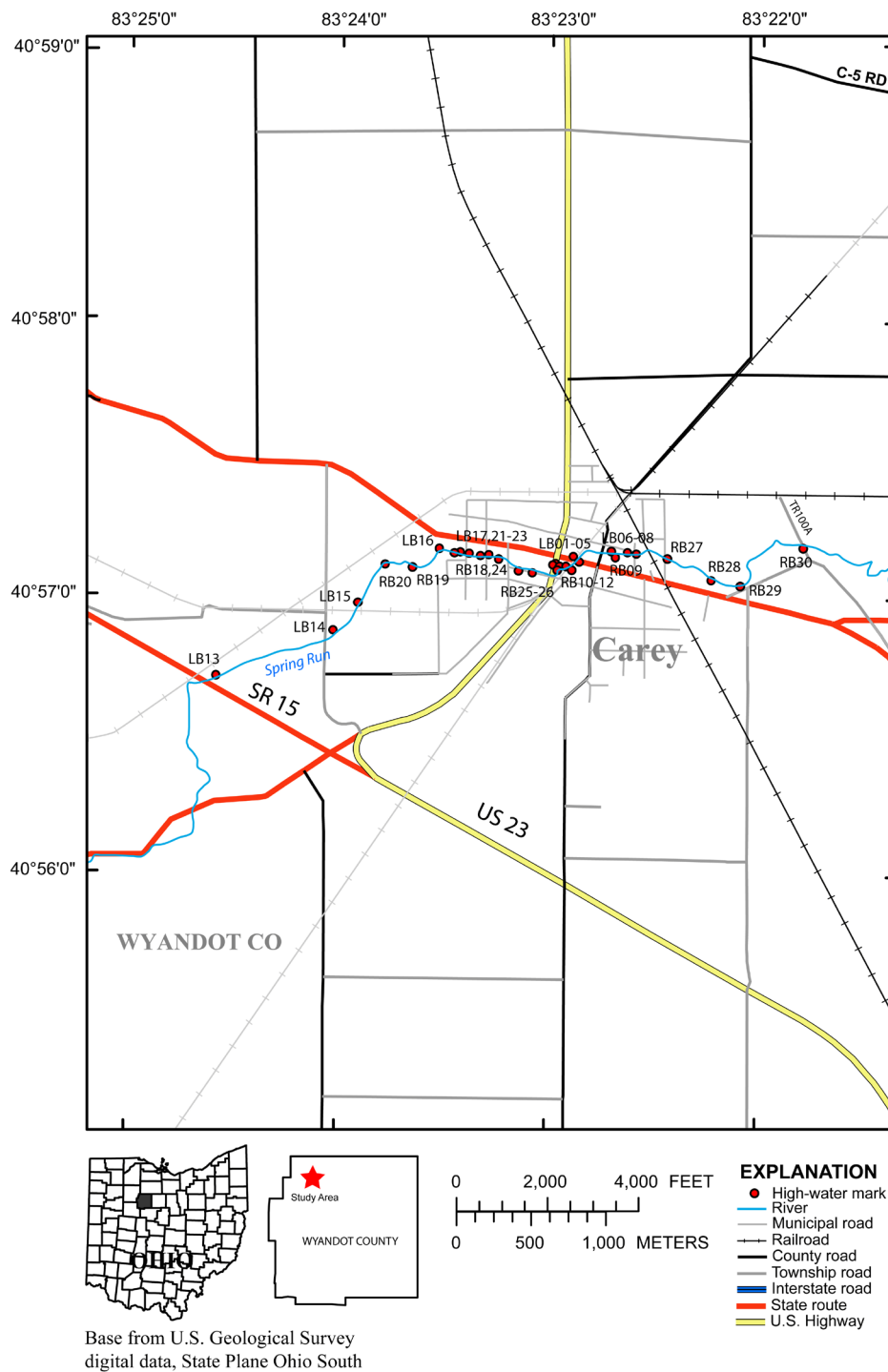


Figure 8. Locations of high-water marks along Spring Run in and near the village of Carey, Ohio.

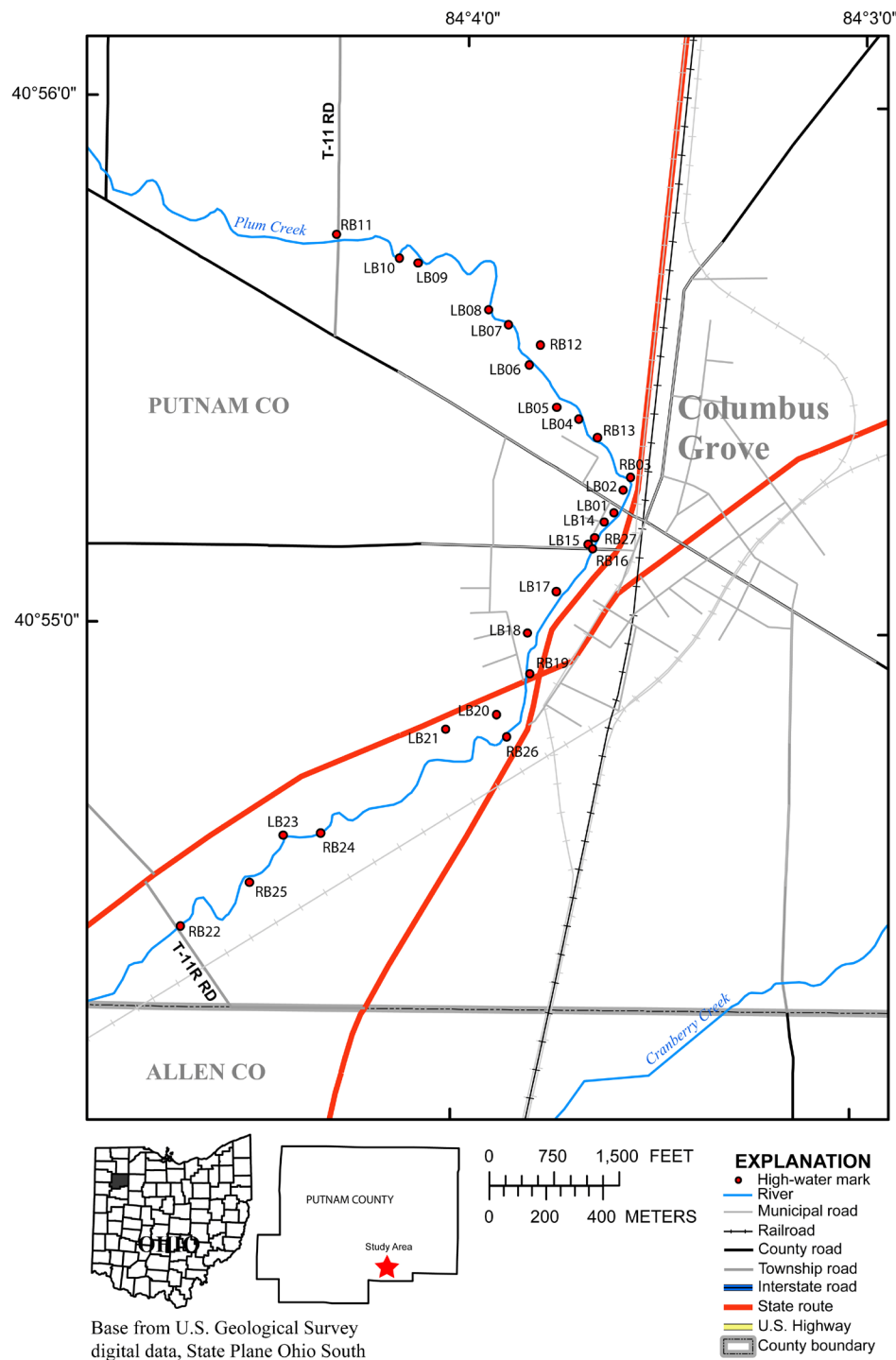


Figure 9. Locations of high-water marks along Plum Creek in and near the village of Columbus Grove, Ohio.

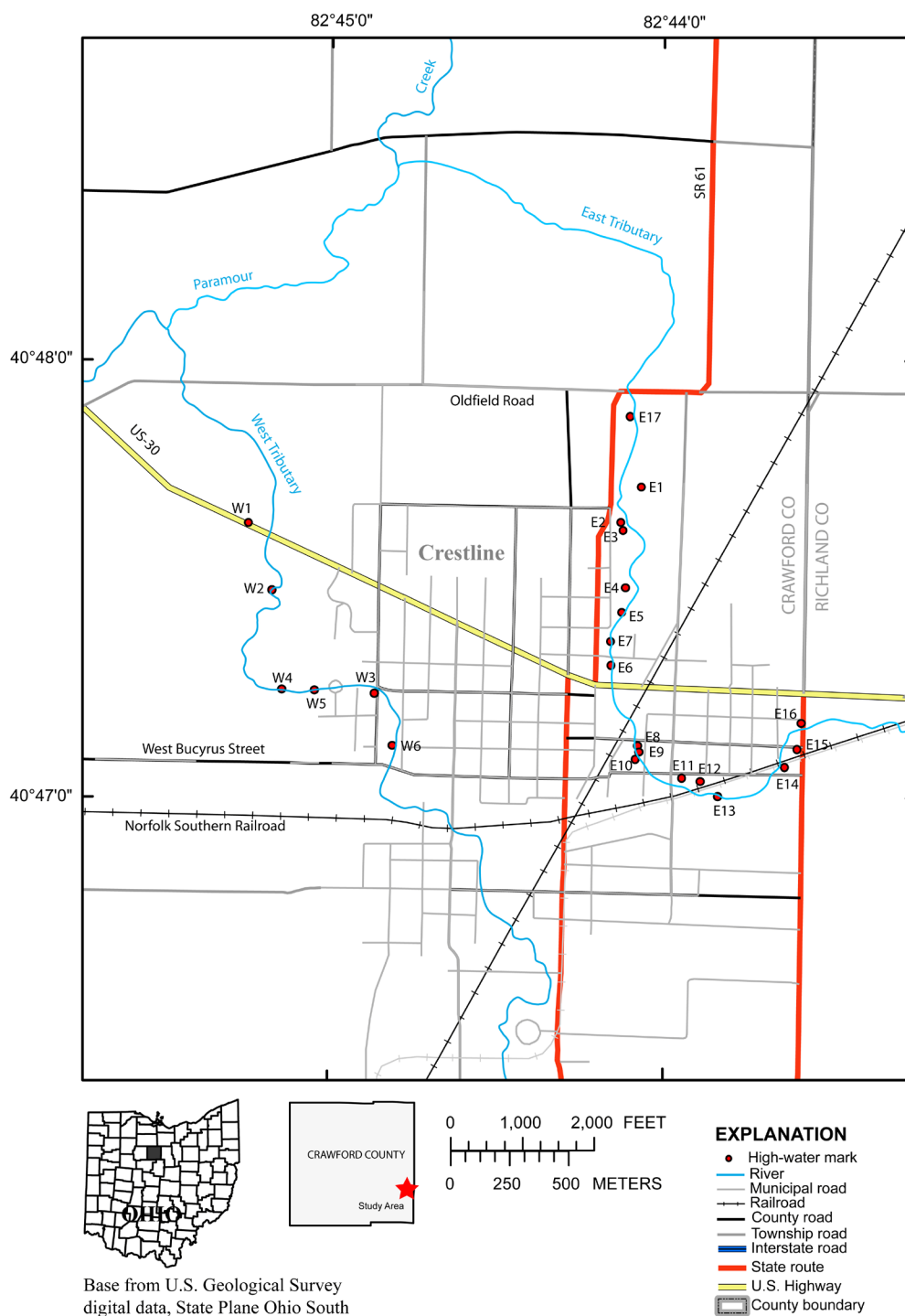


Figure 10. Locations of high-water marks along east and west unnamed tributaries of Paramour Creek in and near the village of Crestline, Ohio.

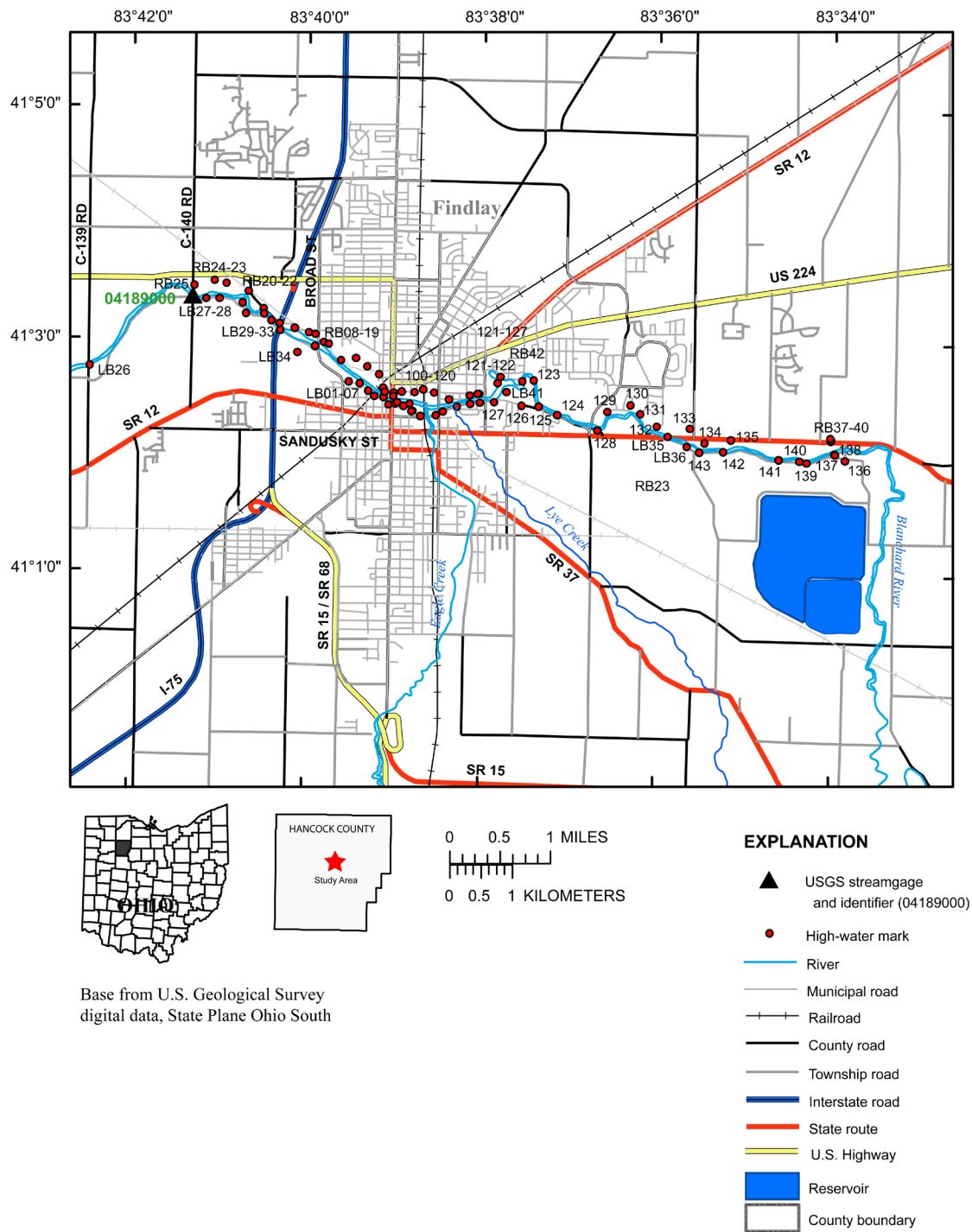


Figure 11. Locations of high-water marks along Blanchard River in and near the city of Findlay, Ohio.

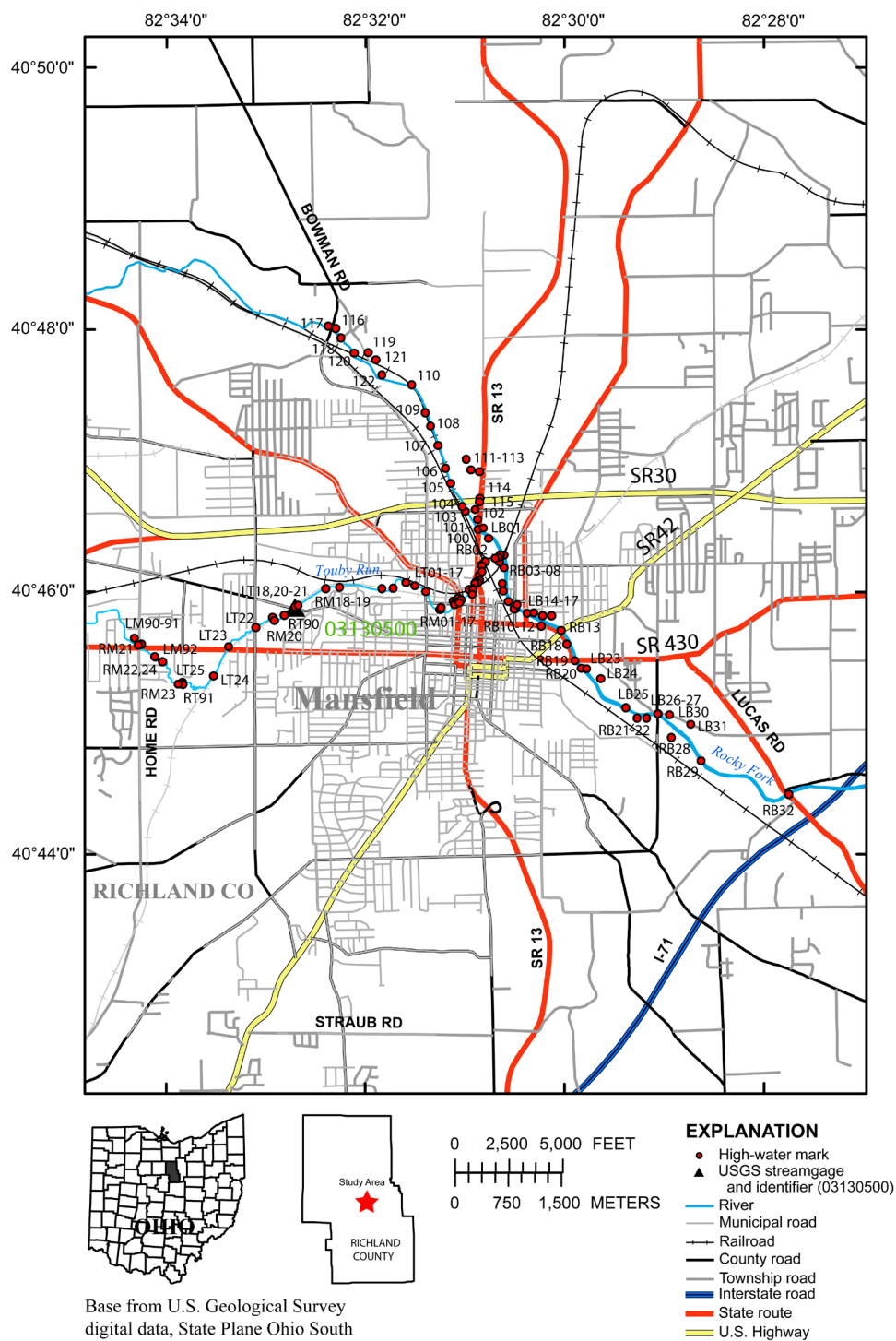


Figure 12. Locations of high-water marks along Rocky Fork Mohican River and Touby Run in and near the city of Mansfield, Ohio.

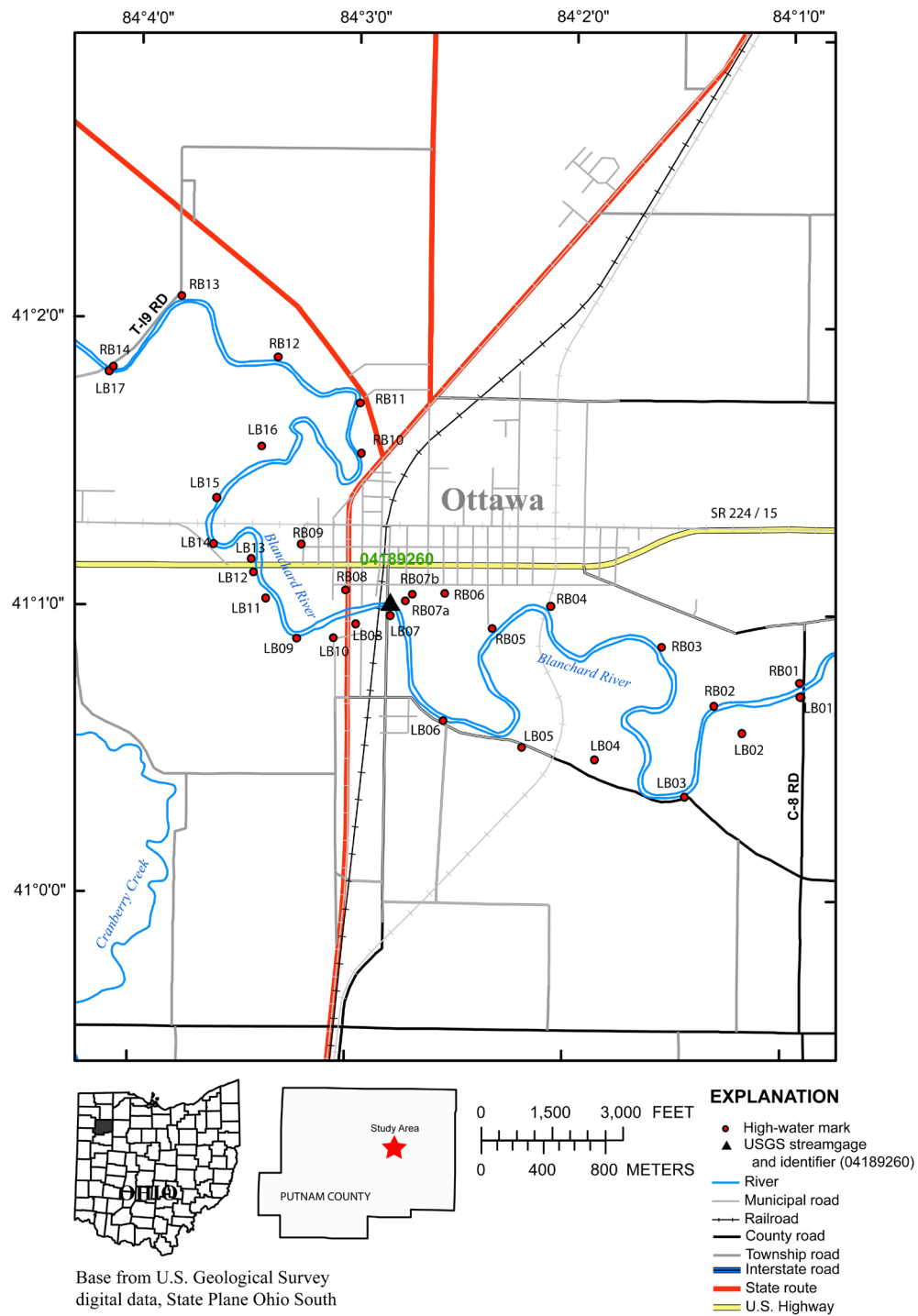


Figure 13. Locations of high-water marks along the Blanchard River in and near the city of Ottawa, Ohio.

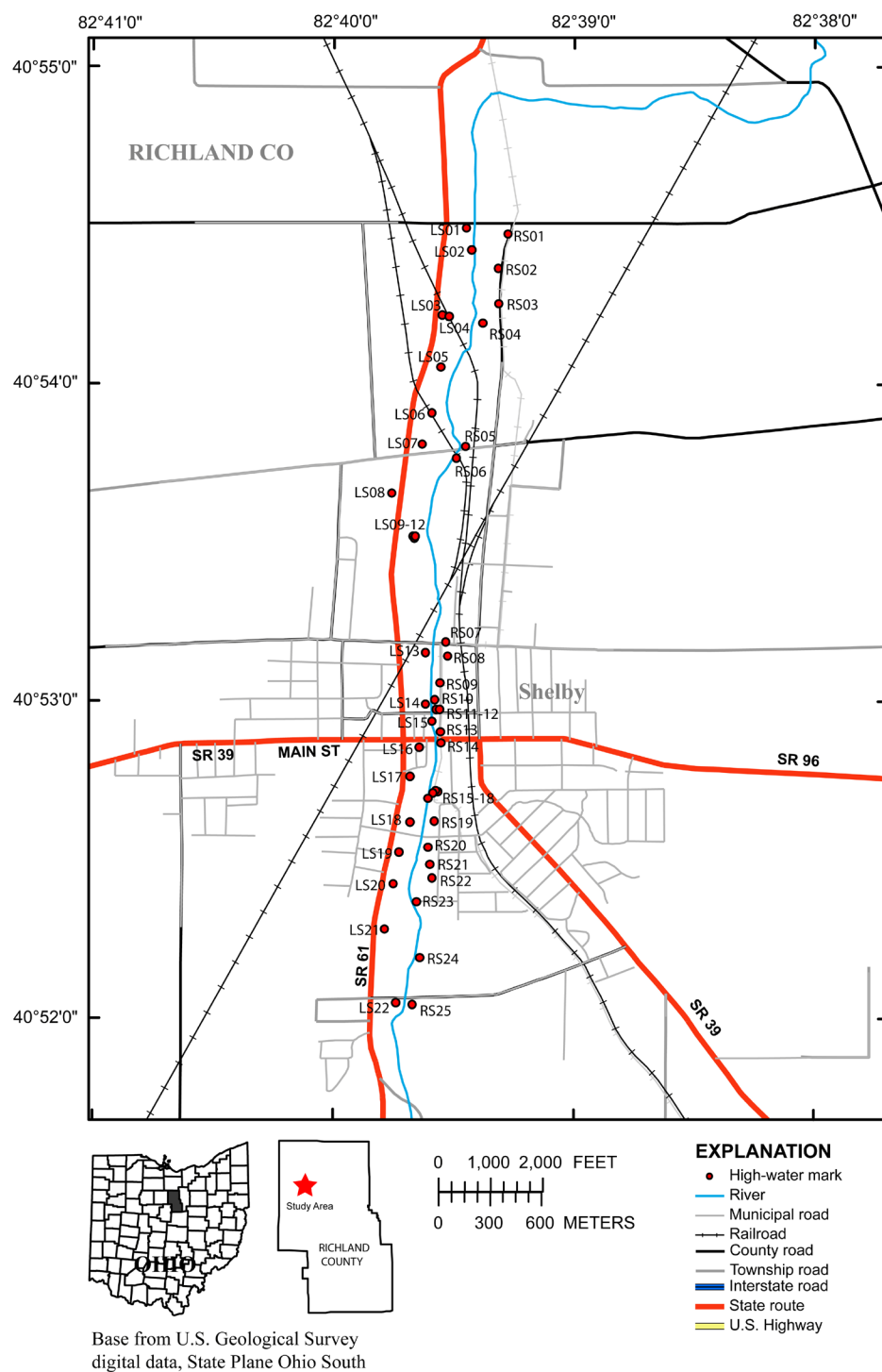


Figure 14. Locations of high-water marks along the Black Fork Mohican River in and near the city of Shelby, Ohio.

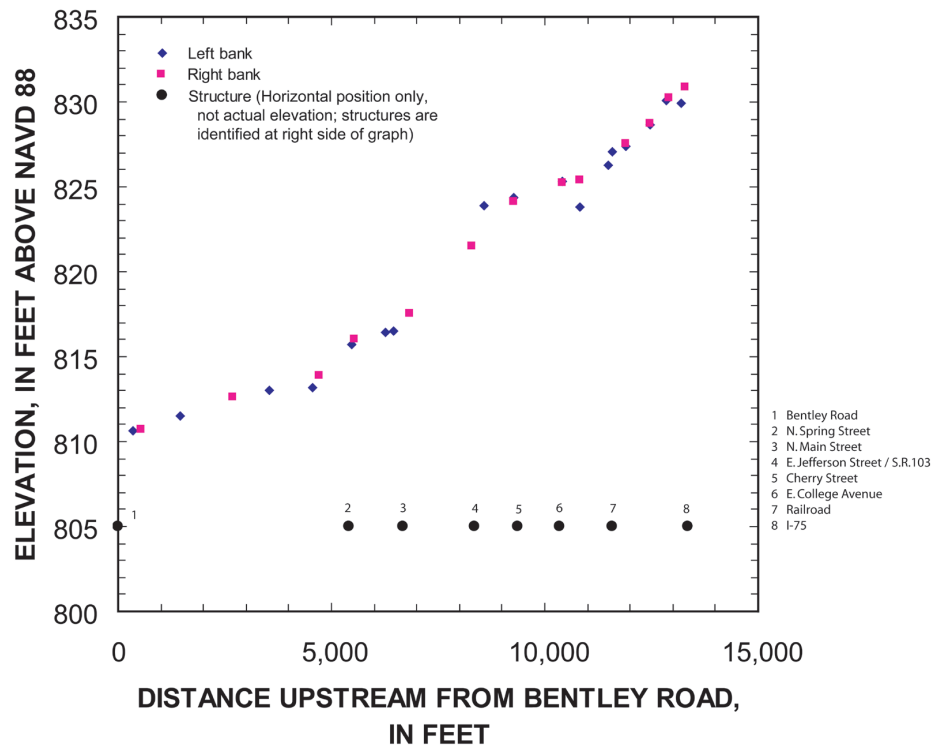


Figure 15. High-water-mark profile for Riley Creek in and near the village of Bluffton, Ohio.

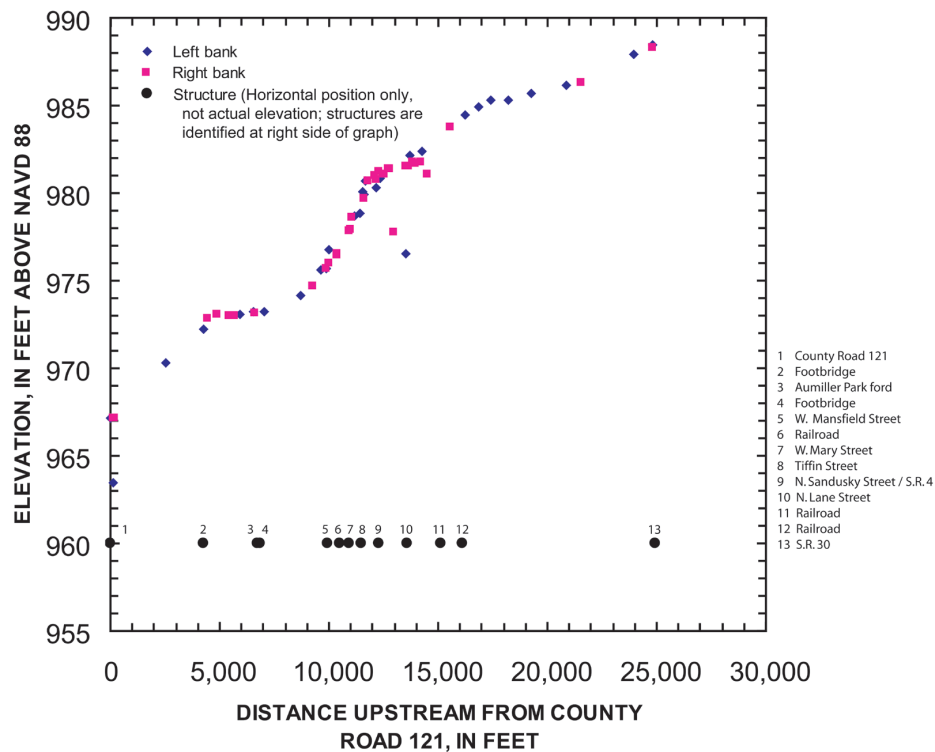


Figure 16. High-water-mark profile for the Sandusky River in and near the city of Bucyrus, Ohio.

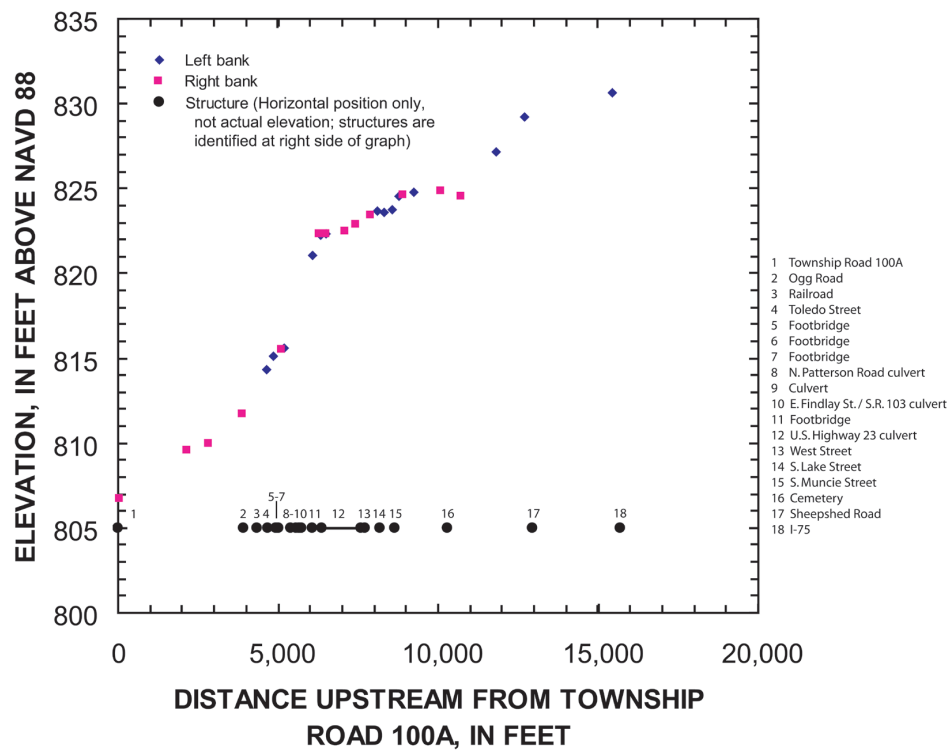


Figure 17. High-water-mark profile for Spring Run in and near the village of Carey, Ohio.

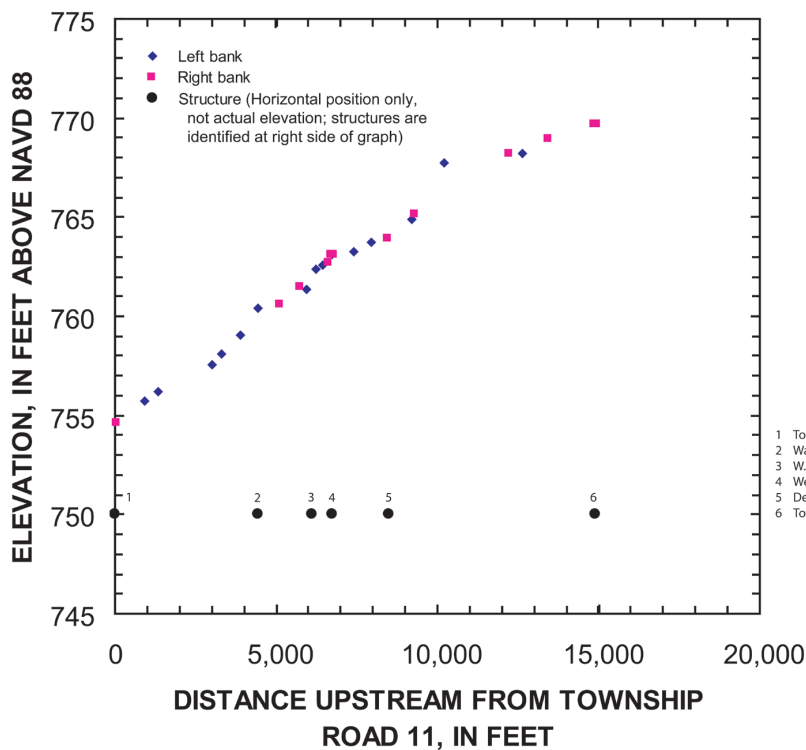


Figure 18. High-water-mark profile for Plum Creek in and near the village of Columbus Grove, Ohio.

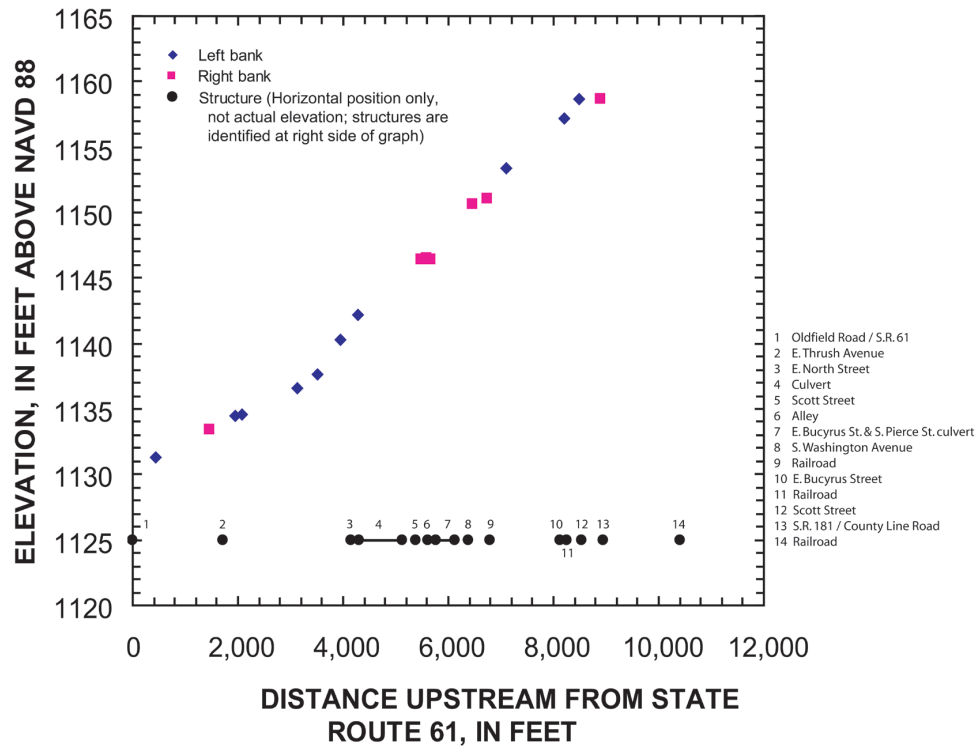


Figure 19. High-water-mark profile for the east unnamed tributary to Paramour Creek in and near the village of Crestline, Ohio.

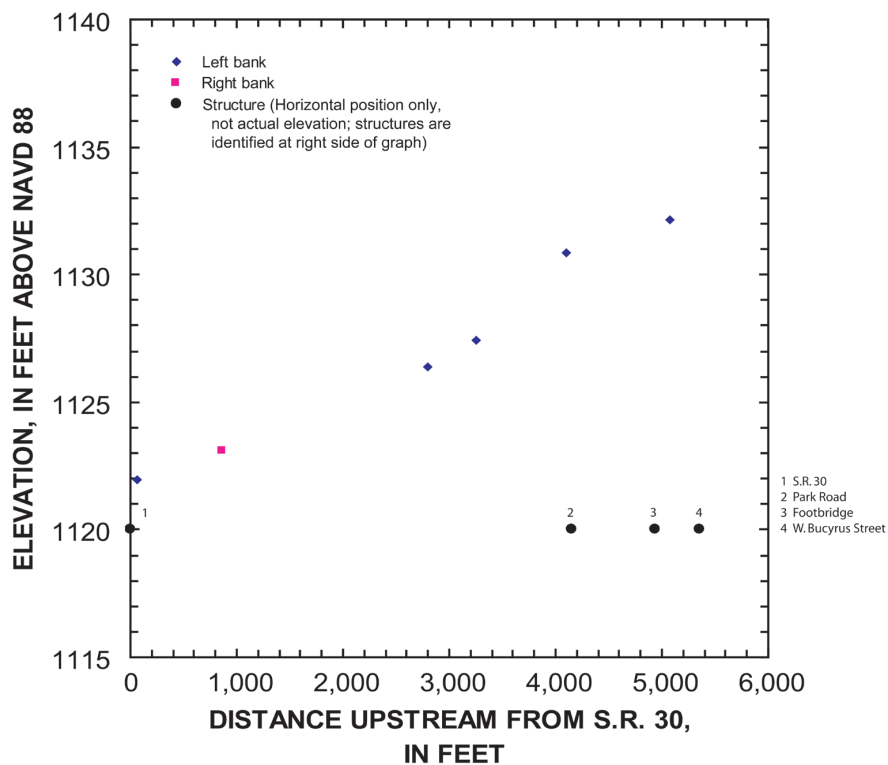


Figure 20. High-water-mark profile for the west unnamed tributary to Paramour Creek in and near the village of Crestline, Ohio.

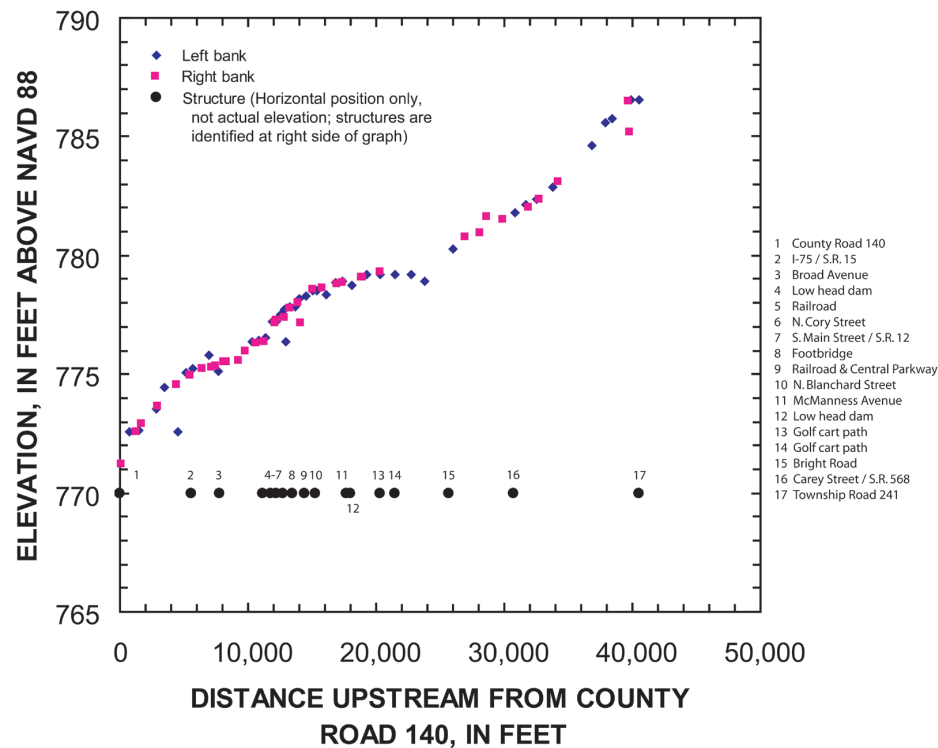


Figure 21. High-water-mark profile for the Blanchard River in and near the city of Findlay, Ohio.

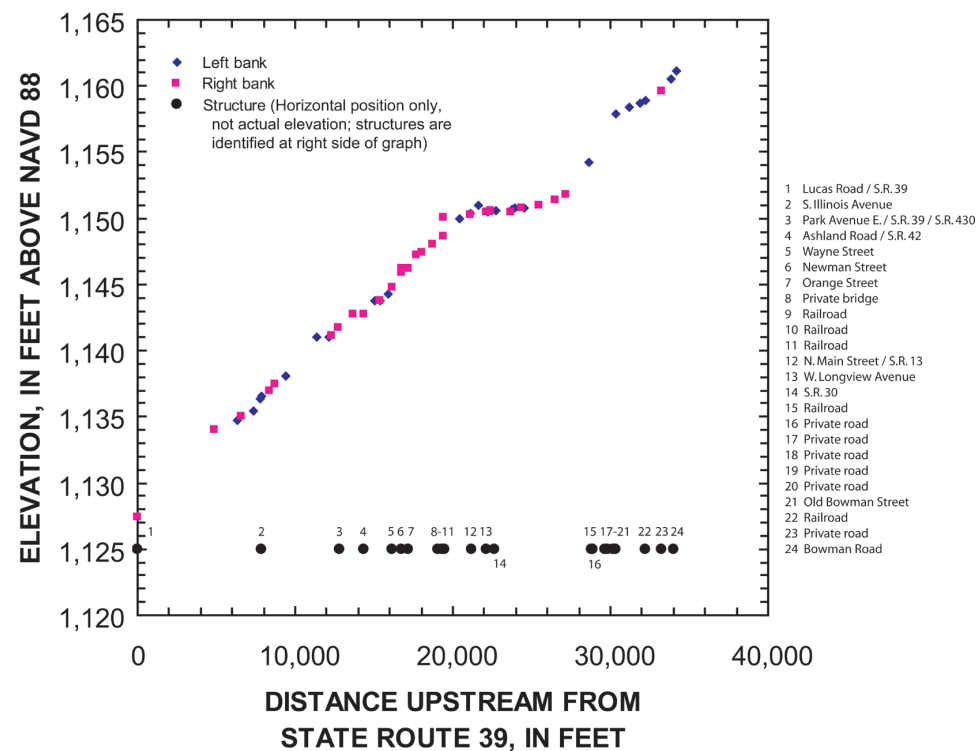


Figure 22. High-water-mark profile for the Rocky Fork Mohican River in and near the city of Mansfield, Ohio.

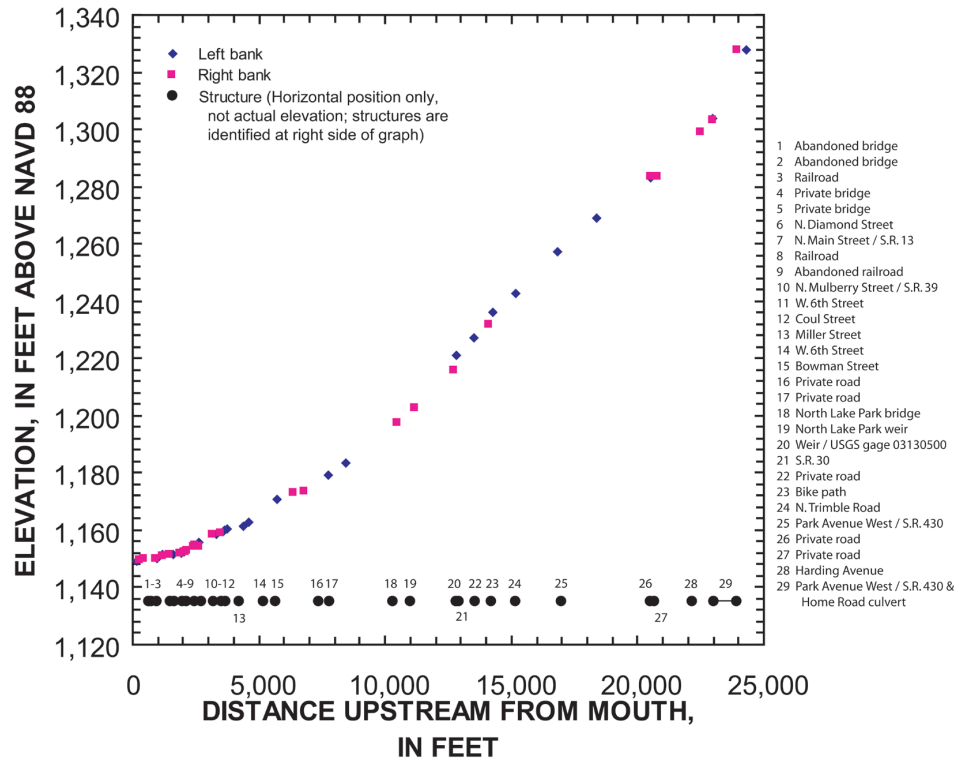


Figure 23. High-water-mark profile for Touby Run in and near the city of Mansfield, Ohio.

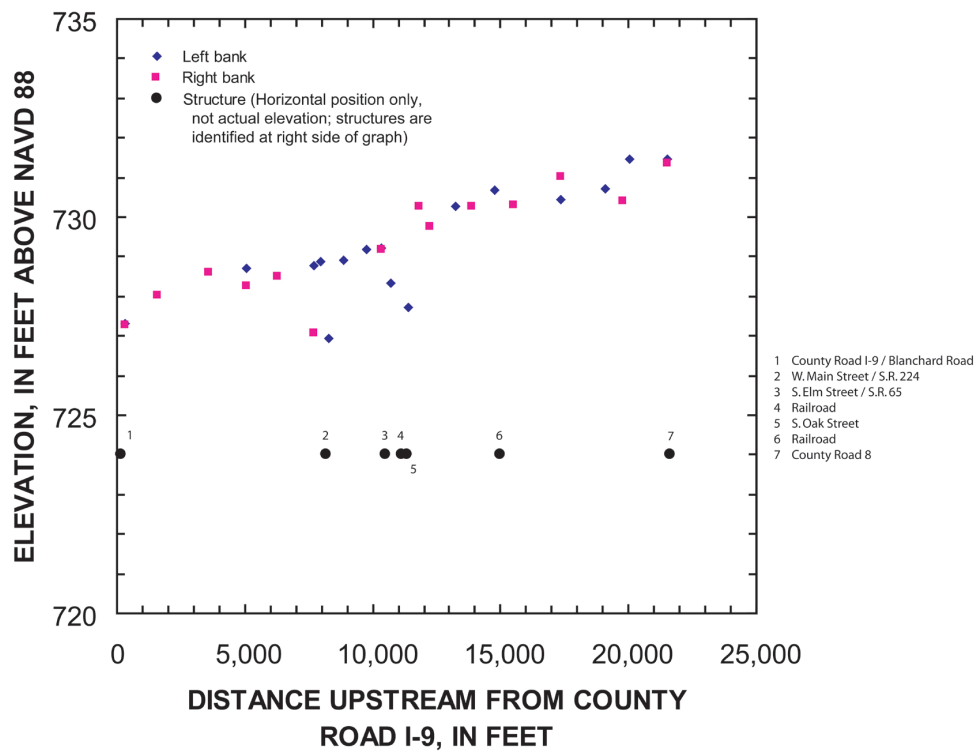


Figure 24. High-water-mark profile for the Blanchard River in and near the city of Ottawa, Ohio.

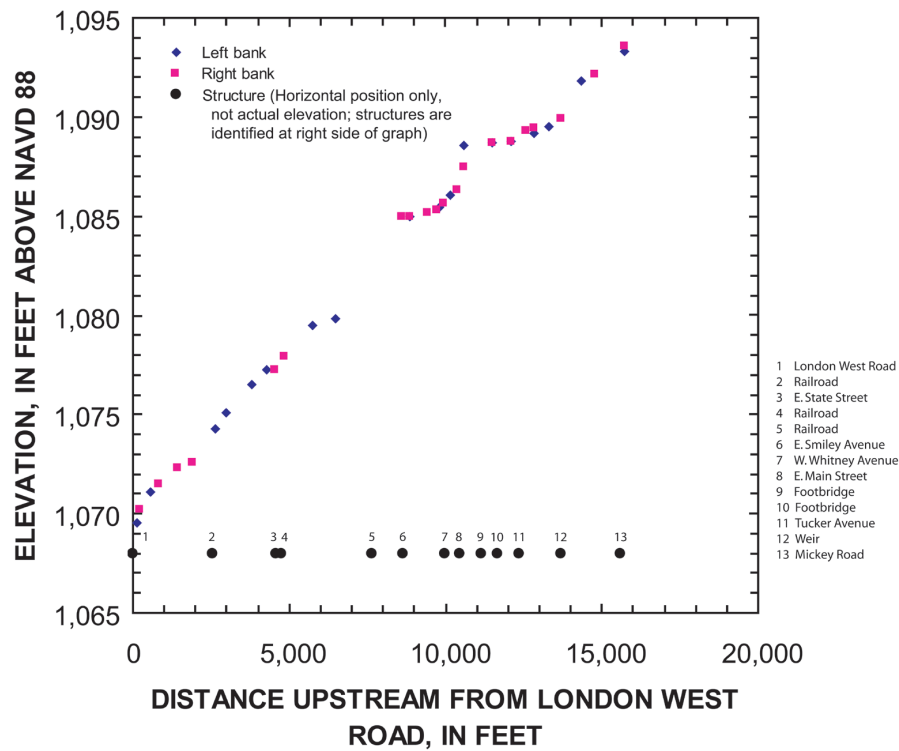


Figure 25. High-water-mark profile for the Black Fork Mohican River in and near the city of Shelby, Ohio.

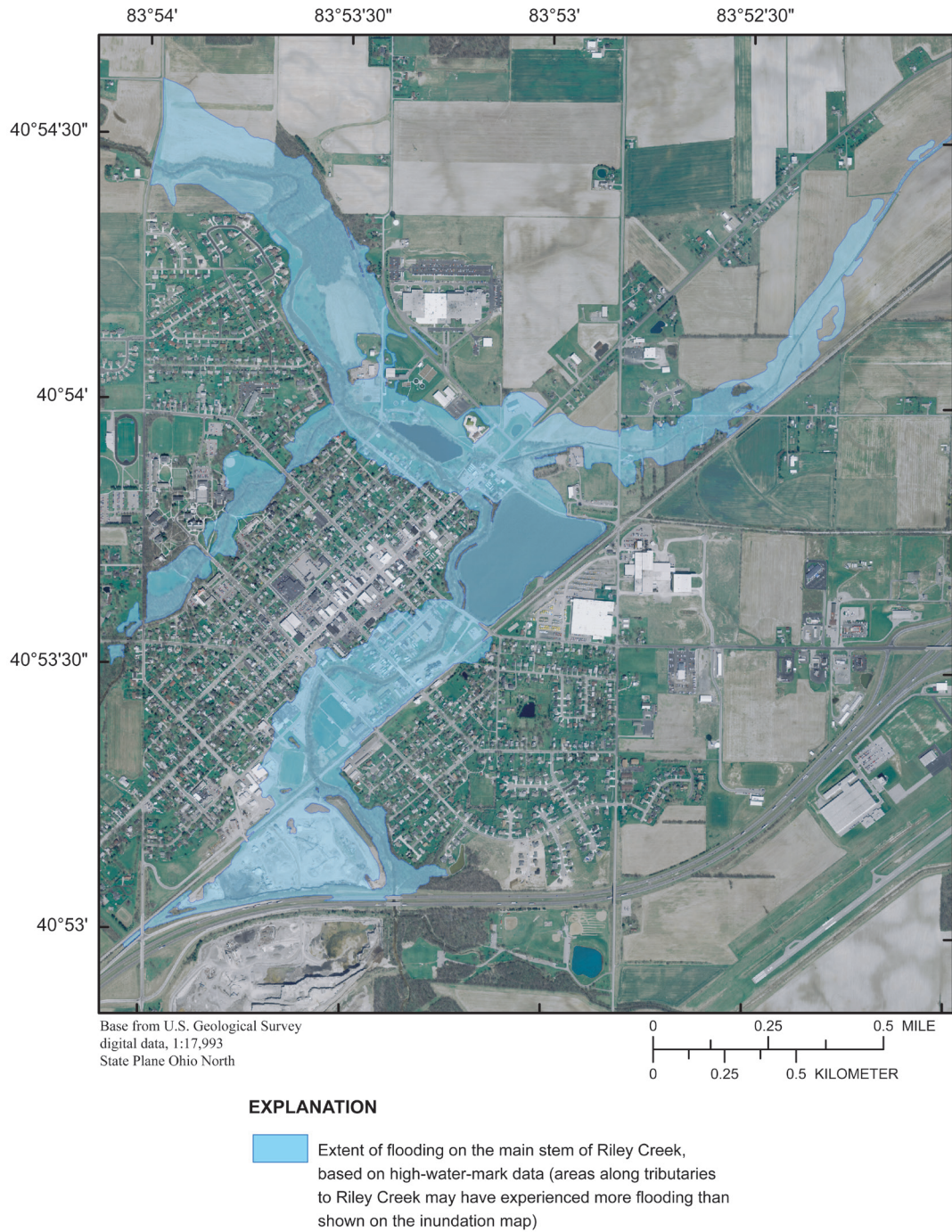


Figure 26. Estimated flood-inundation area for Riley Creek in and near the village of Bluffton, Ohio.

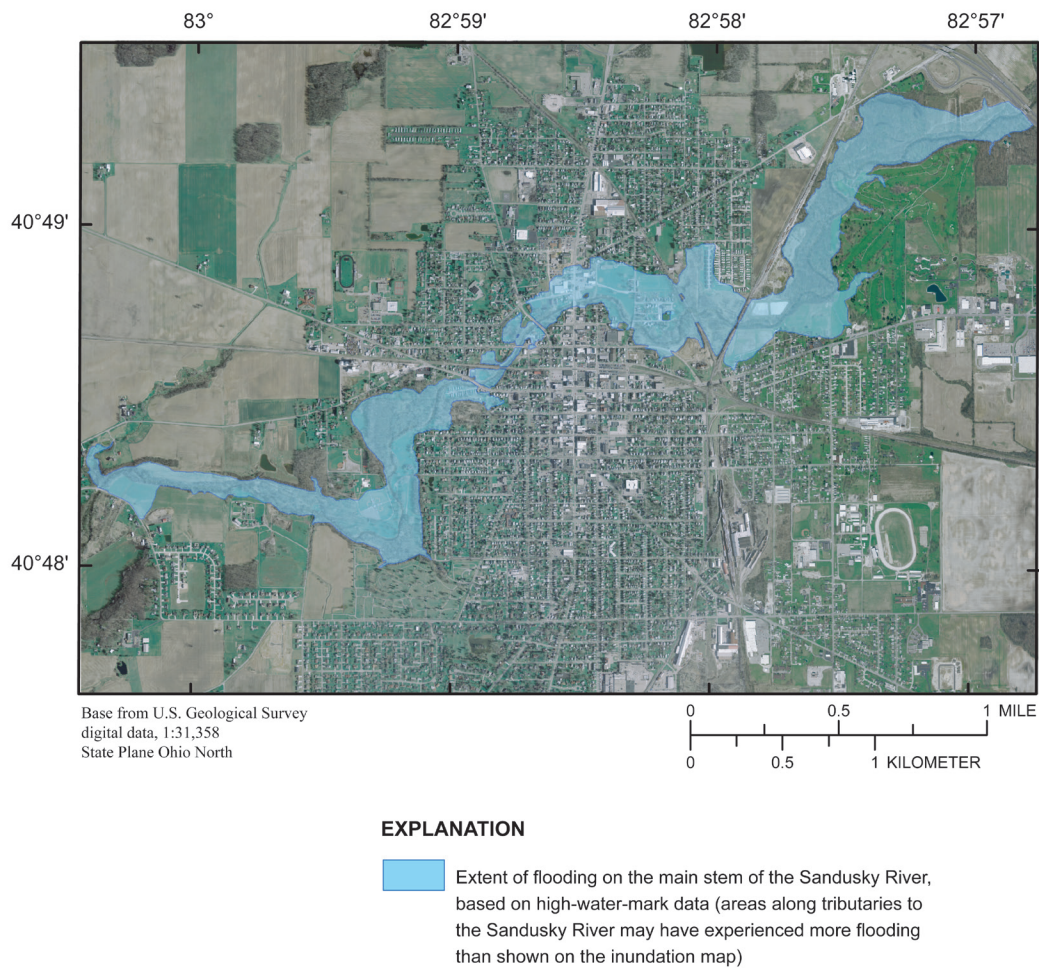


Figure 27. Estimated flood-inundation area for the Sandusky River in and near the city of Bucyrus, Ohio.

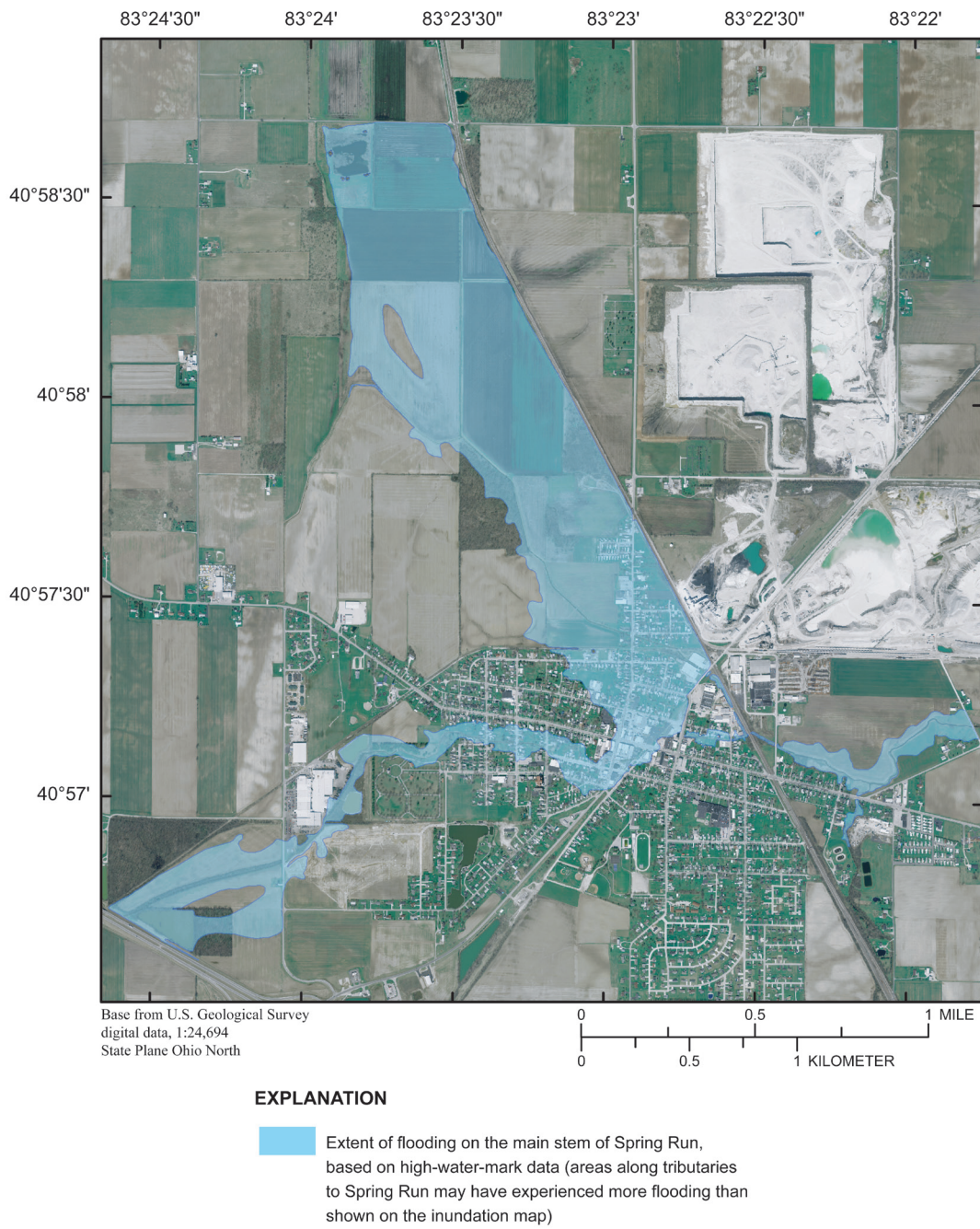


Figure 28. Estimated flood-inundation area for Spring Run in and near the village of Carey, Ohio.

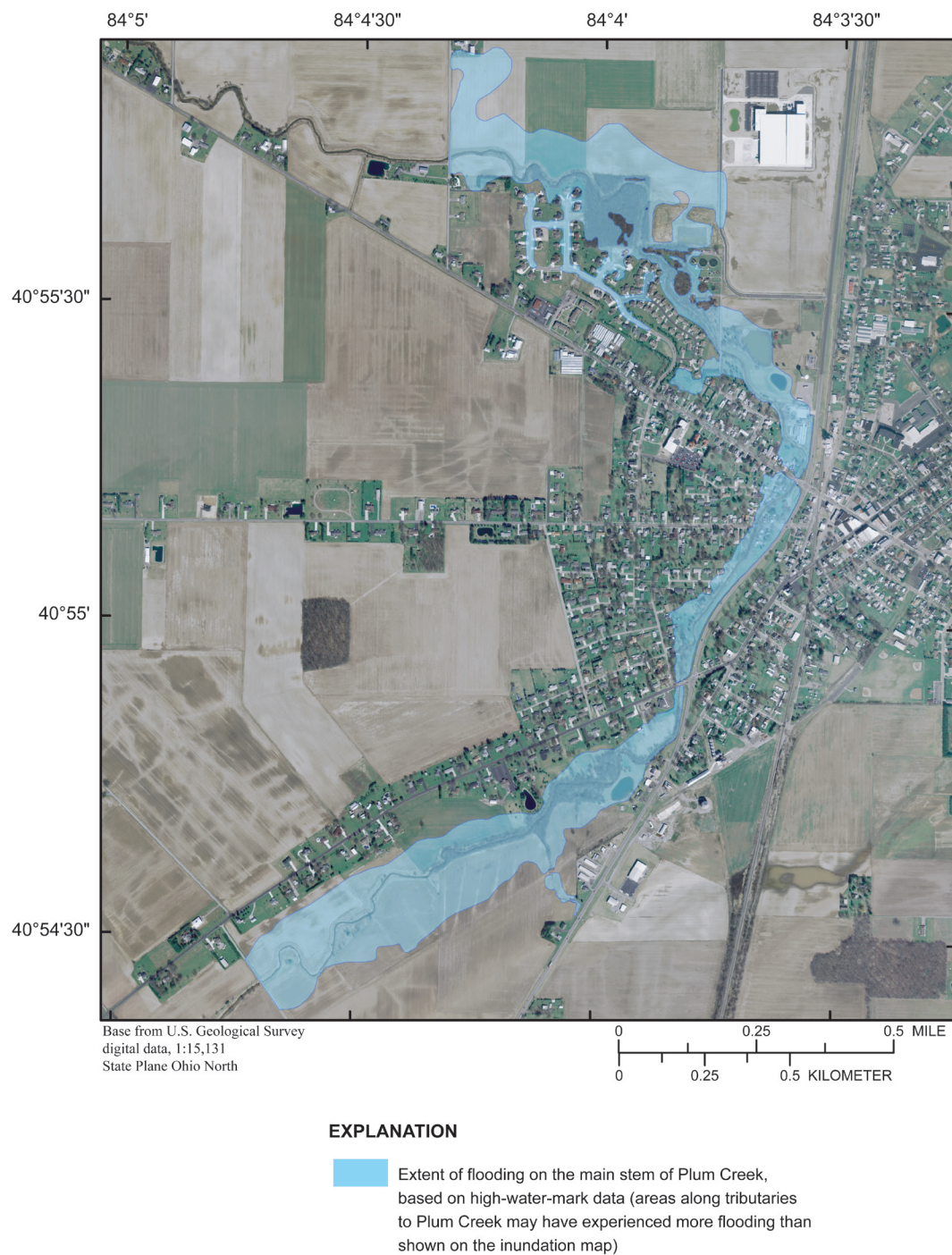


Figure 29. Estimated flood-inundation area for Plum Creek in and near the village of Columbus Grove, Ohio.

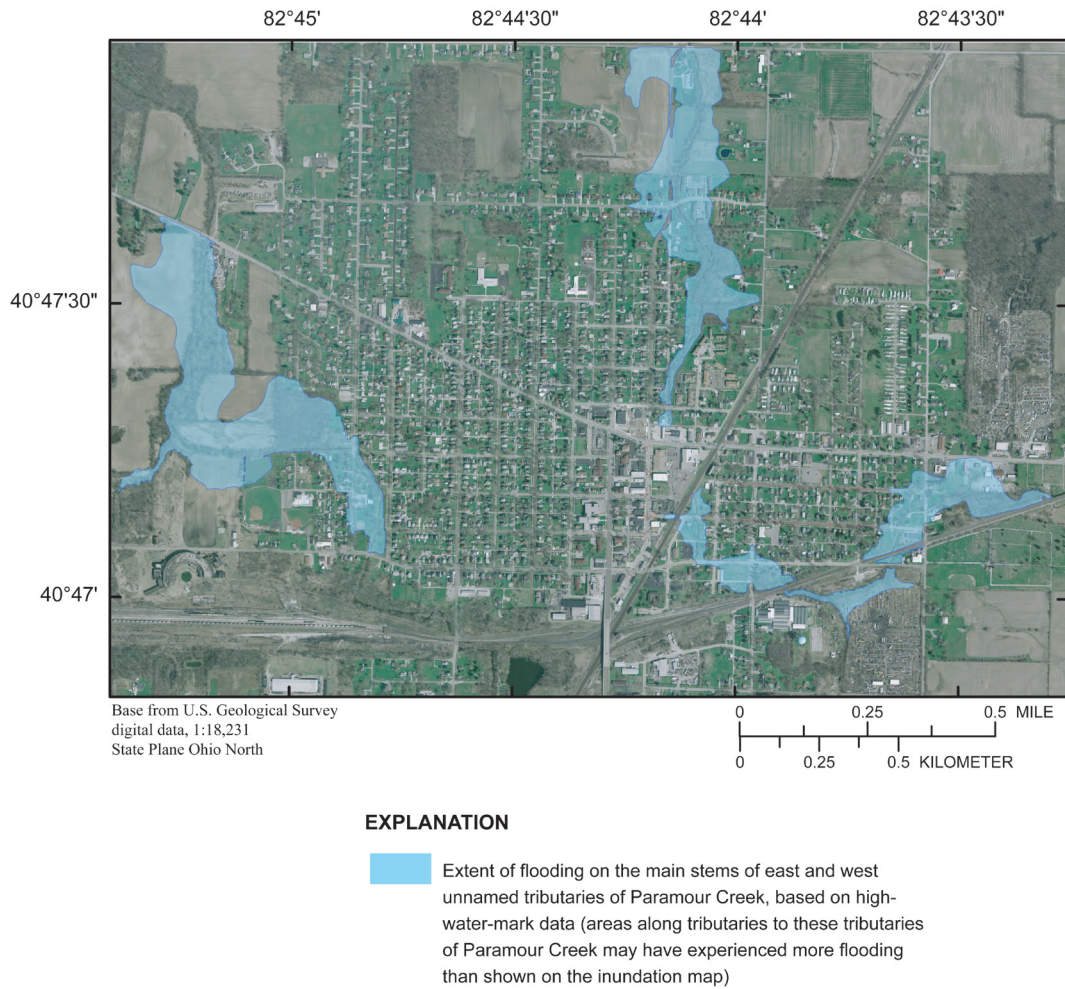
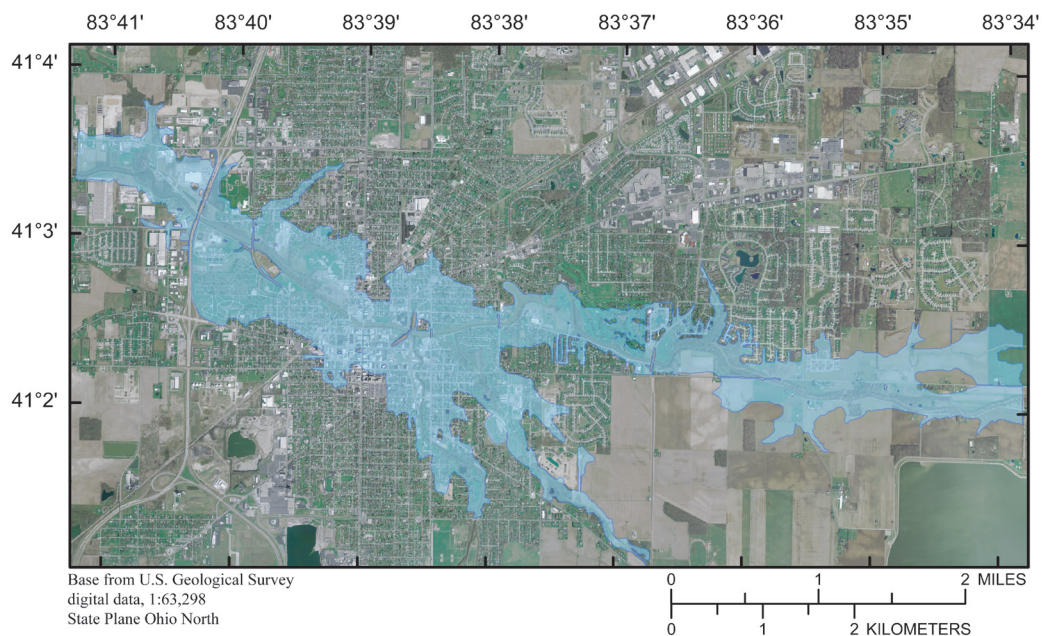


Figure 30. Estimated flood-inundation area for east and west unnamed tributaries of Paramour Creek in and near the village of Crestline, Ohio.



EXPLANATION

- Extent of flooding on the main stem of the Blanchard River, based on high-water-mark data (areas along tributaries to the Blanchard River may have experienced more flooding than shown on the inundation map)

Figure 31. Estimated flood-inundation area for the Blanchard River in and near the city of Findlay, Ohio.

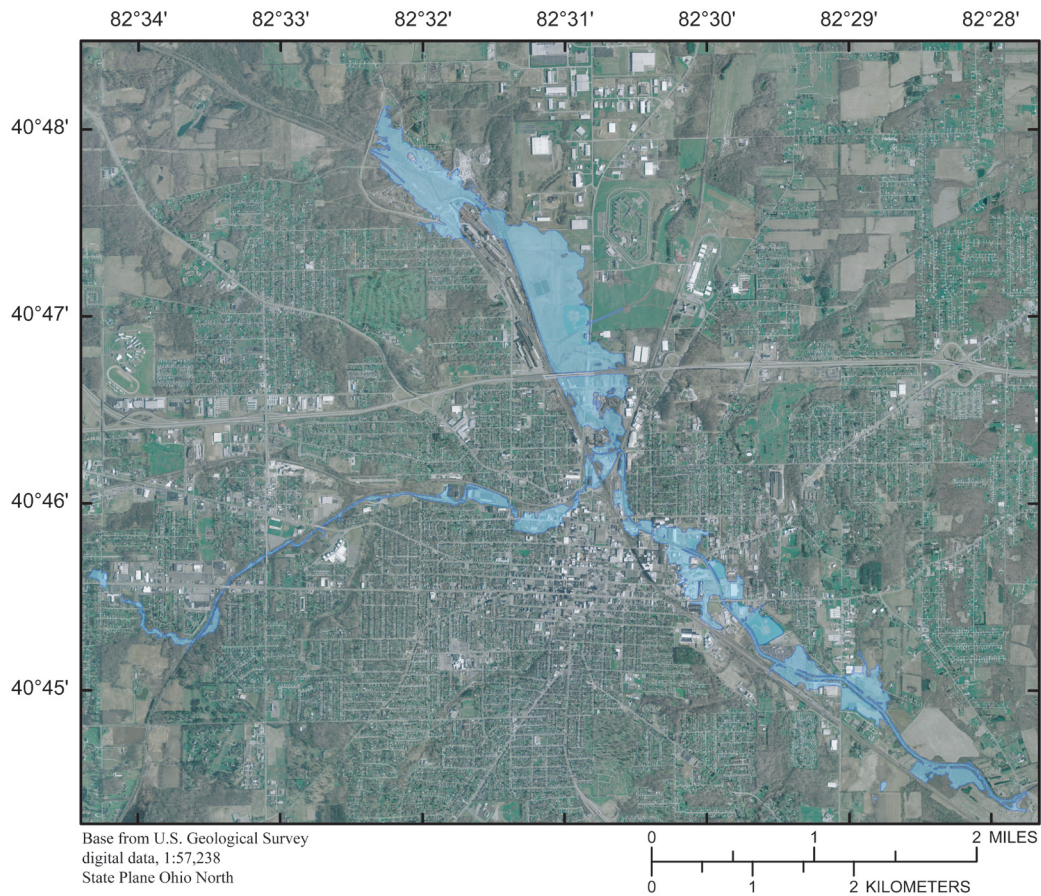


Figure 32. Estimated flood-inundation area for Rocky Fork Mohican River and Touby Run in and near the city of Mansfield, Ohio.

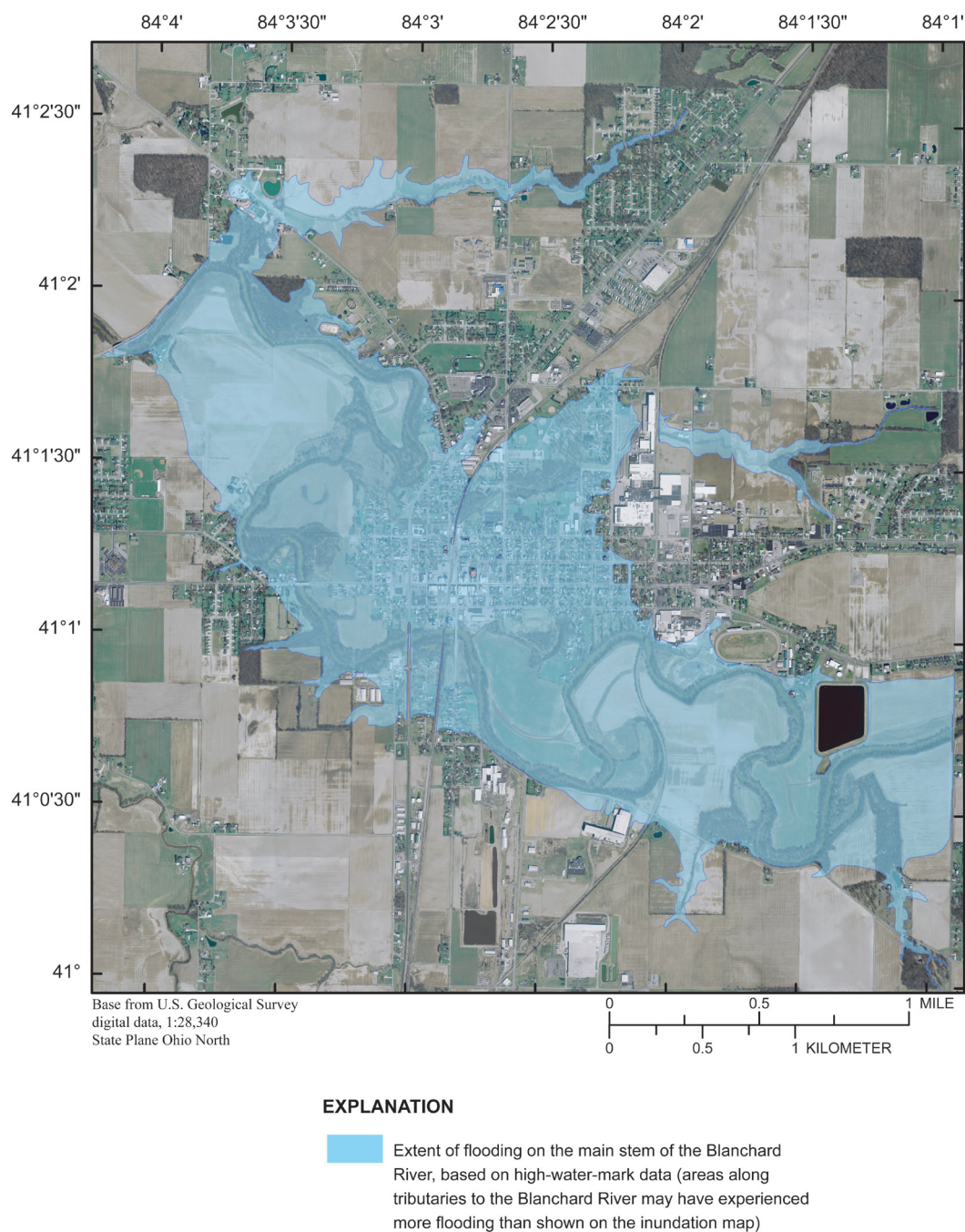


Figure 33. Estimated flood-inundation area for the Blanchard River in and near the city of Ottawa, Ohio.

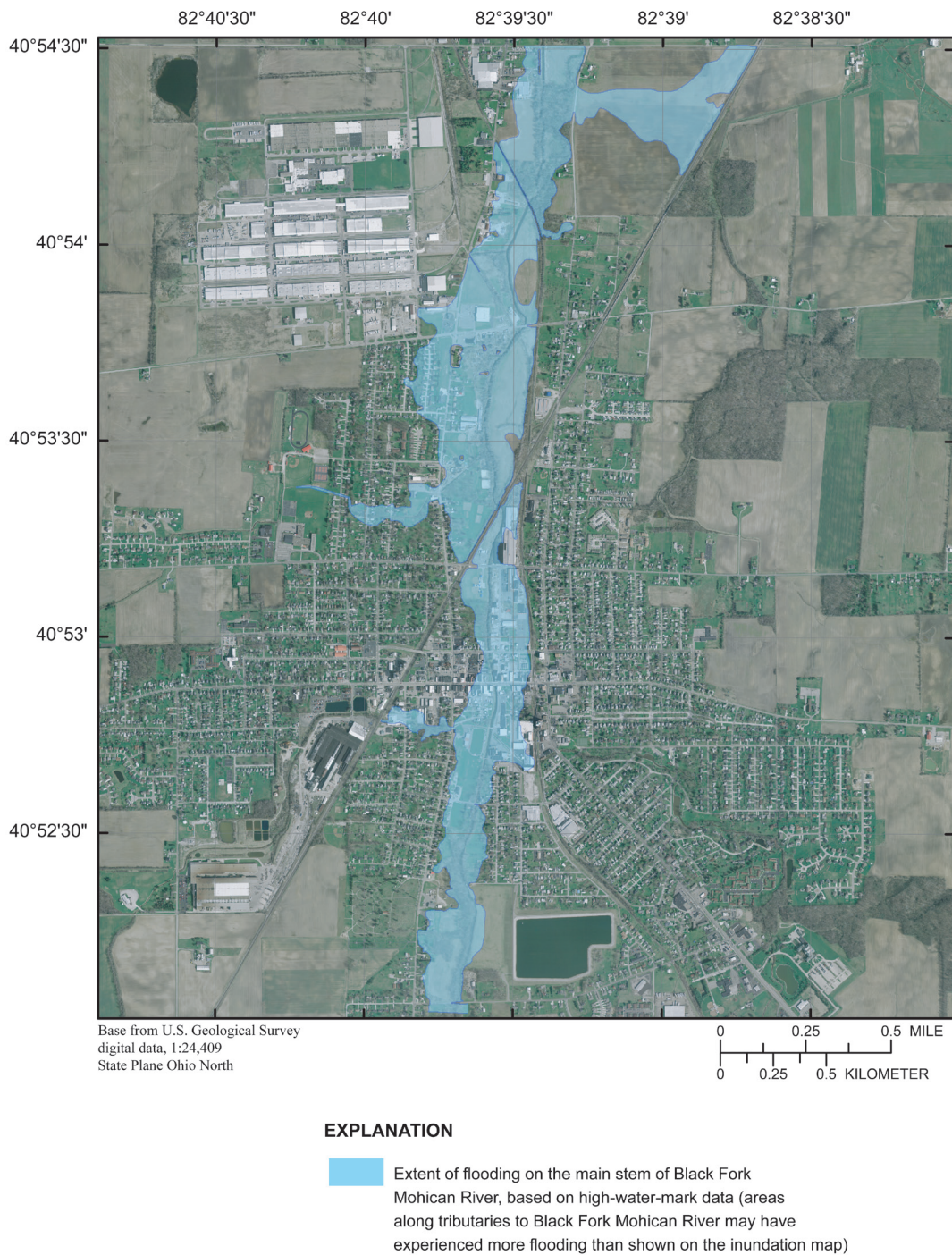


Figure 34. Estimated flood-inundation area for the Black Fork Mohican River in and near the city of Shelby, Ohio.

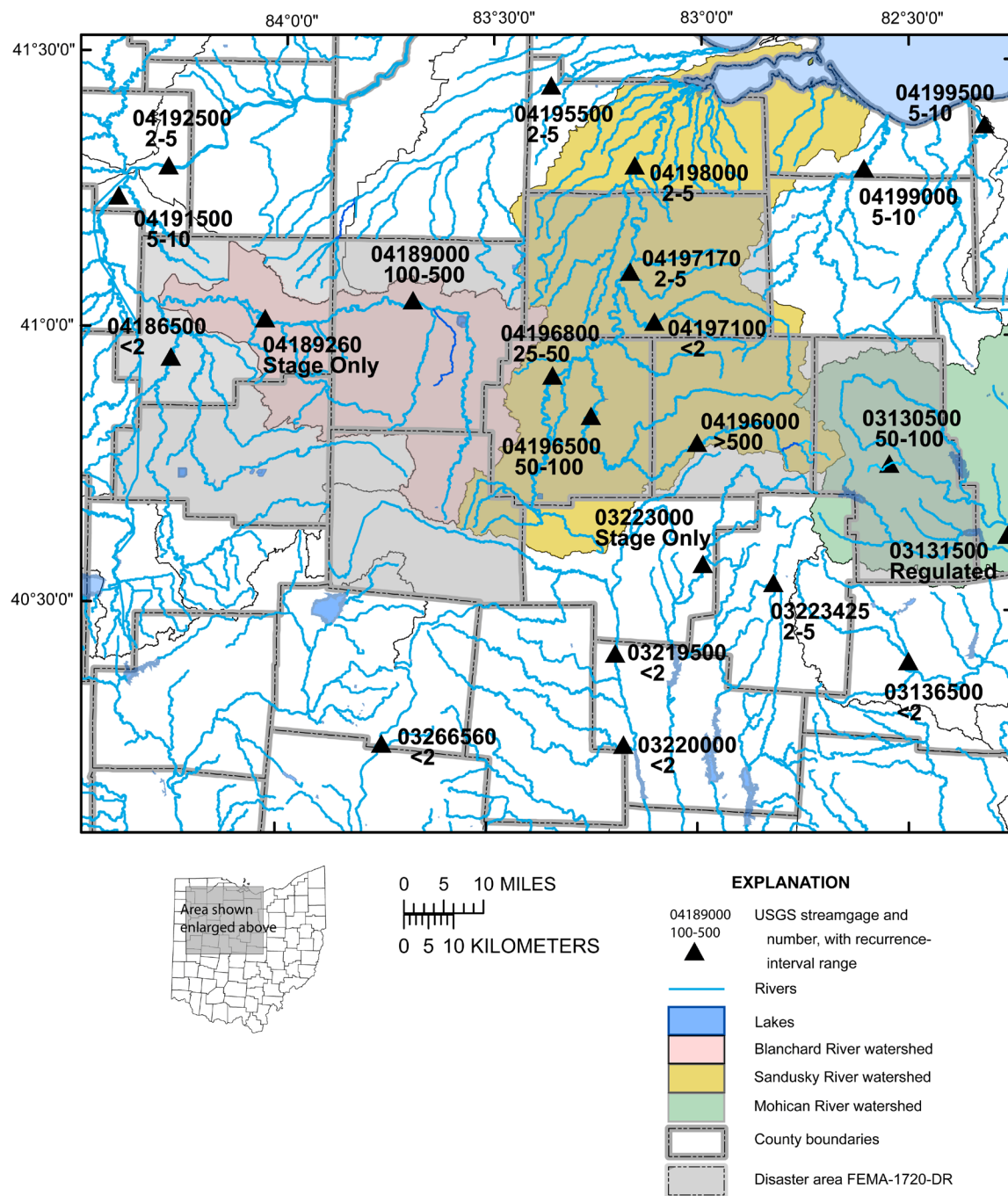


Figure 35. Location of selected USGS streamgages, with recurrence-interval ranges, in and around the designated disaster area for the flood of August 21-24, 2007.

