Floods of December 2004 and January 2005 in Ohio: FEMA Disaster Declaration 1580

By Andrew D. Ebner, David E. Straub, and Jonathan D. Lageman

In cooperation with the Ohio Emergency Management Agency

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Conversion Factors 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)
	Area	
square mile (mi^2)	2.590	square kilometer (km^2)
	Flow rate	
foot per second (ft/s)	0.3048	meter per second (m/s)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
meter per second (m/s)	2.237	mile per hour (mph)
	Pressure	
millibar (mb)	1.0	hectoPascal (hPa)

Temperature in degrees Fahrenheit (°F) may be converted to degrees Celsius (°C) as follows:

°C = (°F-32)/1.8

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:

°F = (1.8x°C)+32

Vertical coordinate information is referenced to North American Vertical Datum of 1988 (NAVD 88), the National Geodetic Vertical Datum of 1929 (NGVD 29), and the U.S. Army Corps of Engineers 1912 Datum (COE 1912), as noted.

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

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

Abbreviations

FEMA – Federal Emergency Management Agency

FIS – Flood Insurance Study

GPS – Global Positioning System

GIS – Geographical Information System

NEORSD – Northeast Ohio Regional Sewer District

NGS – National Geodetic Survey

NOAA – National Oceanic and Atmospheric Administration

NWS – National Weather Service

Ohio EMA – Ohio Emergency Management Agency

RTK – Real-Time Kinematic

TIN – Triangulated Irregular Network

USACE – United States Army Corps of Engineers

USGS – U.S. Geological Survey

USC&GS – United States Coast & Geodetic Survey

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Abstract

A large snowstorm at the end of December 2004 that left more than 20 in. of snow in some areas of Ohio, followed by unseasonably warm temperatures in early January 2005, caused snowmelt to begin filling river channels. Widespread rain showers during January 2005 combined with this snowmelt to cause flooding throughout Ohio and mudslides in some areas. Record peak streamflows occurred at nine U.S. Geological Survey (USGS) streamgages. Damages caused by the snowstorms, flooding, and mudslides were severe enough for 62 counties in Ohio to be declared Federal disaster areas. In all, approximately 3,664 private structures were damaged or destroyed, and an estimated $238 million in damages occurred.

This report describes the meteorological factors that resulted in severe flooding throughout Ohio between December 22, 2004, and February 1, 2005, and examines the damages caused by the storms and flooding. Peak-stage, peak-streamflow, and recurrence-interval data are reported for selected USGS streamgages. Flood profiles determined by the USGS are presented for selected streams.

Introduction

Snowmelt, combined with the passage of several widespread rainstorms in January 2005, caused flooding throughout much of Ohio. The Federal Emergency Management Agency (FEMA) declared 62 counties affected by flooding, winter storms, and mudslides as disaster areas (FEMA–1580–DR, Ohio, declared on February 15, 2005, with an incident period from December 22, 2004 through February 1, 2005). Figure 1 shows the 62 counties that were declared Federal disaster areas and whether they were declared to be eligible for Individual Assistance[1], Public Assistance[2], or both (Federal Emergency Management Agency, 2007). In many of these counties, several floods occurred during this 6-week period.

Because of the magnitude of these floods, the U.S. Geological Survey (USGS), in cooperation with the Ohio Emergency Management Agency (Ohio EMA), completed a study to describe pertinent flood information to document this historic event. Documentation of floods can assist Federal, State, and local agencies in making informed decisions on flood-plain management and flood-emergency practices. Flood profiles were developed for Buffalo Creek (head of Wills Creek) and Wills Creek near the Village of Pleasant City (appendix 1–A), Wills Creek near the Village of Derwent (appendix 1–A),Wills Creek near the Village of Kimbolton (appendix 1–A), Leatherwood Creek near the Village of Quaker City (appendix 1–**B**), Clear Fork near the Village of Birmingham (appendix 1–C), West Fork Duck Creek near the Villages of Ava and Coal Ridge (appendix 1–D), West Fork Duck Creek near the Village of South Olive (appendix 1–D), East Fork Duck Creek near the Village of East Union (appendix 1–E), and the Muskingum River near the City of McConnelsville (appendix 1–F) as requested by Ohio EMA.

This report describes the weather conditions leading to the flood. A general description of the flood is also presented, along with damage estimates.

[1] Individual Assistance is defined as assistance to individuals and households.

[2] Public Assistance is defined as assistance to State and local governments for the repair or replacement of disaster-damaged public facilities.

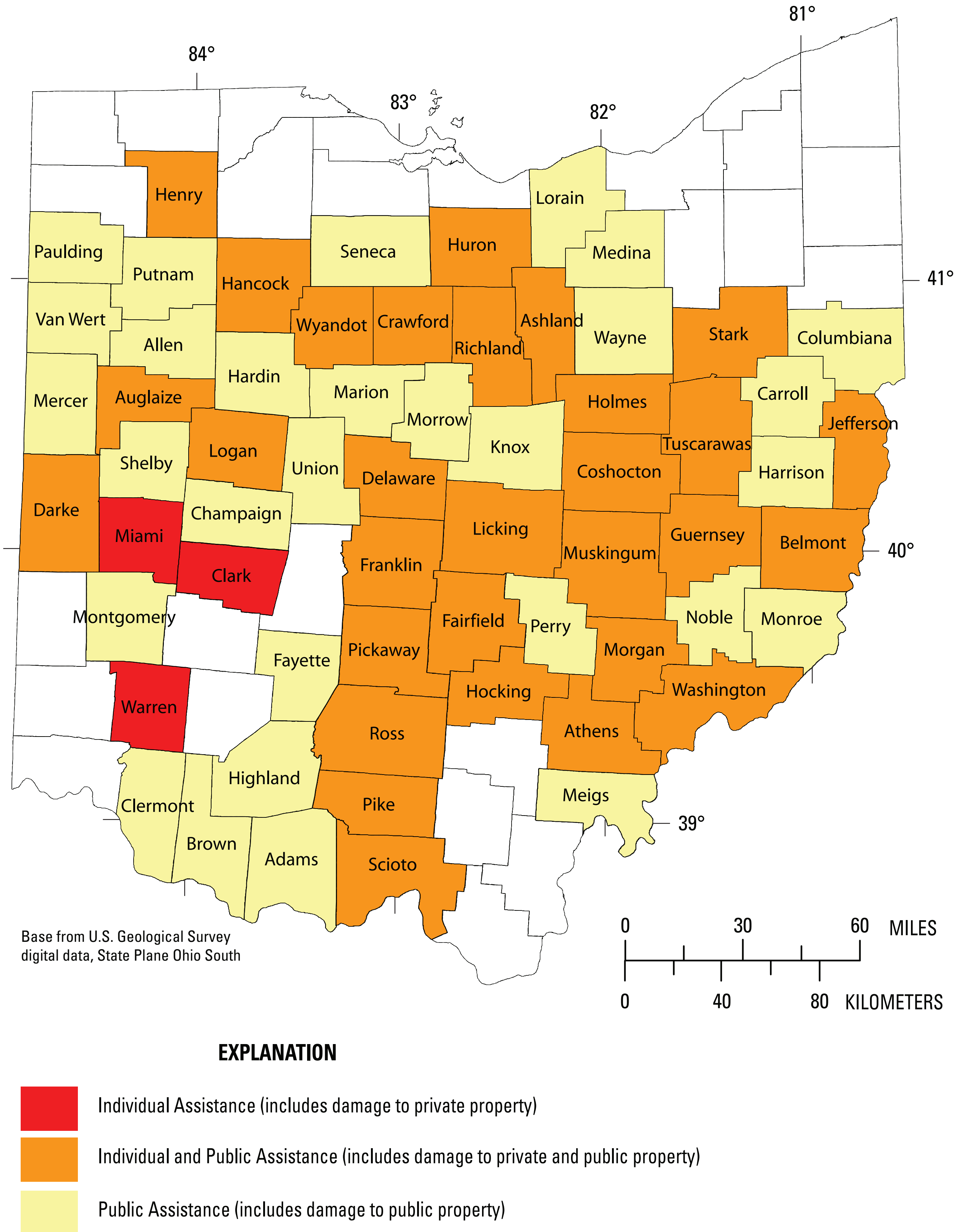

Figure 1. Ohio counties declared disaster areas under FEMA declaration 1580 (modified from Federal Emergency Management Agency, 2007).

Antecedent Climatic Conditions

Unusually wet conditions that preceded the floods in Ohio during December 2004 and January 2005 contributed to the severity of flooding. Climatic conditions prior to the flooding are presented in this section.

November 2004. The National Oceanic and Atmospheric Administration (NOAA) divides Ohio into 10 regions based on similar climatological characteristics. Precipitation was above normal[3] for the month in all regions of Ohio except the Northeast (fig. 2A). The State as a whole was 0.56 in. above normal, with an average precipitation of 3.54 in. for the month. The South Central Region received the most precipitation with 4.52 in., whereas the Northeast Region received the least with 2.78 in. (fig. 2A)(Cashell and Kirk, 2004a).

December 2004. Precipitation totals for each region were at or above normal except for the Northwest Region (fig. 2B). The State as a whole was 0.65 in. above normal, receiving 3.41 in. The Northeast Region received the most precipitation with 4.90 in., whereas the Northwest received the least with 2.43 in. Precipitation in the beginning of the month fell mostly as rain, but towards the end of the month, a snow and wintry mix fell over the middle and northern third of the state (Cashell and Kirk, 2004b).

December 2004–January 2005 Flood

Unseasonably warm temperatures (maximum temperatures ranging from 50 to 60°F) at the end of December 2004 and the beginning of January 2005 caused snow that had fallen in late December 2004 to melt (National Oceanic and Atmospheric Administration, 2004, 2005). This snowmelt and runoff was followed by storms that crossed Ohio during the beginning and middle of January 2005. This combination of runoff from snowmelt and runoff from rainfall caused rivers to overtop their banks throughout much of Ohio. From December 22, 2004, to January 15, 2005, the circulation in the upper levels of the atmosphere was characterized by a ridge[4] of high pressure over the Gulf of Alaska, a trough[5] of low pressure over the southwestern United States, and a ridge of high pressure over the east coast of the United States (fig. 3A). A strong jet stream[6] extended from the southwestern United States up to New England. In comparing the conditions from December 22, 2004, through January 15, 2005 (fig. 3A), to the average conditions for the same period from 1979 to 1995 (fig. 3B), it can be seen that the ridge and trough system over the north Pacific Ocean and western United States was much more amplified during December 22, 2004–January 15, 2005, than it is normally, and there was a stronger than normal jet stream across the United States. Air flow generally runs parallel to the isolines shown in figures 3A and 3B, so it is evident that the flow of air into the Midwest during December 22, 2004–January 15, 2005 (fig. 3A), came from further south than normal (fig. 3B). This atmospheric circulation pattern steered large winter storms, deep layers of moisture (from the Gulf of Mexico), and unseasonably warm temperatures into Ohio from December 22, 2004, through January 15, 2005 (Bell and Higgins, 2005).

Winter Storm of December 22–23, 2004

On the morning of December 22, 2004, a low-pressure system formed over eastern Texas and began to move northeast up the Ohio River Valley. An upper-level trough was positioned to the west of Ohio, allowing air to rise and aiding in the development of the storm. Abundant moisture was present in the low-pressure system due to winds from the Gulf of Mexico and the Atlantic Ocean. This atmospheric condition allowed for high levels of moisture convergence[7] throughout the region.

Light snowfall began in Ohio on the morning of December 22, 2004, and intensified during the afternoon hours. During this time, snowfall rates of 1 to 2 in. per hour occurred. In the early morning hours of December 23, 2004, the low-pressure system from the southwest brought warmer air to the region, causing a slight temperature increase and turning snow into a wintry mix and freezing rain. Precipitation again turned to snow around daybreak due to a drop in temperatures as the low-pressure system passed (Angel, Hinson, and Herndon, 2004a).

From 12 to 18 in. of snow fell over much of central and north-central Ohio, with parts of Richland and Miami Counties receiving more than 20 in. (fig. 4). At Mansfield Lahm Airport in Richland County, 23 in. of snow was recorded. Parts of central and north-central Ohio also experienced freezing rain, with ice accumulations ranging from ¼ in. to 1 in. The impact and damage caused by this winter storm has been compared to the record-setting blizzard of January 1978 (Angel and others, 2004a).

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[3] "Normal" refers to the average value for the period 1951–2000 (Cashell and Kirk, 2004 a,b).

[4] A ridge is defined as an elongated region of relatively high atmospheric pressure.

[5] A trough is defined as an elongated region of relatively low atmospheric pressure.

[6] A jet stream is defined as a narrow stream of the atmosphere with relatively strong winds.

[7] Moisture convergence is defined as a measure of the degree to which moist air is converging into a given area.

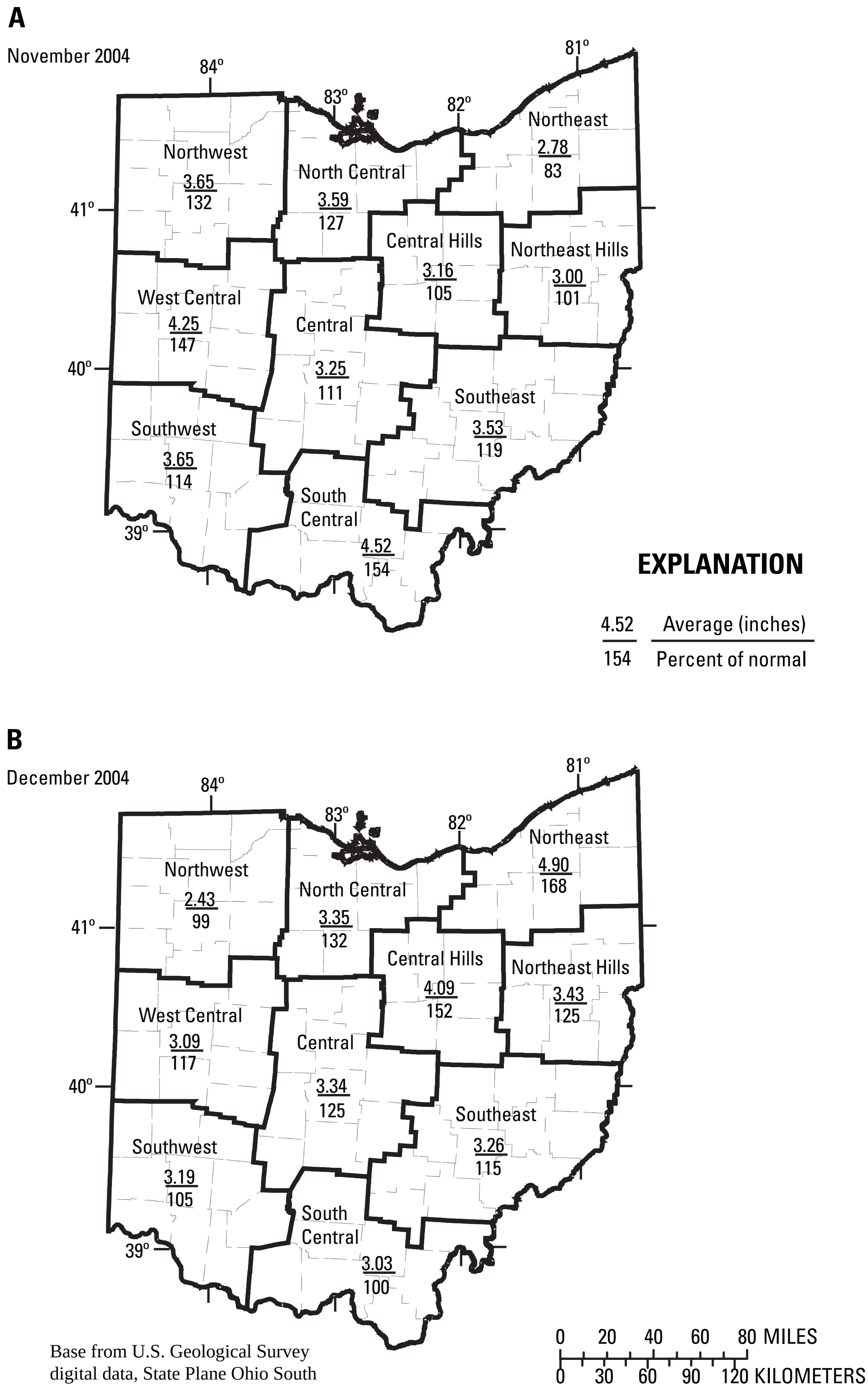


Figure 2. Regionally averaged monthly total precipitation and percentage of normal precipitation for the 10 climatic regions of Ohio for A, November and B, December 2004 (modified from Cashell and Kirk, 2004 a,b; "normal" refers to the average value for the period 1951–2000).

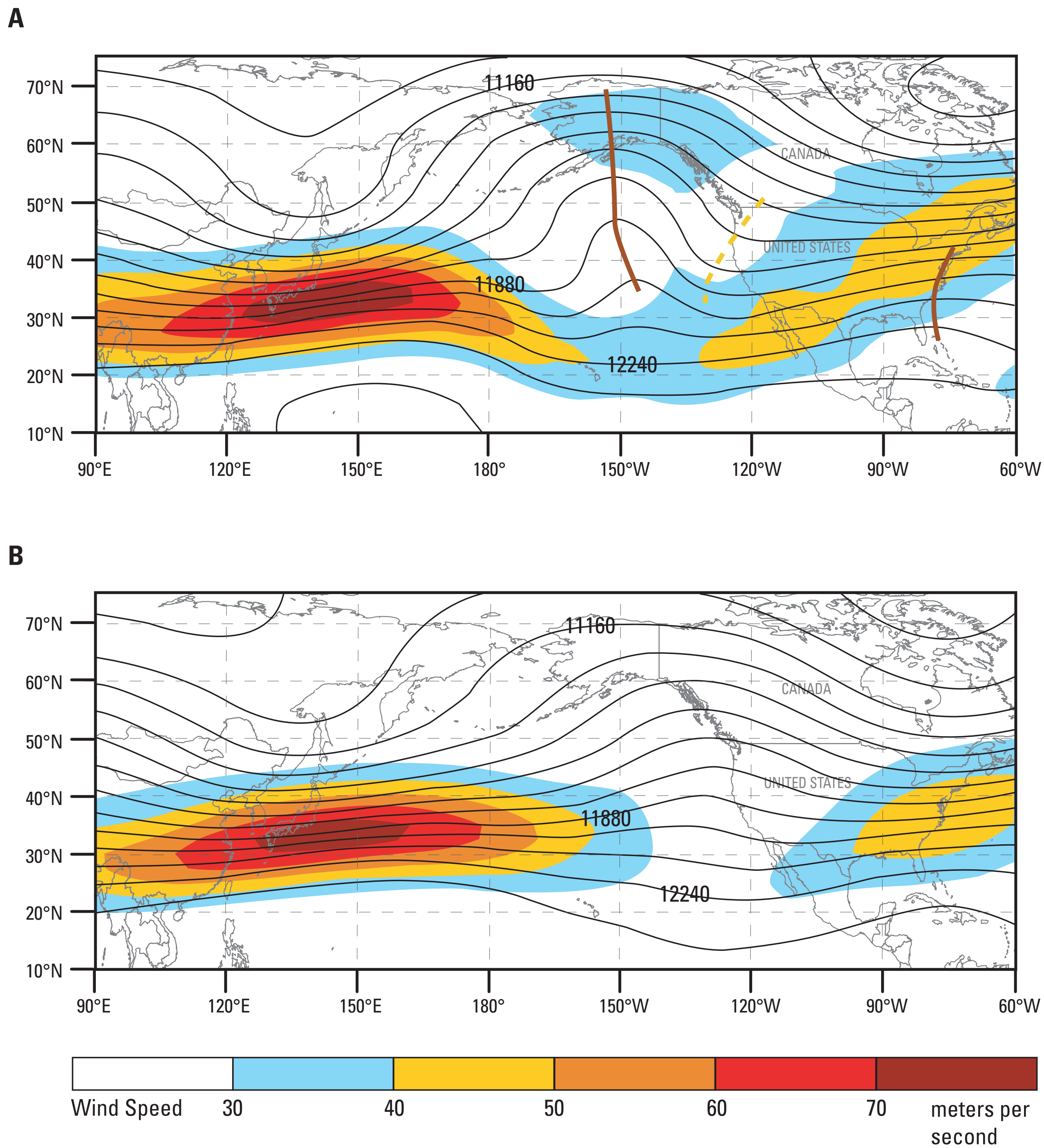


Figure 3. Mean 200-millibar heights (contour interval is 120 meters) and wind speeds (shading, meters per second) **A**, from December 22, 2004, through January 15, 2005, and **B**, for the climatological means calculated from daily means for December 22–January 15 during 1979–1995. The solid brown line denotes the axis of a ridge of high pressure, and the dashed yellow line denotes the axis of a trough of low pressure. Shaded area shows region of strong winds (jet stream). Air flow generally runs parallel to isolines (modified from Bell and Higgins, 2005).

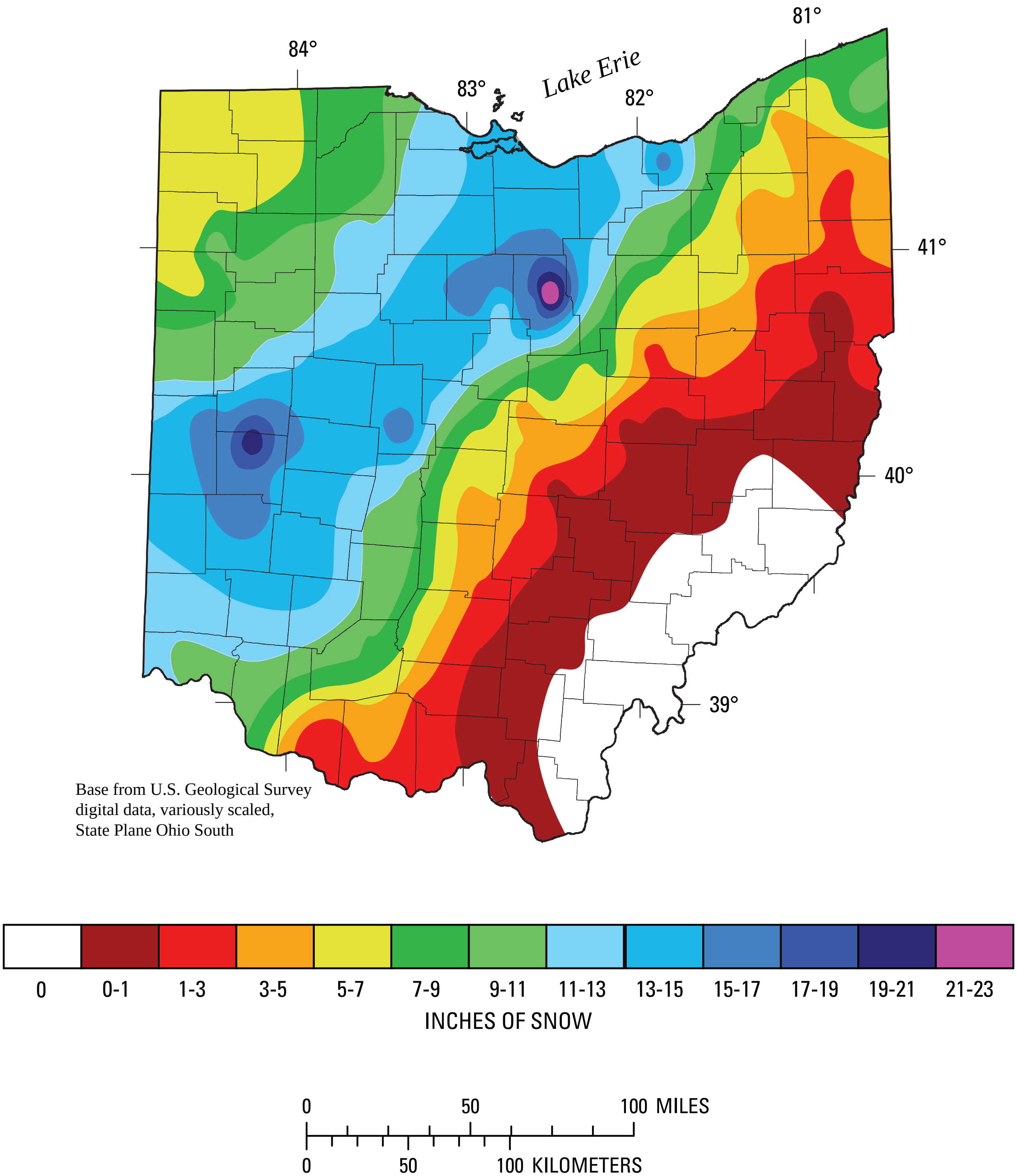


Figure 4. Distribution of 48-hour snowfall totals in Ohio for December 22–23, 2004. Based on data collected at 87 weather stations throughout Ohio (National Oceanic and Atmospheric Administration, 2004).

Storms of January 2005

Unseasonably warm temperatures on January 1–3, 2005, led to the rapid melt of snow from the December 22–23, 2004, winter storm. Starting on December 31, 2004, temperatures in Ohio began to rise as a warm front crossed over the State. The amplified ridge/trough circulation pattern in the upper atmosphere (fig. 3A) steered warm air into the Midwest. This circulation pattern persisted through January 15, 2005. Maximum temperatures in Ohio during this time were between 50 and 60ºF.

January 2005 was an unusually wet month for Ohio (Cashell and Kirk, 2005). Although precipitation occurred throughout the month (precipitation fell somewhere in the State on every day of the month), two periods brought a majority of the precipitation to the region.

On January 3, 2005, a stationary front developed over the Ohio River Valley. This front provided the necessary lifting mechanism for a period of extended rain to develop over Ohio. On January 6, 2005, this front began to move northeastward as a low-pressure center developed over northern Kentucky. Rain continued over central and southern Ohio until the afternoon of January 6 as this low-pressure system moved northeastward out of Ohio. During this 4-day event, the City of Urbana, in Champaign County, received the most rain for the State with 6.47 in. (National Oceanic and Atmospheric Administration, 2005).

On January 11, 2005, a widespread area of rain ahead of a warm front affected Ohio. As the low-pressure system associated with this warm front passed north of Ohio on January 13, the cold front associated with this low-pressure system brought another widespread area of rain across Ohio. Rain persisted in Ohio until January 14, 2005. During this 4-day event, Bellefontaine, in Logan County, received the most rain for the State with 4.43 in. (National Oceanic and Atmospheric Administration, 2005).

For January 2005, Urbana received the most rainfall, with 11.17 in.—8.79 in. above the normal January precipitation for this weather station (fig. 5) (National Climatic Data Center, 2007). Rainfall intensities and recurrence intervals for selected National Weather Service (NWS) sites from the storms that affected Ohio during January 2005 are listed in table 1. The time period used in table 1 is variable in order to show the most intense period of rainfall at each of the selected rain gage sites. The combination of warming temperatures producing runoff from snowmelt and storms bringing rain to the region caused flooding in streams throughout the State.

General Description of the December 2004–January 2005 Flood

The following sections present information about the flooding that resulted from the January 2005 storms. This section examines streamflow and stage at selected USGS streamgages in the affected counties (fig. 6). 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 a lack of available streamflow data.

Areal Distribution

The counties listed in table 2 were declared Federal disaster areas (FEMA–1580–DR) as a result of the flooding during the end of December 2004 and during January 2005. Table 2 also lists areas affected by flooding and the streams that caused the flooding. Locations of USGS streamgages, streams, and dams in the areas flooded are shown in figures 7–15.

Flood Stages, Streamflows, and Recurrence Intervals

USGS streamgage records were examined to determine which streams were most affected by these storms. The peak streamflows for these streams were compared to the recurrence intervals for streamflows that are reported in Koltun and others (2006). For streamgages that did not have sufficient record to compute a reliable recurrence-interval estimate, and so are not reported in Koltun and others (2006), recurrence intervals were estimated by use of Ohio StreamStats (U.S. Geological Survey, 2007). Table 3 lists the peak stage, peak streamflow, and recurrence-interval range for selected USGS streamgages for December 22, 2004–February 1, 2005. For those stations on regulated rivers, a recurrence interval is not given. Record peak streamflow occurred on Rocky Fork at Gahanna (station 03228560), Scioto River at Circleville (station 03230700), Scioto River at Piketon (station 03237020), Bokengehalas Creek at De Graff (station 03260706), Stillwater River near Ansonia (station 03263168), Mad River at West Liberty (station 03266560), Auglaize River near Cridersville (station 04185771), South Turkeyfoot Creek near Elery (station 04192575), and East Branch Vermilion River near Clarksfield (station 04199365). However, all these stations have a relatively short period of record. Although Blue Creek near Latty (station 04191207) was the only stream on which a recurrence interval greater than 100 years occurred, floods with recurrence intervals of 10–25 years occurred at 12 sites throughout the State.

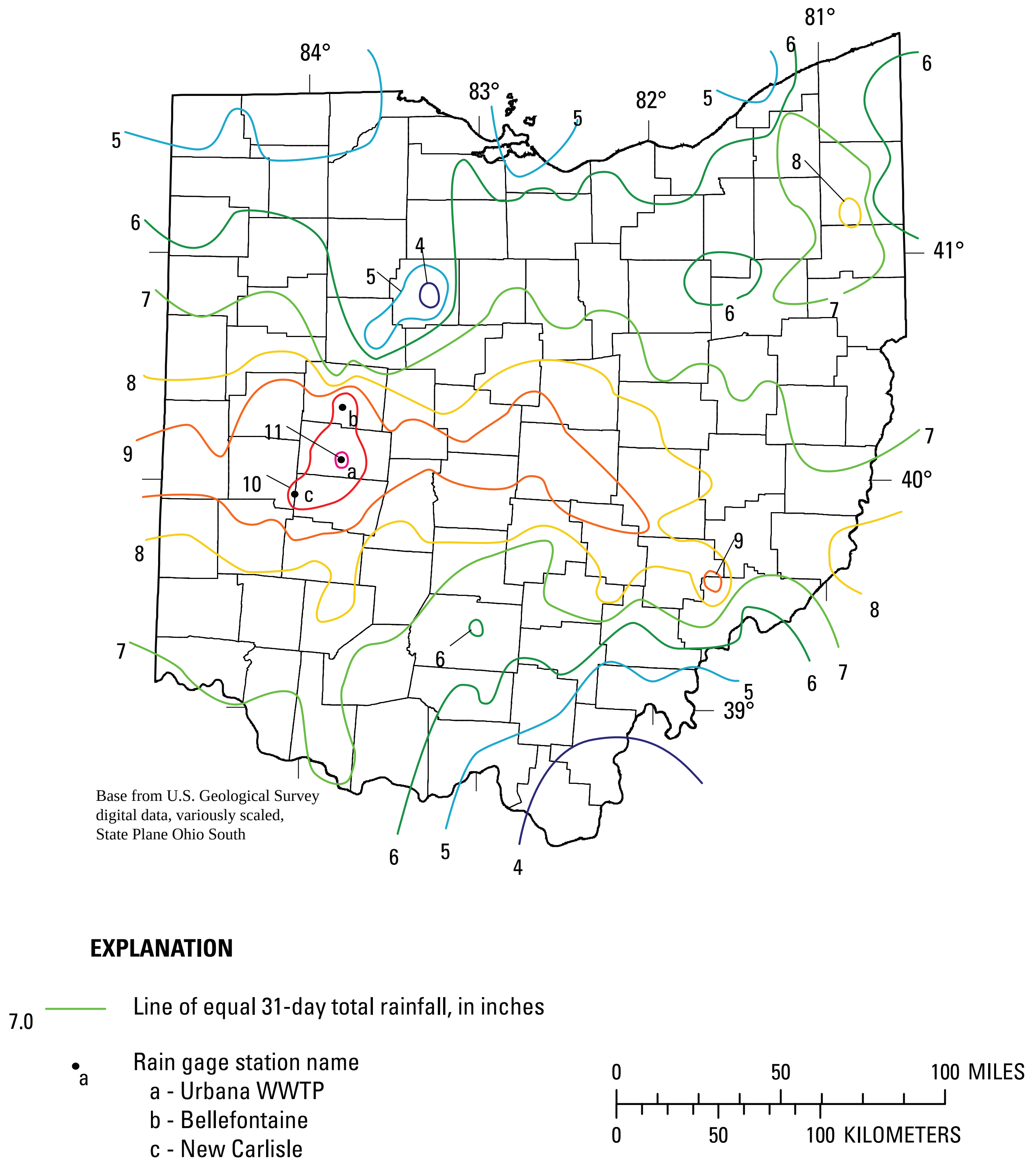


Figure 5. Isohyetal map of rainfall totals in Ohio for January 2005. Based on data collected at 141 rain gages throughout Ohio (National Oceanic and Atmospheric Administration, 2005).

Table 1. Precipitation totals and recurrence intervals for selected National Weather Service rain gages in Ohio for January 2005. Station locations are shown on figure 5.

[Data from National Oceanic and Atmospheric Administration, 2005; WWTP, wastewater treatment plant]

Station name	County	Dates (2005)	Period (days)	Precipitation (inches)	Recurrence interval[1] (years)
Urbana WWTP	Champaign	January 1–30	30	11.17	10–25
Urbana WWTP	Champaign	January 3–6	4	6.47	50–100
Bellefontaine	Logan	January 1–30	30	10.88	10–25
Bellefontaine	Logan	January 11–14	4	4.43	5–10
New Carlisle	Clark	January 1–30	30	10.22	5–10

[1]From National Weather Service (2007).

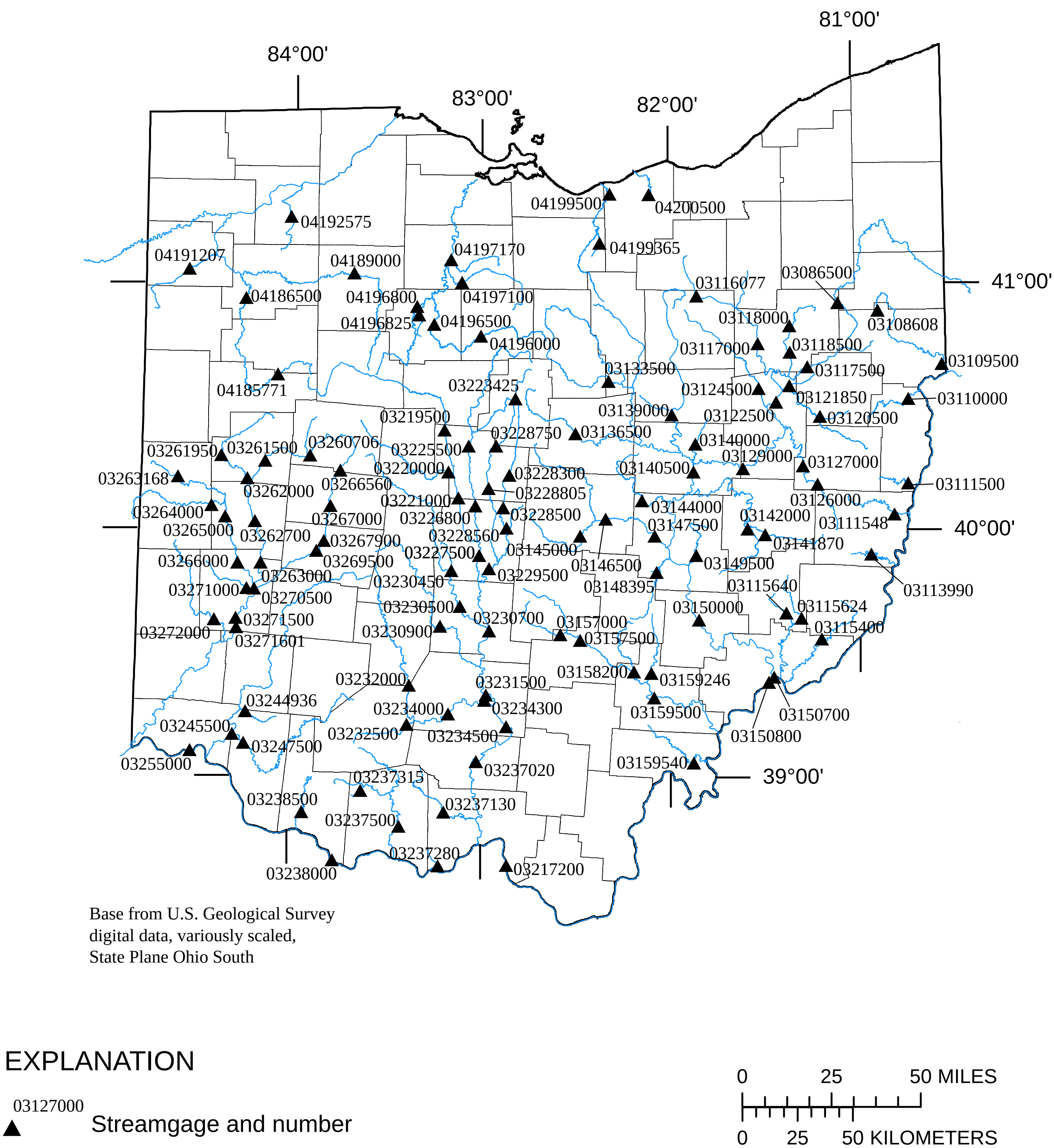


Figure 6. Locations of selected U.S. Geological Survey streamgages referred to in this report.

Table 2. Areas and streams affected by flooding during December 2004–January 2005.

[Data from Angel and others, 2004a,b]

County	Stream(s)/Source	Areas	Figure
Adams	Ohio Brush Creek and its tributaries	Widespread	7
Allen	*Data not available*	Widespread	8
Ashland	Black Fork Mohican River	Loudonville	9
	Lake Fork Mohican River	Behind Mohicanville Dam	9
	Charles Mill Lake	Swampy lowlands between Mansfield (in Richland County) and Ashland	9
Athens	Monday Creek	Widespread	10
	Sunday Creek	Chauncey	10
	Hocking River	Nelsonville, Chauncey, Athens, and Hockingport	10
	Shade River and its tributaries	Widespread	10
	Ohio River and its tributaries	Hockingport	10
Auglaize	*Data not available*	Widespread	8
	Scioto River	Eastern part of county	7
Belmont	Wheeling Creek	Lansing and Brideport	11
	McMahon Creek	Warnock, Glencoe, Neffs, and Bellaire	11
	Little McMahon Creek	Neffs	11
	Cumberland Run	Glencoe	11
	Pinch Run	Bellaire	11
	Wegee Creek and Pipe Creek	Shadyside	11
	Captina Creek	Powhatan Point	11
	Data not available	St. Clairsville	11
	Data not available	Centerville	11
Carroll	McGuire Creek	Perrysville	12
	Sandy Creek	Widespread	12
	Indian Fork/Atwood Lake	Dellroy	12
	Indian Fork	Carrollton	12
Champaign	*Data not available*	Widespread	13
Clark	*Data not available*	Widespread	13
Clermont	Little Miami River and its tributaries	Widespread	13
Columbiana	Ohio River and its tributaries	East Liverpool and Wellsville	12
Coshocton	Killbuck Creek	Blissfield and Warsaw	9
Crawford	*Data not available*	Widespread	14
	Olentangy River	Southern part of county	7
Darke	Tributaries of the Great Miami River	Widespread	13
Delaware	Scioto River and its tributaries	Widespread	7
Fairfield	Buckeye Lake	Around Buckeye Lake	10
	Hocking River and Clear Creek	Widespread	10
Fayette	Paint Creek	Widespread	7
Franklin	Scioto River and its tributaries	Widespread	7
	Scioto River	Southern Columbus	7
	Big Walnut Creek and Rocky Fork	Gahanna	7

Table 2. Areas and streams affected by flooding during December 2004–January 2005. —Continued

[Data from Angel and others, 2004a,b]

County	Stream(s)/Source	Areas	Figure
Guernsey	Buffalo Creek	Pleasant City	10
	Wills Creek	Pleasant City, Derwent, Byesville, Cambridge, and Kimbolton	10
	Clear Fork	Birmingham	10
	Leatherwood Creek	Quaker City	10
Hancock	Blanchard River and Lye Creek	Findlay	8
	Eagle Creek	Findlay and Arlington	8
	Buck Run	Arlington	8
Hardin	Scioto River	Widespread	7
Harrison	Conotton Creek	Jewett	12
Henry	*Data not available*	Widespread	8
Hocking	Hocking River and Monday Creek	Widespread	10
Holmes	Walnut Creek	Widespread	15
	Killbuck Creek	Killbuck	9
	Black Creek	Glenmont	9
	Mohican River and its tributaries	Widespread	9
Huron	*Data not available*	Widespread	14
Jefferson	Ohio River and its tributaries	Toronto, Steubenville, and Brilliant	12
	Short Creek	Mt. Pleasant	12
	Yellow Creek	Widespread	12
Knox	Mohican River and its tributaries	Brinkhaven and Walhonding	9
	Wakatomika Creek	Widespread	10
	North Fork Licking River	Widespread	10
Licking	Licking River and its tributaries	Widespread	10
	Wakatomika Creek	Widespread	10
	Buckeye Lake	Around Buckeye Lake	10
Logan	Mill Creek and Big Darby Creek	Eastern part of county	7
	Great Miami River and its tributaries	Widespread	13
Lorain	Vermilion River	Widespread	14
	Black River and its tributaries	Carlisle Township	14
Marion	Scioto River	La Rue and Prospect	7
Medina	Wolf Creek	Sharon Township	12
Meigs	Shade River and its tributaries	Widespread	10
	Ohio River and its tributaries	Pomeroy and Racine	10
Mercer	Grand Lake St. Marys	Celina	8
Miami	Great Miami River and its tributaries	Widespread	13
Monroe	Sunfish Creek	Cameron and Clarington	11
	Straight Fork	Graysville	11
	Little Muskingum River	Rinard Mills	11
	Ohio River and its tributaries	Hannibal	11

Table 2. Areas and streams affected by flooding during December 2004–January 2005. —Continued

[Data from Angel and others, 2004a,b]

County	Stream(s)/Source	Areas	Figure
Montgomery	Great Miami River and its tributaries	Widespread	13
Morgan	Muskingum River	McConnelsville	10
Morrow	Whetstone Creek	Widespread	7
	Alum Creek	Widespread	7
	Big Walnut Creek	Widespread	7
Muskingum	Muskingum River	Adams Mills, Dresden, and Zanesville	10
	Licking River	Zanesville	10
	Salt Creek	Widespread	10
	Claypit Creek	Widespread	10
	Jonathan Creek	Widespread	10
	Wakatomika Creek	Widespread	10
Noble	Buffalo Creek	Sarahsville	10
	West Fork Duck Creek	Ava, Coal Ridge, Caldwell, and South Olive	11
	Johnny Woods River	Ava	11
	East Fork Duck Creek	East Union	11
Paulding	*Data not available*	Widespread	8
Perry	Buckeye Lake	Around Buckeye Lake	10
	Monday Creek	Widespread	10
	Sunday Creek	Widespread	10
Pickaway	Scioto River and its tributaries	Widespread	7
Pike	Scioto River	Widespread	7
Putnam	*Data not available*	Widespread	8
Richland	Black Fork Mohican River	Shelby	9
	Charles Mill Lake	Swampy lowlands between Mansfield and Ashland (in Ashland County)	9
Ross	Scioto River and its tributaries	Widespread	7
Scioto	Scioto River and its tributaries	Widespread	7
Seneca	*Data not available*	Widespread	14
Shelby	Great Miami River and its tributaries	Widespread	13
Stark	Tuscarawas River	Navarre and Canal Fulton	12
	Sugar Creek	Brewster	12
	Nimishillen Creek and its tributaries	Canton and East Sparta	12
	Sandy Creek	Minerva and Waynesburg	12
	Little Sandy Creek	Waynesburg	12
Tuscarawas	Tuscarawas River	Dover, New Philadelphia, Zoar, and above the Dover Dam	15
	Sugar Creek	Dover	15
	South Fork Sugar Creek and Walnut Creek	Dundee	15
	Huff Run	Mineral City	15

Table 2. Areas and streams affected by flooding during December 2004–January 2005. —Continued

[Data from Angel and others, 2004a,b]

County	Stream(s)/Source	Areas	Figure
Tuscarawas (*continued*)	Stillwater Creek and Little Stillwater Creek	Dennison and Uhrichsville	15
	Data not available	Newcomerstown	15
Union	Mill Creek and Big Darby Creek	Widespread	7
Van Wert	*Data not available*	Widespread	8
Warren	Little Miami River and its tributaries	Widespread	13
Washington	Muskingum River	Marietta	10
	Ohio River and its tributaries	Marietta	11
	Duck Creek	Marietta	11
Wayne	Killbuck Creek and Jennings Ditch	Wooster	9
Wyandot	*Data not available*	Widespread	14

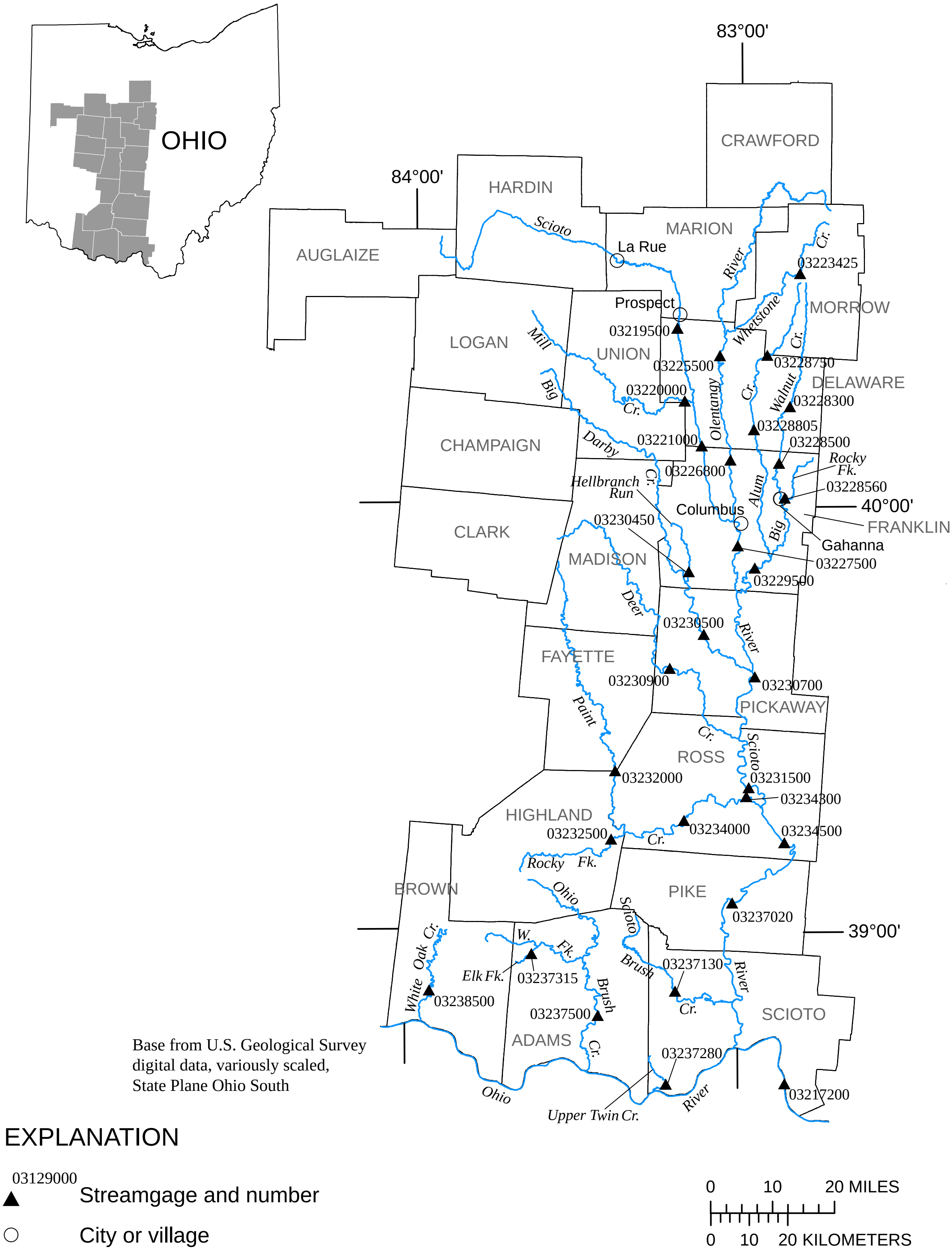


Figure 7. Selected areas of central Ohio affected by flooding during December 2004 and January 2005.

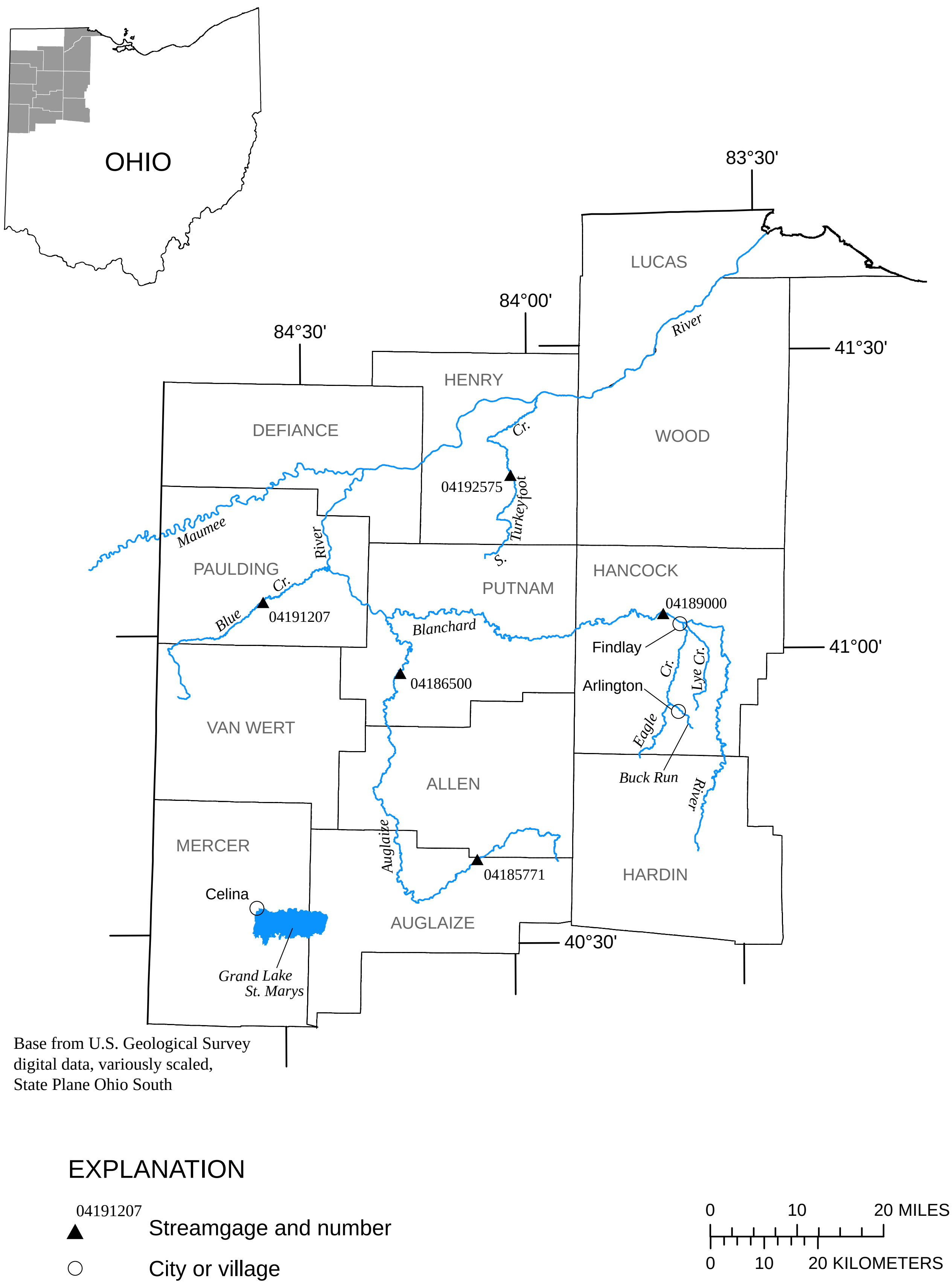


Figure 8. Selected areas of northwestern Ohio affected by flooding during December 2004 and January 2005.

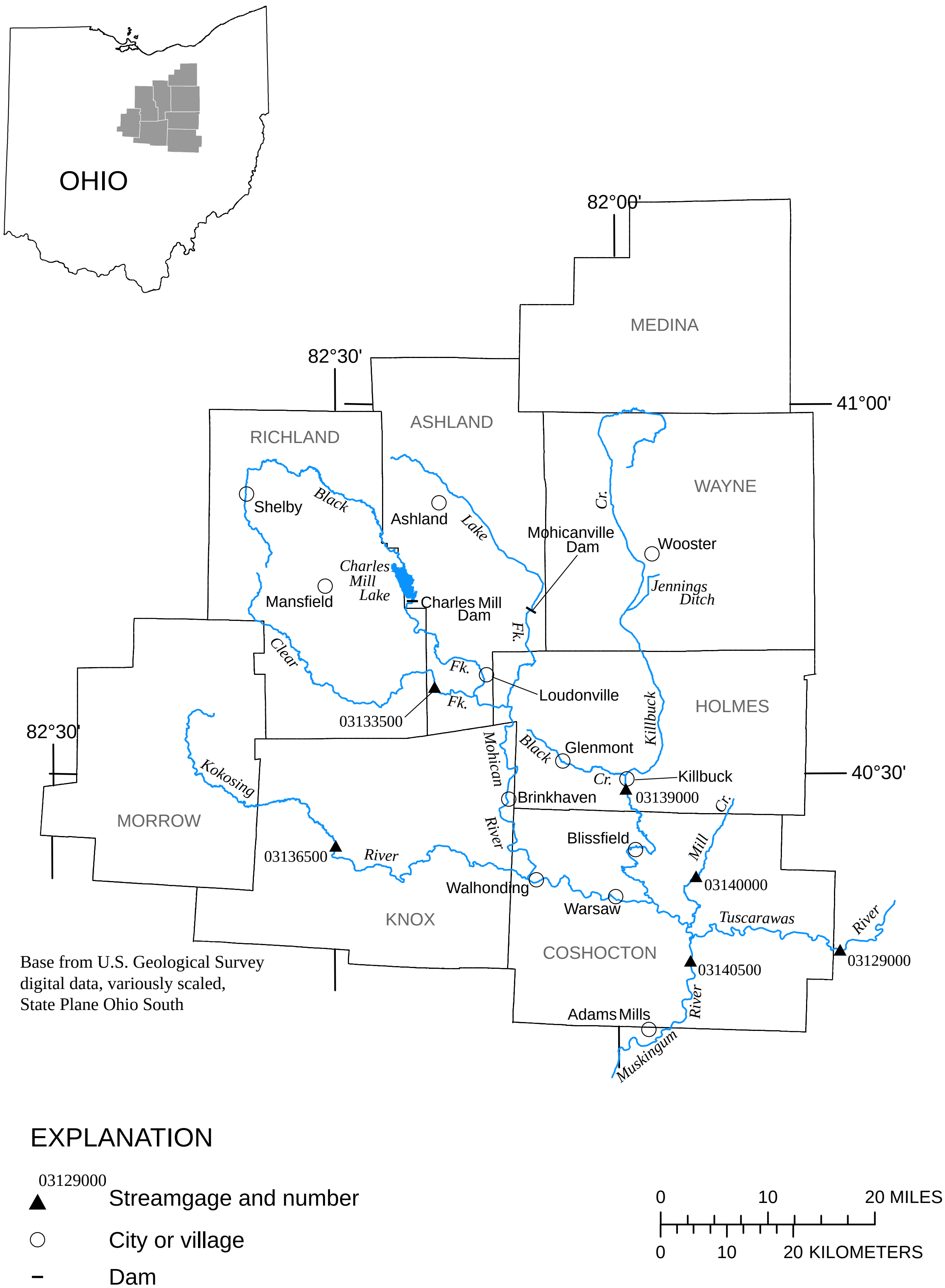


Figure 9. Selected areas of east-central Ohio affected by flooding during December 2004 and January 2005.

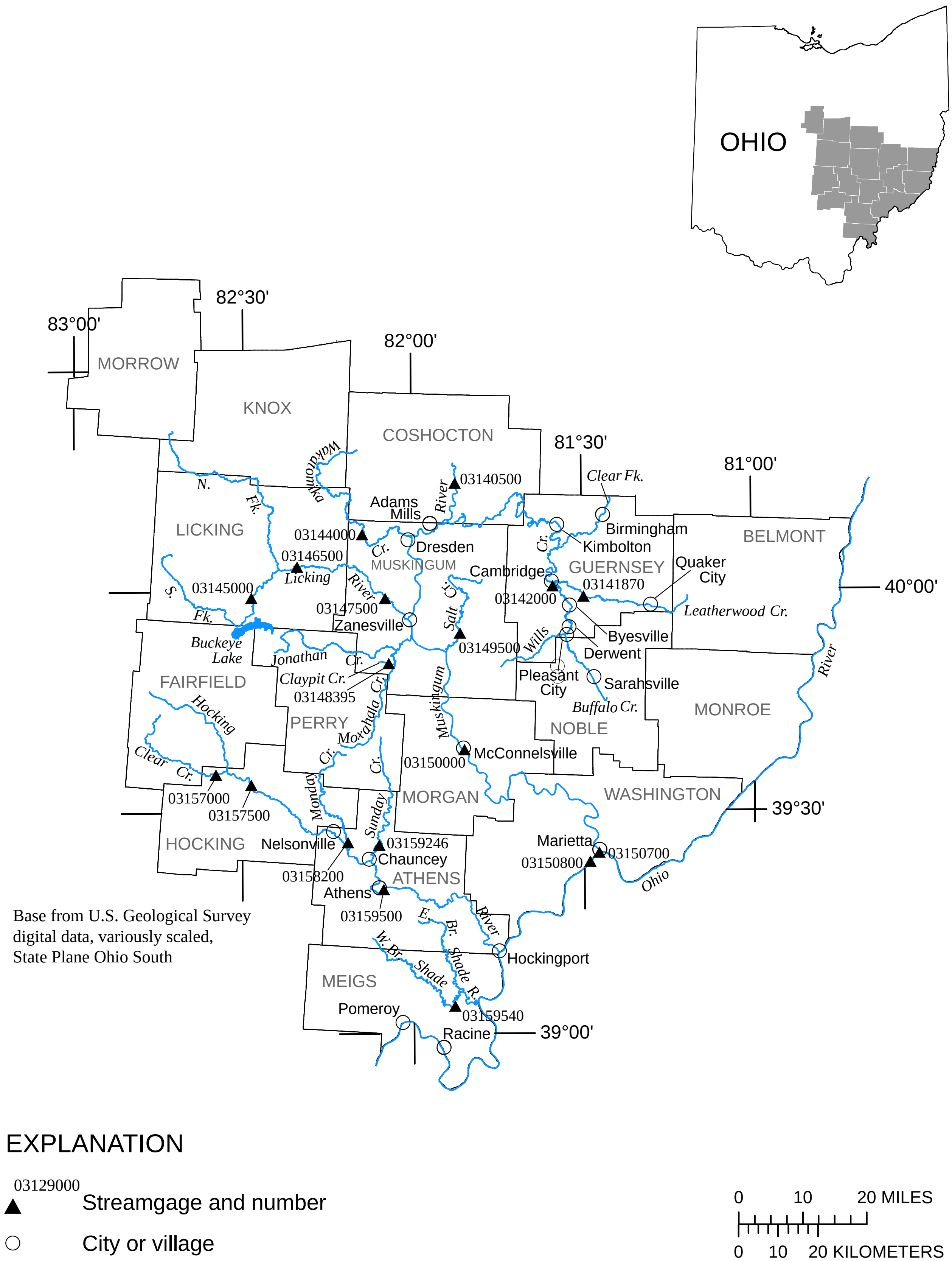


Figure 10. Selected areas of southeastern Ohio (16-county area) affected by flooding during December 2004 and January 2005.

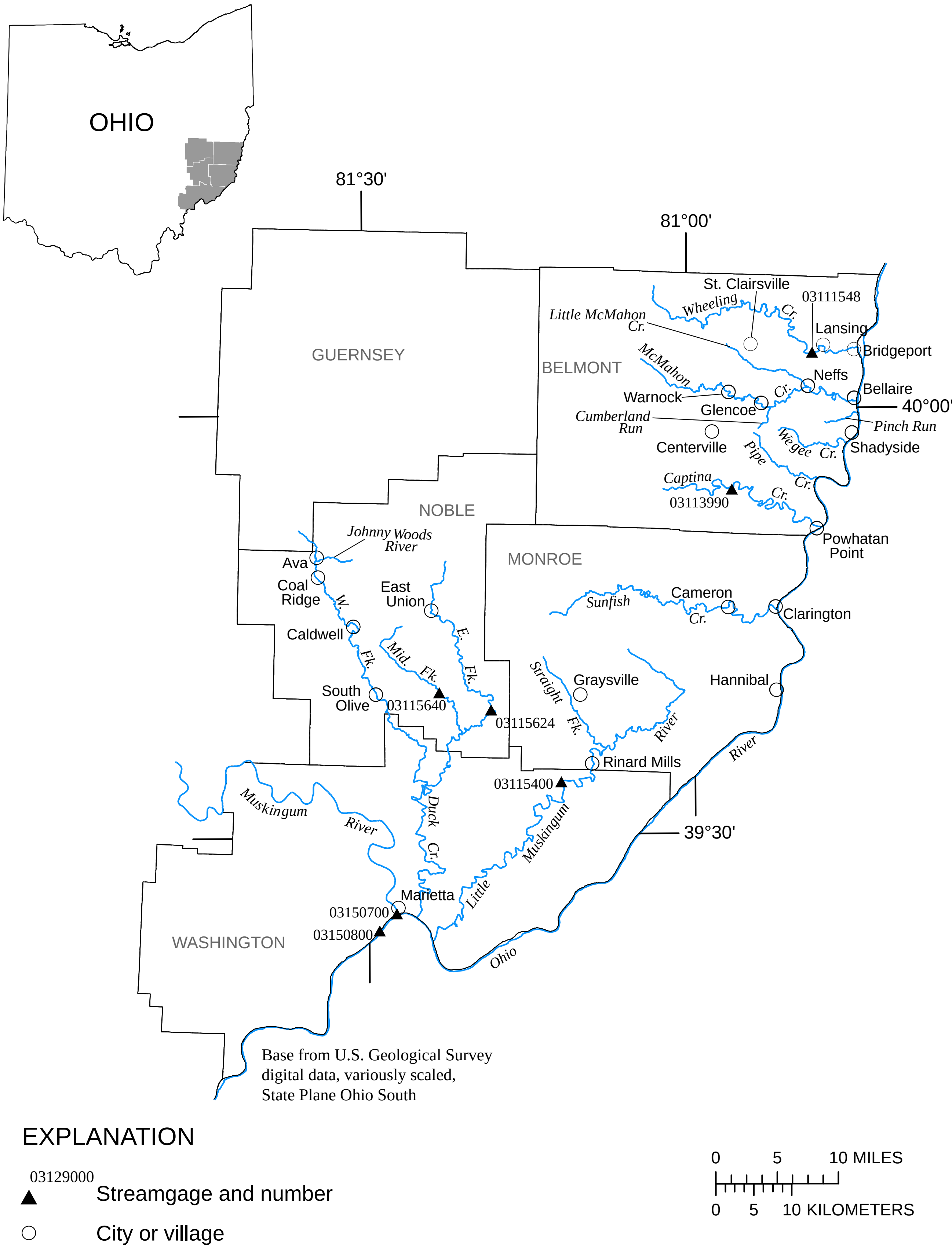


Figure 11. Selected areas of southeastern Ohio (five-county area) affected by flooding during December 2004 and January 2005.

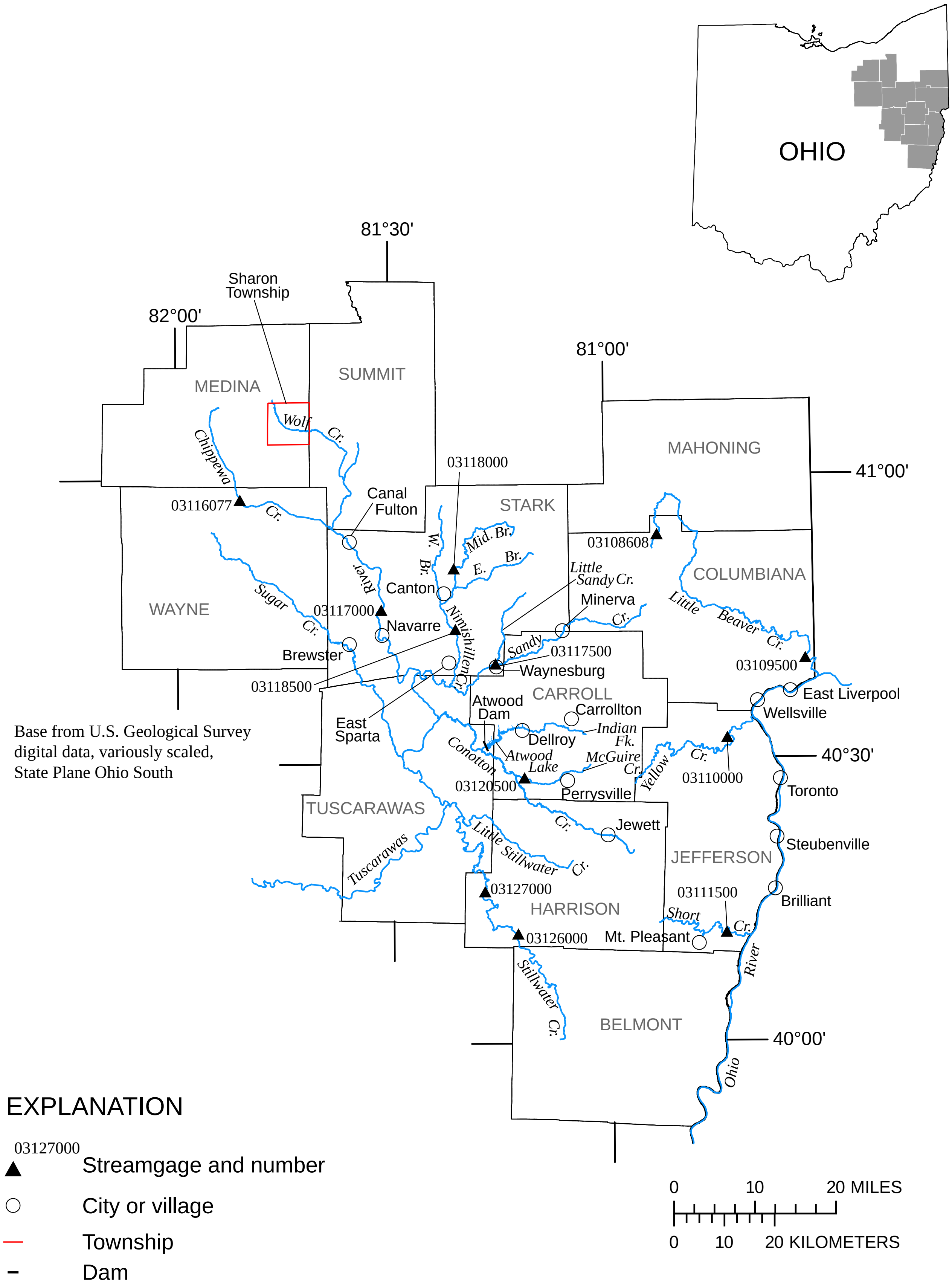


Figure 12. Selected areas of eastern Ohio affected by flooding during December 2004 and January 2005.

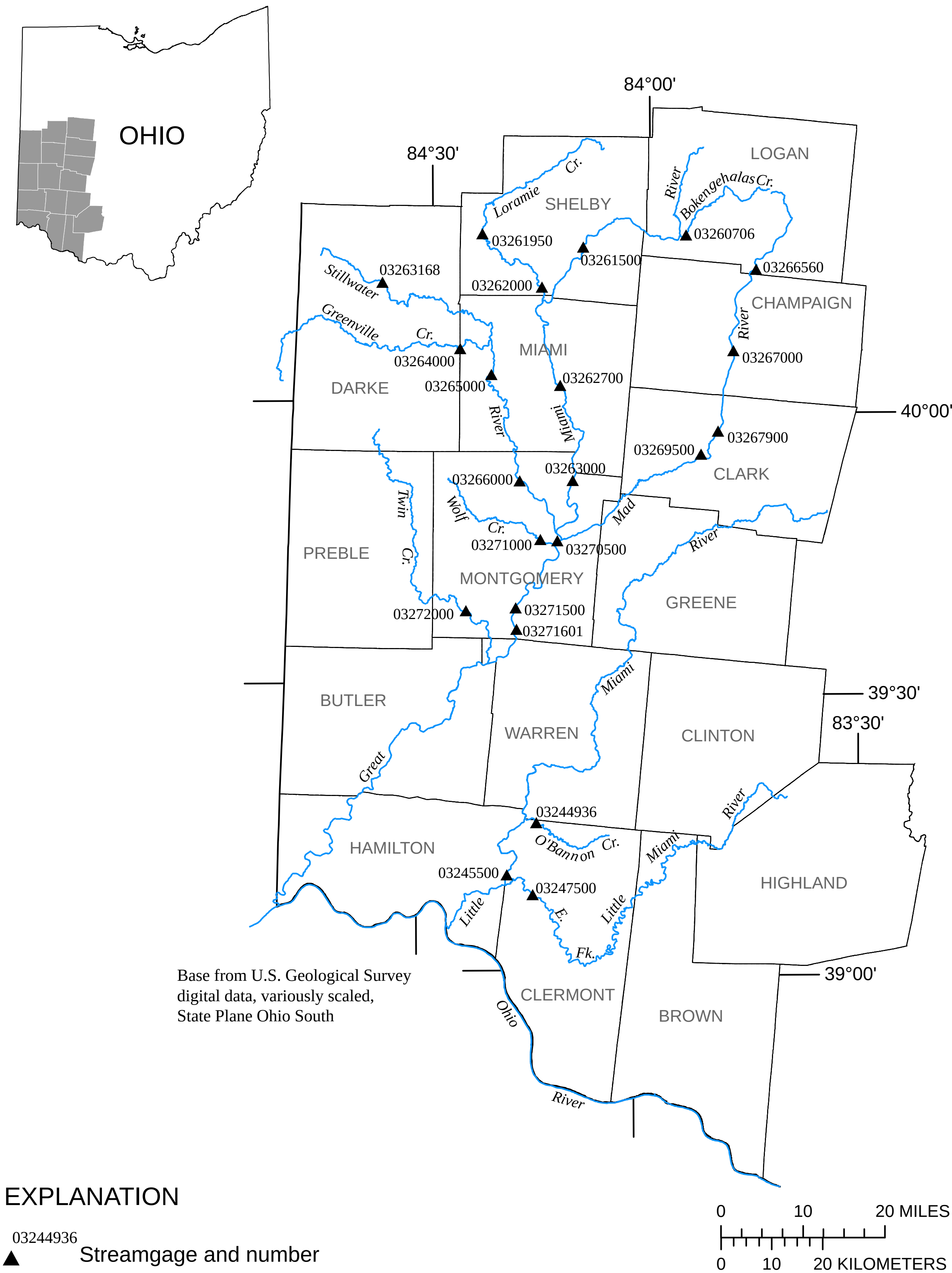


Figure 13. Selected areas of southwestern Ohio affected by flooding during December 2004 and January 2005.

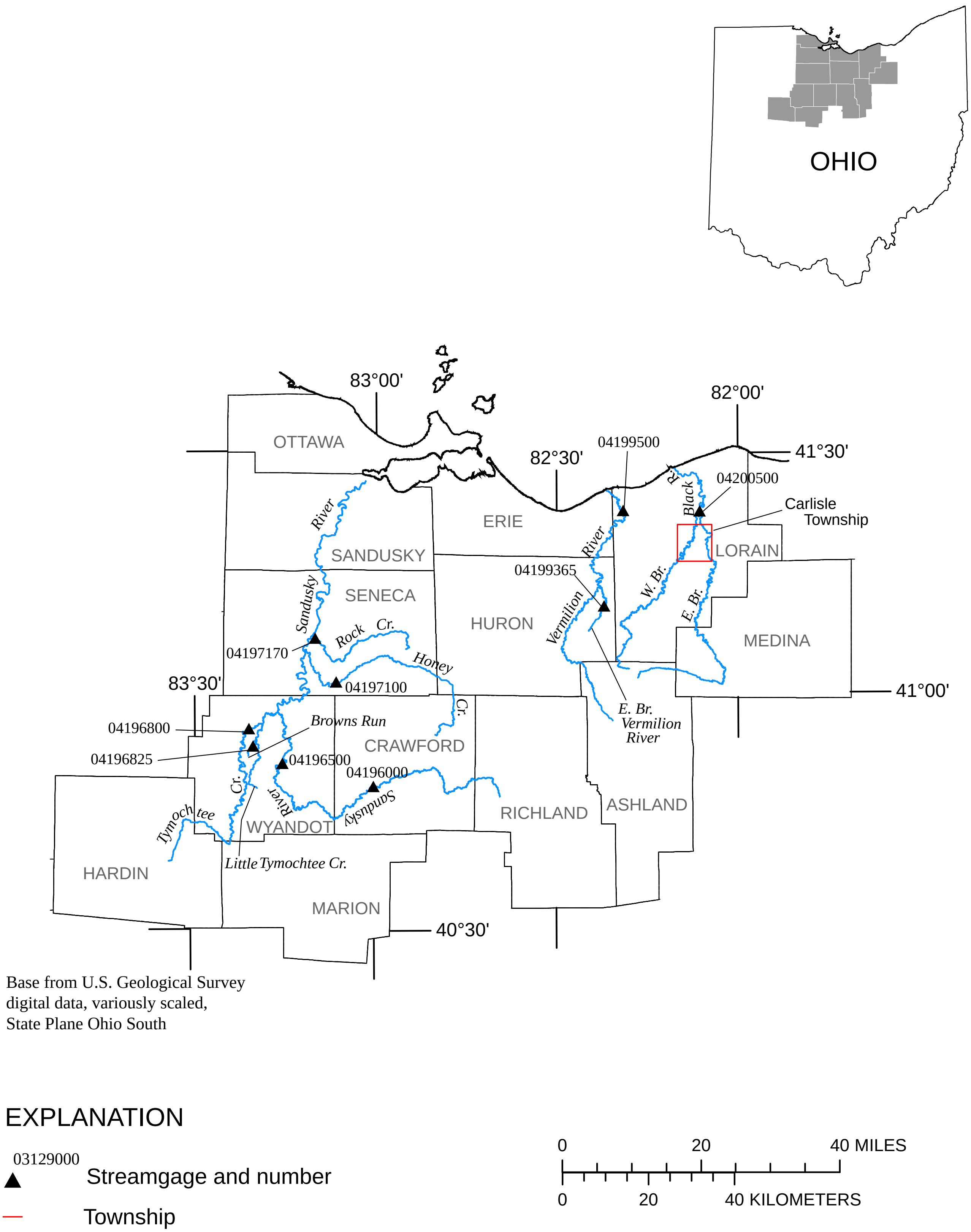
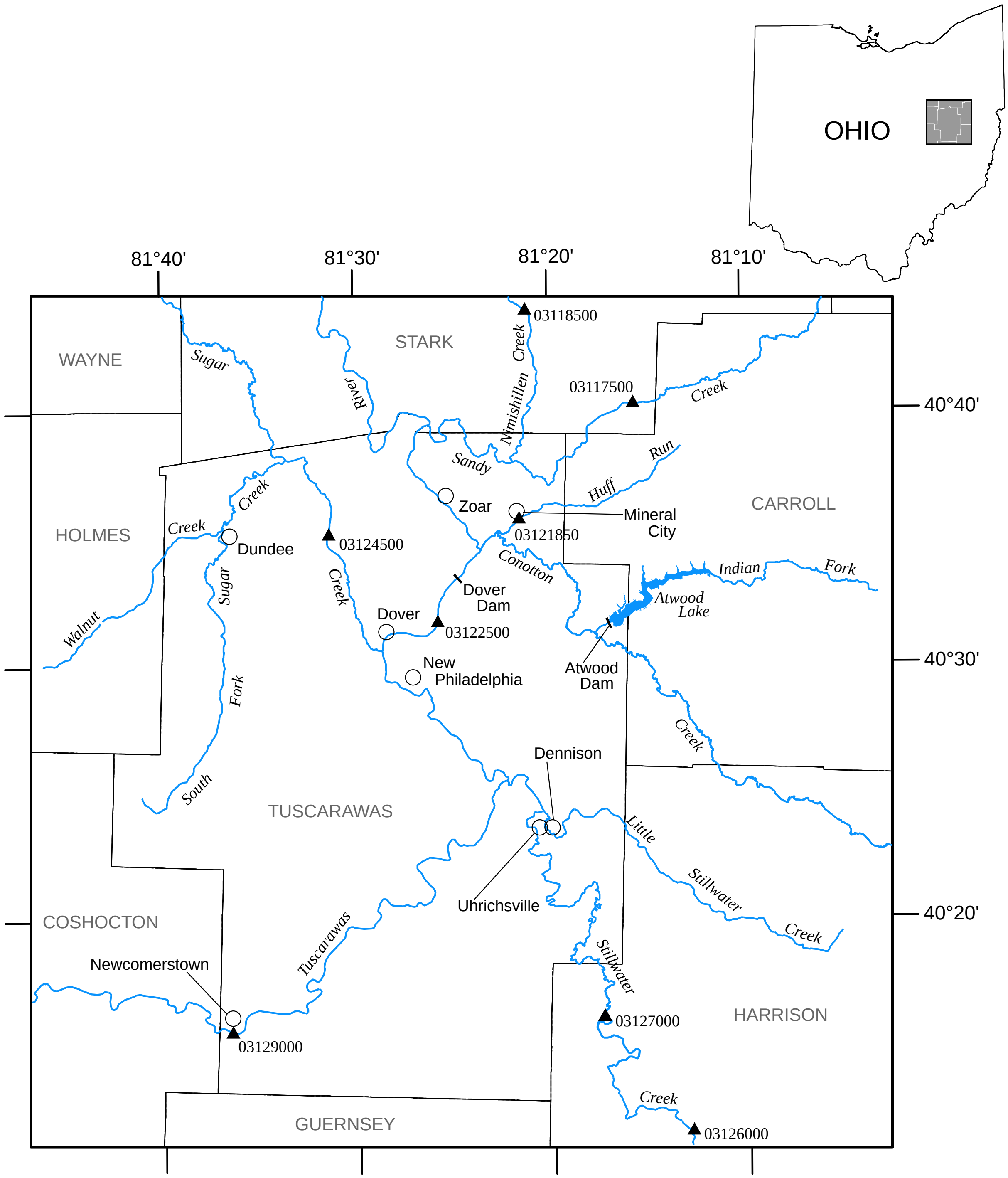


Figure 14. Selected areas of central-northern Ohio affected by flooding during December 2004 and January 2005.



Base from U.S. Geological Survey
digital data, variously scaled,
State Plane Ohio South

EXPLANATION

▲ 03127000 Streamgage and number

○ City or village

– Dam

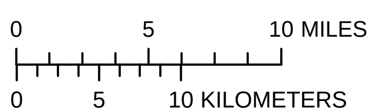


Figure 15. Selected areas of Tuscarawas County affected by flooding during December 2004 and January 2005.

Table 3. Peak stages, peak streamflows, and estimated recurrence-interval ranges at selected U.S. Geological Survey streamgages in Ohio, December 22, 2004–February 1, 2005.

[mi^2, square mile; ft, foot (above gage datum); ft^3/s, cubic foot per second; <, less than; N/A, not available; thick lines separate dates of maximum peak]

Permanent station number	Stream and place of determination	Drainage area (mi^2)	Gage datum (feet)	Period of systematic record (water years)[a]	Maximum prior to December 22, 2004			Maximum during December 22, 2004–February 1, 2005			Estimated recurrence-interval range (years)
					Water year[a]	Stage (ft)	Streamflow (ft^3/s)	Date	Stage (ft)	Streamflow (ft^3/s)	
03148395	Claypit Creek near Roseville	2.25	N/A[b]	10	2004	36.08	252	December 23	34.65	199	2–5[c]
03157000	Clear Creek near Rockbridge	89	760.13[d]	67	1948	17.68	16,000	December 23	4.98	1,140	< 2[e]
03116077	Chippewa Creek at Mill Rd at Sterling	50.4	960[f]	5	2004	9.96	1,040	December 31	9.31	932	< 2[c]
04197170	Rock Creek at Tiffin	34.6	740[g]	24	1998	8.96	2,640	December 31	7.34	1,310	2–5[e]
04199365	East Branch Vermilion River near Clarksfield	32.3	N/A[b]	5	2004	92.12	1,200	December 31	93.6	2,000	5–10[c]
04196000	Sandusky River near Bucyrus	88.8	955.04[g]	81	1959	11.9	13,500	January 1	8.99	3,190	2–5[e]
04199500	Vermilion River near Vermilion	262	595.14[g]	57	1969	17.14	40,800	January 1	8.6	9,260	5–10[e]
04200500	Black River at Elyria	396	620.83[g]	62	1969	26.4	51,700	January 1	14.63	9,820	2–5[e]
04196500	Sandusky River near Upper Sandusky	298	792.25[g]	66	1959	15	10,000	January 2	9.43	5,930	2–5[e]
03237280	Upper Twin Creek at McGaw	12.2	538.41[g]	44	1960	11.62	7,320	January 3	6.34	913	< 2[e]
03247500	East Fork Little Miami River at Perintown	476	507.2[g]	88	1964	23.84	42,400	January 3	12	9,200	< 2[e]
03108608	Middle Fork Little Beaver Creek near Salem	1.68	N/A[b]	5	2004	61.86	428	January 5	55.66	61	< 2[c]
03237130	Scioto Brush Creek at Otway	94.4	N/A[b]	5	2003	91.53	10,950	January 5	84.87	3,750	2–5[c]
03237315	Elk Fork at Winchester	6.45	N/A[b]	10	2003	78.31	2,210	January 5	69.13	700	< 2[c]
03271000	Wolf Creek at Dayton	68.7	700[g]	33	1959	55.1	12,500	January 5	7.86	4,180	< 2[e]
03086500	Mahoning River at Alliance	89.2	1,037.3[d]	65	1959	9.11	9,740	January 6	5.08	2,640	2–5[e]
03109500	Little Beaver Creek near East Liverpool	496	702.77[d]	90	1941	17.4	25,000	January 6	12.42	11,800	2–5[e]
03110000	Yellow Creek near Hammondsville	147	692.1[g]	66	2004	12.98	10,500	January 6	10.02	6,120	10–25[e]

Table 3. Peak stages, peak streamflows, and estimated recurrence-interval ranges at selected U.S. Geological Survey streamgages in Ohio, December 22, 2004–February 1, 2005. —Continued

[mi², square mile; ft, foot (above gage datum); ft³/s, cubic foot per second; <, less than; N/A, not available; thick lines separate dates of maximum peak]

Permanent station number	Stream and place of determination	Drainage area (mi²)	Gage datum (feet)	Period of systematic record (water years)[a]	Maximum prior to December 22, 2004			Maximum during December 22, 2004–February 1, 2005			Estimated recurrence-interval range (years)
					Water year[a]	Stage (ft)	Streamflow (ft³/s)	Date	Stage (ft)	Streamflow (ft³/s)	
03111500	Short Creek near Dillonvale	123	676.1[g]	65	2004	12.65	9,110	January 6	10.04	4,780	5–10[e]
03111548	Wheeling Creek below Blaine	97.7	699.11[g]	24	2004	12.54	8,500	January 6	8.45	3,960	2–5[e]
03113990	Captina Creek at S.R. 148 at Armstrongs Mills	127	756.09[h]	3	2004	23.54	28,100	January 6	10.63	6,790	5–10[c]
03117000	Tuscarawas River at Massillon	518	916[d]	68	1969	16.43	10,700	January 6	12.83	6,540	10–25[e]
03118000	Middle Branch Nimishillen Creek at Canton	43.1	1,046.6[d]	65	1959	6.5	2,470	January 6	5.71	672	2–5[e]
03121850	Huff Run at Mineral City	12.3	886.98[g]	9	2004	5.82	1,860	January 6	N/A	700	2–5[c]
03126000	Stillwater Creek at Piedmont	122	872[d]	68	1998	10.75[i]	3,770	January 6	11.14	1,250	N/A
03129000	Tuscarawas River at Newcomerstown	2,443	780[d]	86	1913	21.5	83,000	January 6	10.32	15,200	< 2[e]
03139000	Killbuck Creek at Killbuck	464	788.05[g]	76	1935	21.77	28,800	January 6	18.17	10,500	10–25[e]
03140000	Mill Creek near Coshocton	27.2	782[d]	70	1969	13.92	8,720	January 6	11	164	< 2[e]
03144000	Wakatomika Creek near Frazeysburg	140	748.12[d]	70	1979	14.07	16,800	January 6	11.53	9,930	10–25[e]
03146500	Licking River near Newark	537	779.02[g]	67	1959	20.3	45,000	January 6	15.83	23,100	10–25[e]
03157500	Hocking River at Enterprise	459	723.58[g]	76	1907	22	36,000	January 6	18.15	15,200	10–25[e]
03158200	Monday Creek at Doanville	114	650[f]	9	1998	19.42	5,130	January 6	19.06	4,250	2–5[c]
03159246	Sunday Creek below Millfield	126	670[f]	4	2004	24.48	4,440	January 6	22.93	3,690	N/A
03219500	Scioto River near Prospect	567	886.9[d]	93	1913	21.1	27,000	January 6	14.18	8,310	5–10[e]
03220000	Mill Creek near Bellepoint	178	865.14[d]	65	1959	13.85	20,300	January 6	8.96	5,440	2–5[e]
03221000	Scioto River below O'Shaughnessy Dam near Dublin	980	775[d]	86	1913	24.6	74,500	January 6	15.88	27,300	10–25[e]

Table 3. Peak stages, peak streamflows, and estimated recurrence-interval ranges at selected U.S. Geological Survey streamgages in Ohio, December 22, 2004–February 1, 2005. —Continued

[mi^2, square mile; ft, foot (above gage datum); ft^3/s, cubic foot per second; <, less than; N/A, not available; thick lines separate dates of maximum peak]

Permanent station number	Stream and place of determination	Drainage area (mi^2)	Gage datum (feet)	Period of systematic record (water years)[a]	Maximum prior to December 22, 2004			Maximum during December 22, 2004–February 1, 2005			Estimated recurrence-interval range (years)
					Water year[a]	Stage (ft)	Streamflow (ft^3/s)	Date	Stage (ft)	Streamflow (ft^3/s)	
03227500	Scioto River at Columbus	1,629	680[g]	87	1913	N/A	138,000	January 6	26.61	64,600	N/A
03228500	Big Walnut Creek at Central College	190	815.16[g]	68	1959	19.75	23,800	January 6	15.21	12,100	5–10[e]
03228560	Rocky Fork at Gahanna	28.2	780[g]	3	2004	8.18	1,930	January 6	8.55	2,170	5–10[c]
03229500	Big Walnut Creek at Rees	544	698.2[g]	83	1979	17.75	21,700	January 6	16.6	15,900	2–5[e]
03230450	Hellbranch Run near Harrisburg	35.8	813[f]	14	1998	14.19	3,180	January 6	9.85	1,700	2–5[c]
03232000	Paint Creek near Greenfield	249	844.27[g]	77	1968	14.28	21,700	January 6	12.55	12,600	10–25[e]
03232500	Rocky Fork near Barretts Mills	140	770.8[g]	67	1964	15.1	13,400	January 6	11.05	5,540	< 2[e]
03234000	Paint Creek near Bourneville	807	665.56[g]	85	1964	20.5	56,900	January 6	11.13	N/A	N/A
03234300	Paint Creek at Chillicothe	1,136	600[g]	21	1990	24.67	30,100	January 6	23.48	26,700	N/A
03237500	Ohio Brush Creek near West Union	387	510.6[d]	75	1997	31.15	77,700	January 6	17.94	18,800	< 2[e]
03238500	White Oak Creek near Georgetown	218	604.2[g]	79	1964	14.64	22,400	January 6	7.49	9,210	< 2[e]
03244936	O'Bannon Creek near Loveland	54.5	599.610[g]	3	2004	9.32	10,500	January 6	7.6	4,610	2–5[c]
03245500	Little Miami River at Milford	1,203	494.35[d]	84	1959	22.3	84,100	January 6	19.1	31,400	2–5[e]
03261500	Great Miami River at Sidney	541	924.7[d]	94	1913	19.6	44,000	January 6	14.2	12,400	5–10[e]
03262000	Loramie Creek at Lockington	257	876[d]	92	1913	91.6	25,600	January 6	84.23	5,620	N/A
03262700	Great Miami River at Troy	926	810.67[g]	45	1995	16.02	21,700	January 6	15.66	18,500	N/A
03263000	Great Miami River at Taylorsville	1,149	760.11[d]	90	1913	25.4	127,000	January 6	29.31	28,200	N/A
03263168	Stillwater River near Ansonia	74.3	N/A[b]	5	2003	96.6	2,700	January 6	97.43	3,850	5–10[c]
03264000	Greenville Creek near Bradford	193	948.9[d]	76	1913	12.1	18,200	January 6	9.84	5,870	5–10[e]

Table 3. Peak stages, peak streamflows, and estimated recurrence-interval ranges at selected U.S. Geological Survey streamgages in Ohio, December 22, 2004–February 1, 2005. —Continued

[mi^2, square mile; ft, foot (above gage datum); ft^3/s, cubic foot per second; <, less than; N/A, not available; thick lines separate dates of maximum peak]

Permanent station number	Stream and place of determination	Drainage area (mi^2)	Gage datum (feet)	Period of systematic record (water years)[a]	Maximum prior to December 22, 2004			Maximum during December 22, 2004–February 1, 2005			Estimated recurrence-interval range (years)
					Water year[a]	Stage (ft)	Streamflow (ft^3/s)	Date	Stage (ft)	Streamflow (ft^3/s)	
03265000	Stillwater River at Pleasant Hill	503	846.73[d]	91	1913	17.5	51,400	January 6	17.22	18,700	5–10[e]
03267000	Mad River near Urbana	162	985.22[g]	83	1959	12.05	8,000	January 6	8.9	4,100	5–10[e]
03269500	Mad River near Springfield	490	881.42[d]	96	1913	16.9	55,400	January 6	12.26	12,400	2–5[e]
03272000	Twin Creek near Germantown	275	724[d]	93	1913	18.3	66,000	January 6	52.91	8,280	N/A
03117500	Sandy Creek at Waynesburg	253	955[d]	68	1959	10.05	15,000	January 7	8.44	5,700	5–10[e]
03120500	McGuire Creek near Leesville	48.3	915[g]	68	1942	6.7	640	January 7	5.76	436	N/A
03127000	Stillwater Creek at Tippecanoe	282	849[d]	68	2004	17.64	4,740	January 7	16.8	3,850	N/A
03142000	Wills Creek at Cambridge	406	772.34[g]	72	1998	26.91	11,400	January 7	21.22	6,440	N/A
03159500	Hocking River at Athens	943	611.26[g]	95	1907	27	50,000	January 7	23.78	18,000	5–10[e]
03230500	Big Darby Creek at Darbyville	534	713.69[g]	84	1959	17.94	49,000	January 7	15.63	21,300	10–25[e]
03230700	Scioto River at Circleville	3,217	643.03[g]	7	2004	22.32	48,500	January 7	23.36	53,500	N/A
03234500	Scioto River at Higby	5,131	567.28[g]	77	1937	26.4	177,000	January 7	22.04	72,500	2–5[e]
03237020	Scioto River at Piketon	5,836	531.43[g]	4	2004	25.80	60,300	January 7	28.52	78,700	N/A
03270500	Great Miami River at Dayton	2,511	700[d]	114	1913	29	250,000	January 7	34.33	45,800	2–5[e]
03271500	Great Miami River at Miamisburg	2,711	678.6[g]	74	1913	N/A	257,000	January 7	18.15	49,800	N/A
03271601	Great Miami River below Miamisburg	2,715	670[g]	15	2004	19.71	39,700	January 7	21.47	50,900	N/A
03150700	Ohio River at Marietta	35,590	566.06[h]	N/A	1913	58.30	N/A	January 8	43.60	N/A	N/A
03150800	Ohio River near Marietta	35,620	566.64[g]	N/A	N/A	N/A	N/A	January 8	41	N/A	N/A
03159540	Shade River near Chester	156	576.91[g]	41	1997	31.44	15,600	January 8	16.83	2,850	< 2[e]
03231500	Scioto River at Chillicothe	3,849	594.05[g]	100	1913	39.8	260,000	January 8	20.89	67,700	5–10[e]

Table 3. Peak stages, peak streamflows, and estimated recurrence-interval ranges at selected U.S. Geological Survey streamgages in Ohio, December 22, 2004–February 1, 2005. —Continued

[mi^2, square mile; ft, foot (above gage datum); ft^3/s, cubic foot per second; <, less than; N/A, not available; thick lines separate dates of maximum peak]

Permanent station number	Stream and place of determination	Drainage area (mi^2)	Gage datum (feet)	Period of systematic record (water years)[a]	Maximum prior to December 22, 2004			Maximum during December 22, 2004–February 1, 2005			Estimated recurrence-interval range (years)
					Water year[a]	Stage (ft)	Streamflow (ft^3/s)	Date	Stage (ft)	Streamflow (ft^3/s)	
03266000	Stillwater River at Englewood	650	780[g]	82	1913	N/A	85,400	January 8	51.7	10,100	N/A
03217200	Ohio River at Portsmouth	62,000	N/A	N/A	1937	74.23	N/A	January 10	55.90	N/A	N/A
03228805	Alum Creek at Africa	122	822[g]	44	1963	14.2	6,460	January 10	5.33	1,840	< 2[e]
03238000	Ohio River at Maysville, Ky.	70,130	450.90[g]	N/A	1937	75.30	N/A	January 10	55.47	N/A	N/A
03255000	Ohio River at Cincinnati	76,580	428.88[g]	122	1937	80.00	894,000	January 10	56.86	N/A	N/A
03124500	Sugar Creek at Strasburg	311	896.24[d]	52	1935	12.7	19,700	January 11	6.55	2,850	N/A
03115400	Little Muskingum River at Bloomfield	210	645.99[g]	34	2004	32.16	41,600	January 12	25.71	12,800	< 2[e]
03115624	East Fork Duck Creek near Road Fork	61.3	N/A[b]	5	2004	103.5	12,450	January 12	93.83	3,450	2–5[c]
03115640	Middle Fork Duck Creek at Middleburg	20.5	N/A[b]	5	2004	99.38	5,460	January 12	93.85	1,450	2–5[c]
03118500	Nimishillen Creek at North Industry	175	976.72[d]	85	2003	14.18	9,310	January 12	8.88	4,200	2–5[e]
03136500	Kokosing River at Mount Vernon	202	984.1[g]	53	1959	18.19	38,000	January 12	11.87	6,060	2–5[e]
03140500	Muskingum River near Coshocton	4,859	725[d]	70	1913	28.8	202,000	January 12	19.45	33,600	N/A
03141870	Leatherwood Creek near Kipling	69.5	790[g]	6	2004	17.21	10,100	January 12	14.73	4,050	5-10[c]
03145000	South Fork Licking River near Hebron	133	856[g]	67	1959	12.4	5,880	January 12	11.19	3,020	N/A
03149500	Salt Creek near Chandlersville	75.7	681.71[g]	19	2004	22.26	13,500	January 12	18.49	5,620	10–25[e]
03150000	Muskingum River at McConnelsville	7,422	650.31[d]	86	1913	33.5	270,000	January 12	13.77	60,400	2–5[e]
03223425	Whetstone Creek at Mt. Gilead	37.9	1,074.00[g]	10	1998	13.64	5,650	January 12	8.6	1,730	2–5[c]

Table 3. Peak stages, peak streamflows, and estimated recurrence-interval ranges at selected U.S. Geological Survey streamgages in Ohio, December 22, 2004–February 1, 2005. —Continued

[mi^2, square mile; ft, foot (above gage datum); ft^3/s, cubic foot per second; <, less than; N/A, not available; thick lines separate dates of maximum peak]

Permanent station number	Stream and place of determination	Drainage area (mi^2)	Gage datum (feet)	Period of systematic record (water years)[a]	Maximum prior to December 22, 2004			Maximum during December 22, 2004–February 1, 2005			Estimated recurrence-interval range (years)
					Water year[a]	Stage (ft)	Streamflow (ft^3/s)	Date	Stage (ft)	Streamflow (ft^3/s)	
03226800	Olentangy River near Worthington	497	743.2[g]	52	1959	15.68	16,500	January 12	10.27	8,360	N/A
03228300	Big Walnut Creek at Sunbury	101	945[g]	18	1997	11.2[j]	6,700	January 12	11.24	6,320	10–25[e]
03228750	Alum Creek near Kilbourne	64.9	900.99[g]	14	1975	12.05	4,850	January 12	10.6	4,570	5–10[c]
03260706	Bokengehalas Creek at De Graff	40.4	977.382[g]	15	2003	6.8	925	January 12	7.95	1,370	10–25[k]
03261950	Loramie Creek near Newport	152	926.57[g]	42	1991	14.32	6,500	January 12	13.98	4,640	N/A
03266560	Mad River at West Liberty	36.6	1,078.00[g]	11	2004	8.73	1,640	January 12	8.85	1,690	N/A
03267900	Mad River at St. Paris Pike at Eagle City	310	904.66[g]	42	1959	N/A	18,300	January 12	16.82	8,690	10–25[e]
04191207	Blue Creek near Latty	65.2	N/A[b]	5	2003	98.03	6,150	January 12	95.73	4,050	100–500[c]
04197100	Honey Creek at Melmore	149	818[f]	46	1981	11	4,400	January 12	9.94	3,400	2–5[e]
03225500	Olentangy River near Delaware	393	799.58[g]	94	1913	25.5	41,600	January 13	8.85	4,480	< 2[e]
04185771	Auglaize River near Cridersville	63.8	N/A[b]	5	2004	95.1	2,080	January 13	95.6	2,400	5–10[c]
04186500	Auglaize River near Fort Jennings	332	713.6[g]	81	1992	19.76	12,800	January 13	17.13	8,450	5–10[e]
04189000	Blanchard River near Findlay	346	753.76[h]	80	1913	18.5	22,000	January 13	12.79	7,290	2–5[e]
04192575	South Turkeyfoot Creek near Elery	37.8	N/A[b]	5	2003	95.75	1,200	January 13	96.65	1,400	2–5[c]
04196825	Browns Run near Crawford	2	N/A[b]	10	2003	98	265	January 13	95.39	105	2[c]
03133500	Clear Fork below Pleasant Hill Dam near Perrysville	198	967[d]	68	1959	4.89	2,340	January 14	4.21	1,860	N/A
04196800	Tymochtee Creek at Crawford	229	785.86[g]	46	1991	9.77	6,700	January 14	8.65	4,850	2–5[e]
03230900	Deer Creek near Pancoastburg	277	700[g]	43	1964	80.93	19,500	January 17	6.92	2,920	N/A

Table 3. Peak stages, peak streamflows, and estimated recurrence-interval ranges at selected U.S. Geological Survey streamgages in Ohio, December 22, 2004–February 1, 2005. —Continued

[mi^2, square mile; ft, foot (above gage datum); ft^3/s, cubic foot per second; <, less than; N/A, not available; thick lines separate dates of maximum peak]

Permanent station number	Stream and place of determination	Drainage area (mi^2)	Gage datum (feet)	Period of systematic record (water years)[a]	Maximum prior to December 22, 2004			Maximum during December 22, 2004–February 1, 2005			Estimated recurrence-interval range (years)
					Water year[a]	Stage (ft)	Streamflow (ft^3/s)	Date	Stage (ft)	Streamflow (ft^3/s)	
03122500	Tuscarawas River below Dover Dam near Dover	1,405	861.51[d]	84	1913	23.5	62,000	January 19	9.62	7,920	< 2[e]
03147500	Licking River below Dillon Dam near Dillon Falls	742	700[g]	68	1959	32.46	47,000	January 29	11.49	7,670	< 2[e]

[a] 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.

[b] Gage datum is based on an arbitrary datum.

[c] Based on frequency estimates from Ohio StreamStats (U.S. Geological Survey, 2007).

[d] COE 1912.

[e] Based on weighted estimates from Koltun and others (2006).

[f] From topographic map.

[g] NGVD 1929.

[h] NAVD 1988.

[i] A peak stage of 11.44 ft occurred in water year 1963 but is associated with a peak discharge of only 1,430 ft^3/s.

[j] A peak stage of 11.86 ft occurred in water year 1991 but is associated with a peak discharge of only 4,590 ft^3/s.

[k] Based on weighted estimates calculated with equations in Koltun (2003).

Flood and Storm Damages Associated With FEMA-1580-DR

Although it was not possible to determine an exact value of the damages caused by the flooding, Ohio EMA was able to obtain some estimates of the extent of the damage. According to the Ohio EMA (Kay Phillips, written commun., 2007), flooding for the period December 22–February 1, 2005, resulted in damage to or destruction of 3,664 private properties. Damages to public property were estimated to be in excess of $127 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.

Tables 4 and 5 list the extent of the damages to private and public property. Table 4 lists the estimated damages incurred to private property (Individual Assistance). Table 5 indicates estimated damages to public properties such as city and county buildings, roadways, vehicles, certain utilities, and other publicly owned property.

Table 4. Damage estimates for Individual Assistance associated with Federal Emergency Management Agency disaster declaration FEMA–1580–DR.

[Source: Kay Phillips, Ohio Emergency Management Agency, written commun., 2007]

County	Structures damaged[1]	Structures destroyed[2]
Ashland	115	0
Athens	106	8
Auglaize	17	6
Belmont	0	3
Clark	38	0
Coshocton	38	0
Crawford	261	0
Darke	356	0
Delaware	30	0
Fairfield	49	0
Franklin	97	0
Guernsey	23	0
Henry	24	0
Hocking	46	0
Holmes	170	2
Huron	202	0
Jefferson	60	0
Licking	107	0
Logan	40	1
Miami	19	0
Morgan	107	0
Muskingum	85	0
Pickaway	52	0
Pike	12	0
Richland	79	0
Ross	1,211	0
Scioto	33	19
Stark	72	0
Warren	138	0
Washington	20	0
Wyandot	18	0

[1]Properties that received damage considered to be repairable.

[2]Properties that were considered to be a total loss.

Table 5. Damage estimates for Public Assistance associated with Federal Emergency Management Agency disaster declaration FEMA–1580–DR.

[Source: Kay Phillips, Ohio Emergency Management Agency, written commun., 2007]

County	Estimated damage	County	Estimated damage
Adams	$358,750	Logan	$4,424,160
Allen	$4,956,000	Lorain	$1,765,000
Ashland	$4,473,400	Marion	$1,511,000
Athens	$1,835,300	Medina	$1,553,629
Auglaize	$4,452,220	Meigs	$132,900
Belmont	$12,082,100	Mercer	$803,760
Brown	$921,500	Monroe	$1,964,500
Carroll	$1,116,600	Montgomery	$1,240,605
Champaign	$694,396	Morgan	$1,113,000
Clermont	$780,900	Morrow	$899,700
Columbiana	$933,600	Muskingum	$3,047,731
Coshocton	$1,023,300	Noble	$498,100
Crawford	$4,414,000	Paulding	$540,300
Darke	$1,185,360	Perry	$1,274,300
Delaware	$430,500	Pickaway	$1,437,056
Fairfield	$1,240,900	Pike	$1,193,750
Fayette	$259,300	Putnam	$110,393
Franklin	$3,201,415	Richland	$6,580,194
Guernsey	$3,168,560	Ross	$920,500
Hancock	$5,292,810	Scioto	$332,000
Hardin	$9,402,689	Seneca	$4,555,750
Harrison	$225,000	Shelby	$2,272,042
Henry	$226,000	Stark	$3,049,600
Highland	$2,809,100	Tuscarawas	$2,656,400
Hocking	$384,000	Union	$120,000
Holmes	$448,150	Van Wert	$135,411
Huron	$4,826,750	Washington	$1,173,100
Jefferson	$1,804,000	Wayne	$436,800
Knox	$1,337,689	Wyandot	$4,742,172
Licking	$2,649,783		

Summary

An amplified ridge/trough system in the upper atmosphere was in place over North America from the end of December 2004 through the first half of January 2005. This atmospheric circulation pattern steered large winter storms, deep layers of moisture, and unseasonably warm temperatures into Ohio from December 22, 2004, through January 15, 2005. A large winter storm on December 22 and 23, 2004, left 12 to 18 in. of snow over much of central and north-central Ohio. This storm was followed by unseasonably warm temperatures that triggered snowmelt. Runoff from widespread rain showers during January 2005 combined with this snowmelt, resulting in flooding and widespread damage throughout Ohio. The most intense rainfall occurred when 6.47 in. of rain fell in Champaign County over a 4-day period.

A peak flow corresponding to a 100- to 500-year flood occurred on Blue Creek near Latty (station 04191207) in Paulding County. This was the highest estimated recurrence interval at USGS streamgages from December 22, 2004–February 1, 2005. Record peak streamflow occurred at nine streamgages, and flooding was widespread throughout the State.

In all, 62 counties throughout Ohio were declared Federal disaster areas (FEMA–1580–DR) as a result of the storms, flooding, and mudslides between December 22, 2004 and February 1, 2005. An economic impact of $238 million was estimated by the Ohio EMA.

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