

Causal factors

The immediate cause of the 1889 flood was the failure of the South Fork Dam. Although the cluster of small communities along the Little Conemaugh and Conemaugh Rivers had already experienced some flooding because of heavy rains, this situation was familiar to Johnstownners and probably would not have resulted in significant loss of life or exceptional property damage, had the dam not failed and released some 640 million cubic feet of water.

The 1936 flood was the result of quite different circumstances. The heavy rains which caused flooding in the drainage area of the Conemaugh River were part of a larger weather system extending throughout much of the northeastern United States. The storm caused extensive damage elsewhere, including Pittsburgh's worst ever flood. In Johnstown, flood waters rose slowly and, except for the extraordinary depth (17 feet at City Hall), the situation locally with regard to the effects of spring rain and snow melt was not unfamiliar. City officials had anticipated the likelihood of flooding weeks before the event occurred, and had taken some measures to reduce the severity of flooding.

The 1977 flood was the result of unusually severe, localized thunderstorms which, unbeknownst to weather forecasters, had stalled over Johnstown and vicinity, producing rainstorms of such intensity that the rapid runoff quickly exceeded the capacity of small streams and dam spillways. Nearly half the deaths were the result

TABLE 1
*A Comparison of Causes, Height and Mortality of Three Major Floods
in Johnstown, Pennsylvania*

Date	Causes	Height of water at present site of City Hall	Mortality*
May 31, 1889	Heavy rains estimated at 6.2", combined with failure of earthen South Fork Dam (640 million cubic feet of water)	21 feet	2,209
March 17, 1936	Heavy rains and warm temperatures caused rapid melting of a 14' snow cover	17 feet	25
July 19-20, 1977	Heavy localized thunderstorms, releasing up to 12" of rain over a 9 hour period, and the failure of 7 earthen dams, including Laurel Run Dam (101 million gallons, or about 13.5 million cubic feet of water)	8 feet	85

Note: *Figures for the number of lives lost include all deaths attributed to each flood, not just deaths occurring within the city of Johnstown. The 1936 figure includes 12 "flood-related" deaths not attributed to drowning.

of a single dam failure, while others occurred as normally placid streams quite suddenly became like rivers. This flood illustrates the continuing difficulty of forecasting or reporting from afar the ongoing nature of severe localized storms. The breakdown of communications systems, the inadequacy of local reporting mechanisms and the complications of nighttime and severe weather conditions all hindered the deployment of timely warnings and effective evacuation measures. The fact that a number of flood control channelization systems in the Johnstown region proved to be inadequate for the severe weather conditions of that night serves as a reminder that any flood control project has certain built-in limitations which nature will occasionally exceed. Finally, vigilance against flooding may have faltered because of confidence in the Corps of Engineer's channelization project which, having prevented flooding for more than 35 years, helped reinforce the local image of Johnstown as "the flood free city."

Areal Extent

Loss of life and property damage in the 1889 flood were confined to low-lying areas along the Little Conemaugh and Conemaugh Rivers and that portion of the Stonycreek River receiving a backwash of water from the temporary damming of

TABLE 2

*A Comparison of Property Damage Losses for Three Major Floods in Johnstown, Pennsylvania
(All Values Expressed in Millions of Dollars)*

Date	Johnstown estimated losses, in then current dollars	Johnstown estimated losses, adjusted to 1977 equivalent dollars	Flood area estimated losses, in then current dollars	Flood area estimated losses, adjusted to 1977 equivalent dollars
May 31, 1889*	16	97-145	17	103-154
March 17, 1936	41**	179-221**	50-80	219-269; 350-431
July 19-20, 1977	117	117	200-240	200-240

Notes. These values correspond to commonly cited loss estimates associated with each flood.^{7 10 11 13} Values are given for the city of Johnstown and for the overall areas affected by each flood. These figures should be viewed with considerable caution, because of the lack of consistency in the way in which losses are estimated, and because of the widely differing definitions of the affected areas.

1889 and 1936 losses have been adjusted to their 1977 dollar equivalents, using both the GNP Deflator Index (source: *Historical Statistics of the United States*, Volume 1) and the Consumer Price Index (sources: *Economic Report of the President* and *Survey of Current Business*). Because these two indices produce different values, the 1977 equivalents for prior years are presented as ranges. However, given the uncertainties associated with the original data and the questionable accuracy of these conversion indices when applied to real estate and infrastructure, even these range values should be viewed with great caution, particularly for the 1889 flood.

*Most of property damage in the 1889 flood occurred in areas which, if they were not at the time, are now part of Johnstown.

**The 1936 estimate for Johnstown excludes public works.

the Stone Bridge. The 1936 flood in Johnstown was part of a much larger regional pattern of rainstorms and spring flooding in which other cities suffered more damage and loss of life. What is commonly defined as the flood of 1977 involved portions of five Pennsylvania counties, with loss of life widely dispersed, excepting only the cluster of deaths in Tanneryville.

Mortality

Loss of life is the most common criteria by which we measure a disaster's severity. In the U.S. flood experience, only the Galveston hurricane of 1900, with its 5,000+ fatalities, surpassed the Johnstown flood of 1889 in mortality. Apart from these two most severe flood experiences, only another dozen or so floods in the United States, with causes ranging from tidal waves, hurricanes and other tropical storms to flash flooding, persistent rainstorms and dam failures, have resulted in more than 100 fatalities. This makes the flood of 1977, with its 85 deaths, a major flood mortality experience although in no way comparable to the flood of 1889. This is not the case for the 1936 flood; indeed, had the 1889 flood not already established Johnstown's flood reputation, it is not likely that the 13 deaths by drowning in 1936 would be considered noteworthy.

Economic losses

The financial dimensions of property loss for the three floods are difficult to compare, for several reasons. First, substantial differences in the sizes of the affected areas makes establishing a basis for comparison difficult. Second, there is reason to believe that the criteria for estimating flood damage in each of the three years differs, perhaps significantly, thus rendering published damage estimates difficult to compare. Third, even assuming that the damage estimates for each flood are reasonably accurate, adjustments must be made for differences in the value of the dollar over time.

Table 2 contains estimates of property damages due to the three floods and conversions of the 1889 and 1936 figures to their 1977 dollar equivalents. These adjustments were made using both the GNP Deflator Index and the Consumer Price Index. Neither measure is without its flaws. The composition of the Consumer Price Index varies over time and, given what it measures, is somewhat questionable when applied to flood damage estimates dominated by losses in real estate, infrastructure and major capital investments. Comparable reservations are appropriate regarding use of the GNP Deflator Index, which is based on the value of goods produced. Nevertheless, if one accepts original flood damage estimates as being reasonably on target and reasonably comparable, and if one accepts their conversions to a common year value (1977) as "being in the ballpark," then the results are quite surprising.

The 1889 flood, the nation's most infamous flood and its second worst ever in terms of mortality, does not tower above the other two floods when property losses are compared. Instead, it is the St. Patrick's Day Flood of 1936, which had the least loss of life and deep but not turbulent waters in the city itself, which accounts for

the highest dollar losses, even though many more buildings were destroyed in the 1889 flood.

What explains these findings? Simple or single answers are not forthcoming, but several contributing factors immediately suggest themselves. First, more people and more firms occupied the floodplain in 1936 than in 1889, and thus there was more investment in real estate. By 1977, city population had fallen significantly and businesses had also begun to outmigrate. Nevertheless, significant investment remained in Johnstown even though the central city was a declining economic unit. Second, over a 100 year period, the level of material wealth grew considerably, as did the extent of public and corporate investment in infrastructure. More recent floods are more expensive floods because, over time, more individual and societal wealth has been accumulated and thus there is more to lose. Third, the 1936 flood caused more damage than the 1977 flood because the water rose to a greater height and stood in place for a longer period of time. Despite the deeper waters, loss of life was less in 1936 because the element of surprise (e.g. dam failure and rapid, unexpected rise in stream height at nighttime) was absent.

CONSEQUENCES OF THE JOHNSTOWN FLOODS

The physical evidence of these three severe floods has been largely eradicated, but some significant and enduring consequences remain. Three are discussed here: the changing political geography of the city of Johnstown; the rapid suburbanization of areas above the floodplain; and the popularization of an image for Johnstown which was synonymous with flood disaster.

Growth of Johnstown by Consolidation and Annexation

One almost immediate consequence of the 1889 flood was a dramatic change in the political geography of Johnstown. Prior to the flood, Johnstown was a borough of slightly more than 10,000. It shared its modest floodplain and the immediately adjacent upland areas with a number of other settlements whose population totalled nearly 30,000.

In May of 1889, Johnstown's Borough Council rejected the petition of the unincorporated settlement of Moxham to consolidate with Johnstown, but agreed to reconsider the question on May 31. The flood on that same date delayed further discussion of the annexation, but in the months immediately following the flood the move to consolidation took on a new intensity and broader popular support. A number of communities now sought consolidation into a single, larger unit.

On November 6, 1889, barely five months after the flood, residents in Johnstown, Millville, Cambria City, Prospect, Woodvale, Coopersdale, Grubbtown, and Conemaugh all voted in favor of consolidation (although the courts later turned down Coopersdale's petition because it didn't share a common boundary with Johnstown) (Figure 4). Only East Conemaugh and Franklin voted against consolidation. The unincorporated village of Moxham petitioned to join the city, and was annexed in

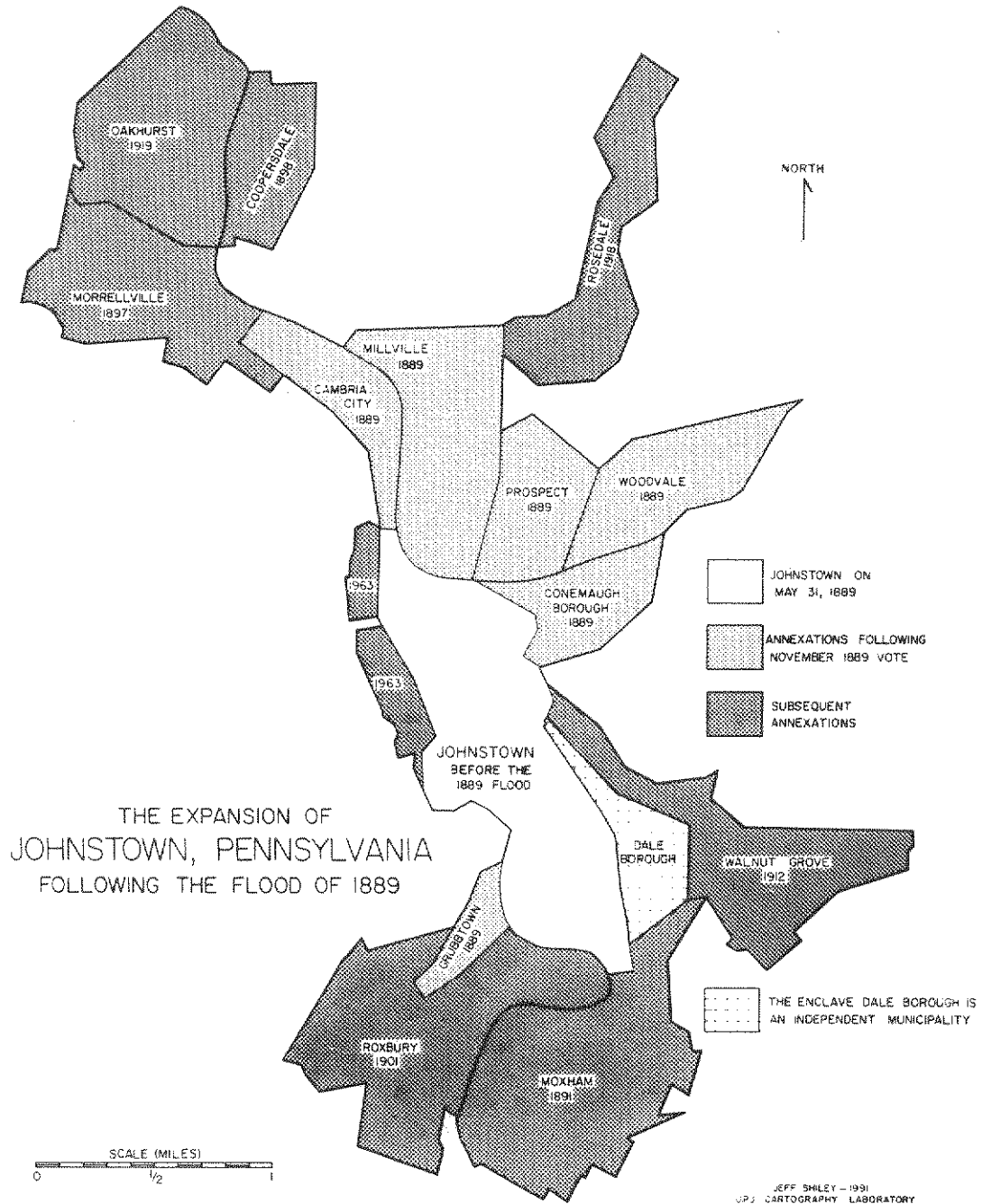


FIGURE 4. The political geography of Johnstown changed as a result of the 1889 Flood, when six previously independent boroughs and villages voted to consolidate with Johnstown. The outline of Johnstown shown here is based on its 1991 boundaries. Also shown are the approximate boundaries of the 13 boroughs and villages annexed between 1889 and 1919. Reflected in the city's boundaries but not shown in detail are 11 additional annexations ranging from 0.2 acres to 33.74 acres. The 1963 annexation of 84.82 acres consists of a steep hillside on either side of the Incline Plane.

1891. Morrellville and parts of Stonycreek and Upper Yoder Townships also petitioned to join the city, and were subsequently annexed. By 1891, less than two years after the flood, the much expanded city of Johnstown had a population of 22,539, more than double that of the pre-flood period!

Consolidation's popularity, according to Johnstown newspaper articles and editorials from the summer and fall of 1889,⁶ seemed to stem from the perception that the many small, separate municipalities were handicapped in their efforts to secure flood recovery assistance or otherwise act effectively on their own behalf. A case in point was sanitation control, which was difficult to implement on a municipality by municipality basis. The multiplicity of municipalities was perceived as impeding recovery efforts because so many different officials had to be consulted before any agreement could be reached on common actions. Smaller communities also complained that public relief efforts overlooked them in favor of the larger and more visible city of Johnstown. Consolidation was seen as a way of overcoming these obstacles.

For several decades Johnstown continued to expand by annexation, adding Morrellville (1891), Coopersdale (1898), Roxbury (1911), Walnut Grove (1912), Rosedale (1918) and Oakhurst (1919).⁷ Other boroughs created by the Pennsylvania legislature declined to join with the city, and indeed have resoundingly defeated every consolidation proposal put forward.

Suburbanization

A second consequence of the 1889 flood was rapid suburbanization in locations above the floodplain. Almost immediately following the flood, the Cambria Iron Company, dominant employer in Johnstown and predecessor to Bethlehem Steel Corporation, built the Borough of Westmont on a bluff overlooking the city of Johnstown. Westmont was intended to house Cambria Iron Company employees in a model community serving all classes. Located about 500 feet above the city, Westmont had easy access to downtown Johnstown via an inclined plane, which began operation in 1891 and continues its service more than one hundred years later.

Many flood survivors rebuilt their homes on the floodplain, but others were attracted to higher elevations in places like Westmont, Roxbury, Daisytown, Upper Yoder Township, Brownstown, Ferndale, Dale and Moxham. Over the next hundred years, other municipalities also attracted population and reinforced the early post-flood pattern of upland suburbanization.

Johnstown's Image as "The Flood City"

A third consequence of the 1889 flood was the popularization of Johnstown as the flood city, a view that subsequent floods in 1936 and 1977 only served to reinforce. The 1889 flood was the most devastating disaster of the nineteenth century, and as such was extensively covered by the print media. Reporters and photographers crowded into Johnstown to record that "epitome of horror for the Victorian Age" (Figure 5).

The greatest natural disaster of the century, it touched the emotions of all levels of society. The rush of the waters on unsuspecting Johnstown, the violation of happy homes, the cruel drownings and horrors at the bridge, the plight of orphans and widows, the recovery of the dead—all these became subjects of conversation, poetry, novels, legends and song. However incredible the descriptions coming from Johnstown may have sounded, the photographs soon showed gruesome evidence that the calamity was real!⁸

As Selvaggio notes, “the country was deluged with fake histories, pathetic songs, pulp novels, bad verse, and vivid photographs, each, in its way, commemorating the disaster.”⁹

News accounts of the 1936 and 1977 floods inevitably contained references to and comparisons with the events of 1889, reinforcing the notion that Johnstown and flooding were synonymous. That this image persists is verified by much anecdotal evidence provided by residents of the Johnstown area, who have become accustomed to hearing strangers automatically link Johnstown with its flood history.

The other side of the “Johnstown flood image” is reflected in the *local perception* of the flood history, in which the city’s recovery from three devastating floods

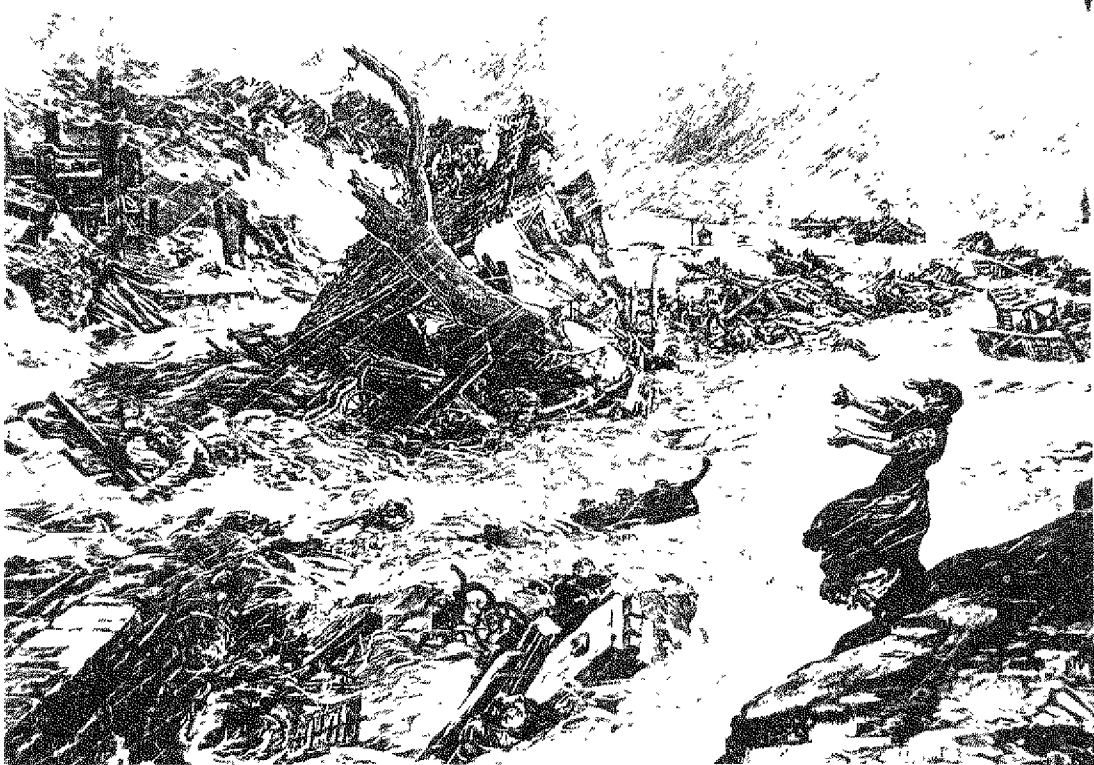


FIGURE 5. “The Flood at Johnstown—The Scene at the Bridge.” This drawing by W.A. Rogers appeared in *Harper’s Weekly* (XXXIII, 1695), June 15, 1889. The 1889 flood produced an outpouring of sensational and sentimental drawings, photographs, books, commentaries and poetry.

in less than one hundred years is seen as proof of its resilience, its “unquenchable spirit,” its ability to “triumph over adversity.” This experience has produced an almost automatic response locally; its theme is the community’s faith in its ability to recover from whatever natural or economic disaster may befall it.

The communal flood history experience now combines local pride with a strong entrepreneurial interest, as institutional and private sector forces combine to market the flood history. The 1889 flood is now a heavily promoted tourist attraction. The Johnstown Flood Museum, located in a former library built with funds donated by Andrew Carnegie, contains flood memorabilia and is one of the area’s two major “interpreters” of the flood. In March 1990, its documentary film on the 1889 flood won a prestigious Oscar award. The other major interpreter of the 1889 flood is the National Park Service, which operates at the site of the infamous South Fork Dam. Marketing the flood history is also being linked to plans for America’s Industrial Heritage Project, which is intended to preserve working examples of coal mining and iron and steel making as they were in the second half of the nineteenth century.

CONCLUSIONS

More than 100 years after the event, identification with a notorious disaster continues to have an impact on Johnstown. The 1889 flood changed the political geography of the valley, fueled the move to the upland suburbs, and created an indelible link with the flood image. While differing from the 1889 flood in cause, areal extent, mortality and economic impact, the subsequent major floods in 1936 and 1977 helped reinforce the popular image of Johnstown as the flood city. More locally, the community’s successive flood recovery efforts are seen as evidence that the community is resilient in the face of adversity. This “triumph of the human spirit” has most recently become a vehicle for marketing a local tourist initiative based on the flood history combined with the area’s nineteenth century experiences in basic steel and coal mining and its richly diverse ethnic heritage. Therein lies the hope of parlaying the tragic event of 1889 and its successor floods into something of lasting benefit to the community.

Note: Some portions of this chapter which deal with the 1889 flood events and consequences draw upon the author’s previous article about the 1889 Johnstown flood, “The Legacy of the Johnstown Flood” (*The Pennsylvania Geographer*, Volume XXVIII, No. 2 [Fall/Winter 1990], 68-80), and papers presented at the 1990 Annual Meeting of the Association of American Geographers (April 20, Toronto, Ontario, Canada) and the Applied Geography Conference (Charlotte, North Carolina), October 25, 1990.

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