Spring 2019

"A Flood of Problems" in Michigan: An Urban Environmental History

Nancy M. Germano

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By

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Spring rains produced "A Flood of Problems," announced the front page of the *Kalamazoo Gazette* on Saturday, April 19, 1975. The previous evening's four-inch downpour exceeded the city's total rainfall for the entire month of April 1974 (3.59 inches) and April 1973 (3.99 inches). The newspaper's reporters detailed local "problems," including flooded roads, overflowing sewer systems, and flooded basements in homes near the sewage treatment plant. Lansing and Flint also experienced heavy rain. Flooding and mudslides closed Interstates 75, 96, and 496 and US Highway 23. A mudslide on westbound I-496 in Lansing trapped several vehicles, including a fire engine.[1] Flooding across the state was described as the "worst since 1947." With expected damage in the millions of dollars, Governor William G. Milliken asked President Gerald R. Ford for federal disaster aid for fourteen counties.[2]

While Lansing endured the initial brunt of the 1975 storm emergency, Kalamazoo remained in the path of rising waters and suffered subsequent damage. Kalamazoo authorities evacuated eighty area families from their homes, while others voluntarily abandoned their homes. City crews worked round the clock to fill sandbags and pump out basements. Kalamazoo Township Supervisor F. E. Griffith told a *Gazette* reporter that the fire department gave top priority to pumping basements for those homes that would not fill with water again, explaining that it was not practical to pump an entire neighborhood surrounded by a pond of water. City health officials warned homeowners to avoid contact with the water because of probable pollution from septic systems, to disinfect walls and household items, and to throw away all food items except canned goods. The *Gazette* also ran an article featuring warnings by the US Department of Housing and Urban Development of the hazards that might await

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[1] "Kalamazoo All Awash! 4-Inch Rainfall Drenches Area," *Kalamazoo Gazette* (hereafter *KG*), 19 April 1975.

[2] "Five Area Counties Involved," *KG*, 21 April 1975.

The Michigan Historical Review 45:1 (Spring 2019): 81-107

occupants returning to flood-damaged homes, including structural damage, gas leaks, and electrical system damage.[3]

As flooding receded, municipal public works crews and federal disaster teams inspected for damage and assessed the costs. President Ford, himself from southwestern Michigan, declared his home state a major disaster area. Statewide, April's flooding caused $75 million worth of damage.[4] In Kalamazoo, Civil Defense Director Walter Jones estimated $1 million in public costs for township police, fire, patrol, and rescue workers, along with damage to private homes and businesses that equaled or exceeded that amount.[5] Perhaps to reassure traumatized residents with long-term perspective, the *Gazette* ran a follow-up piece—"Flooding a Part of Kalamazoo History"—which showed photographs of past floods and lightheartedly noted that "historically, on occasion, life is 'goo' in Kalamazoo."[6]

In this article, Kalamazoo serves as an important case history for exploring urban Michigan's complex relationships with riverine landscapes.[7] This is not a story of inevitable environmental degradation resulting from human settlement patterns and intervention in the natural processes of the floodplain.[8] Nonetheless, Kalamazoo's urban flood history does represent persistent conflicts between urban land development rights and a city's desire to capitalize on its natural wealth, on the one hand, and community and environmental security and sustainability on the other. I begin with a biographical examination of the city and its river, focusing on how people experienced flooding firsthand.[9]

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[3] "It Depends on Rainfall," *KG*, 23 April 1975; "Dozen Families Flee Homes," *KG*, 23 April 1975; "It Spells Trouble! Floods Causing Some Problems, Worries, Unusual Circumstances," *KG*, 23 April 1975; "Enter Flooded Home Carefully," *KG*, 24 April 1975.

[4] "Kalamazoo to Receive Flood Aid," *KG*, 28 April 1975.

[5] "Water Level Drops," *KG*, 25 April 1975.

[6] "Flooding a Part of Kalamazoo History," *KG*, 26 April 1975.

[7] This article is based in part on the author's doctoral dissertation, "The Urban Midwest's 'Dangerous Friends': At the Confluence of Flooding Rivers, an Environmental Movement, and a National Insurance Program" (PhD diss., Indiana University, 2017).

[8] See, for example, George P. Marsh, *The Earth as Modified by Human Action: A New Edition of Man and Nature* (New York: Scribner, Armstrong & Co., 1874); James P. Kemper, *Rebellious River: Use and Abuse of America's Natural Resources* (Boston, MA: Bruce Humphries, Inc., 1949).

[9] I take the approach of geographers and environmental historians such as John O. Anfinson, *The River We Have Wrought: A History of the Upper Mississippi* (Minneapolis: University of Minnesota Press, 2003); Mark Cioc, *The Rhine: An Eco-biography, 1815-2000* (Seattle: University of Washington Press, 2002); and Grace Karskens, "Floods and Flood-mindedness in Early Colonial Australia," *Environmental History* 21 (2016): 315-342.

Next, I explore how local, state, and federal actors intersected to manage inconveniently "abundant" water and to conquer problem flooding, as a particularly Midwestern problem.[10] This necessarily involves intersections between problem-solving and politics.[11] Finally, I examine the economics of environmentalism in the context of urban water management. I pay special attention to flood insurance as a critical mechanism for negotiating the political and legal quagmires of public interests and private rights.[12]

In the twenty-first century, Michigan cities continue to battle extreme and locally-catastrophic flood events. From this struggle emerges a reasonable question: At what point should flood disasters be approached as unnatural and avoidable events, rather than "natural" and "unavoidable" (as in, "on occasion, life is 'goo'")?

A Biography of the Kalamazoo River Basin

In the Michigan Territory of the late 1820s, Euro-American settlers began arriving at the future site of Kalamazoo County. Settlers discovered fertile prairie land, rolling hills, and fresh-water rivers, creeks, and lakes. These were legacies of Pleistocene Epoch glaciers. When the glaciers' Lake Michigan Lobe paused during its northwesterly recession, it released large quantities of till, forming the Kalamazoo moraine. While the lobe remained stable, melting ice transported outwash away from the moraine, creating an outwash plain. Simultaneously, the Saginaw Lobe retreated in a northeasterly direction, forming the Tekonsha moraine in the eastern part of the county and creating another outwash plain. The glaciers'

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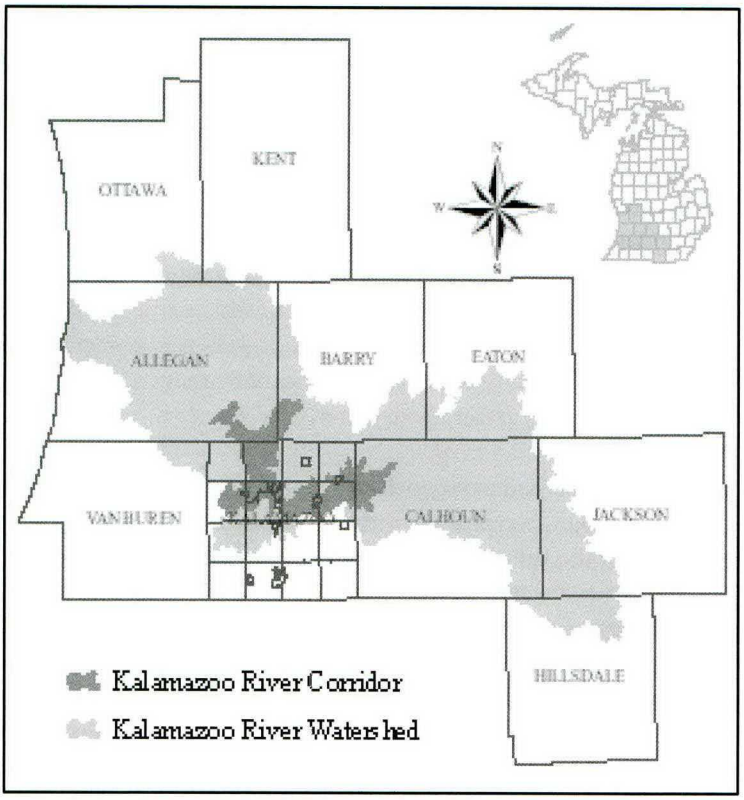
[10] Lynne Heasley and Daniel Macfarlane, "Introduction," in *Border Flows: A Century of the Canadian-American Water Relationship,* eds. Heasley and Macfarlane (Calgary, Alberta: University of Calgary Press, 2016), 8; David B. Walker, "The Nature and Systemic Impact of 'Creative Federalism,'" in *The Great Society and Its Legacy: Twenty Years of U.S. Social Policy*, eds. Marshall Kaplan and Peggy Cuciti (Durham, NC: Duke University Press, 1986), 197-199, 207.

[11] Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920* (Cambridge, MA: Harvard University Press, 1959); John McPhee, *The Control of Nature* (New York: Farrar Straus Giroux, 1989); Karen M. O'Neill, *Rivers by Design: State Power and the Origins of U.S. Flood Control* (Durham, NC: Duke University Press, 2006); Rutherford H. Platt, *Land Use and Society: Geography, Law, and Public Policy*, rev. ed. (Washington, DC: Island Press, 2004).

[12] Ari Kelman, *A River and Its City: The Nature of Landscape in New Orleans* (Berkeley: University of California Press, 2003); David Welky, *The Thousand-Year Flood: The Ohio-Mississippi Disaster of 1937* (Chicago: University of Chicago Press, 2011); Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West* (New York: Oxford University Press, 1985).



A map of Kalamazoo County and the Kalamazoo River corridor.

Source: Kalcounty.com

periods of retreat, re-advance, and stability left the county with morainic ridges, outwash plains, lakes, streams, and poorly drained bogs and ponds.[13]

The Kalamazoo River Valley likely formed when runoff to the river eroded the valley to a depth of more than 150 feet "below the adjacent hills of the moraine and outwash plain," with a floodplain floor more than one mile wide in places.[14] The Kalamazoo River system drains approximately 2,000 square miles in ten counties in southwest Michigan. Its north branch heads in lakes in Jackson County, and the south branch arises from marshland in Hillsdale County, with the two branches joining

[13] Lloyd J. Schmaltz, "Surficial Geology," in *Kalamazoo County: Geology and the Environment*, ed. Richard N. Passero, et al. (Kalamazoo: Western Michigan University, 1978), 17.

[14] Ibid., 22.

at Albion. From there, the river's main stem continues its northwesterly path to Lake Michigan, with the mouth located near the towns of Douglas and Saugatuck. It enters Kalamazoo County at the northeast corner and flows southwesterly until taking a northern turn at Kalamazoo and exiting the county on a northerly path. The river system drains approximately 56% of Kalamazoo County (the northern portion). The St. Joseph River system drains 43% of the county (the southern portion), and the Paw Paw River System drains the remaining 1%.[15]

The city's founder, Titus Bronson, built his claim shanty in the floodplain on the west side of the river in the summer of 1829. By 1836, the fast-growing village faced its first flooding problems, when high water covered the road near the Main Street bridge. In May 1858, the Kalamazoo River again flooded the Main Street bridge, and its Portage Creek and Arcadia Creek tributaries flooded their banks. A large portion of the village flooded, with Whitcomb's Mill and Distillery incurring especially heavy damage. Floods followed in 1854, 1864, 1868, 1869, and 1887.[16]

Despite flood risks, Kalamazoo industries continued to expand within the floodplain of the river and its tributaries. Most famous today are the Dutch immigrants, who arrived as early as 1850. They introduced a strain of celery seeds that later earned Kalamazoo its national reputation as the "Celery City." Celery requires rich soil with constant moisture to grow, and the area's plentiful "muckland" provided those moist

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[15] William B. Harrison, "Surface Water," in *Kalamazoo County,* 45; Michigan Department of Natural Resources, Fisheries Division, *Lower Kalamazoo River Natural River Plan,* rev. 12 March 2002 (Lansing: Michigan Department of Natural Resources, July 1981), 2-6, michigan.gov/documents/Lower_Kalamazoo_River_Plan_23011_7.pdf (accessed 15 March 2017).

[16] Willis F. Dunbar, *Kalamazoo and How it Grew . . . and Grew . . .* (Kalamazoo: Western Michigan University, 1969), 2-5, 23-26, 32-37; Samuel W. Durant, *History of Kalamazoo County, Michigan: with illustrations and biographical sketches of its prominent men and pioneers* (Philadelphia, PA: Everts & Abbott, 1880), 208-213, 217, 219, 220, 223, 263; Susan E. Gray, "Land Speculator as Confidence Man: Mumford Eldred, Jr., and the Michigan Land Rush," *Journal of the Early Republic* 10, no. 3 (Autumn 1990): 387-388; Michigan Water Resources Commission, *Flood Conditions in the Kalamazoo Area* (Lansing: Michigan Water Resources Commission, July 1957), 1. Bronson is described as generous and scrupulously honest, but an eccentric man who offended others. Historians surmise that the name change was an effort to disassociate the town from the man. In addition to the village name change, on January 23, 1837, the village newspaper owner changed the name of the *Michigan Statesman* to *Kalamazoo Gazette.* First published on October 2, 1835, it is the oldest newspaper in the state outside of Detroit.

A postcard showing one of Kalamazoo's many celery fields, c. 1911

Source: Kalamazoo Public Library Historical Photographs, Flickr Commons

conditions. By the end of the century, Kalamazoo had approximately 4,000 acres in celery cultivation and around 400 farms employed 3,500 workers.[17]

The still-larger pulp and paper industry also capitalized on Kalamazoo River water. Paper-making required an abundant water supply, a power source like hydro-electricity, and a means to carry away waste, such as a river current. Early paper production used straw from nearby wheat and rye fields, but later production depended upon the area's hardwood forests. By the turn of the century, paper mills lined the banks of the river and its tributaries.[18]

The village itself needed a coordinated water system to fight fires, for household use, and for sewage drainage. Public and private drains handled

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[17] Dunbar, *Kalamazoo,* 47-48, 61-63, 99-100; Durant, *History of Kalamazoo County,* 225, 230; John T. Houdek and Charles F. Heller, Jr., "The Emergence of Prosperous Farmers and Businessmen in Nineteenth-Century Kalamazoo County, Michigan," *Michigan Historical Review* 37, no. 2 (Fall 2011): 56-58; John A. Jakle and James O. Wheeler, "The Changing Residential Structure of the Dutch Population in Kalamazoo, Michigan," *Annals of the Association of American Geographers* 59, no. 3 (September 1969): 446-447.

[18] Dunbar, *Kalamazoo,* 89-91; Durant, *History of Kalamazoo County,* 256; Larry B. Massie and Peter J. Schmitt, *Kalamazoo: The Place Behind the Products*, sponsored by Kalamazoo Chamber of Commerce (Windsor Publications, 1981), 121-124, 149-150.

Riverside Foundry during a Kalamazoo River flood, c. 1900

Source: Kalamazoo Valley Museum Photograph File and Kalamazoo Public Library

Kalamazoo's sewage, emptying into area waterways. Sewage disposal was such an essential service that, in 1881, Kalamazoo trustees amended the village charter to provide for a board of sewerage commissioners and a more coordinated program for ensuring public health. The board had a trunk line constructed on Vine Street, and lateral lines were constructed on other downtown streets. The new sewer system emptied directly into the Kalamazoo River.[19]

By 1884, Kalamazoo's population reached approximately 16,000 (when it incorporated as a city). By 1900, the city's population had increased to 24,404. At that point, city officials began to keep records of flood stages. Just four years later, Kalamazoo experienced its most destructive flood. The "great flood" of March 1904 covered nearly two square miles of the city, closed factories, handicapped transportation, and caused upwards of $50,000 in damages, including the lost wages of factory workers. The front page of the March 26, 1904, *Gazette* announced the arrival of the "Worst Flood Ever Known in History of City."[20] The east side was under water; there were floods on the south side, deserted homes, floating animals, and washed-out roads and railroad tracks. Sewer lines emptying into the river raised concerns about public health dangers

[19] Dunbar, *Kalamazoo,* 93-94; Durant, *History of Kalamazoo County,* 259, 268-269.
[20] "Kalamazoo Valley Raging Flood," *KG*, 26 March 1904.

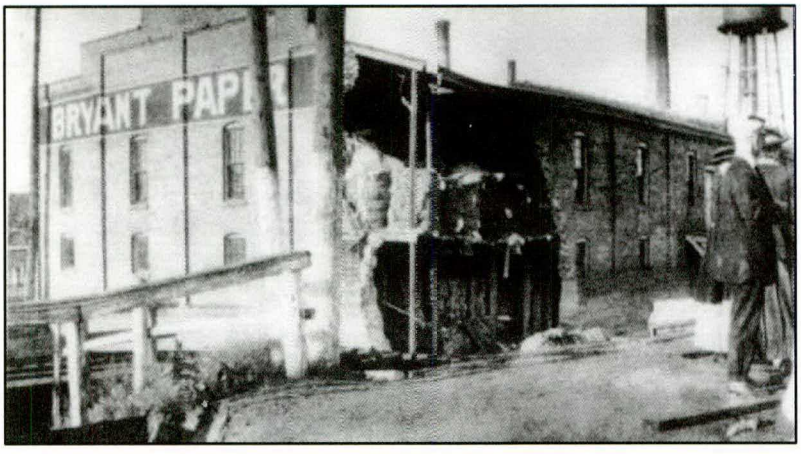
Flooded homes in the East Vine Street area of Kalamazoo, March 27, 1904

Source: Kalamazoo Public Library History Room Photograph File

from the flood water. The flood of 1904 provided the city with a baseline comparison for floods to follow in 1908 and 1918.[21]

This continuous and often-destructive flood pattern became well known but did not prevent mostly unchecked urban growth. By the mid-twentieth century, Kalamazoo's built environment and related urban infrastructure had consumed the river's floodplain. Kalamazooans developed all available water resources—mucklands, rivers, and creeks. Simultaneously, though, city, state, and federal officials did apply expertise and management techniques to mitigate flooding. They also attempted to reconcile conflicting ideas about local responsibility, state governance, and federal assistance. An examination of both governance and specific methods reveal flood control efforts that nonetheless went astray. Officials and residents lost sight of the *biography* of the river valley. The

[21] Dunbar, *Kalamazoo,* 86, 103; "Loss Amounts to $50,000," *KG,* 5 April 1904; Michigan Water Resources Commission, *Flood Conditions in the Kalamazoo Area,* 1-2.



The Bryant Paper Company was among the Kalamazoo businesses to suffer flood damage in 1914.

Source: Western Michigan University Photograph and Kalamazoo Public Library

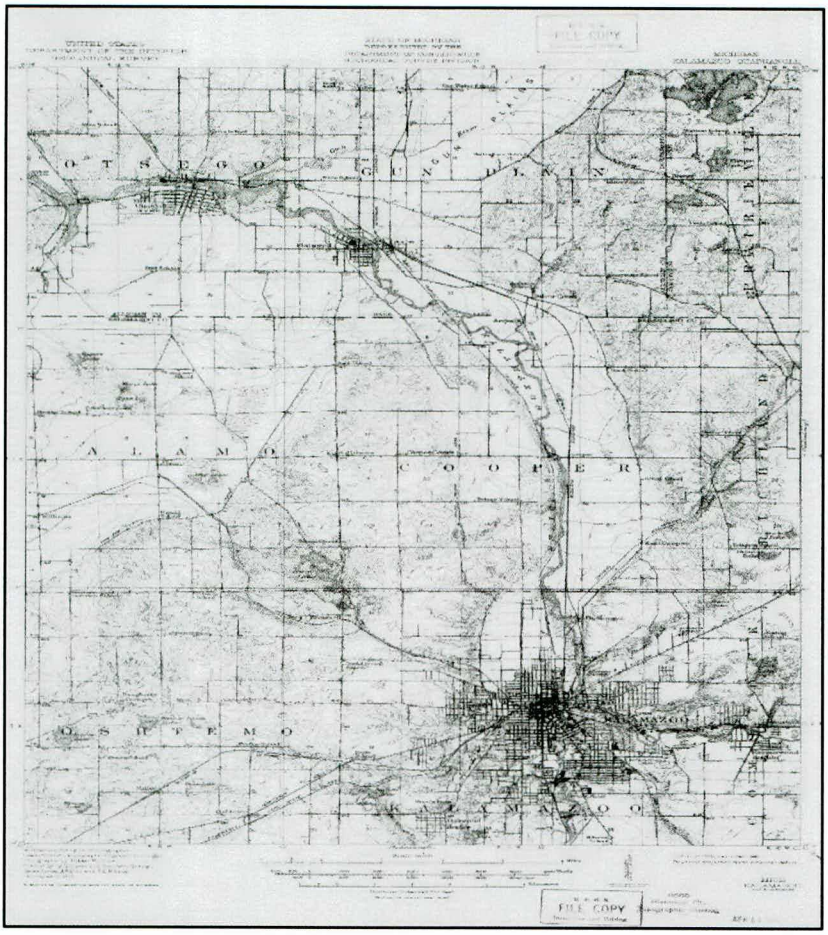
1975 flood was typical of the ensuing dangers of growth that capitalized on but could not fully control a dynamic urban landscape.

Managing the Floodplain's Risk

Local Solutions

As Kalamazoo faced twentieth-century urban growing pains, managing the floodplain became a priority. After extensive flooding in the 1930s, city officials applied to the federal Works Progress Administration (WPA) for funds to complete a flood-control project. The agency approved the project to reclaim approximately seventy acres of land for industrial, park, or playground sites along a three-mile stretch of the Kalamazoo River. The work also included cleaning the river and creeks, "banking up" river walls, removing sandbars and kinks in the river, and constructing control basins and reservoirs. The project involved development as well: to develop, landscape, and beautify the area with parks and boulevards; and to plat new streets with lots "suitable for first class dwellings or for business establishments."[22] A further benefit: several years of employment for large numbers of men, with the WPA

[22] "City Acquires Land in Flood Control Move," *KG*, 21 May 1940.



Map of Kalamazoo Quadrangle, 1918. Managing the river floodplain became a priority as the urban area expanded.

Source: US Department of the Interior, Geological Survey, at www.oldmapsonline.org/map/usgs/5442852

paying the majority of costs. The *Gazette* reported that this project would be the "largest flood control program ever planned by the city," and Kalamazoo officials fully expected it to place the city on a "virtually 'high and dry' basis so far as floods are concerned."[23]

As work was nearing completion in 1943, City Manager Edward S. Clark claimed in a report that the city should recoup the nearly $100,000

[23] "Flood Control Project Will Cost $237,820," *KG,* 24 October 1939.

cost by selling choice building lots in the reclaimed area. Clark also reminded citizens of why the project had been needed: the land adjacent to creeks was lower than the river's ordinary high-water level (which was reached after any heavy rain or sudden winter thaw). Therefore, water would back up into the creeks, and hundreds of homes and business buildings with floors below the normal river level flooded. To remedy this, ponds had been added to the WPA project to function as storage basins. Unfortunately, as Clark noted, the ponds would not completely replace "the natural flood basins lost when the former swampy areas adjacent to the creeks were filled by property owners to provide home or building sites," but once completed, Clark claimed the program would make the city "virtually free from serious flood damage."[24]

The 1940s brought about new interventions in the Kalamazoo River flood regime, some evolving from local circumstances, others linked to national events. In 1941, the federal government restricted WPA funds to defense projects. Kalamazoo found itself shouldering costs for any future remediation, either by issuing debt or with taxes. In addition, the city faced a decreasing tax base because its population was decreasing as the county's population was growing. This pattern was indicative of the national trend toward suburban annexation at the expense of urban centers. The city accumulated a backlog of water-related projects. Having relied on pumps for water and septic tanks and cesspools for sewage disposal, the city's postwar suburban communities required modern sanitary services to deal with both "the water accumulating in their streets and yards whenever it rained" and their overflowing septic tanks and cesspools.[25] The city itself had a pressing need for a sewage disposal plant. As the city struggled to manage its debt, and in the context of inadequate infrastructure, residents experienced the 1947 flood.[26]

The April 1947 flood dispelled optimism that the WPA Kalamazoo flood control project would prevent flooding. The river and creeks overflowed into neighborhood streets, basements and celery fields flooded, county roads and bridges washed out, and area businesses were crippled. The Consumers Power Company announced that the river had

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[24] "Report Made on Highway Park Plans," *KG*, 31 January 1943.

[25] Dunbar, *Kalamazoo,* 189.

[26] Ibid., 182-195.

reached its highest level in twenty-five years, while officials estimated damages into the millions of dollars.[27]

Defensive about the system of ponds, sewers, and creeks completed just a few years prior, Clark and City Engineer Harold L. Andrus blamed the 1947 flood on fast-rising river levels, which, they said, had prevented creeks and storm water drains from emptying into the river, thereby causing a backup. When the city attorney determined that the city was not liable to pay damages for private homeowners, property owners united. A coalition of business owners held a public meeting on June 23, 1947, with approximately seventy-five people attending. The group organized as the Kalamazoo County Flood Control Committee and elected officers and a board of directors.[28]

Under directive from the city commissioners, Clark turned to the federal government again, but this time citizens wanted and expected more modern expertise to resolve flooding. Clark contacted Michigan's US Senator Arthur H. Vandenberg, who convinced the Senate that something needed to be done. On June 24, 1947, the Senate Committee on Public Works adopted a resolution authorizing the US Army Corps of Engineers (hereafter Corps) to survey the Kalamazoo River and determine whether flood-control improvements were advisable. A public hearing in city hall on January 21, 1948, allowed the Corps to hear city officials' suggestions for eliminating causes of flooding and to hear community members' concerns. Clark and Andrus went on record in favor of deepening the river through the city and to the east, making further modifications to river hydrography, and building low dams on creeks in lowlands and marsh areas. A number of property owners, business and industrial representatives, and other interested persons testified during the hearing—"most of them favoring immediate flood control measures."[29]

Thus, Kalamazoo began a long process of seeking "permanent," federally funded flood control—a process that involved flood-control studies, recommendations, authorizations, and appropriations, as well as efforts to resolve local conflicts between economic and safety concerns.

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[27] "Rivers, Creeks Go Over Banks," *KG*, 6 April 1947; "Damage in City and State Will Reach Millions," *KG*, 7 April 1947.

[28] "Defend Flood Control," *KG*, 13 April 1947; "City Not Liable for Damages Cause by Flood, Attorney Rules," *KG*, 6 May 1947; "Public Meeting on Floods Called," *KG*, 22 June 1947; "Group Seeking Method to Ban Floods Forms," *KG*, 24 June 1947.

[29] "War Department Engineers Plan River Survey," *KG*, 29 June 1947; US Senate, *Kalamazoo River, Mich., Kalamazoo and Vicinity,* 84th Cong., 1st sess., 1955, S. Doc. 53, v; "Federal Flood Control Survey Planned Here," *KG*, 8 September 1947; "Warns Future Flood May Be City's Worst," *KG*, 21 January 1948.

The arguments for federal assistance posited that engineering expertise and federal dollars would relieve local burdens. Arguments against federal involvement emphasized that it would result in long delays, require capitulation to federal rules, and increase local spending. Moreover, federal legislation was necessary for any proposal involving appropriations. As Corps Milwaukee District Engineer Colonel J. O. Colonna explained, "even if a federal control project is presented to the Kalamazoo 'community,' there will be many strings attached," and he candidly estimated that the cost to the community would "amount to about half the cost of the project"—Kalamazoo would be "faced with a considerable expenditure."[30]

Meanwhile, proponents of a local approach to flood control believed that keeping the river and creeks clear of trash and debris would reduce flooding. City officials allocated "thousands of dollars" each year to remove tons of trash that obstructed river and creek flows, as well as storm sewer drains. While Clark assured residents that the city would do "all it can" to prevent floods, he cautioned that these clean-up efforts could only help reduce damages—the city "certainly can't guarantee the people that we won't have another flood!"[31] As in past years, city commissioners authorized $4,000 for a cleanup project in February 1948 in anticipation of the spring thaw.[32]

Another flood in March 1948 left proponents of federal flood control feeling vindicated in their efforts. The *Gazette* again reported the devastation visiting the city and its surrounds from the swollen Kalamazoo River and creeks—the 1948 flood crested only one foot below the 1947 level.[33] The Kalamazoo Flood Control Committee—the citizen action group formed following the 1947 flood—petitioned the city commission to "fulfill its obligation" to residents and employees in the Portage and Axtell Creek areas by removing obstructions, installing adequate storm sewers, removing filth from stream beds, and restraining industries from upstream dumping. The group's spokesman and attorney, Austin J. Doyle, accused the city of consigning residents and businesses in the area "to the status of a slum." Doyle further claimed that the city

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[30] "U.S. Engineers Making 2-Year Study of Area," *KG*, 22 February 1948.

[31] "Prepare Creeks As Precaution Against Floods," *KG*, 10 February 1948.

[32] "U.S. Engineers."

[33] "Over 17,000 Tons Topsoil Washed Away," *KG*, 28 March 1948.

allowing upstream paper mills to pollute the creek had sacrificed residents and businesses for industry.[34]

Obstruction of surface water sources, however, was only one contributor to the city's flooding problem. As the city suffered a particularly rainy spring in 1948, the *Gazette* highlighted not only the city's drainage challenges but also the effects of manipulating natural systems. Again, there was hope for resolution through human ingenuity:

> Like many other cities which are situated in river valleys, Kalamazoo is confronted with the fact that when man upsets Nature's balance he must devise his own means of correcting the imbalance thus caused. Translated into less philosophical and more specific terms, this means that if we are going to build modern cities and let them grow we must do something to offset the effects of the resulting interference with natural drainage.
>
> We don't want mosquito-breeding swamps in our urban communities, so we fill them in. . . . We don't want flooded basements or yards if we can avoid them, so when we are building on low ground we try to build a little higher than the surrounding area. All these things are logical, natural, and sensible, but the fact remains that they have their effects on the drainage problem. . . .
>
> The hope is that major improvements in the drainage capacity of the Kalamazoo river . . . will eventually provide a final and complete correction of flood conditions in this community.[35]

As the article revealed, despite knowledge of the destructive consequences of human encroachment on floodplains, those activities remained, in their thinking, "logical" and "sensible." Growth and development would continue, and so would the hope that human ingenuity could outwit nature. Beyond the ephemeral moment of the article was a larger collective tendency to forget about floods later, to seek a return to normalcy, and to lose a sense of urgency for costly changes to avoid future floods.

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[34] "More Than 200 Petition for Flood Relief," *KG*, 4 May 1948.

[35] "Kalamazoo's Drainage Problem," *KG*, 13 May 1948.

For its part, the Corps of Engineers did not abandon its pursuit of a federal flood control program for the Kalamazoo River. Corps District Engineer Colonna submitted an initial survey report on July 22, 1949. He determined that the most practical plan would widen, deepen, and straighten the river channel through the city, add a low-flow control dam to offset the impact of river modifications on well-water users and farmers, and enlarge the lower portion of Portage Creek. The proposed improvements, Colonna noted, would "eliminate eighty percent of the flood damages in the area" by providing "complete protection against damage" from floods up to fifty percent larger than the 1904 flood. Initial estimated costs for the project totaled $4,325,000, with the federal share determined at $3,975,000. In addition to paying its share of the costs, the city's obligations included furnishing necessary land and easements, releasing the federal government from any damages, maintaining and operating the project after completion, preventing encroachments, and making changes to city utilities necessitated by channel improvements. The Board of Engineers for Rivers and Harbors agreed with Colonna's recommendations, with one additional proviso: before spending any federal funds and beginning construction, the city must address pollution of the Kalamazoo River from sewer and industrial waste discharges.[36]

After three years, it seemed that federal assistance might be forthcoming. But unforeseen obstacles slowed the momentum. The Kalamazoo project was part of a billion-dollar public works bill that included other projects nationwide. On August 10, 1956, Michigan's Congressman August E. Johansen delivered the unwelcome news that President Dwight D. Eisenhower had vetoed this "pork barrel" bill. Eisenhower signed a revised bill in July 1958, but project commencement remained years away. First, the Corps had to complete a more detailed engineering study; second, federal funding for the project required separate legislation; and third, benefiting communities had to appropriate their "matching" funds and comply with project prerequisites.[37]

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[36] US Senate, S. Doc. 53, 1-6, 31-36, 39-41. The federal Flood Control Act of 1936 and Flood Control Act of 1944 required "local cooperation" as a condition for federal projects that predominantly benefitted local interests.

[37] "Make Flood Control Plans Now," *KG*, 1 August 1956; "Flood Works Bill Vetoed by President," *KG*, 10 August 1956; "Ike Kills Kalamazoo River Bill," *KG*, 15 April 1958; "Ike Backs Sound Water Bill," *KG*, 27 April 1958; "Ike Signs Local River Flood Bill," *KG*, 4 July 1958; "Paper Details Come First," *KG*, 7 July 1958.

State and Regional Solutions

As Kalamazooans continued to balance local and federal solutions, the State of Michigan weighed in. Historically, state officials had taken an active role in managing the state's water sources: its Great Lakes, its 36,000 miles of rivers and streams, and its 11,000 inland lakes. While these resources established major themes in the state's history—navigation, shipping, commerce, water-based industries, sports, and recreation—inland water resources also commanded attention to drainage, pollution, and flooding. Indeed, early in Michigan's state history, its legislature adopted laws to address problems with water that threatened the health and welfare of citizens.

As early as 1897, Michigan passed a law to provide for construction and maintenance of drains and establish a method to pay for the work. From that start, state drainage law evolved with amendments made every few years, adding procedures for situations when conflicts of interest arose, for drainage improvements using mechanical pumps, for permits to use county drains for sewage disposal, for establishment of a revolving fund for drain construction, and for establishment of county and agricultural drainage districts. By 1956, the mounting amendments necessitated a reorganization and recodification of the law, which at that point not only governed drainage but also, specifically, provided for flood control projects.[38]

In another early foray into state oversight of water matters, legislators placed pollution control under the purview of the state Department of Conservation, created in 1921. In 1929, the state became one of a few to create a Stream Control Commission with the sole purpose of protecting the state's waters from waste disposal by municipalities, industries, public or private corporations, individuals, or any other entity.[39] Writing in 1946, after seventeen years of commission efforts, however, commission chair William DeKleine voiced his frustration about the continued level of pollution, calling it "far greater today than before the war." DeKleine's frustration was also directed at the commission's inability to achieve its goal, noting the lack of staffing and funding needed for pollution control "on the scale necessary to meet the multitude of problems which Michigan's water resources and their conflicting uses present." To make

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[38] *Michigan Public Acts* (hereafter *Acts)* 1897 PA 254; *Acts* 1901 PA 27; *Acts* 1909 PA 69; *Acts* 1911 PA 208; *Acts* 1915 PA 296; *Acts* 1921 PA 95; *Acts* 1923 PA 316; *Acts* 1929 PA 158; *Acts* 1931 PA 243; *Acts* 1932 PA 38; *Acts* 1949 PA 247; *Acts* 1956 PA 40.

[39] *Acts* 1921 PA 17; *Acts* 1929 PA 245.

matters worse, the sources of pollution went beyond municipal sewer systems and industrial waste disposal—a significant amount of pollution originated from state institutions such as hospitals and universities. In his opinion, some exceptions were needed to avoid charges of the state violating its own laws, which also made the commission's job of enforcing pollution abatement for others more difficult.[40]

On May 17, 1949, state lawmakers reorganized the commission in an attempt to encourage more cooperation. Under the 1949 act, the commission's name was changed to the Water Resources Commission, and it added three citizen members: one each from groups representing industrial management, municipalities, and conservation associations. In addition to the commission's original responsibility to control pollution, the law specifically required that the commission provide advice and support for any flood-control and drainage districts. Thus, the new commission became the "middle man" between local and federal governments for flood control projects. Exercising its new responsibilities, the commission met with the Corps in January 1950 in connection with Kalamazoo's pursuit of a federal flood-control project. To appease one of the Corps' reservations about the project, the commission declared its intent to "establish as its objective in the Kalamazoo area, the cleanup of all pollution detrimental to the proposed flood-control project within the next 3- to 5-year period."[41]

The commission's 1950-1952 report to Governor G. Mennen Williams and members of the legislature reaffirmed conflicts attendant to the state's "most important natural resource," noting that water was, at times, also "one of the great agents of destruction." The commission reported that "direct damage to property along inland rivers by seasonal floods has been estimated at more than $1,500,000 per year in Michigan." Based on experience, the commission expected flood damages to increase in the future "under the double threat of continued, unrestricted encroachments by permanent building" in floodplains and stream

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[40] William DeKleine to Andrew W. Fleming, Press Secretary, Executive Office, "Stream Control Commission," August 1946, "Legislative Committee on Stream Pollution," Record 65-51-A, box 1, folder 14, Michigan History Center, Lansing, MI (hereafter MHC).

[41] *Acts* 1949 PA 117; Michigan Water Resources Commission, *Combined Second and Third Annual Reports, 1950-1952* (Lansing: Water Resources Commission, 1952), 16; US Senate, S. Doc. 53, x.

obstruction originating, in part, from industrial waste disposal practices. Yet, in 1952, the commission's regulations had not addressed these threats, and the commission and the public still looked to structural approaches to correct flooding problems.[42]

Regional efforts to manage water resources also complicated matters. The commission sponsored the ninth Midwestern States Flood Control Conference on the campus of Michigan State College in East Lansing in June 1954. Representatives from nine Midwestern states attended the conference to discuss hydrological and legal aspects of water management. Commission chairman and director of conservation Gerald E. Eddy presented a paper on the problems of water management in Michigan, noting that the abundance of water had presented problems in terms of managing the state's water resources—chiefly, "a persisting public attitude of taking water for granted," which in turn had led to "a lack of public understanding of how water resources behave"—citing the example of encroachment on floodplains. The "most complex" problem, however, was that of stream flow stabilization—managing seasonal river levels would require "varied, widespread, and carefully coordinated" efforts.[43]

Conference attendees also discussed the challenge of keeping the public informed of water resource issues. The commission explained its goal of presenting "a clear, concise picture" of what had happened in the past and what might be expected in the future. Its message held particular significance, the commission noted, because "many homes and businesses have been built in the flood plain" due to a lack of public information. "Floods that have occurred tend to be 'soon forgotten,'" it warned, and "each new structure added in these damaged areas awaits the rise of uncontrolled waters inundating the flood plains."[44] The commission's 1954 report on flood conditions in the state's capital was prompted, in part, by the weather event in 1947, which had caused significant damage to property along the Grand and Cedar Rivers in Lansing. Unlike Kalamazoo, settlement in Lansing had begun on higher land, but as the city grew its lowlands became more valuable for commercial, industrial, and residential use. At the time of its report, the commission stated that development had continued with nearly all of the

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[42] Michigan Water Resources Commission, *Combined Reports,* 15-17, 45-46.

[43] Gerald E. Eddy, "Basic Problems of Water Management in Michigan," in Michigan Water Resources Commission, *Talks and Papers Presented at Ninth Midwestern States Flood Control Conference* (Lansing: Michigan Water Resources Commission, 20 January 1955), 15-20.

[44] Michigan Water Resources Commission, *Flood Conditions in the Lansing Area* (Lansing: Michigan Water Resources Commission, September 1954), 2.

floodplains utilized, and, if a flood of the same or greater magnitude as the 1904 flood were to occur again in the 1950s, the commission estimated it would cause flood damages in excess of $5 million in Lansing.[45] With its report, the commission met its goal of presenting information to help inform the public and policy makers of flood dangers and associated challenges.

The state adopted an intermediary position during the 1950s, and state legislators approved laws that enabled local units of government to take action. In 1952, the state authorized local governments to acquire land and contract with the federal government for flood-control projects for the public good. In 1956, legislators approved procedures for local governmental units to establish water management districts with the authority to undertake drainage and flood-control improvements to eliminate problems jeopardizing the health and safety of individuals. In 1964, lawmakers also authorized two or more local governments to collaborate and petition to establish a river management district, which would have the power to acquire, construct, operate, and finance water storage or other river control facilities. Over the years, the state had further enabled local control of land use and flood prevention by providing legal authorization to establish local planning commissions and zoning laws, as well as granting powers to effect and enforce local goals by issuing bonds, assessing taxes, policing through use of ordinances and regulations, appropriating and budgeting, and utilizing eminent domain.[46]

Beginning in the late 1960s, state legislation reflected a more authoritative approach to flood control, in keeping with changes occurring in Washington, DC. As Congress debated the details of a national flood insurance program, Michigan legislators adopted the Subdivision Control Act of 1967, mainly directed at alleviating indiscriminate land subdivision practices but also requiring state agency reviews when a proposed subdivision involved flood-prone areas. In 1968, state lawmakers passed the Floodplain Control Act, giving the commission responsibility for ensuring stricter controls over alterations and obstructions to watercourses

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[45] Ibid., 3-4.

[46] *Acts* 1952 PA 278; *Acts* 1956 PA 40; *Acts* 1964 PA 253; Michigan Department of Natural Resources, Division of Land Resource Programs, *Floodplain Management and State Action in Prevention of Flood Damage* (Lansing: Michigan Department of Natural Resources, December 1977), 29-32.

and floodplains. As authorized under that act, the commission issued regulations for floodplain control, which prohibited future interference with the natural function of floodplains with a drainage area of at least two square miles (except in specified circumstances).[47]

A reorganization and restructuring of agencies charged with managing the state's natural resources occurred in the late 1960s and 1970s. In 1969, all functions of the Department of Conservation transferred to a new Department of Natural Resources (DNR), and the Water Resources Commission became a division of the DNR. Declaring that, "despite the great effort of conservationists, man still misuses and mistreats his environment," Governor William Milliken created an advisory council for environmental quality. Milliken's order tasked the council with investigating and evaluating the effectiveness of environmental management programs and making recommendations, using available expertise, to advance "the art of environmental quality management." The council's working priority list was long, but it included the need for zoning to protect floodplains and open space in urban areas and water management for purposes of flood control. In 1973, Milliken designated the DNR as the state entity responsible for developing and coordinating all environmental matters.[48]

Another matter that captured Milliken's attention was land use—an issue that combined environmental issues with economic development. In November 1970, Milliken established a special commission on land use to consider and recommend possible programs aimed at protecting future land use needs. For "the best interests of the public," the special commission identified critical land use areas: urbanizing areas, prime agricultural land, recreational land, and unique and natural resource areas. The special commission's report, dated December 1971, referred to the rapid growth of urbanized land in southern Michigan—an increase from 669,000 acres in 1940 to 1,722,000 acres in 1961—and the conflicting demands on the limited land resources, which called for action to achieve the goal of a "better society." Believing that state management of land use practices was necessary to ensure the future health of the state's citizens, the special commission recommended tax reform to correct existing

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[47] *Acts* 1967 PA 288; *Acts* 1968 PA 167; *Michigan Administrative Code* 1954 ACS 62, sec. 323.201, *et seq.*; Michigan Department of Natural Resources, *Floodplain Management*, 26-28.

[48] *Acts* 1969 PA 208; Michigan Executive Order 1969-1; Michigan Office of Planning Coordination, Bureau of Policies and Programs, Technical Report J-11, *Environmental Quality in Michigan* (Lansing: Michigan Office of Planning Coordination, February 1970), 1-4; Michigan Executive Order 1973-2.

conflicts of interest. The proposed law would correct the state's "ad-hoc approach to establishing priorities."[49] In 1974, the legislature passed one component of the special commission's recommendations—a law aimed at preserving valuable agricultural land and open spaces—permitting landowners to enter into agreements pledging they would not sell their land to developers in exchange for tax benefits. Unfortunately for the proponents of an omnibus land use control law, the farmland preservation act generated debates. With critics viewing the policies as inappropriate government interference in private property decisions and market functions, the land use control law never received legislative approval.[50]

The conflicts surrounding land use and water resources continued, despite the state's efforts. The state's flooding problems continued as well. After the 1975 flood on the Kalamazoo, Grand, Flint, and Shiawassee Rivers, legislators approved the Emergency Preparedness Act of 1976, which offered state protection and recovery from natural and man-made disasters within the state and broadened the definition of disasters to include such events as floods. The DNR prepared a floodplain management report in 1977, which presented an overview of why floods occur, the problems they create, the range of potential flood prevention and damage control measures, and actions taken at all levels of government to control floods. After conceding that "we are losing the battle of flood control," the DNR stated the "obvious": "the solution to the flood damage problem lies with the wisdom applied in the use of the floodplain." Flood prevention instead of flood control guided the DNR's response to flooding in the late 1970s. The DNR posited that instead of "trying to keep rivers away from man, keep man away from the rivers—for floods are natural acts while flood losses result from the acts of man, a payment which nature extracts in return for occupation of her flood plain."[51]

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[49] Audrey Gunn to William A. Ryan, 13 September 1971, and Special Commission on Land Use, "Land Use Programs for Michigan: A Framework for Action," 14 December 1971, "Legislature, Special Committees, 1971, Land Use," Record 82-126, Box 4, Folder 10, MHC.

[50] *Acts* 1974 PA 116; Public Sector Consultants, Inc., "Land Use and Sustainability," in *Michigan in Brief, 2002-03*, 7th ed., sponsored by the Michigan Nonprofit Association and the Council of Michigan Foundation (Lansing: Public Sector Consultants, Inc.), michiganinbrief.org/edition07/Chapter5/LandUse.htm (accessed 30 March 2017).

[51] *Acts* 1976 PA 390; Michigan Department of Natural Resources, *Floodplain Management*, 12, 24-32.

Solutions proffered to manage flooding problems had failed. The DNR's suggestion for flood prevention appeared sound, as the costs of flood damage continued to rise. But their actions could not keep up with the demands of modern cities to grow, not only geographically but also economically. A destructive flood event would catch residents and government officials in a web of conflicting concerns. How could modern cities prevent flooding and costly damage? Who would decide what flood prevention measures to take, and who would pay for those measures? Would that action produce the desired results without causing other problems? Although dissenting voices warned that urban growth and development threatened the health and safety of communities, economic concerns drowned out those warnings.

The Economics of Environmentalism

By the 1975 flood, the federal flood-control project for the Kalamazoo River, initiated in 1947, remained only a "fond dream" for its surviving proponents. The federal government now favored a new approach to flood control, one that reflected ideas of an ascendant environmental movement. The National Flood Insurance Program (NFIP), authorized in 1968 during President Lyndon B. Johnson's administration, changed the direction of federal flood control assistance. Instead of structural means, the federal government would subsidize an insurance program that required local regulation of floodplain development and individual purchase of flood insurance policies.

Initially proposed in the 1950s to control the rising costs of federal flood disaster assistance, the NFIP finally passed Congress in 1968 as part of a comprehensive Housing and Urban Development Act aimed at addressing the nation's housing crisis. Flooding presented a threat to housing and living conditions in urban communities, and the program's proponents believed that a properly designed insurance program would help reverse the visible impact of flooding in cities. Michigan's Subdivision Control Act of 1967, Floodplain Control Act of 1968, and floodplain control regulations aligned with the nonstructural approach endorsed under the NFIP. The aim was to control the economic and social costs of flood losses. State officials further included the NFIP in the state's overall program of floodplain management. A state coordinator worked with local governments on compliance, providing not only education, technical assistance, and oversight for communities, but also

assistance for lenders, realtors, and insurance agents. The state's efforts retained a commitment to seeking any available federal funding.[52]

Implementing the NFIP unleashed old ideological objections to the program. Opponents from the insurance industry objected to government interference; federalists objected to a federally mandated program; capitalists called the program socialistic. Community leaders worried about the impact of regulating use of valuable land in floodplains and a decreasing urban tax base. Individuals wondered how the household budget could absorb the cost of another insurance policy.

Community decisions to participate in the program reflected a convoluted mix of both economic and environmental pressures. At midcentury, Kalamazooans had decided to abandon the pay-as-you-go system in their efforts to address the city's growing needs. In this new era, under the leadership of City Manager Clarence H. Elliott, voters approved a $2,870,000 bond issue to help finance the "long-delayed" sewage disposal plant. Elected commissioners increased property taxes and voters approved another bond issue for a host of other capital improvements, including modernizing streets, constructing new pumping stations and a water utility building, adding a new bridge over the river, acquiring land for a police and municipal court building, and acquiring land to expand the airport. In 1955 and 1956, five communities had voted in favor of annexation to the city, more than doubling the city's area and increasing the city's responsibility to provide services. Accommodating the acquisitions meant additional expenses for the city, and voters approved municipal bonds of $1,970,000 for storm sewers and more than $2,000,000 for sanitary sewers (one-quarter of which would be paid for by a tax assessment).[53]

The city's existence, identity, and growth had relied on its direct relationship with its own natural resources and landscape. As the city grew, however, that relationship grew less visible to residents and policymakers. As late as 1947, almost one thousand acres in the county remained devoted to growing celery. By 1960, the industry had practically disappeared. Although growers named several causes for this decline, one

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[52] Michigan Department of Environmental Quality, "National Flood Insurance Program," michigan.gov/deq/0,4561,7-135-3313_3684_3725-9380--,00.html (accessed 5 April 2017).

[53] Dunbar, *Kalamazoo,* 196-204; Massie and Schmitt, *Kalamazoo: The Place,* 202.

significant reason pointed to the paper mills' deep wells, which had drawn too much water from the subsoil needed for celery. Following World War II, land utilized for celery farms also became valuable real estate to meet the booming demands for residential and industrial development.[54]

Communities negotiated the costs of these changes, both in terms of environmental health and economic viability. Despite their intimate relationship with the landscape, and their hard-won knowledge that manipulation and overuse created flood problems, communities like Kalamazoo continued to prioritize economic priorities and hope that human ingenuity would, someday, overcome the threat of flooding.

The advent of flood insurance coverage further obscured the important issues Kalamazoo still faced. Even the NFIP's original purpose became lost. Before communities and individuals could fully participate in the NFIP, some technical and time-consuming steps had to occur. First, the Federal Insurance Administration (FIA) had to create and issue Flood Hazard Boundary Maps (FHBM). Second, if a community agreed to join the NFIP after receiving its FHBM, it entered the NFIP's initial, or "emergency," stage, permitting residents to purchase flood insurance on a limited basis. Third, based on the community's agreement to participate, the FIA would conduct a flood insurance study and contract with an engineering firm to prepare a more technical Flood Insurance Rate Map (FIRM), which permitted the community to enter the NFIP's "regular" program. Lastly, the community needed to adopt floodplain regulations within one year of receiving its FIRM. If the community did not take this final step to participate in the NFIP's "regular" phase, its citizens could not purchase new flood insurance policies, and it could not renew any existing flood insurance policies at the end of the stated policy period.[55]

The case of Kalamazoo demonstrates the long process required to implement the NFIP. Kalamazoo received its FHBM on February 15, 1974, almost six years after the NFIP's introduction. The following year, the city commission adopted a resolution to enter the NFIP's "emergency" component. In order to advance to the "regular" component, a consultation meeting occurred in the spring of 1978 to determine existing information and additional studies needed. After studying overflows from

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[54] Dunbar, 130, 193-195; Jakle and Wheeler, "Dutch Population in Kalamazoo," 457; Massie and Schmitt, *Kalamazoo: The Place*, 172.

[55] The Institute of Rational Design, Inc., *Guidebook for Communities: National Flood Insurance Program* (New York: The Institute of Rational Design, Inc., September 1977), 18; James R. Quinn, *Thirty Years in Deep Water: The NFIP and Its Struggle for Significance* (Belleville, Ontario: Epic Press, 2000), 84-88.

the Kalamazoo River, Portage Creek, and Arcadia Creek, representatives from the Federal Emergency Management Agency (FEMA), an engineering firm, and the community met to review and approve the results in mid-1982. After approval, FEMA issued its report dated November 1984—more than ten years after Kalamazoo had received its FHBM.[56]

With FEMA's report in hand, city officials faced a six-month deadline to adopt floodplain regulations to retain eligibility to participate in the NFIP and advance to the "regular" program. The city's zoning laws adopted in 1954 had not included floodplain restrictions. City Planner Gary P. Niemeck drafted a proposed floodplain management ordinance, which he forwarded to city officials for review. As required by local law, public notices and hearings provided information and opportunities for comment. The city's Office of Economic Development and Planning recommended adoption of the proposed ordinance, with a warning that failure to adopt the regulations would render floodplain property owners ineligible for mortgages, loans, grants, or any other funding directly or indirectly connected with a federal agency. The executive director of the Kalamazoo Downtown Development Authority (DDA) wrote to Mayor Francis P. Hamilton and the city commissioners on March 12, 1985, urging adoption of the proposed floodplain regulations to ensure protection of the "financial health of property owners in the floodplain" and avoid loss of "future funding" for "needed improvements in the floodplains." Although noting the added burden on developers and real estate investors of "yet another layer of construction regulations," the DDA believed the city had "little choice but to adopt the regulations."[57] Following a public hearing on March 18, the commissioners adopted the ordinance, adding a chapter to the city's zoning law. The new law included a cautionary section: its provisions, based on scientific and engineering recommendations, offered a reasonable degree of regulatory flood protection; its provisions did not imply that larger floods or floods outside the identified hazard areas would not occur; and its provisions did not create any city liability for flood

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[56] Federal Emergency Management Agency, *Flood Insurance Study: City of Kalamazoo, Kalamazoo County, Michigan* (November 1984), 2-4, 10.

[57] Gary P. Niemeck to Sheryl L. Sculley, January 21, 1985, memorandum, Kalamazoo City Attorney's Office, Freedom of Information Act Coordinator (KCAO); Gary P. Niemeck to City Planning Commission, January 15, 1985, memorandum, KCAO; Gary P. Niemeck to City Commission, February 13, 1985, KCAO; James A. Visser to Francis P. Hamilton and Members of the City Commission, March 12, 1985, KCAO.

damages resulting from reliance on the regulations. Thus, Kalamazoo entered the NFIP regular program on May 1, 1985.[58]

With the complicated process behind them, Kalamazooans presumably could rest assured that they had taken the necessary precautions against flood damages. Yet participating in the NFIP did not prevent flooding or flood damages. A 1988-1989 U.S. Geological Survey summary of flooding stated that "the most extensive and damaging flood of record" occurred in the central Lower Peninsula in September 1986, causing approximately $500 million in damages. Although stating that major flooding in Michigan was not frequent, the USGS report quoted an average annual flood damage amount of $60 million-$100 million.[59] Furthermore, enforcing floodplain regulations remained a community mandate and purchasing flood insurance policies remained an individual responsibility—an individual choice which has proved unpopular, as only a fraction of insurable structures are covered by flood insurance.[60]

Conclusion

Riverine cities and towns across Michigan had a history of problematic flooding. Flooding represented a risk that could occur at any time under the right conditions, but because of its unpredictability and irregularity, the threat was often forgotten in favor of more immediate or desirable economic concerns. As demonstrated with the case of Kalamazoo, settlement and growth placed residents and businesses in an unhealthy and dangerous position when the river flooded. Despite awareness of the river's propensity to flood and the inadvisability of developing floodplains, urban residents approached their flood problems with hopes that management and expertise, with sufficient funding, could overcome nature. Government officials working with engineering and scientific experts also believed that some combination of management, manipulation, and methodology would provide future solutions. Continued growth led to destructive flooding. But it was also persistent

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[58] *City of Kalamazoo Ordinance Nos. 439 and 1345.*

[59] US Geological Survey, "Michigan Droughts and Floods," in *Water-Supply Paper 2375, National Water Summary 1988-89—Floods and Droughts*, http://md.water.usgs.gov/publications/wsp-2375/mi/index.html (accessed 15 March 2017).

[60] Federal Emergency Management Agency, "Community Status Book Report: Michigan," fema.gov/cis/MI.pdf (accessed 15 March 2017); Michigan Department of Environmental Quality, "Floodplain Management/National Flood Insurance," michigan.gov/deq/0,4561,7-135-3313_3684_3725---,00.html (accessed 4 April 2017); Michigan Department of Environmental Quality, "National Flood Insurance Program," michigan.gov/deq/0,4561,7-135-3313_3684_3725-9380--,00.html (accessed 31 January 2018).

attitudes about private property rights and the pursuit of economic "progress" that, despite a working knowledge of floodplain risks and also the rise of environmentalism even at local levels, ultimately overrode concerns for community and landscape protection.

The NFIP represented an environmentally conscious management technique that also offered economic benefits. By following state and federal governments' approved path toward flood prevention, communities gained eligibility for their residents to receive federally subsidized flood insurance, federally backed mortgages, and eligibility for federal funds in the event of a major disaster. Yet the modern and enlightened management approach did not successfully curb ongoing urban growth, meaning that the best flood insurance coverage could do was to offset the costs of flood damage.

By way of an epilogue, the city of Kalamazoo and Kalamazoo County have recently experienced more destructive flooding that threatened community viability. The 2018 spring rains caused a "historic crest" of the Kalamazoo River and $2.5 million in damages. Affected businesses and homeowners learned that, unfortunately, this flood was far less damaging than the last major event in 2008, and this time, the county did not qualify for federal funds under a state of emergency.[61] These events are as distressing for today's residents as historical floods were to earlier citizens. But they should not be a surprise. Economics, politics, and cultural attitudes curtailed the effectiveness of past approaches, while facilitating floodplain encroachments that remain in place today. Likewise, Kalamazoo's flood history reveals past limitations of environmentalist approaches to urban landscapes. Hopes that floodplain regulations would result in a changed philosophy and "keep [people] away from the rivers" were as much wishful thinking as the hope that continued growth would not interfere with the success of expensive flood control efforts. And yet, humans must hold onto hope. Indeed, research into and experiments with new "soft landscape armor" floodplain restoration methods, combined with local sustainability initiatives and flood warning systems, may lead toward more workable solutions to protect urban floodplains and urban dwellers. While history cannot be undone, it can inform the path toward the future.

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[61] "$2.5M in Damage Caused by Kalamazoo Record-Breaking Floods," *MLive*, 9 March 2018, mlive.com/news/kalamazoo/index.ssf/2018/03/flood_victims_form_coalition_t.html (accessed 9 November 2018).