



A Flood in a Small Community

A Test of the National Planning Frameworks

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On August 28, 2011, the Village of Schoharie in upstate New York was flooded with water from nearby Schoharie Creek and its tributary stream, Fox Creek. This widespread, devastating flooding caused by Hurricane Irene was unprecedented. The entire main street and surrounding residential streets were inundated with water that flooded basements and reached halfway up the first floors of buildings. Homes, agriculture, businesses, cultural and natural resources, and public infrastructure in this village of about 1,000 residents were destroyed. Just one week later, Schoharie sustained further damage from Tropical Storm Lee. The recovery from this severe devastation effort will continue for many years.

This brief assesses the National Planning Frameworks in Schoharie.¹ It considers the village's level of preparedness for the particularly severe flooding events of 2011, examines the effectiveness of the emergency response systems and various recovery programs, and discusses the challenges of planning for increased resilience to future extreme weather events. This analysis is necessarily incomplete because recovery activities are still under way in Schoharie and strategies to enhance resilience to future flooding are still being planned and implemented. Still, the challenges that Schoharie faced when planning and responding to a catastrophic incident could apply to any number of small communities in the United States.²

Natural Disasters in the United States

Since 2000 the United States has experienced approximately 60 major natural disasters—droughts, earthquakes, floods, hurricanes, tornadoes, wildfires, and winter storms—a year. The president makes

major disaster declarations in response to requests from the governor(s) of the affected state(s). These declarations identify the counties affected by the major disaster and commit federal government resources to help state and local recovery efforts. The Federal Emergency Management Agency (FEMA) administers and coordinates federal disaster recovery efforts and provides financial support to homeowners, businesses, and state and local governments.

Droughts and hurricanes are particularly destructive. The National Oceanic and Atmospheric Administration (NOAA), which measures the economic costs of natural disasters in the United States, has identified 170 natural disasters that caused damage of \$1.0 billion or more (in 2013 dollars) between 1980 and 2013. The average cost of these disasters is \$6.3 billion, but the average cost of droughts and hurricanes is more than twice this average.

The NOAA file identifies 30 hurricanes since 1980 that resulted in damage assessed at \$1.0 billion or more. The two most destructive hurricanes, Katrina and Sandy, caused damage estimated at \$149 and \$66 billion, respectively. The damage from Hurricane Irene was assessed at \$10.1 billion, with the largest losses in North Carolina, New York, and Vermont. The devastation caused by Irene in several localities, however, such as the Village of Schoharie, was the most extensive in local history.

Two federal insurance programs alleviate flood-related natural disasters: the National Flood Insurance Program (NFIP) and crop insurance. NFIP protects property owners in flood-prone areas against potential losses through insurance and mitigates future damages. The US Department of Homeland Security administers NFIP in close coordination with private-sector insurance companies.³ Participation in NFIP is based on an agreement between the federal government and local communities to provide insurance if the community will implement and enforce floodplain management measures to reduce future risks in flood hazard areas. Approximately 5.0 million households and businesses nationwide have maintained active NFIP policies in recent years. According to NFIP data, the national coverage of households is below 5.0 percent; statewide coverage in New York is less than 2.5 percent.⁴

Agricultural producers can protect against either the loss of their crops from a natural disaster (crop yield insurance) or the loss of revenue from lower agricultural commodity prices (crop revenue insurance). The US Department of Agriculture provides crop yield and crop revenue insurance for crops and livestock against damage caused by droughts, floods, hail, and winter freezes.⁵ The two main categories of crop yield insurance are crop-hail insurance, and multi-peril crop insurance (MPCI). Private-sector insurance companies sell and service MPCI policies and receive subsidies for administrative and operating expenses. While the largest part of insurance payments is from losses due to droughts, compensation from floods is also common.

Water in the Schoharie Valley

The Schoharie Creek rises in the northern Catskill Mountains, flows northward through Green, Schoharie, and Montgomery Counties, and joins the Mohawk River at Schoharie Crossing near Amsterdam, some 85 miles from its headwaters. The towns and villages located along the banks of the

Schoharie Creek as it flows northward include (from south to north) Prattsville, Blenheim, Middleburg, Schoharie, and Esperance.

The upper reaches of the Schoharie Creek have six dams. The dam at Gilboa (between Prattsville and Blenheim) is part of the New York City Department of Environmental Protection system that supplies the city with water. Two dams downstream from the Gilboa Dam supply electricity to the northeastern power grid during peak demand periods. These Blenheim-Gilboa dams create two lakes that provide water for power generation by pumping water uphill to a reservoir at night and then running it downhill to a lower reservoir during the day to create electricity. The Blenheim-Gilboa dams are earthen, as are three other flood-control dams upstream from the Gilboa Dam. The holding capacity of the upstream trio is much lower than the Gilboa Dam, but they contributed to the flooding in 2011 when they filled and spilled water into the Schoharie Creek watershed.

The Schoharie Creek and its tributary streams have overflowed their banks on numerous occasions, from the first recorded flooding in 1696 through to the flash floods of June 2013. Much of the village lies in the Schoharie Creek floodplain. The soils of the floodplain are very fertile and well drained, and a significant amount of agricultural production takes place in and around the village.

The main transportation corridor through the village is Route 30, which runs parallel to and near Schoharie Creek. The business district is located on this route, where it is known as Main Street. As the Village of Schoharie is the county seat, government facilities and services including the courthouse, the Department of Public Works, the Schoharie County Office Building, and the Schoharie County Public Safety Building are located there. The office building provides county services such as the County Clerk, the Department of Health, Real Property Tax Services, and the Treasurer. The public safety building includes the headquarters for the sheriff's office, the county jail, emergency medical services, and a communications center. A number of regional emergency management services are also located within the village, including the Schoharie Fire Department and the Schoharie Police Department.

The floods of August–September 2011 affected nearly all structures in the Village of Schoharie. By Saturday night, August 27, 2011, the gale-force winds of Hurricane Irene were categorized as a tropical storm. Torrential rain was dumped in the headwaters of the Schoharie Creek, which began to rise and soon reached flood stage at Gilboa Dam. Sirens sounded throughout the valley at 11:00 a.m. on Sunday, August 28. Immediately, emergency evacuation plans were put in place. Harold Vroman, chairman of the Schoharie County Board of Supervisors, declared a state of emergency at 1:00 p.m. that same day.

Rushing floodwaters inundated the Schoharie Creek basin and surrounding areas, carrying tons of disgorged earth, boulders, and uprooted trees. The force of the floodwaters straightened the naturally curved banks of the creek and its tributary streams. Automobiles, parts of buildings, and other materials were swept away, as were crops, livestock, and farm equipment. Winds downed power lines. Communication services, both landline and cellular, were made inoperable. The water and sewer systems were flooded out. Some evacuation routes were either washed out or blocked by fallen trees and power lines. Several bridges were closed.

About 10 days after Irene, Tropical Storm Lee poured additional heavy rainfall on an already waterlogged region, bringing further flooding and destruction. Schoharie County was included in the Presidential Disaster Declarations.⁶ These declarations ensured that federal resources were available to respond to the impact of the storms and assist the recovery effort.

Damage Caused by the Flood

The devastation from the flooding was unprecedented, with widespread destruction of homes, agriculture, businesses, natural and cultural resources, and public infrastructure. An estimated 75 percent to 85 percent of homes and essentially all businesses in the village sustained severe damage from Hurricane Irene and Tropical Storm Lee.⁷

Crops were ruined and livestock drowned. Floodwaters destroyed much in the way of farm infrastructure. As the floodwaters receded, farmers were left with tons of debris to clear as well as concerns about soil contamination.

Inundation with torrential rain and subsequent flooding caused significant damage to the Schoharie Creek and its tributary streams. Heavily eroded banks deposited sediment in their degraded channels. Streams were scoured by debris, including vegetation stripped from the floodplain. The aquatic habitat of the waterways was destroyed. Aquatic wildlife and vegetation were found in buildings and on roadways after the flood receded.

Damage to public infrastructure included roads and bridges, sewerage and stormwater systems, and public facilities. Nearly every public facility (town, village and county offices, and the firehouse) was affected by water. Loss of access to the Schoharie County Office Building meant emergency medical services and county health services were disrupted. Flooding also caused losses and damage to many county records. About 10 feet of water entered the first floor of the Schoharie County Public Safety Building. Before the approaching hurricane struck, the inmates at the county jail had been moved to Albany County. Significant damage at the facility caused a major disruption in essential public safety systems, including E-911. Drinking water sources became contaminated and sewage was washed downstream.

Property tax revenue fell significantly from the loss of residential and commercial taxpayer base. These losses eroded property values and reduced the prospects for attracting the investors needed for commercial development. The flooding had four measurable effects on village finances: a noticeable increase in general expenditures, a sharp decrease in the property tax base, a loss in revenue from public utilities, and increased costs associated with the sewer system. As a result, the total budget for the village during 2011–12 incurred a deficit, which extended into 2012–13.

Response and Recovery

The recovery and reconstruction effort was extensive. Government relief agencies, agricultural recovery teams, businesses, charitable organizations, faith-based groups, fire and police departments, and the National Guard all helped in the effort. The statewide response to Hurricane Irene and Tropical Storm Lee spanned nearly three months and represented one of the largest operations in the history of New York State (New York State 2012, 5).

In 2011, Congress appropriated \$400 million for Community Development Block Grants Disaster Relief (CDBG-DR) to assist in the recovery from the natural disasters that occurred nationwide.⁸ New York State received \$93 million in CDBG-DR funding, the largest allocation of all states.⁹ In the year following the flood, Schoharie County received \$48.2 million in assistance from New York State. This total included \$1.2 million to individuals and families, \$1.6 million to businesses, \$1.8 million to farmers, \$26.5 million to the county, \$10.8 million for transportation costs, and \$1.2 million for environmental projects (New York State 2012, 11).

The National Response Framework, a guide to how the nation responds to disasters and emergencies, was relatively effective.¹⁰ Specific resources and capabilities necessary to respond to the catastrophic flooding were delivered at an appropriate level of coordination. Property and the environment were protected, basic human needs were met, basic services and community functionality were restored, and a secure environment for transition to recovery was established.

The floods of August–September 2011 tested the emergency response plans and communications systems. Though the ability to respond to the flood was in place, unanticipated challenges arose in the 2011 flood: cellular and landline telephone services were disrupted, power was lost, and vital evacuation roads were inundated with water and became inaccessible. Aging and undersized stormwater systems were overwhelmed by the volume and speed of the floodwaters from the Schoharie Creek. These systems have been restored, but they need to be strengthened. They need greater capacity to accommodate the increased volume of water during a flood event and to build increased resilience.

Disruption of emergency medical services and county health services during the flood highlighted the fragility of the health and social services systems. The village is a largely low- and moderate-income community with an aging population. Since the 2011 floods, health and social services have been restored to levels that existed before the flood events. These services need to be enhanced, however, for future contingencies in order to build increased resilience.

The National Disaster Recovery Framework is a guide to promote effective recovery, particularly for large-scale or catastrophic incidents.¹¹ The floods of August–September 2011 tested the various recovery programs. Lack of accurate information immediately after the flood was frustrating to local residents. Communication was poor and the process was difficult, time-consuming, and took longer than expected. The agencies were overwhelmed by the scale of the disaster and were insufficiently prepared to manage the massive recovery effort. It appeared that the various agencies were not coordinating, so there was no viable way for them to be effective.

Cooperation and coordination among local officials, agencies and organizations, both public and private, together with businesses and residents is vital if a community is to achieve positive recovery outcomes. Local recovery initiatives, such as Schoharie Area Long Term Recovery, Inc., need to be fostered; local expertise encourages long-term revitalization and enhances resilience in a community. The long-term efforts need to build upon the multifaceted partnerships and networks that developed after the 2011 floods.

To restore and revitalize the health and social fabric of the community, the village needs to foster economic development. Increased development will both increase job opportunities and expand the local property tax base. Economic conditions before the disaster were not strong and the floods of 2011 exacerbated the situation. Because the floods caused several businesses to close temporarily and some establishments did not reopen, some residents were without employment.¹² Many businesses on Main Street have recovered, and a few new businesses have opened. Full recovery has been slow, however, and the loss of economic vitality threatens current business efforts. The future of Main Street continues to remain precarious owing to the continued vacancy of several anchor structures, which contributes to blight and hinders re-investment. Restoration of the local business economy and strategies to address storm-related business resiliency are critical.

How well did the two federal government insurance programs perform in the Schoharie area following the floods of August–September 2011? Insurance protection provides an alternative to disaster assistance. There are other programs for which property owners and communities are eligible to receive assistance for a natural disaster event. The various regulations of these programs affect decisionmaking, implementation, and use.

At the time of the flood FEMA records indicate that 91 of the 437 homes in the Village of Schoharie (21 percent) had active NFIP policies.¹³ Low participation in the NFIP program is common even in a locality with an extensive history of past flooding. Many holders of active NFIP policies in the village experienced delays in receiving payments, and disputes about claims were common. After state officials received numerous complaints from households and businesses about the slow responses, the New York Department of Financial Services intervened and urged property insurance companies to provide prompt service for NFIP policyholders (New York State 2012, 6). Uninsured Schoharie homeowners often received payments from FEMA more quickly (albeit for low amounts, not exceeding \$30,300) than homeowners who received NFIP payments through private insurance carriers.

Though many farmers held MPCl insurance policies at the time of the flood, the payments covered only part of the total loss. Further, a substantial share of farmers did not have active insurance policies. Uncompensated losses probably exceeded the insurance payments made to farmers in the Schoharie Valley, but an aggregate summary has not been assembled.

Overall, insurance against agricultural losses was probably more effective than flood insurance in compensating losses. Much of the contrast reflects higher insurance coverage against agricultural losses compared to flood insurance coverage for households and businesses. These conclusions are

somewhat tentative, however, because a careful comparative analysis of the performance of the two insurance programs since the flood of 2011 has not been undertaken.

Prevention, Protection, and Mitigation

Given the extensive history of flooding by the Schoharie Creek and its tributaries, existing comprehensive plans in the Village of Schoharie recognize the importance of the floodplain and incorporate the lessons of past floods. The National Mitigation Framework seeks to increase risk awareness and mitigation in order to reduce the risk and associated consequences of a disaster incident.¹⁴ The challenges of planning for increased resilience to future extreme weather events are enormous for a small community. What are the prospects for the future? To answer this question, we need to be cognizant of several considerations discussed below.

Future Climate and Weather

Projections of future climate change for the Northeast United States are subject to great uncertainty,¹⁵ uncertainty that extends to smaller geographic areas such as New York State and Schoharie County. A review of historical annual weather indicators shows a rise in annual precipitation of 16 percent in New York State since 1950 that is contributing to an increased risk of flooding. A second factor that can augment the likelihood of flooding is an increase in the average intensity of rainstorms. Precipitation intensity rose between 1958 and 2012 in all regions of the United States except the Southwest, but the largest increases occurred in the Northeast (Dourte and Fraisse n.d). Thus, a continuing risk of flooding in the Schoharie Valley is likely.

Emergency Preparedness

The floods of August–September 2011 tested the preparedness of the village to a severe natural disaster event. In addition to three emergency preparedness measures currently in place, a fourth planned measure will help reduce the destructiveness of future floods and increase resilience. First, a system of emergency evacuation routes established after the flood of 1996 reduced uncertainty in moving affected citizens from the immediate path of floodwaters. Second, the Gilboa Dam siren system was instrumental in saving lives during the 2011 floods; there were no flood-related fatalities despite the fact that the flooding was the most severe ever experienced. This siren system can be expected to perform well during future floods. Third, a new layer of defense against uncontrolled release of water from the Gilboa Dam, termed the Obemeyer Spillway Gate system, was put in place in August 2012. Its moveable steel panels can be raised and lowered to control the outflow of water from the dam. These panels deliver increased capacity to hold water behind the dam, and they help control the release of water into the Schoharie Creek north of the dam. Fourth, there are plans to dig a low-level outlet that will allow greater control of the water level in the reservoir behind the Gilboa Dam. Construction is to commence in 2015, and the projected completion date is 2019. When completed, the outlet can direct a controlled flow of water from the dam’s reservoir northward more quickly, reducing the risk of the dam being overtopped.

Reservoir Management

Six dams can influence the water flow of the Schoharie Creek: the three earthen flood control dams located above the Gilboa Dam, the Gilboa Dam, and the two Blenheim-Gilboa Dams. Dam Concerned Citizens (DCC), a Schoharie Valley citizens group concerned with flooding in the valley, has reached an agreement with NYCDEP to lower the water level in the reservoir before spring to improve the dam's ability to absorb high seasonal inflows without immediately passing an unaltered inflow downstream from the dam. The agreement provides a partial cushion in regulating the release of water from anticipated seasonal patterns of precipitation and snow melt. The quantitative effect of the agreement is unknown, but it is expected that this mitigation measure will help during future flooding periods.

Mitigation by Private-Property Owners

The unprecedented devastation caused by the 2011 floods requires a reconsideration of building codes, zoning laws, and land use regulations. The existing local Floodplain Law needs to be consistent with the latest federal and state standards. Many residential and business properties are located in flood-prone areas. Investing in flood-mitigation measures in private structures are important near-term steps to help safeguard health, life, and property. Managing development in high flood-risk areas is the single biggest opportunity the Village of Schoharie has to limit the threat and cost of future floods.

Following the 2011 flooding, NFIP premiums for residential and business property are slated to rise substantially.¹⁶ To reduce the cost of flood insurance premiums, the Village of Schoharie is planning to join the Community Rating System (CRS) of the NFIP whereby the village would adopt and enforce a floodplain management strategy that exceeds minimum NFIP requirements.¹⁷ Participation in the program would help keep the cost of living in the village affordable and encourage the establishment of businesses on Main Street. Besides helping reduce flood insurance premiums, the CRS would provide an additional component to village flood preparedness, mitigation planning, and increased resilience.

Effective flood preparedness efforts depend on a better alignment of the decisions made by federal, state, and local authorities. Development choices and zoning decisions lie mostly in the hands of state and local authorities, while the federal government pays a disproportionate share of flood-recovery costs and disaster assistance. This incentive structure needs to change, such as by shifting more flood management and protection costs from public taxpayers to private-property owners living in a floodplain, and by creating economic incentives, such as tax breaks or insurance rate discounts, for investing in flood resilience.

Conclusion

Given the extensive history of flooding by the Schoharie Creek and its tributaries, planning for and responding to floods has been uneven. While many constructive steps have been taken, the severe flood of 2011 highlighted the need for coherent planning to minimize private and public losses. Two community-driven planning projects are in place to increase resilience against future severe-weather

events: the New York Rising Community Reconstruction Program, and the Village of Schoharie Long-Term Community Recovery Strategy. The village has identified specific development and recovery projects pertaining to housing, agriculture, commerce, infrastructure, and the environment. Implementation of these projects is critical for fully recovering from the 2011 flood and for building resilience.

Major challenges for effective public policy in managing flood risks, however, remain. Because private-property owners can rely on taxpayer-funded flood-response resources, they may have a reduced incentive to be responsible for their own protection and invest less in flood-mitigation measures. In addition, most property owners in flood-prone areas do not pay the true cost of their home-location decisions. In many cases, flood insurance premiums do not reflect actuarial risk. Moving increased responsibility to local communities to encourage flood-proofing measures, and charging insurance premiums that reflect the true risk, can lead to different decisions.

Over time, having local communities assume a greater share of flood-recovery costs might provide an incentive for better planning and zoning decisions in high flood-risk areas. This conversation is difficult, but until these perverse incentives are changed, people will continue to locate in flood-prone areas, and taxpayers nationwide will continue to pay for a disproportionate share of flood-recovery and disaster-assistance costs.

The National Planning Frameworks are living documents, and their effectiveness will be evaluated regularly with real-world applications. Thus, the flooding in the Village of Schoharie can inform the review process. The review would consider the effective practices and lessons learned from the experiences in the village to enhance national preparedness.

Notes

1. Presidential Policy Directive 8: National Preparedness was released in March 2011 to strengthen the security and resilience of the United States by preparing systematically for threats that pose the greatest risk to national security. The directive defines five preparedness mission areas—prevention, protection, mitigation, response, and recovery—and mandates the development of documents to guide policy in each area. The National Planning Frameworks address the role of the whole community in the preparedness mission.
2. As defined by directive 8, a catastrophic incident is any natural or manmade incident that results in extraordinary levels of casualties, damage, or disruption severely affecting the population, infrastructure, environment, economy, national morale, or government functions.
3. See “The National Flood Insurance Program,” Federal Emergency Management Agency, last updated February 13, 2015, <https://www.fema.gov/national-flood-insurance-program>.
4. In 2011, 4.7 percent of households nationwide and 2.2 percent of households in New York State were covered.
5. The US Department of Agriculture’s Risk Management Agency provides crop insurance to farmers and ranchers through the Federal Crop Insurance Corporation, which the department operates and manages.
6. An emergency declaration for Hurricane Irene was announced on August 26, 2011; a major disaster declaration followed on August 31. An emergency declaration for Tropical Storm Lee was announced on September 9, 2011; a major disaster declaration followed on September 13.
7. See the *Village of Schoharie Long Term Community Recovery Strategy*, Part 1, September 2014 draft, p. 4, <http://www.schohariecounty-ny.gov/CountyWebSite/villsch/201409FinalLTCRSeptember.pdf>.

8. The US Department of Housing and Urban Development (HUD) provides flexible grants to help cities, counties, and states recover from presidentially declared disasters. In response to disasters, Congress may appropriate additional funding for the Community Development Block Grants and Home Investment Partnership Program as Disaster Recovery grants to rebuild affected areas and help the recovery process. These grants often supplement the disaster programs of FEMA, the Small Business Administration, and the US Army Corps of Engineers.
9. See “Community Development Block Grant Disaster Recovery (CDBG-DR) for 2011 Disasters Frequently Asked Questions (FAQs),” US Department of Housing and Urban Development, <https://www.hudexchange.info/onecpd/assets/File/CDBG-DR-2011-Disasters-FAQS.pdf>.
10. The mission of the National Response Framework includes 14 core capabilities: planning, public information and warning, operational coordination, critical transportation, environmental response/health and safety, fatality management services, infrastructure systems, mass care services, mass search and rescue operations, on-scene security and protection, operational communications, public and private services and resources, public health and medical services, and situational assessment.
11. The National Disaster Recovery Framework provides guidance for effective recovery support to states, tribes, and local jurisdictions affected by disasters. It provides a flexible structure for disaster recovery managers to operate in a unified and collaborative manner. It also focuses on how best to restore, redevelop, and revitalize the economic, social, and natural and cultural resources of a community and build a more resilient nation.
12. While village-level unemployment data are not available, our analysis of unemployment data for Schoharie County suggests that the unemployment rate increased during September–November 2011 by an average of about 1.0 percent because of the floods.
13. “Much Done, More to Do,” *Times Union*, November 19, 2011.
14. The National Mitigation Framework discusses seven core capabilities required for entities involved in mitigation: planning, public information and warning, operational coordination, community resilience, long-term vulnerability reduction, risk and disaster resilience assessment, and threats and hazard identification.
15. Weather refers to natural phenomena such as temperature and precipitation. Climate refers to average weather for an extended period, and climate change refers to changes in climate.
16. The timing of increases in future NFIP premiums is uncertain. March 2014 legislation has temporarily frozen and limited the increases in certain premium rates during the next few years.
17. *Village of Schoharie Long Term Community Recovery Strategy*, Part 1, p. 28.

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