



Understanding and Managing Flood Risk: A Guide for Elected Officials

Volume III – Success Stories

2020

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Cover Photos:

Center: Iowa City, Iowa current Mayor Jim Throgmorton (left) and former Mayor Matthew Hayek.

Clockwise from top left: Roseville, California Mayor John Allard; Harris County, Texas Judge Ed Emmett; Longmont, Colorado Mayor Brian Bagley; former Longmont, Colorado Mayor Dennis Coombs; Valley View, Ohio Mayor Jerry Piasecki; Illinois Senator Sue Rezin. Photos by ASFPM, 2019.

Understanding and Managing Flood Risk: A Guide for Elected Officials Volume III – Success Stories February, 2020

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Association of State Floodplain Managers, Inc.
8301 Excelsior Drive
Madison, Wisconsin 53717
608.828.3000
www.floods.org

The Association of State Floodplain Managers, Inc. (ASFPM) published this *Guide* as part of its mission to promote education, policies and activities that mitigate current and future losses, costs and human suffering caused by flooding. Founded in 1977, the organization had over 18,000 members in 2019, including members in 37 state chapters. ASFPM supports professionals involved in floodplain management, flood hazard mitigation, flood preparedness and flood warning and recovery. Members represent local, state and federal government agencies, citizen groups, private consulting firms, academia, the insurance industry and lenders.

Suggested Citation:

Association of State Floodplain Managers. 2019. *Understanding and Managing Flood Risk: A Guide for Elected Officials Volume III- Success Stories*. 3 vols. Madison, WI. no.floods.org/ElectedOfficialsGuide.

Acknowledgements

We extend our genuine thanks to all the elected officials and professionals that shared their time through meetings, interviews, emails and phone calls for the preparation of this guide. This guide was funded in part by the ASFPM Foundation whose mission is to serve as the catalyst for ASFPM, its chapters and members in order to advance projects, education and policy initiatives that promote reduced flood risk and resilient communities. Funding was also provided by the Westfield Insurance Foundation in support of in-person interviews with elected officials around the country.

Prepared and written by:

Lead author: Rebecca C. Quinn, CFM, President, RCQuinn Consulting, Inc.

Co-author: Leigh M. Chapman, CFM, President and Senior Planner, Salter's Creek Consulting

Special appreciation is extended to the following individuals who assisted in the creation of this publication:

- James C. Schwab, FAICP, Urban Planner & Author, Jim Schwab Consulting LLC, Principal
- Rich Anderson, Ph.D, Energy Director, Senior Advisor, Mayors Water Council, US Conference of Mayors
- Jen Marcy, PMP, CFM, Project Director, Water Resources East, Atkins
- Meg Bartow, Executive Vice President, Director, Public & Risk Communication, Ogilvy
- Lisa Miller, Senior Vice President, Community Engagement & Resilience, Ogilvy
- Julie Tallman, CFM, Development Regulations Specialist, Building Inspection Services, City of Iowa City, Iowa
- Chad Berginnis, CFM, Executive Director, ASFPM
- Larry Larson, P.E., CFM, Director Emeritus-Senior Policy Advisor, ASFPM
- Jenna Moran, Associate Program Director for Resilience, Transportation and Infrastructure, National Association of Counties
- Julie A. Ufner, Associate Legislative Director of Environment, Energy and Land Use, National Association of Counties
- John Ryan-Henry, Resilience Specialist and Legal Advisor, Coastal States Organization
- Alexis Cunningham, NOAA Digital Coast Fellow, Coastal States Organization
- George Riedel, CFM, Donor Coordinator, ASFPM Foundation
- Eric S. Poole, Executive Director, Florida Counties Foundation
- Meredith R. Inderfurth, ASFPM Washington D.C. Liaison
- David R. Conrad, Consultant, Water Resources Policy, David R. Conrad Associates
- Hunter Merritt, Water Resources Planner, Sacramento District, U.S. Army Corps of Engineers

Thank you to the many local elected officials that agreed to be interviewed for this guide:

- Mayor John Allard, Roseville, California
- Mayor Brian Bagley, Longmont, Colorado
- Mayor Dennis Coombs (former), Longmont, Colorado
- Judge Ed Emmett, Harris County, Texas
- Mayor Matthew Hayek (former), Iowa City, Iowa
- Mayor Jerry Piasecki, Valley View, Ohio
- Senator Sue Rezin, Illinois' 38th District
- Mayor Jim Throgmorton, Iowa City, Iowa

Finally, this guide would not be possible without the dedication and creativity of staff at ASFPM:

- Beth Klusinske, Flood Science Center, Research Associate
- Dave Fowler, CFM, Flood Science Center, Senior Project Manager
- Michele Mihalovich, Public Information Officer
- Melissa Haig, MLIS, Flood Science Center, Research Librarian
- Jason Hochschild, Flood Science Center, IT & GIS Analyst
- Jeff Stone, CFM, Research & Development Manager

Please visit ASFPM's [Elected Officials Guide website](http://no.floods.org/ElectedOfficialsGuide) (no.floods.org/ElectedOfficialsGuide) to watch as mayors and elected officials from around the country talk about how they are leading flood risk reduction in their community. Also, explore historic publications and resources available to elected officials while learning about current and continually updated content. For any questions about the website and this companion guide, please contact ASFPM.



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8301 Excelsior Drive

Madison, Wisconsin 53717

608.828.3000

asfpm@floods.org

www.floods.org

no.floods.org/ElectedOfficialsGuide

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Introduction

Volume III of this *Guide* gives you case studies from several communities nationwide that successfully tackled flood mitigation. The communities chosen represent a cross-section of the U.S. – from coastal to inland areas, and small towns to large cities. The case studies include interviews with elected officials. We hope that their stories encourage you to develop your own personal and legislative approach to managing flood risk and improving public safety and property protection in your community.

Volume III is a companion to the main *Guide*, which is written to help elected officials gain a comprehensive understanding of the range of choices that are available as they evaluate how to prepare for – and respond to – flood events in their communities. The main *Guide* consists of Volumes I and II.

Volume I of this *Guide* gives you:

- Information on how to begin addressing flooding in your community, in Section A
- Lessons learned to help prepare your community for the next flood, in Section B
- Basic concepts of mitigating flood hazards, in Section B, including an introduction to financial resources that may be available
- Suggestions for communicating with citizens, in Section C

Volume II of this *Guide* gives you:

- Basic background information on the concepts involved in managing floodplains, in Sections D, E, and F, which describe the essentials of property protection, understanding flood risk, and flood insurance
- Advice on managing, maintaining and strengthening local floodplain management programs, in Sections G and H

A list of referenced documents, webpages and additional resources is in the Resources section, at the end of both Volume I and Volume II of this *Guide*.

Iowa City, Iowa – Higher Standards Following 2008 Flooding

Watch the [full interview](#)



Elected officials: Mayor Jim Throgmorton & former Mayor Matthew Hayek

Iowa City (home to the University of Iowa) is a medium-sized city in eastern Iowa, just west of the Mississippi River. The Iowa River, which runs through the city, frequently overflows during heavy rain events, causing flooding. In June 2008, following record-setting tornadoes and massive amounts of rain from stalled thunderstorm systems, the Iowa River crested at about 31.5 feet (major flood stage is 25 feet). This was the city's largest flood on record, covering approximately 1,600 acres. The flood was 4 feet higher than the 100-year flood elevation, reaching roughly the mapped 500-year flood elevation. Consequently, two neighborhoods with homes that were constructed to be above the 100-year flood elevation were devastated. In total, 251 structures were damaged, and nearly 100 structures were destroyed or damaged beyond repair. More detail can be found in FEMA's [Midwest Floods of 2008 in Iowa and Wisconsin](#).



Flooding at the University of Iowa. Source: University of Iowa Office of University Relations.

In response to the 2008 flood, the City Council in 2010 passed several ordinances and set up new zoning codes and policies to reduce future flood risk. The new ordinances and codes require new structures and structures that are substantially improved to be elevated or flood-proofed to 1 foot above the 500-year flood elevation. They also require structures that have people with limited mobility or emergency responsibilities to be located outside of the 500-year flood hazard area. These structures include police and fire stations, hospitals, emergency centers, senior housing and rehabilitation facilities. To address concerns about the preservation of historic properties, the city added a mechanism for a variance when elevation or flood-proofing would compromise a historic structure.

Iowa City has used voluntary property buyouts to permanently remove residents from flood hazard areas. The city was awarded funds under the Single Family New Construction Program to make up for lost tax revenue from the buyouts and provide homeownership opportunities to primarily low-moderate income homebuyers outside of the 100-year floodplain. Under this program, 141 homebuyers have received assistance purchasing newly constructed homes. According to Matthew Hayek, who served as mayor of Iowa City from 2010 to 2016, the creation of new housing elsewhere more than offset the lost revenue from property taxes due to the buyouts.



Mayors Throgmorton and Hayek discuss property buyouts

Iowa City also created the Gateway Project and the Riverfront Crossings Master Plan to make the city more resilient against flooding. The Public Works, Planning and Community Development, and Building Inspections departments all played a part in flood mitigation efforts, and in the years since the flood, the Building Inspections department and the Planning Division merged into one department to streamline and coordinate on many flood recovery programs. The city also benefited from the Iowa Flood Center (part of the University of Iowa College of Engineering), which provided expertise to improve Iowa City's flood preparedness and resiliency. The city gained public support for its flood mitigation projects by being open in their deliberations and showing pictures of the anticipated outcomes.

The Gateway Project reduces road closures of Dubuque Street and Park Road Bridge due to localized flash flood and historic Iowa River flood events. Dubuque Street is the main entrance to Iowa City and runs parallel to the Iowa River. During the 2008 flood, it was closed for an entire month. The project included raising Dubuque Street by 10 feet (which puts it at 1 foot above the 100-year flood level), and replacing and elevating the Park Road Bridge to 1 foot above the 200-year flood level. Former Mayor Hayek stresses the importance of making "the most of a flood," by taking advantage of post-flood resources to shore up aging infrastructure with massive rebuilding.



Mayors Throgmorton and Hayek on how the Gateway project gained support

According to the former mayor, after 2008, the city began to adopt flood protection measures that also enhance the river as an amenity for times when it is not flooding. This approach reflects a shifting attitude toward the Iowa River, viewing it as an asset or resource rather than merely a potential hazard. Under this approach, the Riverfront Crossings Master Plan was created in cooperation between the city, Environmental Protection Agency and Rebuild Iowa (a state organization). The plan aims to create a resilient riverfront park system using flood mitigation measures and stormwater best management practices. According to the EPA website, the plan would relocate vulnerable properties and infrastructure away from the floodplain and guide future development away from the most vulnerable areas. It promotes green infrastructure, vegetated buffer zones and public spaces along rivers and streams to reduce flooding, runoff and erosion.

One key piece of public infrastructure that was removed from the floodplain is the North Wastewater Treatment Plant. Wastewater is now directed to another plant approximately four miles downstream. Where the old wastewater treatment plant once stood, a park with trails and boat access is being built, and floodplain and wetland areas are being restored. This involves excavating the previously elevated floodplain to connect the restored wetland area to the groundwater table, and stabilizing Ralston Creek using stream restoration structures and vegetation. The restoration will benefit the community by providing natural riparian habitat along the Iowa River, improved water quality and flood storage during rain events.

Looking back, current Mayor Jim Throgmorton recalls that the city was taken by surprise by the 2008 flood, thinking that the ordinances put in place after the Great Flood of 1993 put the city in good shape. However, the 2008 flood proved to be much more severe. Looking toward the future, Mayor Throgmorton said Iowa City leaders anticipate future flood events will be worse than what it has experienced up to now, and the city needs to be prepared to “bounce back better than before.”



Mayors Throgmorton and Hayek offer advice to other elected officials

Harris County, Texas – Flood Control and Mitigation are “Job One” after Harvey

Watch the [full interview](#)



Elected official: Judge Ed Emmett

Like many communities, Harris County, Texas has experienced severe flooding with frequencies that defy the label of “500-year flood.” A 500-year flood struck Harris County in May 2015, Memorial Day weekend in 2016, and most catastrophically, in August 2017 due to Hurricane Harvey. Areas of Harris County around Houston even reached the 1,000-year flood threshold. Although Hurricane Harvey tracked south of the county, parts of Harris County received approximately 50 inches of rain over a four-day period. This intense, persistent rainfall resulted in the flooding of 154,000 homes, 105,000 of which didn’t have flood insurance because they were not officially designated as residing in a floodplain.



Flooding in Houston in the wake of Hurricane Harvey. Source: urban.houstonian from Houston, TX, USA. [CC BY 2.0 (<https://creativecommons.org/licenses/by/2.0>)]

Harvey was a turning point. “The rains from Harvey were totally different. There were areas flooded that had never flooded,” said Judge Ed Emmett, Harris County, Texas’ chief executive officer. He cooperates with county commissioners in overseeing a diverse constituency of over four million residents, including the entire Houston metropolitan area.

In response to the unprecedented flooding, in December 2017, Emmett and his fellow commissioners passed new building code regulations for all construction projects within the 100-year floodplain that require a permit. The regulations require homes and businesses located within the 100-year floodplain to be built two feet above the 500-year flood elevation to mitigate flooding to structures.

However, these impressive new building code regulations are just the first step, and the use of federal funds alone is likely not going to be sufficient to increase Harris County’s flood resilience. To help mitigate future flooding, the commission approved a \$2.5 billion Flood Protection Bond Issue that appeared on the Aug. 25, 2018 ballot (precisely one year after Hurricane Harvey) in a special election. Emmett explained the decision, saying, “A lot of the

projects we're talking about – some of the buyouts [along creeks and tributaries], don't meet the federal government's cost-benefit analysis, so we're going to have to use local funds." On the list of priorities are building a third reservoir, conducting home buyouts in flood-prone areas, and preventing further building in the natural areas that act as a buffer to flooding. Additionally, 23 public engagement meetings were held (in each of the major watersheds) to find out what specific actions will improve each area the most. Since financial assistance from the state's Rainy Day Fund is also not guaranteed, at least part of the cost of these projects is likely to be covered through the bond by the residents of Harris County.



Judge Emmett explains why a special election was held for the Flood Protection Bond Issue

Another priority is assessing flood risk more accurately. According to Judge Emmett, two large reservoirs were built by the Army Corps of Engineers back in the 1940s. At the time of construction, they were 20 miles outside of town, where no one resided. However, current development encroached on these reservoirs, without regard for the location of tributaries and creeks. Currently, hundreds of thousands of people are now living in an area where no one (aside from cows) lived previously, and the exact boundaries of the 100-year floodplain are unknown.

After a crisis, there is temptation for an elected official to build a community back to the state it was in pre-crisis. However, going back to "business as usual," while a popular and less controversial option, does not put a community in a better position to handle the next flood. By putting in place higher standards, Emmett took a political risk in order to make Harris County more resilient.

Resilience Equation Presented by Judge Edward Emmett, Harris County, Texas
at the 2018 ASFPM Annual National Conference in Phoenix

A graphic showing the equation (2P + 2R) (PPR) = RESILIENCE. The text is in a bold, sans-serif font. 'RESILIENCE' is in large orange letters, while the rest is in dark blue. There are diagonal grey stripes in the background.
$$(2P + 2R) (PPR) = \text{RESILIENCE}$$

$$(P_1 P_2 + R_1 R_2) (P_3 P_4 R_3) = \text{Resilience}$$

P₁ = Prevention

Prevent the disaster. We cannot prevent the event, but we can mitigate or reduce the impact. Minimizing the impact is the goal. The event is not the disaster – the impact on lives, property and the community is the disaster. Prevention can help reduce these impacts.

P₂ = Preparation

Preparing for the disaster is important. Events will occur, and you need to know the risk and be prepared. Public announcements, pre-staged trained personnel, adequate resources and a plan are the critical components of preparation.

R₁ = Response

Response to the event is critical. Following a well thought out plan is important, but the plan needs have flexibility to adjust to the unpredictability of each event. The key is to have trained dedicated staff that are empowered to make clear decisions in position “on the ground” during the event. Organizing responders geographically to meet critical needs.

R₂ = Recovery

The most difficult portion of an event is recovery. Real recovery comes when lives and communities are back to normal and steps are being taken by all levels of government and the private sector to mitigate and prepare for the next event. Recovery make take years to complete, especially for the most vulnerable portions of the community.

P₃ = Policies

Government and the private sector need to have policies in place to support P₁, P₂, R₁, and R₂. Policies on resiliency need to be throughout the community at all levels of government and business.

P₄ = Prioritize

Policies need to be important to the elected officials and the community. They need to be supported with money and people. They need to be kept up-to-date to meet changing conditions. Need to correct potential issues before the event by learning from past mistakes.

R₃ = Resources

Funds and staff need to be available to implement the policies, get training and have time for preparation. This means coordinating with the private sector as well. It also means support for implementation of mitigation projects before and after the event.

Emmett's advice to other elected officials in flood-prone communities? Make flood control and resilience "job one" before disaster strikes. Flooding is never a high-priority issue until a flood hits a community, at which point it is too late to use long-term mitigation methods, which are more effective and less costly than short-term prevention or response.



Judge Emmett offers advice to others in flood-prone communities

Longmont, Colorado – Building Back Smarter/More Resilient

Watch the [full interview](#)



Elected officials: Mayor Brian Bagley and former Mayor Dennis Coombs

Longmont, a community full of outdoor recreation opportunities for its 90,000 residents, is located 16 miles from Boulder and 30 miles from Rocky Mountain National Park. In September 2013, it experienced a week-long 1,000-year rain event that caused flooding of the St. Vrain River. The 2013 flood cut Longmont in half, leaving only one route crossing the St. Vrain Creek to serve the entire city for several days. This limited travel access and caused major challenges for emergency responders. Most of the developed areas of the city were underwater, destroying or severely damaging hundreds of homes and businesses, crippling the city's infrastructure, and dislocating vulnerable populations.

According to Brian Bagley, the current mayor of Longmont since 2017, “Had Longmont not been able to literally in a matter of hours set up a command center and with the push of a button communicate to immediately tell everyone it is now time to do what we have trained for, there would have been loss of life.” Based on this experience, his advice to other elected officials in flood-prone areas is that “You’d better have the right people in place, and they’d better have an emergency plan.”



Mayors Bagley and Coombs offer advice to other elected officials

In the aftermath of the flood, rather than simply making repairs to restore infrastructure to its original state, the elected officials in Longmont began focusing on long-term resiliency with the Resilient St. Vrain project in 2014. Resilient St. Vrain is described as an “extensive, multi-year project to fully restore the St. Vrain Greenway and improve the St. Vrain Creek channel to protect people, property and infrastructure from future flood risk.” The project restores and reconstructs the creek channel so that it will have the capacity to convey water of 100-year flood flows, which reduces the reach of floodwaters. In places where this requires widening the creek, they are doing so in an environmentally-sensitive way, using natural design and bioengineering to enhance natural stream functions. These enhancements maintain and improve fish and wildlife habitat along the creek. For example, irrigation ditch diversions that once dammed the creek are being replaced with structures that allow fish passage, and the pedestrian trail will be relocated along one side of the creek to create a buffer zone for wildlife to safely nest and

migrate. As an additional benefit, water quality will be improved by reducing stormwater flow impacts. In effect, this project will convert the very large existing Special Flood Hazard Area (that currently includes most of Longmont's downtown area) into a wide, open channel through Longmont. "That storm is actually going to benefit Longmont in the long-term because we're doing the right thing building the Resilient St. Vrain project," said Dennis Coombs, former mayor of Longmont (2011-2017).



A completed portion of improvements to the St. Vrain Creek channel.

Photo courtesy of the city of Longmont.

As part of the effort to build back smarter under the Resilient St. Vrain project, the Main Street Bridge and South Pratt Parkway Bridge were replaced by longer, wider bridges that safely convey up to 100-year flood levels. This project is funded 75 cents on the dollar through federal sources, with the remaining funding coming from state and local sources. Local funding comes from voter-approved stormwater drainage bonds. According to Mayor Bagley, "The flood really gave the political will to do whatever we need to do."

The Resilient St. Vrain project has a designated public information specialist who provides regular updates to the community on the project through a project website, e-newsletter subscription list, news releases and social media updates. Open houses and public meetings are also held as appropriate. Public messaging about flood risk and flood insurance is tied in with these updates as part of Longmont's participation in the Community Rating System. "It just comes down to communication and trying to be as honest and straight-forward with citizens as you possibly can, but also don't back down from being visionary" explained former Mayor Coombs. Longmont also added a Floodplain Inquiry Map to the city website where residents can search to see if their property is located within a floodplain. The map also shows which areas of Longmont were affected by the 2013 flood.



Mayors Bagley and Coombs talk about the Resilient St. Vrain project

Prior to the 2013 flood, a similar project was completed in 2012 – the Left Hand Creek Flood Project. This project improved the creek channel design to increase flow capacity, updated and resized two bridge culverts, and removed 110 structures from the Special Flood Hazard Area. “We actually built flood resistance on Left Hand Canyon. If we had not done that project, there would have been another thousand homes flooded,” said Coombs. According to a losses avoided study, “[Reducing Losses through Higher Regulatory Standards: 2013 Colorado Floods Case Study](#),” this project saved Longmont an estimated \$22 million in the 2013 flood. Based on this study, it is apparent that the anticipated cost of the Resilient St. Vrain project (between \$120 million and \$140 million) will more than pay for itself in the future.

As a next step, the city is considering implementing restrictions for outside storage of materials, fences and new structures in the floodway, and new basements adjacent to the Special Flood Hazard Area. They are also considering higher standards for substantial damage/improvement criteria such as considering cumulative improvements on a 5-year basis.

Mayor Bagley has a vision for how all of these preparation efforts will pay off for the community when the next major rain event hits, saying “It would be wonderful if we could just sit back and watch the flood from our lawn chairs, and it doesn’t touch anything that is valuable.”

Roseville, California – Leading the Nation in Flood Control

Watch the [full interview](#)



Elected official: Mayor John Allard

Roseville is a city of approximately 133,000 residents in the Sacramento metropolitan area of California. Although seven creeks run through the city, flooding is no longer a major problem. The city's reduction in flood risk is the result of mitigation actions that continue to be implemented by the city after historic floods in February 1986 and January 1995, which resulted in the flooding of 209 and 358 buildings, respectively. Since the 1995 flood, infrastructure improvements have "worked flawlessly to prevent any additional flood damage," says the current mayor of Roseville, John Allard. If not for these efforts, one neighborhood would have flooded multiple times since 1995.



Thanks to flood control improvements, the 100-year flood elevation is now modeled at 2 feet, 9 inches below the high water mark shown on this sign. Photo courtesy of the city of Roseville.

Roseville has been actively involved in FEMA's Community Rating System program since 1992, and became the first city to earn a Class 1 Rating in 2006. As of Oct. 1, 2018, it is still [the only community in the nation with a Class 1 rating](#). This top rating is the result of high marks for public information, mapping and regulatory standards, flood damage reduction, and flood preparedness, which Mayor Allard describes as a "portfolio approach." As a benefit of this rating, property owners in high-risk flood zones receive up to a 45 percent discount on flood insurance.

Since the 1986 flood, Roseville has focused on improving infrastructure over the past few decades. It has invested \$32 million in flood protection – \$15.7 million of which came from the city, \$13.8 million from FEMA grant funding, and \$2.7 million from a local railroad company. These projects included strategically enlarging, adding, replacing, improving or removing culverts and widening stream channels to reduce the size of the floodplain, installing stormwater bypass tunnels and floodwalls and levees, and elevating flood-prone homes that could not be brought out of the floodplain by flood control projects.



Mayor Allard talks about flood control infrastructure projects

Since 1986, the city's development standards have not allowed new buildings to be built within the 100-year floodplain, except in the center of the city if no adverse impact is demonstrated. The flood elevation of any structure must be at least 2 feet above the 100-year flood elevation projected for 2040. As a result of the combination of flood control projects and regulations, less than 7% of the city is currently within a floodplain, and most of the floodplain consists of open space (with no homes). This a remarkable step in mitigating flood losses by restricting construction that would be at risk. Mayor Allard said, "Roseville has overcome the typical developer pushback against higher standards by streamlining the process and making it predictable. Developers appreciate Roseville's efficient and predictable development process. They know there won't be costly delays and costly surprises down the road."



Mayor Allard talks about the city's floodplain regulations

Flood control remains a high priority for the city because flooding is the costliest type of natural disaster, and Roseville wants to continue to attract residents looking for a high-quality community to raise their families or retire. Roseville gets economic benefits from its status as a CRS Class 1 community (in addition to avoiding costly flood damage repairs) because it is an incentive for businesses to locate in the city. Roseville plans to continue to minimize flooding and maintain its exceptional rating by actively managing manmade and natural drainage systems. Ongoing projects include the operation of an alert system that predicts and broadcasts flood warnings and an annual streambed maintenance program for clearing creeks of fallen trees and debris that could otherwise float downstream and block culverts and bridges.

The city has an Emergency Management Team consisting of members from every city department that meets monthly to keep its preparedness current. The city also has a robust communications team that is well-versed in emergency communications with multiple public communication channels, such as social media, email, and direct mail, and the public can view creek levels in real time by seeing stream gauges online. “We continue to receive resident support of our floodplain management efforts using public outreach to showcase our flood alert system and the benefits of our flood protection improvements during any significant storm event,” said Mayor Allard.

Mayor Allard’s advice to other communities after a flood is to act quickly to make investments in flood protection while the flood is still fresh in residents’ minds. For communities in flood-prone areas that have not yet experienced a flood, he recommends learning from other community’s experiences, reaching out to Roseville staff, and not waiting for a flood to act, citing the statistic that for every \$1 invested in flood protection, \$7 is saved in post-disaster recovery.



Mayor Allard offers advice to other elected officials

Valley View, Ohio – Property Elevations and Acquisitions

Watch the [full interview](#)



Elected official: Mayor Jerry Piasecki

Valley View is an incorporated village in northeast Ohio, near Cleveland. It is home to most of the Cuyahoga Valley National Park and is part of the Ohio & Erie Canalway National Heritage Area. Residents have learned to expect flooding based on the geography of the area. “We’re not called Valley View for no reason,” said Mayor Jerry Piasecki. The Cuyahoga River, which runs through Valley View, frequently overflows during heavy rains. Flood stage for the Cuyahoga River begins at 17 feet. In June 2006, the village experienced a devastating 500-year flood in which the river crested at more than 23 feet, requiring hundreds of residents to be evacuated. Although not quite as severe as the 2006 flood, the village again experienced significant flooding in February 2011, when massive amounts of melting snow combined with rain caused the Cuyahoga River to overtop its banks and flood many residential structures.



Flooding at the Tinkers Creek Aqueduct in Valley View. Photo courtesy of the National Park Service.

In response to the 2006 flood, the village used funds from the Hazard Mitigation Grant Program to elevate nine structures and acquire one property at risk of flood damage. Since then, the village has participated for several years in the Pre-Disaster Mitigation and Flood Mitigation Assistance programs to help fund additional elevations and acquisitions. So far, 22 homes have been elevated above the Base Flood Elevation of the Cuyahoga River and another 12 residential properties were acquired to remove them from the floodplain. According to Piasecki, FEMA develops the programs and pays for 75% of the cost. The state of Ohio contributes 12.5%, leaving 12.5% to be covered by local funds.

The village recently partnered with the Northeast Ohio Regional Sewerage District (NEORS) to build retention basins, keep the waterways clear of debris, and continue to elevate or acquire more structures. In 2019, through its Community Cost Share program and Regional Stormwater Management Plan, NEORS is funding half of the cost for five property acquisitions and three structure elevations. The remaining cost to the village will be a little over \$600,000.



Mayor Piasecki talks about working with NEORSD on flood mitigation

Valley View will continue to work closely with NEORSD and FEMA to mitigate flood damage. One advantage of local government in a small village is the special attention they can pay to their residents. With only 800 homes and about 2,000 residents, they regularly hold meetings to meet one-on-one with individual property owners to discuss their flood risk and whether they are eligible and interested in the elevation/acquisition of their property. In this tight-knit community, “every time you raise a home, you’re taking someone out of the fear of flooding, and that’s a lot” said Piasecki.



Mayor Piasecki recalls personally experiencing the 1959 flood as a child

The Illinois 38th District – Illinois Valley Flood Resiliency Alliance

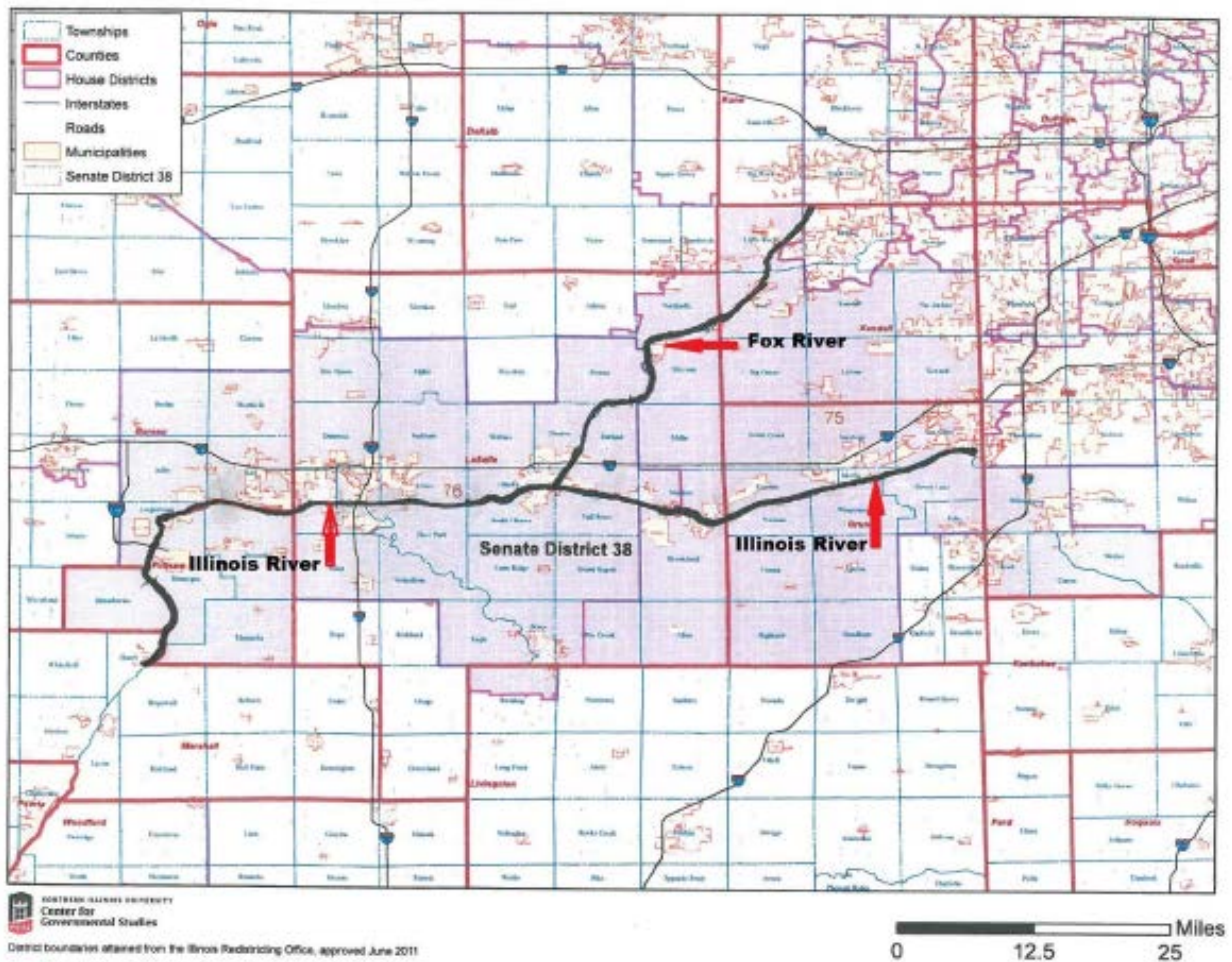
Watch the [full interview](#)



Elected official: Illinois Sen. Sue Rezin

Located southwest of Chicago, the Illinois 38th District includes five counties. The Illinois and Fox Rivers run through the district, which has a total of approximately 130 miles of river frontage. The downside of such an abundance of river access is that the district experiences flooding whenever there is a major rain event. In 2013, record flooding damaged communities, hospitals, schools, wastewater treatment plants, etc., resulting in more than \$150 million in damage.

Senate District 38



However, one community in the district was notably not impacted by the 2013 flood: the city of Ottawa, a community with a history of devastating floods due to its geography. Located at the confluence of the Illinois and Fox Rivers, Ottawa is vulnerable to flooding caused by runoff from a watershed that covers more than 11,000 square miles, even when the city itself gets little rain. The city experienced record flooding in 1974, 1982, 1983, 1996, 1997, 2007, 2008, and 2009. In the late 1990s, Ottawa was one of the worst repetitive loss communities in the state.

Ottawa reversed its fortune mainly through a series of buyouts, beginning in 1998. Most of the buyouts took place in a residential neighborhood known as "the Flats." The Flats had flooded repeatedly because of its location on the Fox River and its low elevation. The area was converted to Fox River Park, and now provides natural floodwater storage when the river rises on a regular basis.

Ottawa also passed an ordinance in 2009 requiring permits for building within the 100-year floodplain, and created a Floodplain Management Commission in 2011. In 2013, the new measures underwent trial by flood. Although the river crested 1.5 feet above the level of any previous event, the city sustained no significant damage. According to a [loss avoidance study](#), the buyouts saved the city \$9.5 million on a \$4.8 million investment.

Following Ottawa's lead after the devastating 2013 flood, Illinois Senator Sue Rezin joined forces with Ottawa Building and Zoning Manager Mike Sutfin to form the Illinois Valley Flood Resiliency Alliance (IVFRA). According to [the senator's website](#), IVFRA brings communities, local governments and emergency personnel together to help them prepare for extreme weather events (particularly floods) through education, communication and purchasing flood-protection materials. IVFRA has also assisted in securing grant funding for communities to reduce flood losses, and developed a resiliency plan for the region. Rezin is a strong advocate for flood mitigation and community resiliency, and there are now 23 Certified Floodplain Managers within her district.

Norfolk, Virginia – Living Shorelines

Norfolk is an urban, highly developed city of approximately 243,000 residents, located in southeastern Virginia, and bordered by the Elizabeth River and Chesapeake Bay. Due to its low elevation and location along the coastline, Norfolk is susceptible to tidal and storm surge flooding, made worse by sea level rise.

Up until recently, sea level rise and flood mitigation were not even mentioned by candidates running for office in Norfolk. However, they have become so relevant (and hard to ignore) that in recent local races, concerns about flooding often become the very first issues candidates address.

Sea level in Norfolk is rising at a twice the global average rate, in part because of the subsidence (sinking) of Chesapeake Bay. Since 1992, sea level has already risen by six inches. If this trend continues, it is projected to rise by 16.5 inches by 2050. As a result of sea level rise, the city now experiences tidal flooding twice as often as it did three decades ago.



Volunteers planting grasses for the Colley Bay living shoreline. Photo courtesy of John Parkinson.

In addition to elevating or buying out properties in harm's way, Norfolk has adopted the use of living shorelines in response to coastal flooding and the threat of further sea level rise. A living shoreline is a stabilized coastal edge made of natural materials such as plants, sand or rock. Living shorelines fight erosion, buffer floods, and protect the coastline. As sea level continues to rise, living shorelines will allow wetlands to migrate upslope, unlike a hard structure, such as a bulkhead. In addition, they also purify water, store carbon, and attract wildlife.

Norfolk has completed dozens of living shorelines projects since the 1990s. These projects involve creating wetlands along the shore. Typically, this begins with forming the outer edge of the new shoreline by burying logs made of coconut fiber in mud flats, adding sand to form the base of the wetland, and planting it with grasses and shrubs. In some locations, oysters are added to provide extra filtration and wildlife habitat.

A prime example of a living shoreline project took place in Colley Bay, an inlet of the Lafayette River. In 2013, this was the site of Norfolk's biggest living shoreline project. It consists of 1,200 feet of natural shoreline, protected by a series of rock sills, and 1.5 acres of new wetlands.

A key part of the success of living shorelines projects in Norfolk is public outreach. There are living shoreline demonstration sites throughout the city to educate the public on the benefits of this practice. Norfolk used resources at the Virginia Institute of Marine Science to learn about living shorelines and has partnered with non-governmental organizations and citizens to help promote, design, fund, and build them.

Findlay, Ohio – Substantial Damage Determinations and Sales Tax to Fund Mitigation

Findlay is a city of a little over 40,000 residents in northwest Ohio, just south of the Michigan border and surrounded by agricultural land. The Blanchard River, which flows through Findlay, frequently overflows during heavy rain events, causing flooding. In August of 2007, Findlay experienced its most significant flooding in nearly 100 years, caused by torrential rain from summer storms from the remnants of Hurricane Erin. During the flood, the Blanchard River crested at over seven feet above flood stage. As a result of the flooding, more than 900 residents of Findlay were evacuated from their homes. Hancock County, where Findlay is located, was declared a federal disaster area and had 250 homes substantially damaged by the flood.



U.S. Coast Guard assisting flood victims to leave their homes in Findlay, Ohio, on Aug. 23, 2007.

Photo courtesy of Petty Officer 3rd Class William Mitchell, U.S. Coast Guard.

Findlay took its job seriously in doing substantial damage determinations after the 2007 flood, conducting over 1,000 of them. Substantial damage determinations have been a controversial issue in other communities due to the perceived burden placed on property owners recovering from a flood event.

To reduce future flood damage, nearly 150 homes and businesses in Findlay have been removed from the floodplain, funded by a combination of local, state and federal funds. Work is also being done to widen the Blanchard River by cutting “benches” in the riverbank to increase the river’s capacity to hold floodwater. This will lower the water level of a 100-year flood by about 1 foot on Main Street. After the excavation work, a riparian buffer will be planted to stabilize the bank, filter pollution and provide wildlife habitat. The project also includes the removal or modification of four small dams in the river and widening the span of the Norfolk Southern Railway bridge. The project is funded by Hancock County’s flood fund. In response to the devastating 2007 flood, Hancock County passed a 0.25% sales tax increase the following year to go toward flood mitigation projects.