



Understanding and Managing Flood Risk: A Guide for Elected Officials

Volume II – Moving Beyond the Essentials

2020

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Cover Photos (Clockwise from top left):

U.S. Senator Debbie Stabenow of Michigan announced federal funding for flood mitigation in Detroit, including new water-absorbing landscape installations on August 6, 2015. Photo by the office of Senator Stabenow.

Valley View, Ohio Mayor Jerry Piasecki was interviewed by ASFPM in May 2019 to talk about flood mitigation in his community. Photo by ASFPM.

Lt. Col. Anthony Mitchell, commander for the U.S. Army Corps of Engineers, Nashville District; Nashville Mayor Karl Dean; and Metro Water Services Director Scott Potter announced the development of a unified flood preparedness program during a news conference at the Metro Courthouse on Tuesday, Feb. 15, 2011. Photo by Mark Rankin/USACE.

Roseville, California Mayor John Allard was interviewed by ASFPM in March 2019 to talk about flood mitigation in his community. Photo by ASFPM.

Understanding and Managing Flood Risk: A Guide for Elected Officials

Volume II – Moving Beyond the Essentials

February, 2020

no.floods.org/ElectedOfficialsGuide

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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.

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Please visit ASFPM's [Elected Officials Guide website](https://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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Introduction to this *Guide*

This *Guide* is written specifically 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. Elected officials, including mayors, council and commission members, judges and other board members, have a vested responsibility to protect and strengthen their communities. Senior administration and management staff share that responsibility and will benefit from reviewing the same information. In some respects, floodplain management may seem challenging because it has many moving parts. But fundamentally, it's about protecting people and property. This *Guide* walks you through the key information you need to fulfill that responsibility.

As an elected official who has ventured into this *Guide*, odds are you're giving some thought to your community's flood risks, and you are aware of your responsibility to protect public safety, general welfare, and the financial health of your community. Perhaps you and your colleagues are:

- Recovering from a flood and need to know how other elected officials have led their communities after floods
- Realizing your community hasn't experienced a flood in some time, and want to know more about risk and being prepared
- Meeting with constituents and media after a recent flood
- Preparing to vote on a development proposal and want to better understand the principles of floodplain management, including factors your staff should consider before issuing permits and approvals
- Evaluating the staff capacity and capability with regard to regulating flood hazard areas and preparing for and responding to flood events
- Considering ordinance changes to better guide development to reduce your community's exposure to flood damage
- Examining options for engineered and natural systems-based projects to mitigate the effects of flooding
- Looking to reduce the flood risk to municipal buildings and your community's infrastructure
- Considering risks posed to emergency responders during flood events due to concentrations of vulnerable populations and/or access to critical facilities

This *Guide* offers background information to help answer your questions and equip you to lead your community to greater resilience. After reading this *Guide*, you will be able to:

- Communicate the concepts of floodplain management to your colleagues and your constituents
- Understand the importance of your community's commitment to floodplain management and the National Flood Insurance Program
- Understand the critical responsibilities of the staff member assigned to fulfill the floodplain manager's responsibilities
- Relay the importance of citizens insuring their structures against flood damage before the next flood
- Make confident critical decisions regarding flood risk and floodplain management to help safeguard residents, businesses, and public infrastructure
- Determine how your community could customize its approach to flooding based on unique characteristics of geography and the watershed, finance, politics and previous successes
- Understand the steps to take before, during and after flood events to protect citizens and help with response and recovery
- Find additional resources to learn more about floodplain management

This *Guide* consists of three separate volumes. The present volume, Volume II, contains Sections D through I; the previous volume, Volume I, contains Sections A through C; and Volume III contains case studies.

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*. Most of the listed resources were prepared by ASFPM or the Federal Emergency Management Agency. You should also be aware that each state has an [NFIP State Coordinating Agency](#) you can contact for guidance. NFIP state coordinators, designated by governors, welcome your inquiries and are there to provide assistance to help resolve your local floodplain management challenges. Some ways in which state coordinators support communities are described in Question 41.

Volume III of this *Guide* gives you success stories from a variety of communities nationwide that went above and beyond in flood mitigation, including interviews with the elected officials involved. 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.

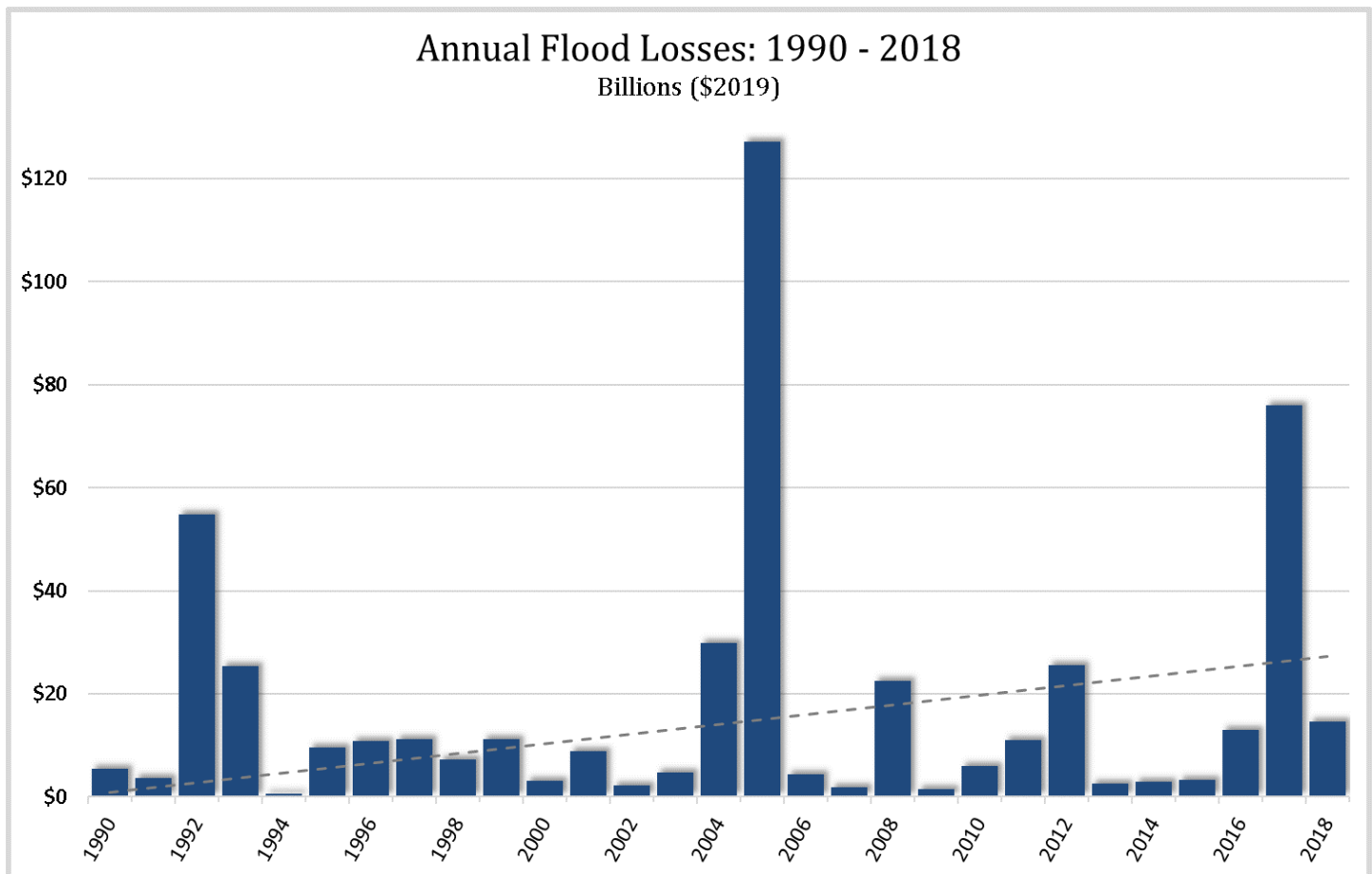
Now is a good time to learn more about sustainable and resilient floodplain management.

The opportunity to provide protection for your citizens and businesses has never been greater. We must begin to make use of our floodplains in ways that are not only ecologically correct, but also ensure public safety and are acceptable to society as a whole. Wise floodplain management provides the means to address your flooding problems as well as create sustainable development for future generations.

Adapted from [ASFPM Overview](#) (accessed April 2019).

Section D. Why do Communities Manage Floodplains?

Communities manage floodplains because promoting public health, safety and general welfare, and providing some degree of property protection, is an exercise of the police powers conferred by state constitutions and statutes. Floods are the leading cause of natural disaster losses in the United States. Floods affect every region of the country. A majority of events declared disasters by the President include flooding as a primary or secondary cause of damage. But the problem is greater than suggested by even the biggest flood disasters; more than half of damaging flood events do not qualify for federal assistance.



CEMHS, 2019. Spatial Hazard Events and Losses Database for the United States, Version 18.1. [Online Database]. Phoenix, AZ: Center for Emergency Management and Homeland Security, Arizona State University. www.sheldus.org

Since 1990 flood losses have averaged nearly \$16 billion per year and per person annual costs have increased fourfold. Total flood losses by decade have jumped from approximately \$142 billion in the 1990s to nearly \$210 billion in the 2000s and through 2018 have already reached roughly \$141 billion.

The [top five costliest U.S. hurricanes on record](#)

have occurred in the past two decades –

Hurricanes Katrina (2005), Sandy (2012), Harvey, Maria and Irma (2017) causing more than \$497 billion in direct losses with a significant portion being flood-related losses. What is known is that major flooding events of all sizes inflict huge tolls on individuals, businesses and communities.



The costs and impacts of flooding go far beyond the direct losses to buildings. When flood events are declared major disasters by the President, recovery costs for certain recipients and some categories of damage may be eligible for federal disaster assistance, but those funds are never enough to pay for full recovery. Some impacts are short term, while others may be felt for months or years, hampering recovery and possibly impairing economic growth:

- **Communities** may not be able to provide utility service if water and wastewater treatment plants and distribution systems are damaged. Flooded public buildings, roads and bridges, schools and recreational facilities impair public services and require immediate, sometimes expensive, repairs. Paying for recovery typically requires diverting capital improvement funds from long-planned projects. Many communities face removal of massive quantities of debris in an era of dwindling landfill space.

- **Families and individuals** may lose jobs or have reduced wages, face significant costs for repairing uninsured damage to buildings and vehicles, or incur additional housing costs as they pay for a place to stay while their homes are repaired. As a result, many families and individuals cope with long-term economic, health and mental health issues.
- **Businesses** may have to scale back or shut down when suppliers are flooded, roads are closed, water and sewer services are impaired, and when employees are coping with loss of housing. Businesses may experience these impacts even if they are not directly affected by an event. Many small businesses never recover after sustaining major flood damage.

Flood Losses at the Local Level

Local flooding can have a much greater impact than is commonly thought. Consider that for every federally declared flood disaster, numerous other floods never get declared – and little to no federal assistance is available. Studies show that communities experiencing a major flood take years, if not decades, to recover. For example, 50 percent of small businesses never reopen after a major flood, and those that do fail at a higher rate within a few years.



For many communities that have not experienced a flood in recent years, it is only a matter of time until a major event occurs. When a flood occurs in a developed area, any and all of the following impacts on communities and their residents and businesses can be expected:

- Decreased revenue due to loss of income, sales, tourism and property taxes
- Costs incurred due to post-flood clean up and repair of buildings and infrastructure
- Loss of jobs due to businesses closing or cutting back on operating hours
- Risk of injury or loss of life, including first responders rescuing those who did not evacuate or are stranded
- Mental health and family impacts, including increased occurrence of suicides and divorce
- Loss of historical or unique artifacts
- Loss of programs or services that are cut to pay for flood recovery
- Deterioration of homes and neighborhoods as floods recur

From ASFPM [*NAI How-to Guide for Planning*](#)

21. What is the National Flood Insurance Program?

The National Flood Insurance Program (NFIP) is a voluntary federal program that enables property owners in participating communities to purchase insurance against flood losses in exchange for those communities adopting and enforcing regulations that reduce future flood damage. The NFIP provides the maps and regulatory basis for local floodplain management programs.

- More than 22,300 local jurisdictions participate in the NFIP, while just over 2,000 communities identified as flood-prone elect not to participate.
- Nearly 5.1 million flood insurance policies are in force, providing financial protection for homeowners, business owners, tenants, nonprofit organizations and governments.
- More than 1.8 million claims have been paid, totaling more than \$68 billion.

Well into the mid-20th century, much of the United States relied on increasingly costly disaster relief to aid flood victims and large public expenditures to pay for structural flood control measures such as dams and levees. Despite billions of dollars invested in such projects, losses of life and property and the amount of assistance paid after disasters continued to increase. During the same period, the private insurance industry found it uneconomical to provide private insurance coverage for flood damage. Seeking a better solution, the U.S. Congress authorized the National Flood Insurance Program in 1968, noting three primary goals:

- To reduce the emphasis on structural flood control measures and balance them with nonstructural community- and state-led floodplain management measures (e.g., elevating buildings above damaging floods)
- To reduce federal disaster costs by shifting the burden from general taxpayers to floodplain occupants
- To provide flood insurance coverage not available on the private market

By providing assistance to flood victims in the form of insurance, and by stimulating state and local floodplain management to constrict the development of flood-prone land, the NFIP creates incentives for communities to help themselves and their citizens. These incentives correspond with the overall goal of responsible government decision

making in flood hazard areas stated by the Federal Task Force on Flood Control in 1965: “those who occupy the floodplain should be responsible for the results of their own actions.” This conceptual basis of floodplain management through insurance and development regulations shifts some of the costs of developing flood hazard areas to private and public landowners.

22. How do communities use regulations to manage floodplains?

Fundamentally, regulating and managing floodplains has two beneficial components: (1) identifying the risk of flooding by producing floodplain maps and (2) applying regulatory criteria to development in identified flood-prone areas to avoid or minimize flood damage. States and communities regulate floodplains to achieve other objectives, including protection of environmental features, providing public open space, greenways and recreational opportunities, and protection of natural and beneficial floodplain functions. Accurate maps that identify flood-prone areas allow communities to incorporate flood risk management into comprehensive plans, land development codes and local mitigation plans to reflect their long-term goals relating to increased resiliency following floods.

Top Five NFIP Community Responsibilities



1. Adopt and enforce floodplain management regulations that require permits for all development in mapped floodplains.
2. Designate a floodplain manager.
3. Require new and substantially improved buildings to be elevated above the base flood elevation (also called the 100-year flood elevation).
4. Conduct field inspections of the mapped floodplain and inspection of permitted development before closing permits or issuing certificates of occupancy.
5. Maintain permit records, including elevation documentation and variance requests.

As community officials work to plan and make decisions to make their communities more resilient, the maps provide value beyond just determining where the regulations apply. NFIP regulation ([44 CFR Section 60.22\(c\)](#)) identifies additional planning and zoning considerations that communities should adopt to guide development in ways that exceed NFIP minimum standards, including:

- Diverting development to areas outside the floodplain using density limits, conservation zoning and transfer of development rights
- Disclosing flood risk to property owners, developers and buyers
- Acknowledging that floodplain development may increase flood risk for existing flood-prone development
- Improving local drainage to control runoff from roofs and paved areas that increase the probability of flooding on other properties
- Requiring buildings to be elevated using pilings or columns, rather than fill, to maintain the storage capacity of the floodplain and to minimize environmental impacts
- Requiring evacuation plans for manufactured home parks and subdivisions and other vulnerable areas



States must also meet requirements.

The NFIP considers states to be communities and expects them to establish and enforce floodplain management requirements for state owned properties and development in mapped floodplains. States can meet NFIP floodplain management requirements through governor's executive orders, legislation or regulation.



No Adverse Impact (NAI)

[No Adverse Impact](#) is an approach to floodplain management that ensures the action of any community or property owner, public or private, does not adversely impact the property and rights of others. Developed by ASFPM, the fundamental premise of NAI is consistent with the ancient legal principle, “Sic utere tuo ut alienum non laedas,” which means “so use your own property that you do not injure another’s property.” Question 42 of this Guide includes more details on the NAI approach to floodplain management.

23. Can communities face consequences for not enforcing, or not adopting, floodplain management regulations?

State constitutions or statutes confer upon local governments the authority (often called “police powers”) to adopt regulations designed to promote public health, safety and general welfare of the citizenry. Property protection is a component of promoting public safety and general welfare.

Communities can reduce their liability for damage by responsibly regulating development and use of community assets, including infrastructure, land or buildings. Floodplain management has come a long way in the last 50 years. Progress is reflected in the knowledge and understanding of flood hazards, as well as which actions society considers “reasonable” to prevent or limit flood damage. In terms of liability, communities have a responsibility to act reasonably to:

- Protect property owners from known hazards
- Prevent property owners from taking actions that would increase flood damage on others
- Enforce adopted regulations uniformly
- Protect the public from the community’s own actions, which may increase future risk

What might happen if a community ignores these responsibilities and does nothing about known flood hazards? In recent years, increasingly broad rules of liability can put landowners and communities at risk if their actions (or inactions) contribute to another’s damage as a result of flooding. Also, the “act of god” explanation for large floods that used to be a successful defense against flood losses in common lawsuits may only be useful for very large and unforeseeable events. Given our modern understanding of the science of flooding, improvement in weather forecasting, and the increasing frequency of severe flood events, it may no longer be acceptable to claim flooding was unexpected.

Where can we find information about floodplain management, flooding and liability?



ASFPM makes available several papers about liability and other legal matters related to floodplain management. Some papers supported by the association speak broadly to reducing government liability, protection of property rights before floods, public liability for flood hazard mitigation, professional liability for construction in flood hazard areas, and liability for failure of water control structures. The website also includes papers about a small number of specific cases decided in recent years.

Access at www.floods.org, Publications and Policy Papers and [Legal Papers](#).

Simply put, failure to act to protect public health and safety could be considered by courts to be negligence on the part of a community. Poor enforcement and willful disregard for adopted regulations may be considered a failure to act reasonably. Modern flood warning systems and robust natural hazard modeling techniques mean floods are more foreseeable than in the past, which means communities have more tools to manage flood hazards and limit damage.



What if my community has chosen not to participate in the NFIP?

Out of nearly 25,000 communities, only about 2,000 identified as flood-prone elect not to join and nearly 200 are suspended. If your community is one of those, you're probably not regulating flood hazards, which could put people and property at risk. Also, your citizens won't be able to purchase NFIP policies, which could limit access to most mortgages. Federal grants and loans for development in special flood hazard areas (SFHAs) won't be available, and some types of federal disaster assistance are limited, putting the burden for recovery entirely on local resources.

Contact [your NFIP state coordinator](#) to learn more (see Question 41 for sources for more help).

24. Do floodplain management regulations create unreasonable barriers to development?

Floodplain management regulations help ensure that we're building and recovering safer, stronger and smarter. If we know an area is mapped as having the potential to flood, and if we know people could be in danger and buildings could be damaged, it makes sense – and we have a responsibility – to take reasonable protective steps as communities develop and redevelop. In the same way that building codes mandate design features that protect buildings and people from fire, floodplain management regulations provide degrees of protection from flooding.

However, there are many factors that drive a desire for development in communities. For example, elected officials may hear versions of: "If we restrict what a property owner can build in the floodplain, aren't we taking away the owner's right to develop land as he sees fit?" or "How can we meet our needs for growth if we're not developing these highly desirable (yet flood-prone) areas near the water?" It is important for you to remember that responsibly regulating development in known hazard areas can help avoid liability and lawsuits that challenge the constitutionality of land use regulations. Also remember there are significant benefits to safeguarding your community's residents, businesses, and economy.



What should I look for to determine if my community's regulations protect against "takings" challenges?

Evaluate whether the regulations:

- ✓ Utilize a performance standard approach (specifies criteria for development rather than prohibiting development)
- ✓ Grant variances in certain limited circumstances
- ✓ Are supported by scientifically sound hazard maps
- ✓ Are adopted and administered in conformance with statutory procedures (e.g., notice and hearing)
- ✓ Are reasonable and fair in administration and enforcement
- ✓ Document threats to public health and safety, and the potential for nuisances

From *Flood Risk in the Courts: Reducing Government Liability While Encouraging Government Responsibility*

As you make decisions around damage reduction measures, be mindful to choose options that reflect the degree of flood risk and characteristics of flooding in your community, as well as types of potential uses of the floodplain. For example, prohibiting hazardous materials facilities in areas prone to flash flooding may be more reasonable than prohibiting a baseball field and bleachers in an area prone to shallow tidal flooding.



Flood risk may vary from community to community.

Different characteristics of flooding cannot be determined simply by looking at flood maps. Flood risk varies depending on depth of flooding, how rapidly flooding occurs (flash floods), how fast floodwater moves, how long flooding lasts, salinity of floodwaters, the presence of waves and debris, and whether soils are vulnerable to erosion.

The defining characteristics of the NFIP minimum floodplain management requirements are described in Section G, and Section H describes a number of effective ways communities have strengthened local programs.

Section E. The Basics of Flood Risk

Every body of water, from the smallest creek to the largest ocean, has a floodplain around it. Simply put, the floodplain is the normally dry land area that is susceptible to inundation when water levels rise higher than normal. Floods can vary in size and how often they occur. Engineers use various methods to analyze these two factors, also called magnitude and frequency, to determine an area's overall probability of flooding.

The flood risk information is then put in a map format that is more easily used by communities as they apply floodplain management regulations and make decisions. Flood risk information and maps are also used by property owners, developers, builders, engineers and architects who are planning how and where to build or improve structures and how to undertake development other than buildings.

The most widely available formats used to convey flood risk information are Flood Insurance Studies and Flood Insurance Rate Maps (FIRMs) developed by FEMA when communities are identified as prone to flooding. FIRMs show areas that are expected to be flooded by the level of flooding that has a 1 percent chance of being equaled or exceeded in any given year. Flood Insurance Studies include summaries of the nature of flooding, historic floods, flood sources studied, and engineering and mapping methods used. Studies also include more detail on flood elevations than shown on FIRMs.

Among other information about communities, FIRMs depict the 1-percent annual chance flood



How are flood maps used?

- **Community officials** use flood maps to understand and communicate local flood risk, manage floodplains and require new and substantially improved buildings to be built in ways that mitigate losses from future floods.
- **Emergency management officials** use flood maps to plan evacuations and access for search and rescue.
- **Mortgage lenders** use them to help determine flood risk and decide whether to require flood insurance as a requirement for loans on buildings in floodplains.
- **Insurance professionals** use the maps to determine the flood risk and insurance costs for buildings in floodplains.
- **Developers and builders** use them as part of location siting and design and construction decisions.
- **Residents and business owners** use flood maps to learn about flood risk as they purchase property and investigate how best to protect their property from physical damage and financial costs of flooding.

(called the “base flood,” see Question 25 for more detail), which is an important concept to understand. Question 2 describes how you can access FEMA’s studies and maps online to learn more about your community’s flood risk.

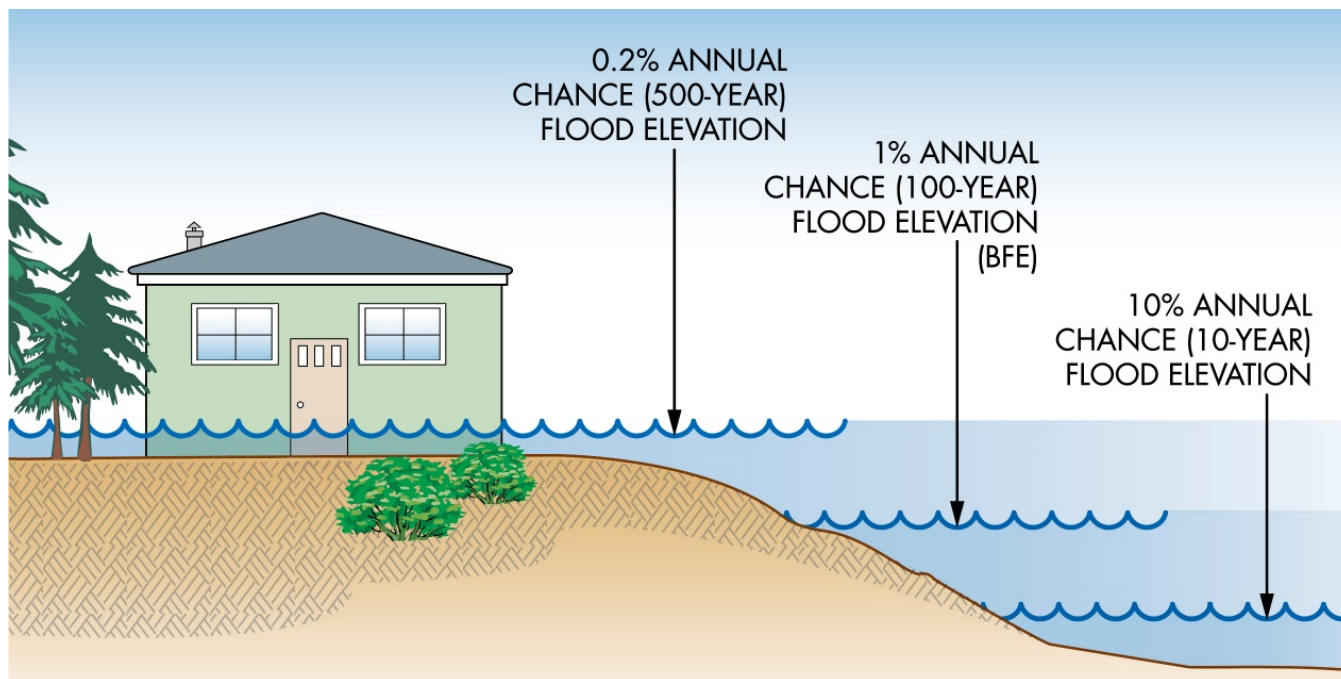
25. What is the base flood and why does FEMA use it for mapping?

The “base flood” refers to the level of flooding that has a 1 percent chance of being equaled or exceeded in any given year. The 1-percent standard is a probability statement – larger floods can and do occur somewhere in the U.S. every year. Just because a specific location hasn’t flooded in many years (or has experienced multiple floods) doesn’t change the probability of further occurrence.

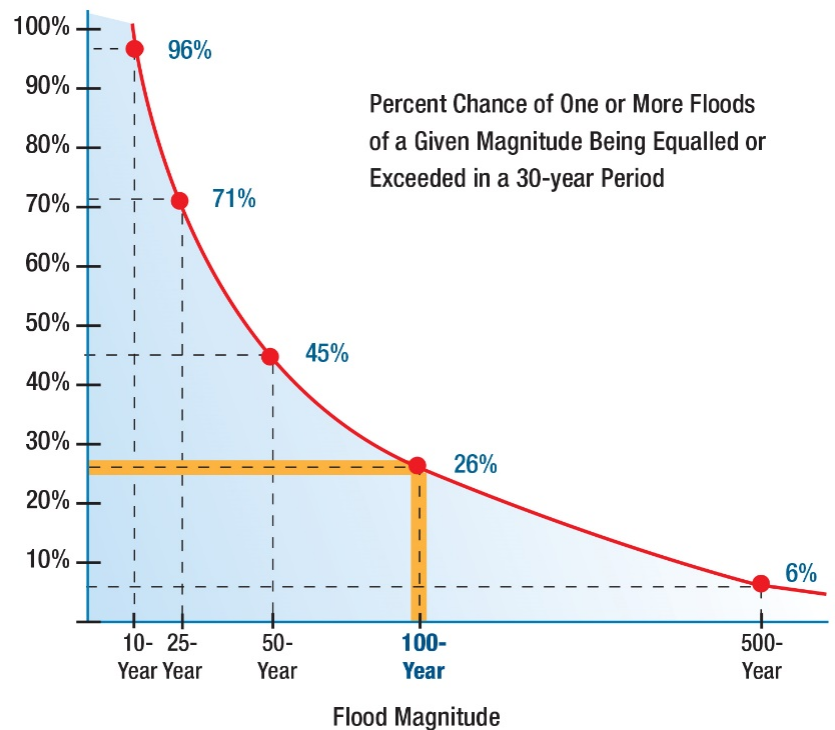
Base flood = 1-percent annual chance flood = 100-year flood*



*Although common, the term “100-year flood” should not be used. It is widely misinterpreted to mean “once every 100 years,” which is incorrect and misleading. The base flood is a statement of probability of occurrence in any given year.



In developing the concepts behind the NFIP, the 1-percent standard was selected as a compromise between legislative and administrative decision makers and the regulated public. It was never envisioned as optimal by those who proposed and implemented it. Delineating areas subject to a shallower and more frequent flood (such as the 10-percent annual chance flood), would result in excessive exposure to flood risk, while regulating to a more severe and less infrequent flood (say, a 0.1-percent annual chance (1000-year) flood), was considered an excessive standard for design purposes for non-critical development.



Many people don't understand just how risky building in flood zones can be. The graphic illustrates there is a greater than 26 percent chance that a non-elevated home in the SFHA will be flooded during a 30-year mortgage period. The chance that a major fire will occur during the same period is less than 5 percent.

FEMA's use of the base flood to delineate areas prone to flooding and to regulate development in those areas should be viewed as a minimum. If your community is aware of factors that increase flood risk, or has experienced flooding that demonstrates that using the base flood elevation is not adequate to protect people and property, elected officials have a responsibility to explore standards that provide a higher level of protection (described in Section H).

26. How does FEMA determine the base flood and how are flood maps prepared?

FEMA uses widely accepted engineering methods and models to determine the base flood along waterways and shorelines and to estimate how high base flood elevations will be. These same methods and models are used by other federal, state and local

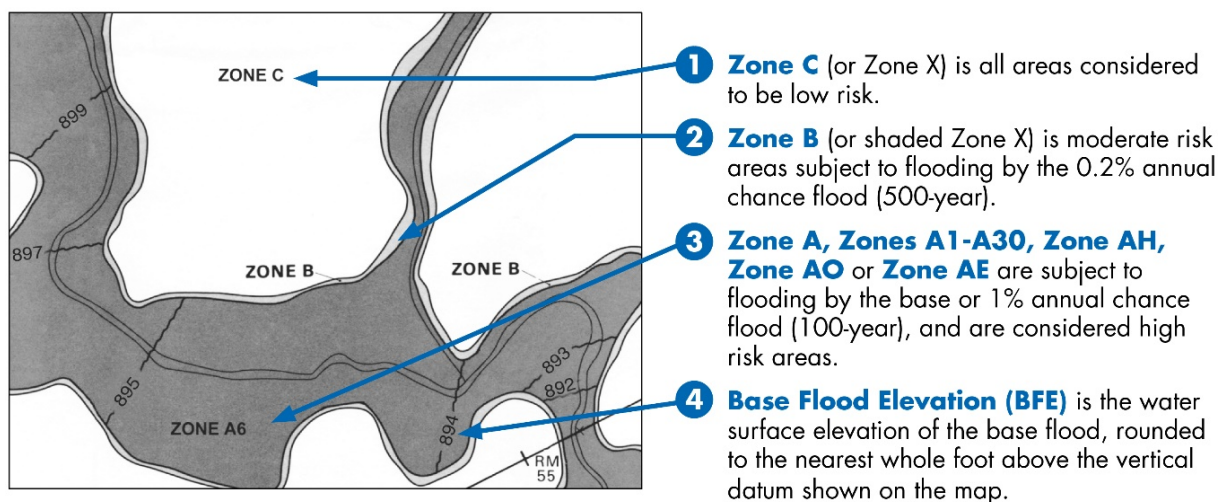
government agencies, as well as by developers, and are based on sound scientific principles. Past flooding and rainfall events are only some of the elements used in these analyses. FEMA then uses the results of the analyses to draw FIRMs. Having high-quality topographic data that shows the shape of the land is important.

During FEMA's mapping and map-revision processes, communities are invited to contribute local information. Communities and the public are also offered opportunities to comment on the results before FEMA finalizes and issues studies and maps.

Community officials and citizens should look beyond using FIRMs as the only sources of flood risk information. Regardless of the methods and models used, the FIRMs have limitations. For example:

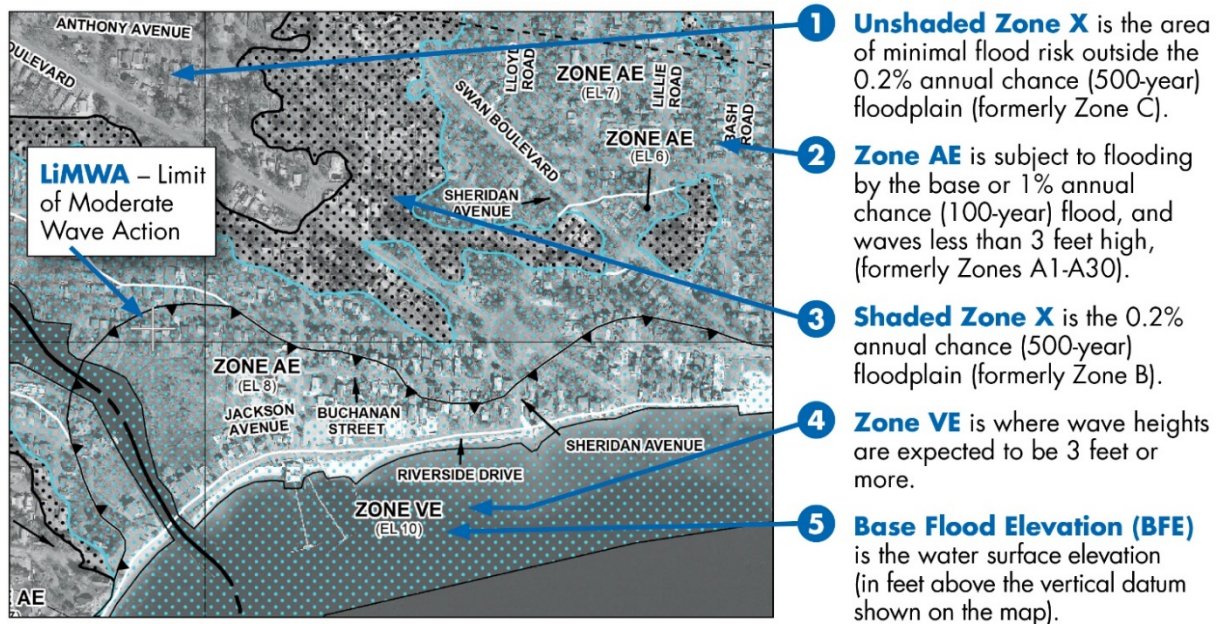
- Each flood map is a "snap shot" representation of risk at the time the flood study was prepared, and does not take into account future effects of urbanization and development, sea level rise, climate change and other factors that will likely increase future flooding.
- Flood maps do not depict all flood risk aspects, such as how rapidly flood conditions may occur (flash flooding), which areas have dangerously fast-flowing floodwater, areas where floodwaters remain high for days or weeks, areas subject to erosion and scour, or what hazards may be present in the floodwater (pollution and debris).

The appearance of FIRMs and flood zones has changed over the years since FEMA began publishing studies and maps. Early maps (sample shown below) are still the only

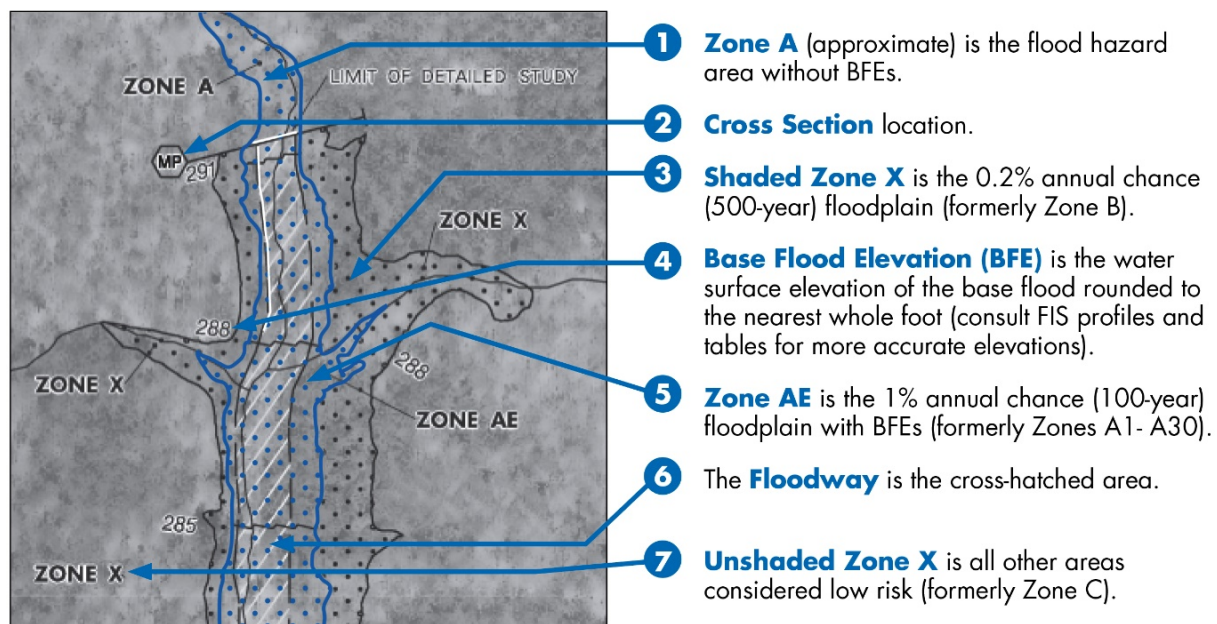


Example of an early riverine FIRM.

maps available for many communities, especially in rural areas. Those maps were paper products that made it difficult to translate flood zone boundaries and flood elevations onto other maps, such as site plans and subdivision plats. Most early maps were drawn on topographic maps without sufficient detail, including U.S. Geological Survey maps with 20-foot contour intervals. More recent maps use digital technology, aerial photography and detailed topographic mapping. Examples are shown below.



Example of a modern coastal FIRM.



Example of a modern riverine FIRM.

27. If an area isn't shown on a FIRM as a special flood hazard area, does that mean there is no flood risk?

No. Any low-lying area close to a body of water has a risk of flooding. But, given budget limitations, many flood-prone areas are not shown on FIRMs, especially those that have poor drainage and are not directly associated with a body of water. FEMA's data show nearly 25 percent of all claims are paid for flood damage to buildings in areas outside of special flood hazard areas. These areas are labeled Zone X (or Zone B/C) on FIRMs and sometimes are called "low risk" floodplains to indicate there is a chance of flooding.

Additionally, from the beginning of the NFIP, FEMA has focused mapping and map revision efforts in urbanized areas and communities where development and growth were anticipated when flood studies were first started. Only about 40 percent of the nation's floodplains have been mapped. This means there are many flood-prone areas not shown on FIRMs. FEMA typically does not study the following:

- Rural watersheds
- Streams with a contributing drainage area of less than 1 square mile
- Local drainage problems not associated with a body of water, usually associated with increasing rainfall runoff in urban areas
- Areas downstream of dams or landward of levees that could be flooded if those flood control structures fail

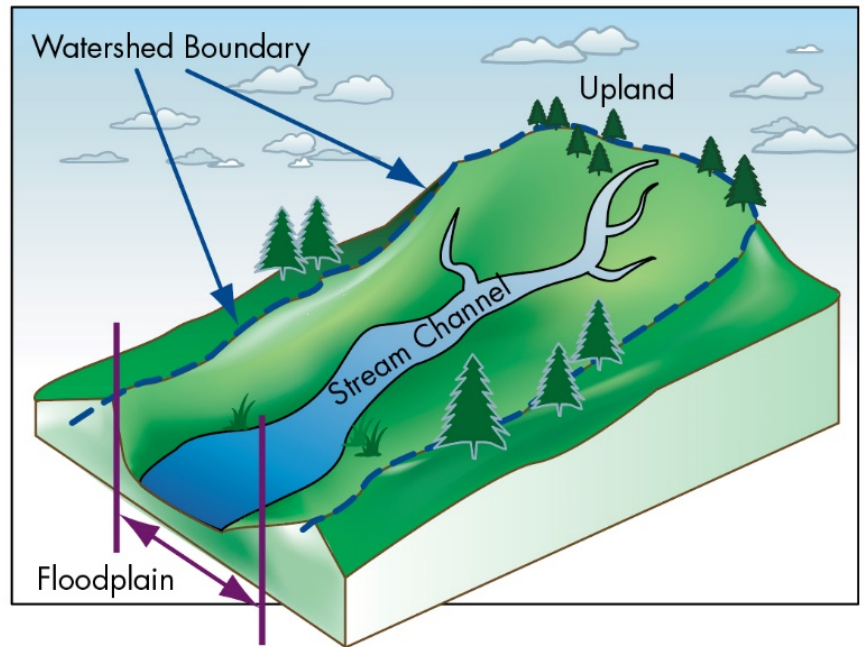


Local flood studies and maps supplement FEMA maps.

The NFIP regulations specifically acknowledge that communities may have local studies and maps showing flood prone areas not shown on FIRMs. These studies can be adopted and locally delineated flood prone areas can be regulated along with SFHAs.

28. Why is it important for us to consider how flood risk may change in the future?

Flood risk is not static – it changes constantly due to development, erosion, land use changes, subsidence of the land, changes in rainfall patterns, sea level rise, and other factors. This can be difficult to understand because flood maps with “precise” floodplain boundaries and elevations give the impression that the lines are fixed and definitive. Community officials should keep in mind that flood risks are likely to change over time, which means buildings designed to comply with today’s minimum requirements will likely be subject to future flooding. It’s a good idea to plan for this by strengthening these requirements for the future. Section H describes many ways communities can strengthen their local floodplain management programs.



A watershed is the area drained by a river and all of its tributaries.

How flood risks may change in the future differs depending on the source of flooding, whether rivers and streams or coastal shorelines.

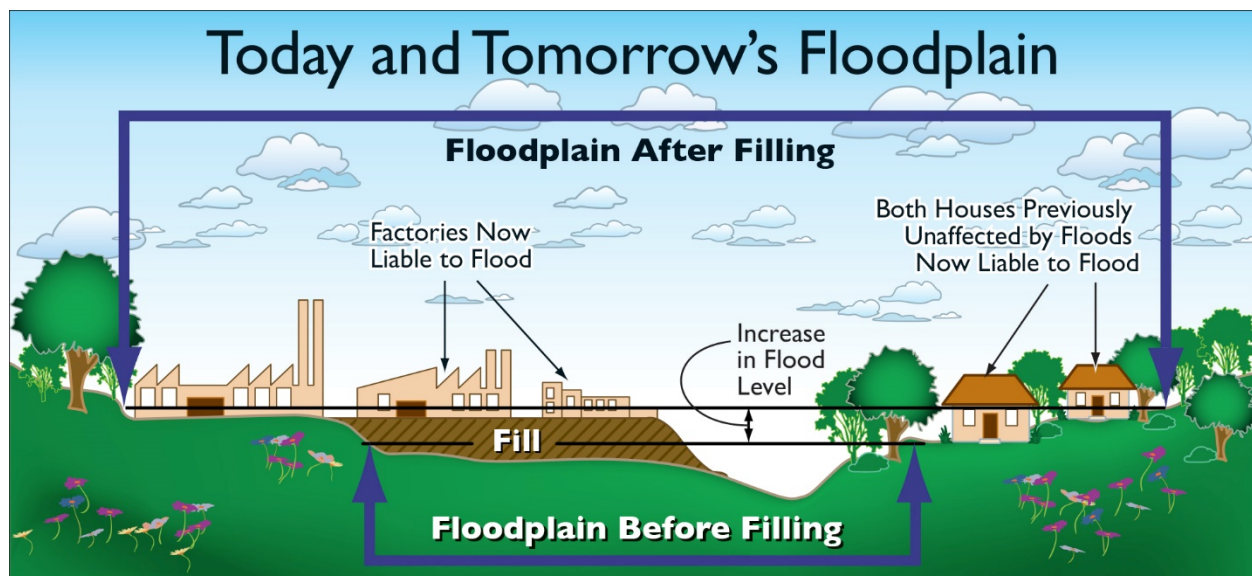
Consider how future watershed development can increase flood risk along rivers and streams.



Floodplain mapping that considers the ultimate watershed build-out condition is one scientific tool that can be used to set regulations and development guidelines so that other properties are not affected by proposed development. Charlotte-Mecklenburg, NC took this proactive approach by considering full build out conditions and land use within and outside the floodplain to identify the cumulative impacts of development. The results showed flood levels in some areas could increase 2-9 feet at full development.

Rivers and Streams. Most inland communities with rivers and streams are aware of the effects of upland development. More impervious surfaces (roofs, parking lots, streets and roadways) mean more rainfall runs off of the land, accumulating in waterways and overflowing into floodplains, usually resulting in deeper flooding (see graphic). Changes in drainage patterns that usually go along with development (gutters, ditches and piped storm drains), can shorten the time it takes for runoff to reach streams. Even in areas where on-site management of stormwater runoff is mandated, stormwater ponds and other features aren't designed to handle the extreme rainfall amounts experienced in many areas that can produce damaging floods.

Many inland communities also are experiencing effects of climate change, including more intense storms with high rainfall amounts that occur over shorter periods of time, reducing the amount of rain that soaks in. Some studies suggest precipitation patterns are changing, with wet areas becoming even wetter, dry areas even dryer, and most studies concluding there will be an increase in the number of "extreme" events.



Adding fill changes floodplain boundaries.

Coastal Shorelines. A large percentage of the U.S. population lives in counties and municipalities with an Atlantic, Pacific, Gulf Coast or estuary shoreline. Numerous population projections indicate that the number of people in those areas will continue to increase. Scientific findings estimate sea level may rise from 1.5 to nearly 10 feet at various coastal locations in this century. Rises in sea level will magnify the risks of storm surge and high-tide flooding (see graphic). Many coastal communities already experience road flooding during normal high tides when rainfall runoff cannot drain

away. In some areas, subsidence (sinking of the land) exacerbates the flooding effects of sea level rise. More pertinent to increasing flood risk associated with climate change and sea level rise is how many people live on low-lying land. One analysis indicates that nearly 5 million Americans live on land that is within 4 feet of the local high tide level.

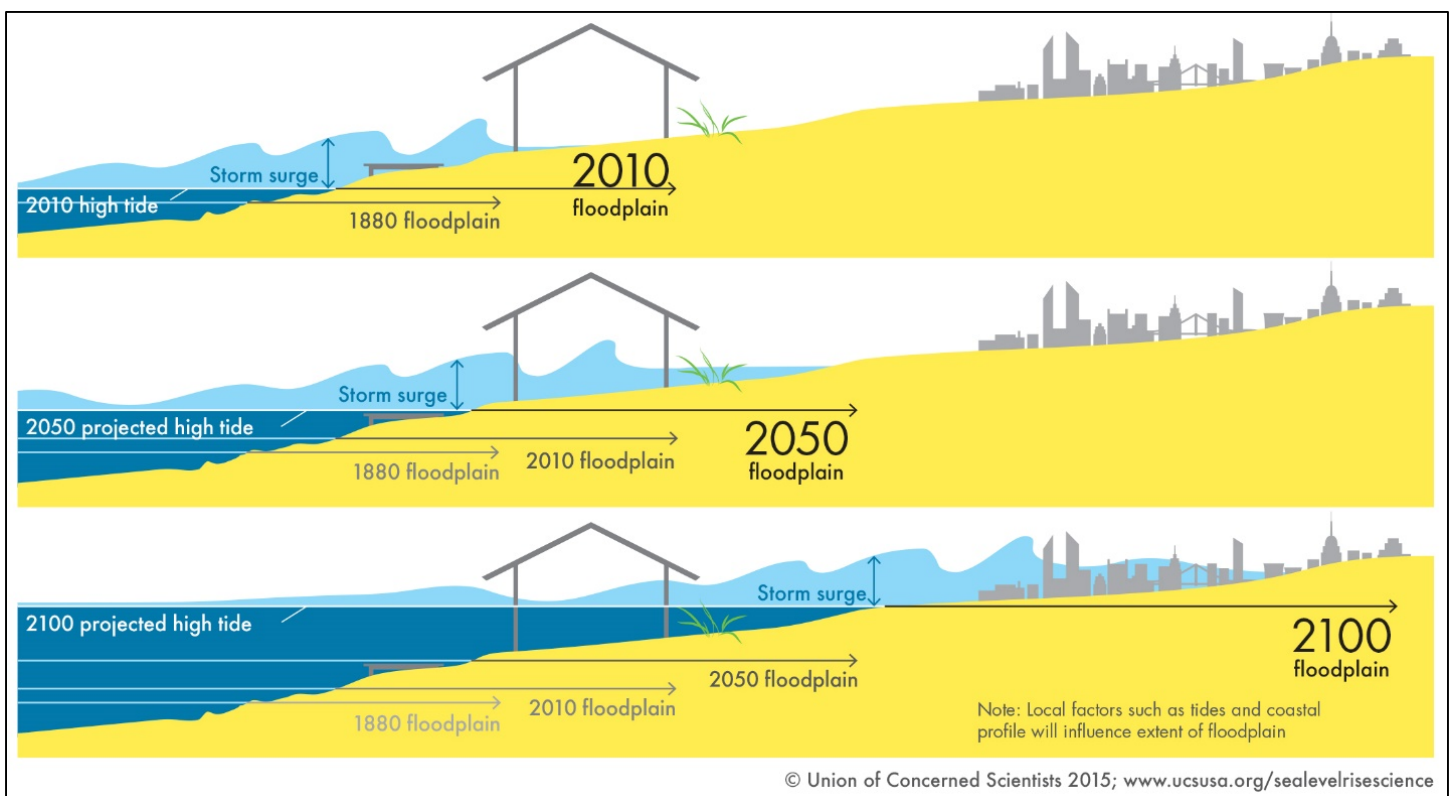
Success Story Connection



Sea level is rising at twice the global average rate in Norfolk, Virginia. In response, [the city has completed dozens of living shoreline projects](#) to protect vulnerable coastal areas.

Many coastal urban communities already deal with more frequent occurrences of high-tide flooding, sometimes called “nuisance flooding,” or “sunny day flooding” due to sea level rise, when even slightly higher than normal tides impede the drainage of stormwater runoff. The resulting inundation of low-lying roads, utilities and buildings can depress property values, speed deterioration of utilities and slow the economy when employees can’t get to work.

Storm surge and high tides magnify the risks of local sea level rise. As local sea level rises, coastal storm surges penetrate further inland. The extent of increased flooding at any given location will depend on several factors, including contours of the land.



Rising sea levels in this century increase the risk of coastal flooding.

Section F. The Basics of NFIP Flood Insurance Policies

It's valuable for elected officials to have a basic understanding of NFIP flood insurance policies, including which buildings can have policies, why banks require some property owners to buy policies, how much coverage is available, and the fact that policies on buildings in mapped flood zones include coverage to help pay the cost of bringing buildings that are substantially damaged by flooding into compliance. You may also find it useful to know the factors used to rate policies, how flood map changes affect policies, and how the financial security of insurance compares to disaster assistance.

Home and business owners are often surprised to learn their general property insurance policies do not cover flood damage. Similarly, renters do not know that renter's insurance doesn't cover contents when damaged by floods. Most people learn this hard lesson after floods occur. Fortunately, access to flood insurance is one of the fundamental reasons communities participate in the NFIP. The readily available policies provide property owners with consistent, affordable coverage to protect against financial losses caused by flooding.

Many property owners and renters obtain NFIP flood insurance from the same companies that write their property insurance policies. Those private insurance companies, which also deploy claims adjusters after flood events, operate under agreements with the NFIP. Some property owners obtain NFIP policies directly from the program.

Communities use a variety of methods to inform and encourage owners to obtain flood insurance policies, focusing on the important message that "General property insurance doesn't cover flood damage." The NFIP provides many websites, videos, fact sheets and brochures written for property owners and policyholders, including many translated to Spanish. These materials offer detail on the availability of flood insurance, mandatory purchase, coverage (amount of insurance available), and filing claims, with a focus on actions owners should take before, during and after floods. A good starting point to find materials is www.floodsmart.gov.



FEMA



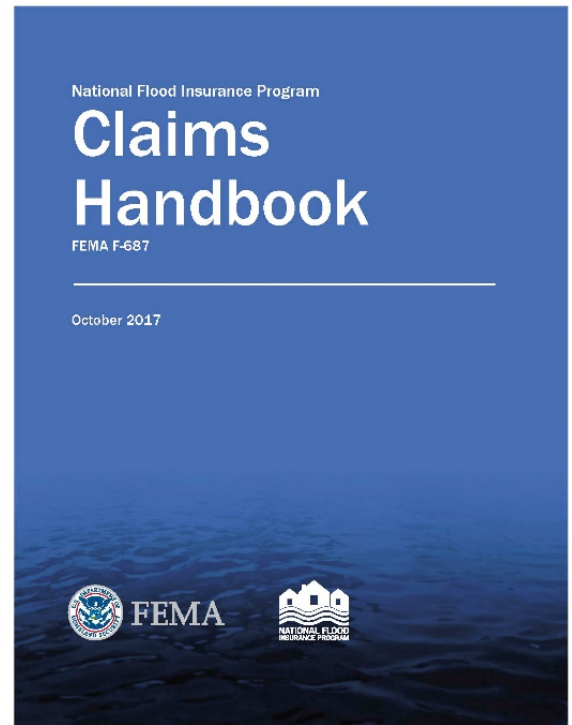
**NATIONAL FLOOD
INSURANCE PROGRAM**

Some topics covered by the NFIP materials include:

- What property owners need to know about flood map changes and flood insurance
- Summary of coverage for homeowners and business owners
- Cleaning up after the flood
- Flood insurance claims process
- What owners need to know to build back safer and stronger

The [NFIP Claims Handbook](#) provides tips for policyholders about what to do before and after a flood, including understanding the coverage, documenting damage, talking to insurance agents, things to do right after flooding occurs, learning about Increased Cost of Compliance coverage, and filing and handling claims and appeals.

Check “Policy Information by State” to learn how many buildings in your community are insured by the NFIP and look up “Claim Information by State” to find out how many claims have been paid in your community since 1978 at <https://www.fema.gov/policy-claim-statistics-flood-insurance>.



Most automobile insurance does not cover flood damage.

Flood damage isn't just about buildings. After Hurricane Harvey, [the Texas Department of Insurance reported](#) to the State Legislature that more than 200,000 personal and commercial automobile claims were filed, of which more than 130,000 were total losses. Total claims would exceed \$2 billion. While auto policies may cover flood damage, events that trigger large claim payments can drive up the cost of premiums for everyone. Plus, claims rarely pay enough to replace cars, making it harder for citizens to recover.

29. Where is NFIP flood insurance available?

NFIP flood insurance is available in 22,300+ communities that participate in the NFIP. Property owners in these communities can purchase NFIP flood insurance policies from private insurance companies and local insurance agents that participate in FEMA's Write Your Own program. Flood insurance coverage may be obtained for all insurable buildings regardless of location in mapped "high risk" floodplains or in "low and moderate risk" areas outside of mapped flood hazard areas identified on NFIP Flood Insurance Rate Maps (see examples of maps in Question 26). The only limitation is that policies are not available for new construction and substantially improved or repaired substantially damaged buildings in federally-designated Coastal Barrier Resource Act areas.

- "High risk" flood hazard areas are identified as Zone A, AE, A1-A30, AO, AH, A99, and AR or Zone V, VE, V1-V30 and VO.
- "Low and moderate risk" areas are identified as Zone X (shaded) and Zone X (unshaded). On older FIRMs, these areas are identified as Zone B and Zone C.



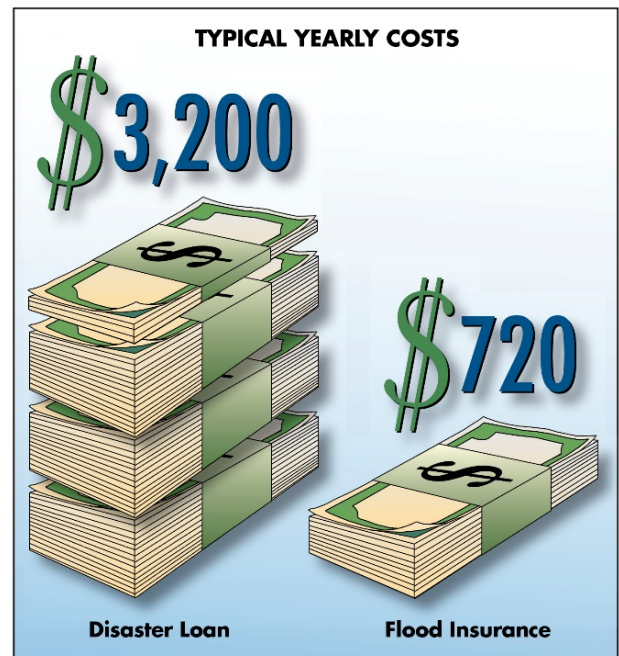
Common misunderstandings about NFIP flood insurance.

Two common misunderstandings can lead owners to make the wrong decision about flood insurance. They may have been told flood insurance isn't available for buildings located in the mapped floodplain, or for buildings **outside** of the mapped floodplain. Sometimes even insurance agents don't realize **NFIP flood insurance policies may be purchased for all insurable buildings**. See Question 20 for more information to counter myths and misunderstandings.

30. How does flood insurance compare to disaster assistance and loans available after flood disasters?

Flood insurance is a dependable way for property owners to obtain protection against financial losses, rather than rely on small amounts of disaster assistance and loans that require repayment.

Flood insurance claims are always paid when insured buildings are damaged by qualifying flood events, even small floods that affect only a few properties. In contrast, most federal disaster assistance is available only after flood events are declared major disasters by the President. When property owners are not insured for flood damage, FEMA's [Individuals and Households Program](#) provides small grants, but the funds do not cover losses to damaged and destroyed buildings. The [Small Business Administration](#) [usually offers loans](#) that must be repaid.



Flood insurance costs households less than disaster loans on average.



Hurricane Harvey illustrates the value of flood insurance.

As of July 31, 2018, the average claim paid by the NFIP for Hurricane Harvey flooding was more than \$115,000 ([Insurance Information Institute](#)). By comparison, the amount of assistance FEMA's Individuals and Households Program (IHP) can provide a survivor or household as a result of declared disasters is limited to \$33,300. For Hurricane Harvey, [the average housing assistance](#) was just under \$9,000 for owners and \$2,000 for renters (and much less for Hurricane Irma). Assistance to repair owner-occupied primary residences is intended to make damaged homes safe, sanitary and functional. This assistance does not pay to return homes to pre-disaster condition.

31. Why do mortgage lenders require some property owners to buy flood insurance?

The NFIP statute requires federally regulated or insured lenders to require property owners with mortgages on buildings located in FEMA-mapped flood zones to purchase and maintain flood insurance policies for the life of loans. This requirement is called “mandatory purchase.” If a property owner doesn’t obtain a policy within 45 days of receiving notice of the requirement, then lenders may “force-place” coverage (buy policies). Force-placed policies usually are more expensive than when owners buy their own policies. Even though not required by the NFIP statute, some lenders may require borrowers to obtain flood insurance on buildings outside of the mapped floodplain.

Most flooded buildings are not insured for flood damage.

Despite the mandatory purchase requirement, the NFIP estimates only 10-20 percent of buildings damaged by flooding in recent years had flood insurance policies. It is helpful to know how many buildings are in your community’s mapped floodplains, and how many are covered by NFIP flood insurance policies. This information helps you understand your community’s exposure to flooding and potential financial loss if uninsured citizens are flooded. This information may be found in your hazard mitigation plan. NFIP policy and claims data, by state and community, are online at www.fema.gov/policy-claim-statistics-flood-insurance.

32. How much coverage for individual buildings is available from the NFIP?

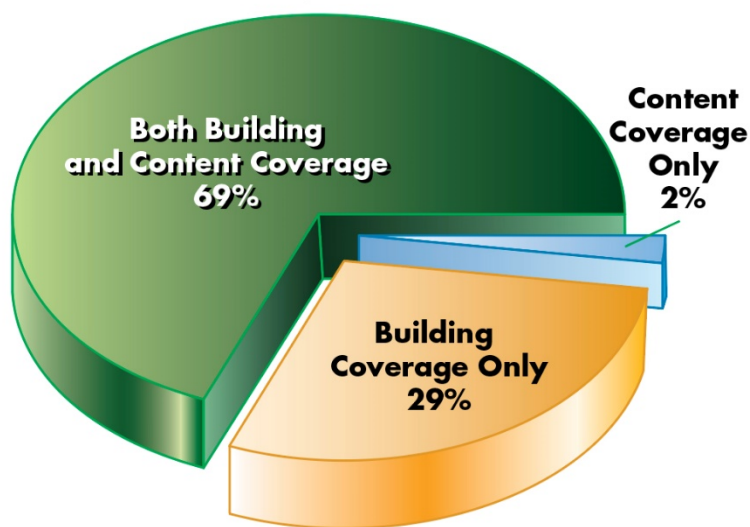
The NFIP offers flood insurance policies for insurable buildings and for contents in insurable buildings. Standard policies are written on buildings in special flood hazard areas, while low-cost Preferred Risk Policies are available for most buildings located outside of mapped special flood hazard areas. For complete coverage, owners must purchase two policies: one for buildings and one for contents. A summary of coverage for both homeowners and business owners is included in the [NFIP Claims Handbook](#).

This table shows the amounts of coverage available for standard policies. The amounts of coverage are limited by law.

Occupancy	Standard Building Coverage Limits	Standard Contents Coverage Limits
Single-Family Dwelling	\$250,000	\$100,000
2-4 Family Dwelling	\$250,000	\$100,000
Other Residential Building	\$500,000	\$500,000
Nonresidential Building (including Business Buildings and Other Nonresidential Buildings)	\$500,000	\$500,000

For NFIP insurance purposes, an insurable building is a walled and roofed structure, including a manufactured home. Insurable buildings are principally above ground and affixed to a permanent site. Buildings under construction may be insured. Insurance covers the building and its foundation, electrical and plumbing systems, central air-conditioning, furnaces and water heaters, refrigerators, stoves, built-in appliances, permanently installed carpeting over unfinished floors, permanently installed paneling, wallboard, bookcases and cabinets, and window treatments. Limited coverage is available for detached garages on the same parcel as an insured building. Many structures are not insurable, including gas and liquid storage tanks, water wells, septic tanks, swimming pools, tennis court and pool bubbles, fences, docks, seawalls, open pavilions, open carports, bleachers, recreational vehicles, and buildings over water built after October 1, 1982.

Policies in Force by Coverage Type
(as of July 31, 2018)



The majority of NFIP policies cover both buildings and contents.

NFIP contents coverage is insurance for removable items inside insurable buildings, including furniture, clothing, and other personal property. Many contents are not insurable, including jewelry, artwork, furs and items valued at more than \$2,500; money, precious metals, stock certificates, and valuable papers; licensed vehicles and boats; animals and livestock; and contents stored in enclosures below elevated buildings.



Who can buy flood insurance for contents?

If an owner lives in a building, the owner must have an NFIP policy for **building** coverage before they can buy **contents** coverage. On the other hand, renters may purchase contents policies even if the building owner does not have a policy on the rented building.

33. What should I know about Increased Cost of Compliance coverage?

When buildings in mapped flood hazard areas are insured by the NFIP, owners can benefit from coverage called Increased Cost of Compliance after a damaging flood. If a building is determined to be substantially damaged by flooding, this coverage helps pay to bring the building into compliance with community floodplain management regulations for new construction. A building is substantially damaged when the cost to repair the building to pre-damage condition equals or exceeds 50% of the market value of the building. See Question 36 for more on the requirements for new construction, substantial improvement and substantial damage. ICC claim payments are also available when communities adopt provisions that require certain buildings that are repetitively damaged by flooding over a 10-year period to be brought into compliance.



ICC-eligible projects include elevating, relocating, demolishing or dry floodproofing a building.

As of late 2018, the NFIP is authorized to pay ICC claim payments up to \$30,000 toward the costs of:

- Elevating buildings on compliant foundations (see Question 36, Existing Buildings), including any freeboard required by communities
- Relocating buildings out of the mapped flood hazard area
- Demolishing buildings
- Dry floodproofing nonresidential buildings

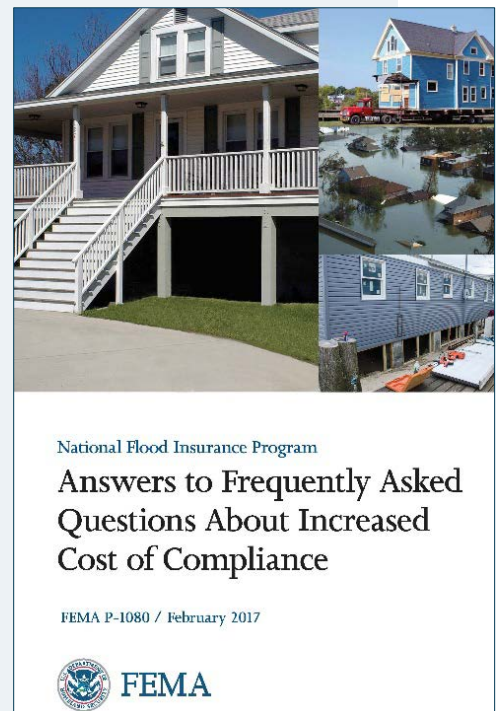
ICC claim payments can be used as part of the non-federal cost share required by FEMA hazard mitigation grants) when those grants are used for ICC-eligible activities. See Question 10 for brief descriptions of those grant programs. Because ICC payments can be a critical part of community sponsored mitigation projects, community officials should learn about ICC before the next flood.



Answers to Frequently Asked Questions about ICC

FEMA P-1080 is written for policyholders and community officials. It includes a series of questions to help community officials understand what they can do to help property owners access ICC funds and their role in making substantial damage determinations, providing information, offering advice about how to bring buildings into compliance, issuing permits, conducting inspections and providing documentation requested by insurance adjusters.

Fact sheets on ICC coverage, a policyholder's processing checklist, proof of loss form and other ICC materials are available online: <https://www.fema.gov/media-library/assets/documents/12164>.



34. How does the NFIP rate buildings for insurance policies?

When buildings are located in special flood hazard areas shown on FIRMs, the NFIP uses several building characteristics to “rate,” or determine the cost of flood insurance premiums, starting with the construction date:

- **Pre-FIRM.** Buildings constructed before communities adopted the flood maps (FIRMs) and regulations necessary to join the NFIP, or on or before Dec. 31, 1974, are called “pre-FIRM.” The NFIP develops specific discounted rates for pre-FIRM buildings that do not depend on how high buildings may be elevated relative to the base flood elevation.
- **Post-FIRM.** Buildings constructed after communities adopted flood maps and regulations necessary to join the NFIP, or after Dec. 31, 1974, whichever is later, are called “post-FIRM.” These buildings should have been built in compliance with the flood hazard information and regulations in effect at the time permits were issued. For post-FIRM buildings, the most significant elements used for rating flood insurance policies include:
 - Date of construction
 - Flood zone
 - Base flood elevation (or flood depth)
 - Lowest floor elevation relative to the base flood elevation
 - Enclosures below the lowest floor
 - Building occupancy (residential, nonresidential, condominium)
 - Presence of basements



How many NFIP flood insurance policies are in force?

In August 2019, the NFIP reported nearly 5.1 million flood insurance policies were in force. Approximately 16 percent of all NFIP policies are written on pre FIRM buildings, 80 percent on post FIRM buildings. Approximately 48 percent of NFIP policies are on buildings located outside of mapped special flood hazard areas and accounts for roughly 29 percent of claims paid.

The final amount charged for any given policy factors in the rate data, the amount of coverage, deductibles, a federal policy fee, a reserve fund assessment, and a surcharge authorized by the [Homeowner Flood Insurance Affordability Act](#). That surcharge is \$25 on single family primary residences and \$250 on other buildings.

The NFIP offers a low-cost Preferred Risk Policy for buildings located outside mapped special flood hazard areas shown on FIRMs. The average premium for these policies is \$439 a year. Low rates are available until a claim is filed, after which rates increase, although the rates are still less than policies used for buildings in mapped flood zones.



**NFIP Community Rating System
communities qualify for
insurance discounts.**

Discounts of 5-45 percent are applied to policies on buildings located in communities that participate in the NFIP Community Rating System (described in Question 43).

35. How do flood map changes affect NFIP flood insurance?

Although FEMA, in cooperation with states, has a long-term objective of revising all flood maps, many maps have not been changed since they were originally prepared decades ago. That is usually the situation in rural communities with little pressure to develop in floodplains. When maps are revised, sometimes base flood elevations are higher, which means the mapped floodplain extends over larger areas than shown on older maps. Sometimes base flood elevations are reduced, which in turn reduces the size of mapped flood zones.

Flood map changes can affect NFIP flood insurance, both the mortgage lender's mandatory purchase requirement and how policies are rated. The table below is from the FEMA brochure [Map Changes and Flood Insurance: What Property Owners Need to Know](#).

CHANGE IN RISK		RATE IMPACT
FROM:	Moderate-to-low-risk area (Zone B, C, or X) or Unknown (Zone D)	<p>Flood insurance is mandatory in SFHA. Flood Insurance is required if you have a mortgage from a federally regulated or insured lender</p> <p>Rating options can offer savings. Buildings newly mapped into an SFHA may be eligible for a lower premium during the first 12 months after a map change. Rates will then go up no more than 18 percent each year. Buying a policy before the new flood map goes into effect will save more money. Your insurance agent can give you more information on how to save. If the building is sold, the policy can be transferred to new owners, allowing them to keep the lower rate.</p>
TO:	High-risk area (Zone A)	
FROM:	High-risk area (Zone A)	<p>Flood insurance is mandatory in SFHA. Flood Insurance is required if you have a mortgage from a federally regulated or insured lender</p> <p>Grandfathering can offer savings. The NFIP grandfathering option lets policyholders who have built-in compliance with the flood map in effect at the time of construction to use their previous zone to calculate the insurance rate. This could lead to large savings. A policy with a grandfathered rating can be transferred to new owners if the building is sold. In most cases, your insurance agent will ask you to provide an Elevation Certificate for use in accurately rating the policy.</p>
TO:	Higher-risk area (Zone V)	
OR:	Increase in BFE	
FROM:	High-risk area (Zone A or V)	<p>Flood insurance is optional, but recommended. The risk is lower, but there is still risk. More than 20 percent of NFIP claims come from buildings outside of SFHAs. You can save money by updating your policy. An existing policy can be changed to a lower-cost Preferred Risk Policy, and as long as all PRP eligibility requirements are met you will get a refund for the price difference. Although flood insurance is no longer federally required, your mortgage lender can still require it.</p>
TO:	Moderate- to low-risk area (Zone X)	
NO CHANGE		<p>No change in insurance rates. This is still a good time to talk with your insurance agent to learn your specific risk and make sure you have enough flood insurance coverage, as well as discuss any mitigating steps you can take to reduce your risk.</p>

Section G. What Makes an Effective Local Floodplain Management Program?



Effective floodplain management

“Effective floodplain management demands local jurisdictions be creative in their approaches, efficient in their performance and comprehensive in their efforts.”

From ASFPM's [*Floodplain Management 2016: Local Programs*](#)

There is no one “perfect” model for effective local floodplain management programs. Every local program has unique characteristics that shape the community’s approach to managing flood risks and floodplain resources. The geologic and geographic variability of floodplains and the variability of risks can be significant. In addition, the constitutionally established relationships between states and communities also differ considerably from state to state. Program components that work well in one state or community may not be effective in others.

Above all, a program is effective if it meets its articulated goals. For communities in the NFIP, this typically starts with the NFIP goals (listed in Section

D). Localities then build on those goals by adding their own community-specific findings and purposes. Communities that participate in the NFIP and remain in good standing in the program share the following goals:

- Protect public health, safety and welfare and reduce the adverse effects of flooding on people and property
- Enable property owners to purchase NFIP flood insurance policies, required by federally insured and regulated mortgage lenders
- Satisfy requirements of many federal grants and loans that support development in mapped floodplains
- Qualify for post-disaster federal financial assistance to repair damaged community-owned buildings in mapped floodplains



Improving effective floodplain management

Importantly, local floodplain management programs that incorporate higher standards more effectively achieve flood damage reduction than those that rely only on the NFIP minimum requirements.

- Qualify for federal hazard mitigation grant funds to undertake projects that reduce vulnerability to future flood damage

Whose program is it?



Sometimes people call local floodplain management programs “the FEMA program,” but communities regulate floodplains, not the federal government. Your community’s floodplain management program is **your** program. Careful administration of your program not only helps protect people and property; it also ensures that your community fulfills its commitments to the NFIP. Those commitments may have been made years ago when the governing body passed resolutions of intent to join the NFIP. Also consider that, if you know your community has areas subject to flooding that aren’t shown on FEMA’s map, shouldn’t those areas be regulated to achieve the same goals stated for regulating mapped floodplains?

36. What are the defining characteristics of the minimum floodplain management regulations adopted by communities?

Local floodplain management regulations govern development in mapped floodplains. Importantly, the regulations consider both the impact of flooding on development (e.g., to minimize damage to buildings) and the impact of development on flooding (e.g., to avoid increasing flood levels or diverting floodwater onto adjacent properties).

Your local floodplain management regulations have as their base the [NFIP regulations](#), which establish minimum requirements for development in mapped floodplains. These requirements are based on the type of flooding (riverine or coastal) and level of detail shown on FEMA maps. The requirements for new buildings, existing buildings, development other than buildings, and development that changes the land are briefly described below.



For floodplain management purposes, what is the definition of development?

Local regulations use the NFIP definition for development: “any man made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.”

New Buildings. Defining characteristics of compliant new buildings:

- Lowest floor elevated to or above the flood level in Zone A/AE, and bottom of lowest horizontal structural member of the lowest floor to or above the flood level in Zone V/VE
- Foundations that resist flood forces
- Enclosures below elevated buildings are not occupied and used only for parking, storage and building access and have flood openings (Zone A/AE) or breakaway walls (Zone V, coastal floodplains with breaking waves)
- Flood damage-resistant materials below the flood level
- Equipment and machinery elevated to or above the flood level
- In Zone A/AE, nonresidential buildings may be designed to be watertight (dry floodproofed) if properly designed for specific locations
- In coastal high hazard areas, called Zone V/VE, foundation design and elevation requirements are more stringent because of the added forces of wave action



Are minimums good enough for your community?

The NFIP minimum requirements are just that – the minimum necessary to participate in the NFIP. Many communities – especially those anticipating changing conditions in the future – decide the minimums aren't sufficient to protect public safety and property. Some of the most common higher standards adopted by flood prone communities are described in Section H.

Building codes include floodplain management requirements.



FEMA reports that, as of September 2019, 47% of flood-prone jurisdictions in the United States are flood-resistant based on their adoption of building codes. Some building codes include provisions that exceed the NFIP minimums (e.g., require higher elevation), and some provisions are more specific than the NFIP requirements. Communities must enforce the more restrictive requirements, whether in building codes or local regulations.

Existing Buildings. Requirements are triggered by improvements or repairs:

- Nonconforming (existing) buildings are allowed to remain until proposed improvements or repairs trigger the requirement to bring the buildings into compliance with all of the requirements for new buildings.
- Floodplain managers must determine whether proposed improvements are substantial improvements and whether damaged buildings have incurred substantial damage.
- Sometimes called the “50 percent rule,” the triggers are:
 - **Substantial improvement**, which is when the cost of improvements (alterations, renovations, additions) equals or exceeds 50 percent of the market value of the building before the improvements are made.
 - **Substantial damage**, which is when the cost to repair a building damaged by any cause (flood, wind, fire, earthquake, neglect, etc.) to its before-damaged condition equals or exceeds 50 percent of the market value of the building before the damage occurred.
- Historic structures may be repaired or improved without strict adherence to new building requirements if the work will allow the structures to retain the historic designation.



Considering amending your community's regulations?

Be sure to contact your NFIP state coordinator for advice. It is very important to have the NFIP state coordinator or the FEMA regional office review proposed changes to regulations well in advance of adoption.



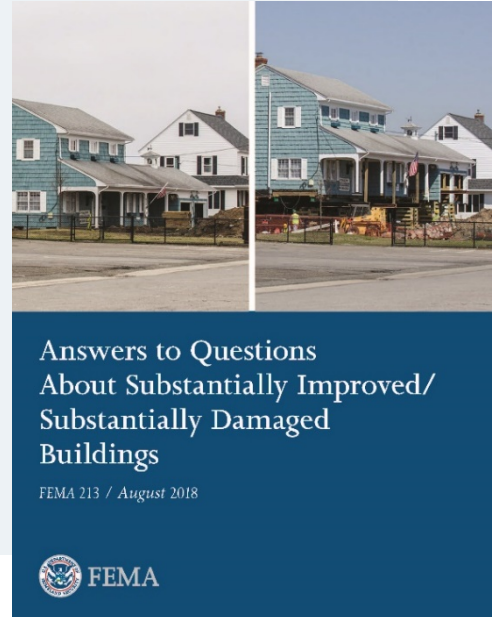
Improvements that cost more than 50 percent of market value are allowed.

It is imprecise to describe the substantial improvement requirement by saying improvements that cost more than 50 percent of market value of an existing building “are not allowed.” Costlier improvements are allowed, as long as the “50 percent rule” is enforced and existing buildings are brought into compliance with the requirements for new buildings.



Answers to Questions about Substantially Improved/Substantially Damaged Buildings (FEMA 213).

Citizens, builders, engineers, architects and others, including community officials, need answers to questions about pertinent definitions and the regulations that apply to existing buildings. [FEMA 213 provides brief answers](#), and refers readers to specific sections for more complete guidance in [FEMA P-758, *Substantial Improvement/Substantial Damage Desk Reference*](#).



Structures Other than Buildings. General requirements apply to development other than buildings because the definition of development captures “any man-made change to improved or unimproved real estate.” Development includes activities that change the land through grading, filling, or excavation and structures such as communication towers, gazebos and music venue stages, outdoor sculptures, road bridges and culverts, pedestrian bridges, outdoor viewing bleachers, membrane structures over pools and tennis courts, playground equipment and picnic tables, domes for road salt, solar panels for solar farms and any other structure. Development other than buildings should:

- Be located and constructed to minimize flood damage
- Meet encroachment limitations if located in a regulated floodway
- Be anchored to prevent flotation, collapse or lateral movement resulting from hydrostatic loads, including the effects of buoyancy, during conditions of flooding



Development other than buildings is also regulated.

With so much focus on regulating buildings in mapped floodplains, too often floodplain managers and others don’t pay enough attention to development other than buildings. Structures such as towers, pavilions, viewing stands, and ground-mounted solar installations can be damaged by flooding.

- Be constructed of flood damage-resistant materials
- Have mechanical, plumbing, and electrical systems elevated or designed to prevent water from entering or accumulating within the components during flooding
- Take into consideration potential impacts of hazardous materials

Development that Changes the Land. General requirements apply to development activities that change the land in mapped floodplains because the broad definition of development captures “any man-made change to improved or unimproved real estate.” Activities that change the land involve mining, dredging, filling, grading, paving, excavation, drilling operations, storage of equipment and materials, and roads that involve fill. Working the land for agricultural purposes is not considered development that changes the land, but fences and other structures are regulated.

The primary consideration when evaluating proposals to change the land in mapped floodplains is whether the activity will encroach into mapped floodways or into mapped floodplains along riverine watercourses that do not have mapped floodways. Engineering analyses may be required to examine the effect of floodway encroachments to determine whether flood depths would be increased if the development is allowed.

Infrastructure and Utilities. General requirements apply to development activities in mapped floodplains that involve installing or replacing infrastructure and utilities, including roads, bridges, culverts, drainage ways, water supply facilities (treatment plants, pumping stations, and distribution pipes), wastewater facilities (treatment plants, pumping stations, and collection pipes), natural gas distribution, and telephone, cable and fiber optic wiring systems.

The NFIP requires all development to be constructed by methods and practices that minimize flood damage. For floodplain management purposes:

- Roads, bridges and culverts should be evaluated to determine whether they will encroach into mapped floodways or into mapped floodplains along riverine watercourses that do not have mapped floodways. Engineering analyses are required to examine the effect of encroachments to determine whether flood depths are increased.

- New and replacement water supply systems must be designed to minimize or eliminate infiltration of floodwater into the systems.
- New and replacement sanitary sewage systems must be designed to minimize or eliminate infiltration of floodwater into the systems and discharges from the systems into floodwater.
- All underground components of utility systems should be located to minimize damage by flooding, including scour and erosion.



Whose responsibility is it?

“Elected officials often see floodplain management and the National Flood Insurance Program as a federal program, not related to their daily needs or local issues.”

From ASFPM’s [Building Public Support for Floodplain Management Guidebook](#)

37. What do local floodplain managers say about obstacles and what they need to do their jobs?

In 2016, ASFPM surveyed local floodplain managers and produced a summary report of the findings. Among the 47 survey questions were questions that gave respondents the opportunity to identify common obstacles, types of assistance needed, and the “one tool” needed to improve local efforts. Common themes of interest to local elected officials emerged:

- Lack of awareness of local requirements (by residents and contractors)
- Elected officials who are unfamiliar with floodplain management requirements
- Not enough time to focus on flood mitigation (too many hats, part time)
- Not enough staff and funding for program administration
- Lack of training and the need for training delivered locally or online
- Lack of cooperation from other departments
- Need help educating elected officials and community management about the importance of floodplain management

- Need the support of community leadership and legal department
- Need better citizen awareness and help with public outreach and education
- Need more support from elected officials
- Need better access to informed and responsive state program staff
- Need updated floodplain management ordinance

Every community has constraints in terms of budget and priorities. Elected officials can work with staff to evaluate the adequacy of tools and training to effectively manage their local programs to achieve the community's overall goals and fulfill commitments to the NFIP.

Researching answers to the following questions in conjunction with the information provided in this *Guide* will help you understand your community's approach toward managing flood hazards and identify ways to strengthen your program:

- Are your colleagues familiar with why we regulate mapped floodplains and that what we do impacts future damage and risk to citizens?
- Do incoming elected officials get briefed on floodplain management and flood hazards in our community?
- What can we do to help citizens, developers and contractors understand our flood hazards and the value of complying with the floodplain management regulations?
- Do we have the right staff position designated as our floodplain manager and is more staff support needed?
- Does our floodplain manager have the right training to do the job and appropriate funding for periodic training and networking?
- Are our different departments and staff with roles in floodplain management working together?
- Should we update our regulations? What requirements that exceed the NFIP (or state) minimum requirements should we consider?
- Does our NFIP state coordinator have the staff and funding needed to support communities throughout the state?

38. How do we establish and manage an effective floodplain management program?

When your community joined the NFIP, commitments were made to adopt flood hazard information (studies and maps), adopt floodplain management regulations, and administer and enforce those regulations. Your community also agreed to help FEMA delineate mapped floodplains, to notify FEMA when community boundaries change, and to maintain certain records available for public inspection.

To effectively manage flood risk, communities must have clear and enforceable regulations, their citizens should be aware of flood risks, and they should consider a variety of damage reduction program elements that go beyond just issuing permits for development. Program effectiveness depends on qualified management and support personnel. Importantly, successful and effective floodplain management programs are understood and supported by elected officials. Some of the ways that you can support a strong floodplain management program in your community are described below.



Most flood-prone communities participate in the NFIP.

Alexandria, VA, and Fairbanks North Star Borough, AK, were the first communities to join the NFIP in the early 1970s. By 1973, nearly 1,000 had joined. As of late 2018, more than 22,300 communities participate, while about 2,000 communities identified as flood-prone elect not to join and nearly 200 are suspended.

Designate the Right Floodplain Manager. The office or official responsible for administering adopted floodplain management regulations is usually called the “floodplain manager” or “floodplain administrator.” The position is identified in regulations, and usually is authorized to delegate performance of certain duties to other offices and employees. The floodplain manager is the primary point of contact between the state and the community and between FEMA and the community.

No one position is the “right” floodplain manager for every community. Your community’s selection may depend on several factors, such as the degree of flood risk, the nature of existing and anticipated development, and whether guiding development

to less hazard-prone areas is an objective. Given the breadth of responsibilities and how managing flood risks should be woven into multiple local government functions, your community's floodplain manager should be in a position to work across departments.

Important Knowledge, Skills and Abilities for Floodplain Managers



- Ability to establish and maintain effective working relationships with staff in other departments, elected officials, the regulated community and the general public
- Able to prepare clear and concise reports and make public presentations to explain complex concepts
- Understand that failure to fully enforce regulations puts people and property at risk, and may increase financial burdens on property owners if buildings are not fully compliant

Also see the ASFPM [Model Job Description for a Community Floodplain Manager](#).

Common floodplain manager designations include:

- The building official is a common choice, reflecting the focus on regulating buildings in mapped floodplains.
- The head of the planning and zoning department, or a lead planner is a common choice, especially in communities that use a variety of tools to guide development to less hazard-prone locations, such as overlay zoning, setbacks and density limitations.
- The head of the public works department or the city engineer was selected by many communities in the early years of the NFIP, in part because of the focus on developing flood hazard studies and maps.
- Smaller NFIP communities that do not have multiple departments may rely on the chief administrative officer or a town clerk to fulfill many responsibilities, including administering floodplain management requirements.



Designation of the floodplain manager

ASFPM's 2016 survey of local floodplain management programs found that designated floodplain managers in many small and rural communities are elected officials (2.3 percent of respondents), clerks (8.2 percent) and treasurers, finance officers and auditors (1.8 percent).

Some small communities establish interagency agreements with counties or larger municipalities to fulfill some or all permitting functions. Interagency agreements should be in writing. However, some floodplain management responsibilities cannot be delegated because each NFIP community has a formal relationship with the NFIP and is ultimately responsible.

Acknowledge Floodplain Manager Responsibilities. Elected officials should acknowledge the breadth of responsibilities fulfilled by floodplain managers and, in many communities, the amount of time and resources necessary to implement effective programs. Local floodplain management regulations authorize floodplain managers to administer and enforce the regulations, and they are authorized to render interpretations consistent with the intent and purpose of the regulations. Even if not stated explicitly, managers are authorized to coordinate with other community offices to fulfill the commitments to the NFIP and to enforce the regulations.

You strengthen your community's commitment to public health, safety and welfare and property protection when you take the time to understand these responsibilities and the importance of supporting your floodplain manager. The more you know, the better you can avoid inadvertently undermining your community's responsibilities. Poor enforcement can lead to sanctions imposed by the NFIP (see Question 39 to learn what can happen if community fails to meet NFIP commitments).

Responsibilities of floodplain managers, summarized in the table below, generally relate to administrative functions, coordination with other offices and agencies, and review of development in flood hazard areas.

Responsibilities of Floodplain Managers

Administration and Coordination

- | | |
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| <ul style="list-style-type: none"> • Establish procedures with other departments and offices to foster cooperation when floodplain management responsibilities cross organizational lines. • Coordinate community involvement when property owners or developers submit documentation to FEMA to change flood hazard information and boundaries, or when FEMA initiates a remapping effort. • Consult FEMA publications and seek advice or assistance from the NFIP state coordinator when evaluating unusual or complicated situations. • Maintain documentation in permanent records, including required design certifications, documentation of building elevations, enforcement actions, and records related to variance requests. • Maintain a basic understanding of NFIP flood insurance and how noncompliance can result in higher cost premiums. | <ul style="list-style-type: none"> • Prepare for and participate in Community Assistance Visits (CAVs), Community Assistance Contacts (CACs), and post-flood evaluations conducted by the NFIP state coordinator and FEMA. • Provide staff reports to decision makers when variances from the strict application of the regulations are sought to explain the requirements and the consequences of granting variances. • Work with local and State emergency management authorities to plan for evacuation and post-flood response actions, including inspection of damaged buildings. • Lead or work with other community departments to identify and pursue opportunities to mitigate existing flood risks. • In Community Rating System (CRS) communities, administer program elements and participate in audits to maintain discounts on NFIP flood insurance premiums. |
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Development Review

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| <ul style="list-style-type: none"> • Communicate with the public, design professionals, developers and builders to explain floodplain management objectives and requirements for development. • Review applications and plans to determine whether proposed new development and subdivisions will be in areas prone to flooding. • Review applications to determine whether proposed development will be reasonably safe from flooding. • Interpret flood hazard area boundaries where necessary to determine the exact location of proposed development. • Provide available flood elevation and flood hazard information. • Determine whether additional flood hazard data must be obtained from other sources or developed by applicants. | <ul style="list-style-type: none"> • Assure that necessary federal and state permits are obtained by applicants. • Review applications for modification of any existing development in mapped floodplains for compliance with the requirements, including work on existing buildings. • Issue floodplain development permits or approvals for development when compliance is demonstrated, or disapprove the applications in the event of noncompliance. • Inspect permitted development. • Take enforcement action when compliance with the requirements and conditions in issued permits is not achieved or when development is undertaken without authorization. |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Support your Floodplain Manager. Now that you know what is expected of your community's floodplain manager – and have a basic understanding of the requirements (see Question 36) – consider how best to answer constituents who object to regulations or suggest a rule shouldn't apply to them. You may find it useful to ask your floodplain manager to provide a brief memo to explain the applicable rules. See Question 40 for advice on what to do when someone challenges a finding that their property is in the regulated floodplain or asks you about waiving requirements or obtaining a variance.



One of the most important ways elected officials can support their floodplain managers is to approve funds for training and professional development. A growing number of communities expect their floodplain managers to become Certified Floodplain Managers. The national CFM® program is developed and administered by ASFPM. Some ASFPM state and regional chapters administer their own CFM programs.

After a flood, your floodplain manager and building department will probably need extra support to do the necessary work. They'll need to tour flooded areas, perform safety inspections, collect data to make substantial damage determinations, brief citizens about permit requirements, help property owners figure out mitigation options, issue permits, and inspect construction. Remember, long-term recovery for larger disasters can take a toll on staff, especially if they were personally impacted.

Maintain Awareness of Ongoing Responsibilities to the NFIP. You should know that the FEMA Regions and NFIP state coordinators regularly visit or contact communities to conduct Community Assistance Visits (CAVs) and Community Assistance Contacts (CACs). CAVs serve the dual purpose of providing technical assistance to community officials and assuring that communities adequately enforce adopted floodplain management regulations. CACs serve the same purposes, but typically are limited to telephone contact.

Generally, a CAV is initiated by contacting the floodplain manager to schedule a meeting. Confirmation letters are sent to the chief executive officer requesting the presence of appropriate personnel. The visit consists of a tour of the floodplain,

inspection of permit files, and meetings with floodplain managers and other community staff. Elected officials may attend. After the visit, a report summarizing the findings is prepared and delivered to the community. If administrative problems or potential violations are identified during the visit, the community will be notified and given the opportunity to correct problems and remedy violations to the maximum extent possible within established deadlines. FEMA or the NFIP state coordinator will work with the community to achieve compliance. In cases where a community does not achieve satisfactory resolution, FEMA may initiate enforcement actions, which may result in probation or suspension from the NFIP (see Question 39).

39. What can happen if my community fails to meet its commitments to the NFIP?

Floods are America's most frequent and most costly natural disasters, affecting every state and nearly every local jurisdiction. The NFIP takes seriously community commitments and responsibilities to enforce floodplain management regulations to manage flood hazards. The NFIP has two levels of enforcement sanctions when communities fail to meet their commitments:

- **Probation** may be imposed when communities fail to adequately enforce local floodplain management regulations, improperly grant variances, fail to remedy identified problems with regulations and program administration, or fail to remedy identified violations to the extent feasible. NFIP policyholders are notified of the causes for probation and must pay a \$50 per year surcharge. Failure to enforce regulations may also create liability, especially if that failure results in harm to people and property (see Question 23).
- **Suspension** may be imposed for failure to adopt effective Flood Insurance Studies and Flood Insurance Rate Maps, failure to adopt compliant regulations, and continued failure to resolve issues that led to probation. Suspension means communities are no longer participating in the NFIP, which means new flood insurance policies cannot be purchased and existing policies cannot be renewed. Other consequences are described in Question 23.

40. What options do I have when a property owner asks for relief from the floodplain management requirements?

Your community's floodplain management regulations include criteria for considering variances. A variance is, in effect, official permission to undertake development in ways that are contrary to or prohibited by regulations. Having the ability to provide relief under very narrow circumstances allows communities to:

- Preserve the purpose and intent of the regulations
- Minimize legal challenges to the regulations and avoid unconstitutional taking of private property without just compensation
- Protect the safety, health, and welfare of the public and emergency responders

When someone requests a variance, ask your floodplain manager to go over the criteria and conditions for variances that are in your local regulations. The variance criteria and conditions in your floodplain management regulations flow from the NFIP regulations at Title 44 CFR Section 60.6. You can go to FEMA P-993, [Floodplain Management Bulletin: Variances and the National Flood Insurance Program](#), for a description of the NFIP regulations and some common situations where variances may be requested. In some cases, NFIP state coordinators may be able to provide written comments for consideration by your community's variance review board.

There are several important things to keep in mind when considering a variance:

- Variances to requirements intended to protect property and public safety should be rare.
- Variances to floodplain management requirements must be granted only after careful consideration of the pertinent factors, including whether compliance creates an exceptional hardship unique to the property (and not the property owner) and whether there is good and sufficient cause to grant the request.
- Financial hardship is not a sufficient cause to issue a variance.

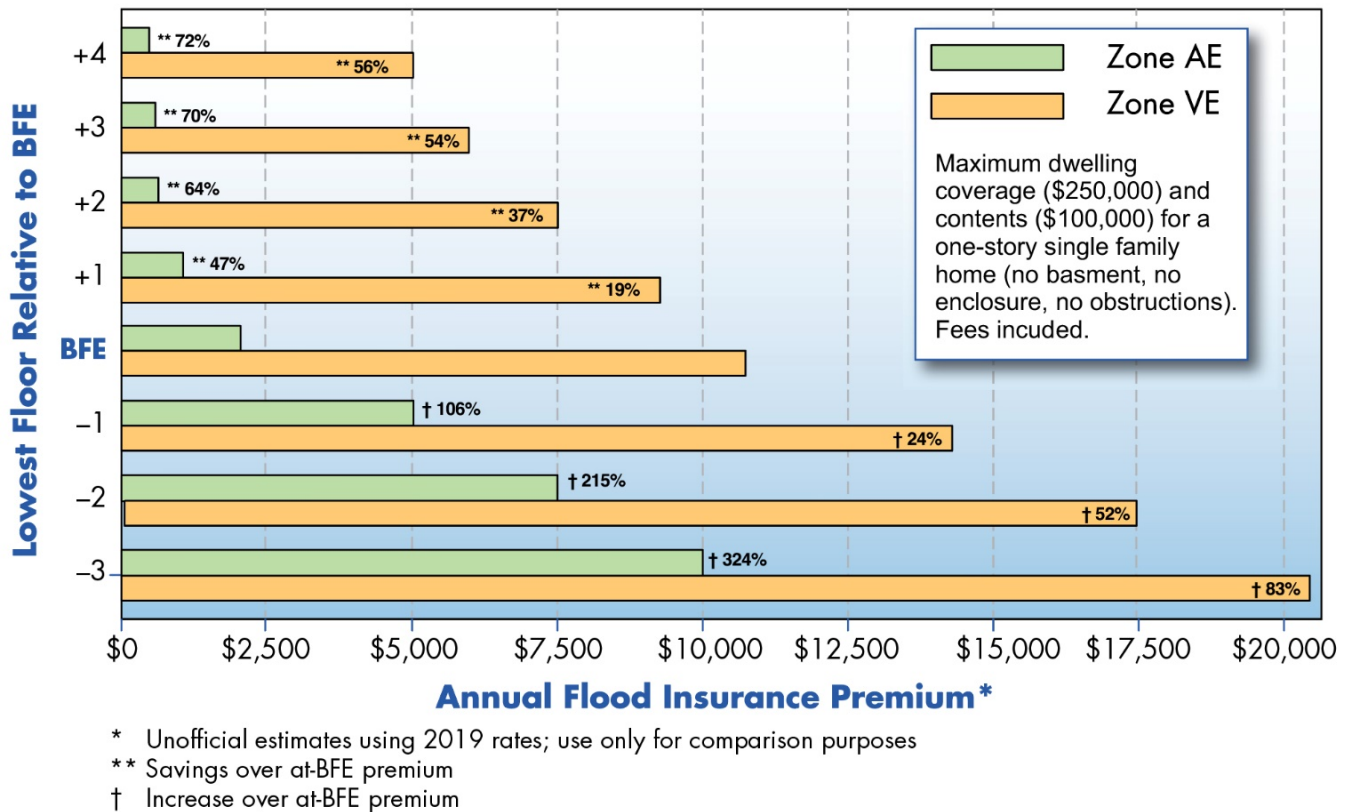


Variances should be rare.

In a 2016 survey of 810 local floodplain managers conducted by ASFPM, fewer than 7 percent indicated having received requests for variances in the year before the survey.

- Granting variances may put people and property at risk, including owners of adjacent properties.

One of the more common requests is to waive or reduce the requirement to elevate buildings. Not only would this put the building, the owner, and future owners, at risk of future flood damage, it results in much higher NFIP flood insurance premiums, even in the rare circumstance that a variance can be justified. The premium for a building that is 3 feet below the required elevation may be as much as \$20,000 (see graphic). While the property owner requesting a variance may not want or be required to buy flood insurance, such high premiums may discourage future buyers.



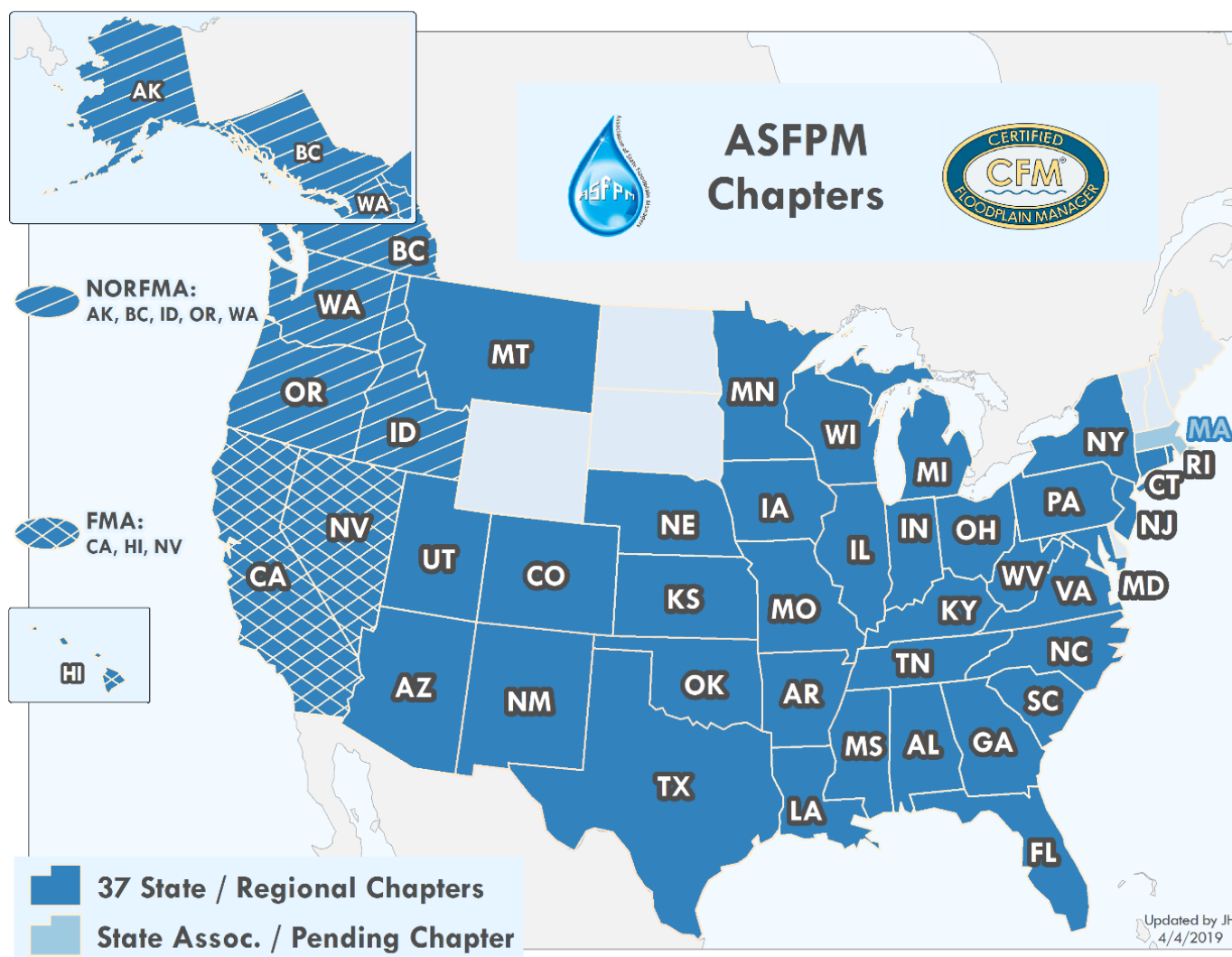
Flood insurance premiums depend upon the elevation of a building. Data based on FEMA's publication [Reducing Flood Losses Through the International Codes: Coordinating Building Codes and Floodplain Management](#).

Communities that grant variances may be subject to a higher level of scrutiny by FEMA and states during Community Assistance Visits. If a pattern and practice of improperly granting variances is found, and if appropriate resolution of identified problems is not undertaken, FEMA may choose to impose sanctions. Question 39 describes the sanctions and how citizens would be impacted.

41. When we have questions about managing our floodplains and flood risk, where do we find help?

Your first stop is your community's floodplain manager. Many questions about interpreting and administering floodplain management regulations are answered in FEMA guidance documents. The Resources section of this *Guide* includes a list of the most commonly accessed FEMA publications.

Conferences, workshops and webinars are hosted by [ASFPM and its 37 state and regional chapters](#) (shown below). Your [NFIP state coordinator](#) can help with unusual



questions, as can FEMA regional office staff. State hazard mitigation officers can provide guidance about hazard mitigation planning and mitigation projects, including potential sources of funding.

How do NFIP State Coordinators Support Communities? Each governor designates an agency to be the NFIP state coordinating agency, usually called the NFIP state coordinator. While the role of this agency varies among states, common activities that support community programs include the following:

- Provide general technical assistance to community officials in the administration and enforcement of local floodplain management regulations
- Review local regulations, including amendments, to ensure the requirements meet or exceed the minimum requirements of the NFIP
- Support FEMA's flood hazard map revision processes
- Conduct Community Assistance Contacts and Community Assistance Visits according to criteria established by FEMA to provide assistance to communities, identify community needs, and evaluate community programs
- Deliver or participate in training for local officials, design professionals and developers
- Suggest federal agencies other than FEMA that may provide assistance (U.S. Army Corps of Engineers, Natural Resources Conservation Service and U.S. Geological Survey).

In addition:

- A number of states have floodplain management statutes and regulations and operate floodplain management permit programs.
- Many states have requirements that are more stringent than the NFIP minimum regulations for development.
- Some NFIP state coordinators provide comments when communities receive requests for variances from their floodplain management requirements.

How do FEMA Regional Offices Help States and Communities Manage Floodplains?

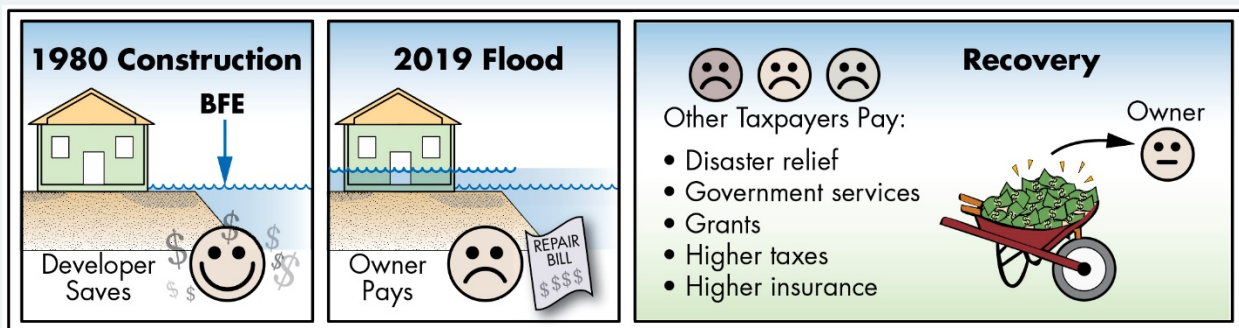
The FEMA regional offices have a responsibility to ensure communities in their regions adopt and enforce compliant floodplain management regulations that meet or exceed the minimum NFIP requirements. Regional office staff also:

- Provide technical assistance to NFIP state coordinating agencies and communities
- Conduct Community Assistance Contacts and Community Assistance Visits to provide assistance to communities, identify community needs and evaluate community programs
- Undertake enforcement actions when non-compliant communities are identified
- Participate in identifying mapping needs and the map revision processes

Section H. Strengthening Your Local Floodplain Management Program

In Section D, we learned that average annual flood losses have increased over the past century. In these times of increasing risks, it's important for communities to look at how they can go beyond the minimum NFIP requirements to better protect people and property. The federal regulations were developed more than thirty years ago to address nationwide goals. We know now that may not be good enough to address flooding experienced by all communities. There are several ways to strengthen your local floodplain management program, including adopting stronger regulations that account for local conditions and implementing actions that matter to your community.

The costs of settling for the minimums.



Simply put, assuming the minimum NFIP standards provide adequate flood protection ignores today's reality. Embedded in that assumption is the notion that it's acceptable for property owners to bear the future consequences and impacts of the community's land use decisions to allow floodplain development. As flood risk changes, property owners may be burdened by increased flood damage. Recovery costs are consequently transferred from those who made (and benefitted from) those land use decisions to others, including victims, nonprofits, and multiple local, state and federal taxpayers.

Some of the ways the minimum requirements fall short of reducing future flood damage – and may instead be intensifying it – include:

- Allowing floodplain development using flood hazard information that may be years old and not adequately account for future development that could increase flood frequency and depths

- Allowing buildings constructed with their lowest floors “at” the minimum elevation (the 100-year or base flood elevation), without acknowledging that the methods used to model and estimate flooding have a number of simplifying assumptions, or that future flooding conditions will worsen
- Allowing development activity to divert floodwater onto other properties, sometimes increasing velocities and flood depths
- Allowing alteration of streams and rivers and allowing development that displaces water, which can increase flood depths

This section describes why robust local floodplain management programs can reduce damage and promote savings on NFIP flood insurance premiums. The section also offers brief descriptions of some ways communities can accomplish those objectives:

- ASFPM’s No Adverse Impact approach to floodplain management (Question 42)
- NFIP’s Community Rating System, which rewards communities that exceed the NFIP minimums with discounts on NFIP insurance premiums (Question 43)
- Some of the more common ways communities strengthen their administration and flood damage reduction programs (Question 44)
- Some regulatory options communities can adopt to strengthen their regulations to better guide development to achieve long-term goals (Question 45)

42. What is No Adverse Impact?



ASFPM developed No Adverse Impact (NAI) to provide communities with options and ideas to avoid making flooding worse and creating other negative impacts to public health, safety and welfare. The program emphasizes communicating and promoting responsible floodplain development through community-based decision making. NAI floodplain management empowers

elected officials and citizens to become better-informed stakeholders and promoters of "wise development."

Rather than view floodplain management as something imposed by the federal government, NAI promotes local accountability for developing and implementing comprehensive strategies and plans. Obviously, you do not want to see your constituents flooded or harmed because of the actions of someone else (including action or inaction by your community). But you may not realize that, as a local official, you have the power to do something about it.



You can be a strong supporter of local floodplain management.

Elected officials can be strong supporters of better programs once they realize:

- Their communities will pay the price of bad decisions over the long run
- Federal and state minimum requirements are not sufficient to adequately protect their citizens
- They may be liable for knowingly allowing flood problems to increase

How Does NAI Work and How Do We Learn More About It? The NAI approach helps communities identify the potential impacts of development and take action to mitigate those impacts. Use the NAI philosophy to shape your community's development management criteria:

- **Develop and adopt a comprehensive plan** (or plan element) to manage development. *Example:* In the mid-1980s, Davenport, IA, along the Mississippi River, developed a Riverfront Conceptual Development Plan that concluded almost all buildings should be held back from the immediate river's edge to allow for a river trail. The plan's recommendations were adopted into the community's comprehensive plan and gradually incorporated into later plans and ordinances. After several subsequent floods, and almost 40 years of guiding development away from floodplains, much of the City's floodplain is now open space. The current comprehensive plan touts the wonderful amenities of the Mississippi River, without mentioning flood hazards.
- **Identify acceptable levels of impact.** Some levels of flooding are acceptable, especially when areas prone to flooding are kept as open space. Where development has already occurred, it may not be feasible to avoid impacts of flooding at reasonable costs. In determining which future impacts to avoid,

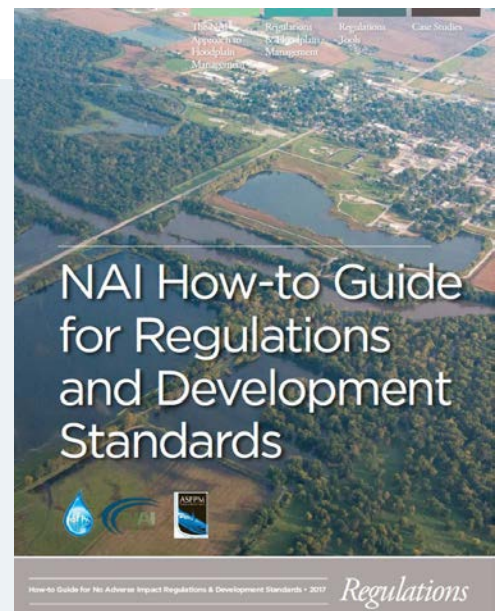
community leaders must weigh relative flood risks in different areas of their community, determine what infrastructure or resources can be flooded with little to no environment impact or taxpayer burden, and conclude what level of flood damage is acceptable.

- **Specify appropriate measures** to mitigate adverse impacts during flood events. *Example:* The City of Poquoson, VA, successfully lobbied the state’s General Assembly to allow regulation and enforcement of “No Wake” zones during flooding events. Fast moving cars and trucks traversing flooded streets were creating wakes and sending more water into flooded homes. The measure has reduced adverse impacts of flooding.
- **Establish a plan for implementation** to reduce or eliminate adverse impacts over time.



NAI Resources

[NAI publications](http://www.floods.org) are available online (www.floods.org), including a toolkit and how to guides for regulations and development standards, hazard identification and mapping, education and outreach, planning, infrastructure, and mitigation. The [*NAI How-to Guide for Regulations and Development Standards*](#) describes many more restrictive regulatory standards, illustrating successful implementation through case studies.



NAI implementation actions may take a variety of forms, including:

- Changes to requirements that govern floodplain/floodway, subdivision, grading/filling and stormwater
- Changes to zoning to guide development away from floodplains or to reduce the density of floodplain development
- Joining the NFIP Community Rating System (described in Question 43)

- Seeking statutory authority to strengthen buildings codes with local amendments (or to gain authority to adopt building codes locally)
- Establishing a mechanism to fund flood mitigation projects and identify and implement such projects (see Section B for an introduction to post-disaster floodplain management and mitigation)
- Outreach to the community to improve understanding of and the need for progressive floodplain management (see Section C for more on communicating with citizens about floodplain management)

43. What is the NFIP's Community Rating System?

The NFIP's Community Rating System (CRS) was first implemented in 1990 and authorized by Congress in 1994. It is a voluntary incentive program that recognizes and encourages local floodplain management activities that exceed the minimum NFIP requirements. When participating communities undertake these activities, including adopting and enforcing regulations that exceed the minimum standards of the NFIP, NFIP flood insurance premium rates in those communities are discounted from 5 to 45 percent. Qualifying activities are those that meet the three goals of the CRS: (1) reduce flood damage to insurable property; (2) strengthen and support the insurance aspects of the NFIP; and (3) encourage a comprehensive approach to floodplain management.

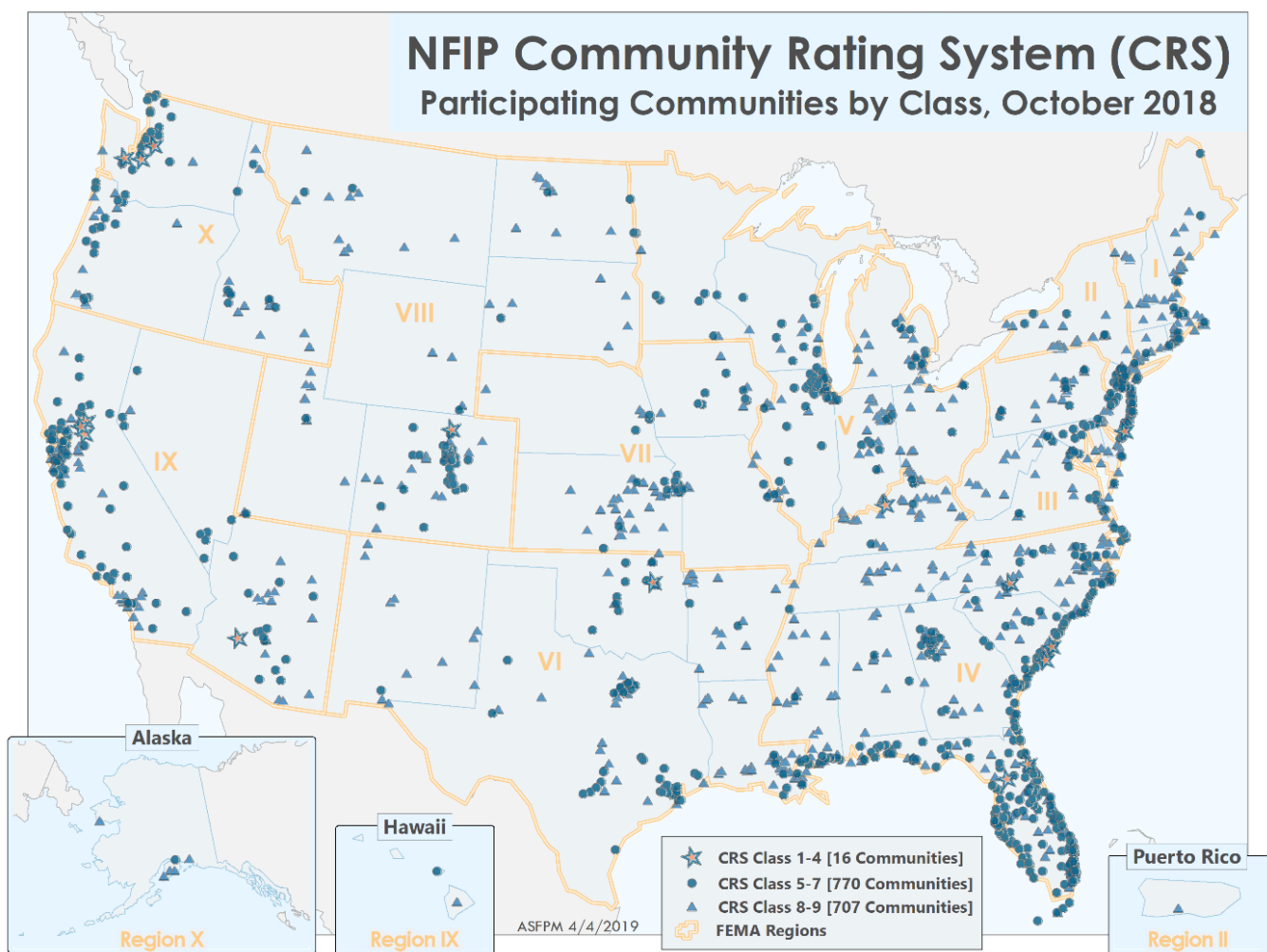
In addition to reduced flood insurance rates, CRS communities and their citizens gain other non-financial benefits, including:



CRS Overview

A short narrated introduction to the CRS suitable for viewers with little or no familiarity with the program is online: [Community Rating System \(CRS\) Overview, Prerecorded Presentation](#). The presentation introduces 19 creditable activities and summarizes the commitments communities must make, including maintaining records and submitting annual reports, the steps you'll need to take to start the application process and available assistance.

- Residents and business owners have increased opportunities to learn about flood risk, evaluate their individual vulnerabilities, take action to protect themselves, and reduce the risk of flooding to their homes and businesses.
- Activities that qualify for CRS credits enhance public safety, reduce damage to property and public infrastructure, and help minimize economic disruption and loss.
- The opportunity to evaluate the effectiveness of their flood programs against nationally recognized benchmarks.



As of October 2018, nearly 1,500 communities were in the CRS, representing more than 70% of NFIP flood insurance policies in force.

Success Story Connection



[Roseville, California](#) became the first city to earn a Class 1 CRS rating in 2006. It maintains this rating through outstanding public information, mapping and regulatory standards, flood damage reduction, and flood preparedness.

How Do We Learn More About the CRS? Whether you're considering participating in CRS or looking to improve your rating, get started by downloading the FEMA brochure, [*NFIP CRS: The Local Official's Guide to Saving Lives, Preventing Property Damage and Reducing the Cost of Flood Insurance*](#). Also, contact your NFIP State Coordinator and neighboring communities that are already in the CRS. Many CRS communities organize user groups to share experiences and provide help. Additional information and fact sheets about the CRS are at <http://www.fema.gov/National-Flood-Insurance-Program-Community-Rating-System>, and the Success with CRS webpage (<https://successwithcrs.us/>) profiles "real-life" examples of how CRS has helped communities across the U.S., explaining how some communities gained public support for a stronger program.



CRS for Community Resilience (a.k.a. the CRS Green Guide)

ASFPM produced [the CRS Green Guide and ancillary resources](#) to encourage more communities to undertake voluntary, effective measures to increase flood resilience, offering a road map for CRS activities that strengthen natural ecosystems and reduce vulnerability to increasing flood risks.

Community Incentives for Nature Based Flood Solutions: A Guide to FEMA's Community Rating System for Conservation Practitioners



This report from The Nature Conservancy explains and gives examples of how municipalities, states and other entities can plan and carry out projects that are integrated to not only reduce flood risk and yield NFIP premium discounts, but also result in critical environmental benefits such as larger green spaces, wildlife habitat, and living shorelines. The report includes a list of guides and decision support tools developed by federal agencies and non profit groups to help communities simultaneously embrace both the CRS and conservation and preservation initiatives. Learn more about The Nature Conservancy program that generated this and other guidebooks at coastalresilience.org.

44. What are some common ways to strengthen our approach to reducing flood risk?

Having good regulations on the books isn't enough. Communities must have effective programs with the right staff, sufficient budget to support administration, enforcement and staff training, and elected officials who support their floodplain managers (see Section G to learn more about effective floodplain management programs). The following additional ways to strengthen local floodplain management programs are briefly described below:

- Flood Warning Systems
- Floodway: More Restrictive Mapping Standard
- Local Flood Hazard Maps
- Mitigation Plans and Projects
- Technical and Financial Assistance for Mitigation by Property Owners
- Temporary Moratorium on Issuing Building Permits



CRS Credits for Strengthening Programs

CRS credits may be available to participating communities that undertake these and other program elements that further the CRS goals.

Flood Warning Systems. The primary objective of flood warning systems is public safety, so emergency management officials can alert the public of impending conditions and decide when to close flood-prone roads and initiate evacuation orders. When warning systems provide credible advanced notice, citizens can be advised to take actions to minimize damage to property. Examples of actions include moving damageable contents out of floodable space (especially basements), moving cars to higher ground, implementing plans to install elements of dry floodproofing protection (e.g., installing special flood barriers across doors and other openings), shutting off gas and electricity, and relocating livestock to higher ground. While these actions don't eliminate damage to buildings, they can make recovery easier. Flood warning systems can be tied to very detailed evacuation plans when water monitoring stations (stream gages), flood depths and evacuation route elevations are carefully analyzed.

Floodway: More Restrictive Floodway Mapping Standard. FEMA uses computer models to simulate filling in the floodplain. Floodway boundaries are drawn when the model indicates the effects of the simulated filling would be to increase the flood depth by not more than 1 foot. Some states and communities work with FEMA to use a more restrictive standard, such as allowing no more than half a foot increase or zero increase. As a result, floodways in those communities tend to be wider, effectively limiting development in a larger portion of the floodplain. A more restrictive floodway mapping standard should be based on an examination of flood conditions and existing infrastructure in your community's floodplain.

Local Flood Hazard Maps. At a minimum, NFIP participating communities must adopt FEMA Flood Insurance Studies and Flood Insurance Rate Maps. However, nothing prevents the use of supplementary local maps and application of the floodplain management regulations to areas shown on those maps as subject to flooding. Communities develop and adopt supplementary maps:

- To delineate areas known to flood that are not shown on FIRMs, including areas with ponding and inadequate local drainage
- To delineate historic floods of record that affected areas outside the limits of the FEMA-mapped floodplain
- To delineate areas subject to future flooding because of changing conditions, such as increased runoff from developing watersheds and more intense storms

Mitigation Plans and Projects. As with any long-term objective, having a well-thought-out plan of action is an important step towards meeting that objective. Most flood-prone communities have developed or participated in development of hazard mitigation plans, and many identify high-risk areas and evaluate options for mitigation projects in advance of the next damaging flood. Section B describes hazard mitigation plans, common mitigation projects and federal grant programs that may be available to support cost-effective projects.

Technical and Financial Assistance for Mitigation Projects by Property Owners. It's not surprising that many communities were established and grew up along rivers and shorelines. Many older communities have large numbers of buildings constructed long before the adoption of floodplain management regulations. Some communities seek federal and state funding to undertake projects to mitigate the effects of flooding

(described in Question 10). Others decide waiting for highly competitive outside funding would take too long, and develop their own programs instead. For example:

- Charlotte-Mecklenburg Storm Water Services, NC, developed [retroFIT](#), a program funded by storm water utility fees to provide financial and technical assistance to homeowners who undertake flood damage reduction measures (elevation, relocation, demolition, wet and dry floodproofing, equipment elevation and basement abandonment).
- South Holland, IL, funds and administers a [Flood Assistance Rebate Program](#) providing up to \$2,500 to homeowners who invest in flood loss reduction projects (overhead sewers, foundation repairs and waterproofing, drain tiles, downspout diversion, flood walls, backflow devices and lift stations and others).

Temporary Moratorium on Issuing Building Permits. The natural reaction to damaging events is to “get back to normal.” But doing that can mean allowing repairs and reconstruction without full consideration of options that contribute to long-term reduction in flood damage. Some communities impose a temporary, short-term moratorium on issuing permits to allow officials and property owners time to inspect structures in flooded areas and examine options (see Question 9 for examples of mitigation actions), including higher standards (described in Question 45). Especially when federal or state mitigation grant funds may be available, time is needed to evaluate the feasibility of obtaining funds. Funds may be used for a variety of projects that reduce future risk, including acquisition (buy-out), moving buildings to higher ground, elevation on higher foundations, retrofit dry floodproofing of nonresidential buildings, and some drainage projects. FEMA’s mitigation funding programs are described in Question 10. While even a short-term moratorium may be unpopular with those anxious to rebuild quickly, the longer-term benefits of careful planning should not be overlooked.

Taking Time to Strengthen Regulations After Floods



One benefit of a pause, or formal temporary moratorium on reconstruction, is the time it allows community officials to examine whether to modify their floodplain management regulations before reconstruction begins. Some communities do this even if they do not impose a moratorium. Property owners can exert pressure to repeal existing higher standards, which is another reason it’s important to have knowledgeable elected officials and staff who understand the long-term benefits of those higher standards.

45. What are some common ways to strengthen our regulations?

Your [NFIP state coordinator](#) is the best source of assistance for considering and adopting higher standards. FEMA Regional Offices may also offer advice. **Remember – always have your NFIP state coordinator review proposed changes to your floodplain management regulations before adoption.** In addition to their technical expertise, they may have sample language written to work with your existing regulations.

Strengthening Regulations Involves Benefits and Costs

Your community should consider the pros and cons of higher standards. Each standard has its own pros and cons, but they share the following:

- **Pros:** reduce flood risk over the long term; acknowledge community specific needs; contribute to overall resiliency and ability to recover after disasters; qualify for CRS credit points, which, in turn, lowers the cost of NFIP flood insurance – adopting ordinances should include whereas clauses that articulate the merits of higher standards
- **Cons:** have some increased up front costs; may be difficult for property owners to internalize long term benefits; may be subject to pressure to repeal after flood events

The following common ways to strengthen local floodplain management regulations are briefly described below:

- Coastal A Zone Like Coastal High Hazard Area
- Critical Facilities Protection
- Cumulative Substantial Improvement
- Dry Land Access
- Enclosure Limitations
- Fill: Limitations on Use
- Fill: Compensatory Storage
- Foundations and Design Certification
- Freeboard: Additional Height
- Freeboard: Regulating Land Outside 100-Year Floodplain, But Below Freeboard Elevation
- Hazardous Materials
- Location Restrictions Based on Depth and Velocity
- Low-Density Zoning
- Lower Substantial Improvement Percentage
- Manufactured Home Limitations
- Preservation of Natural Areas
- Repetitive Flood Loss (Substantial Damage)
- Setbacks
- Stormwater Management
- Subdivision Design

Building Codes and Higher Standards that Affect the Design of Buildings



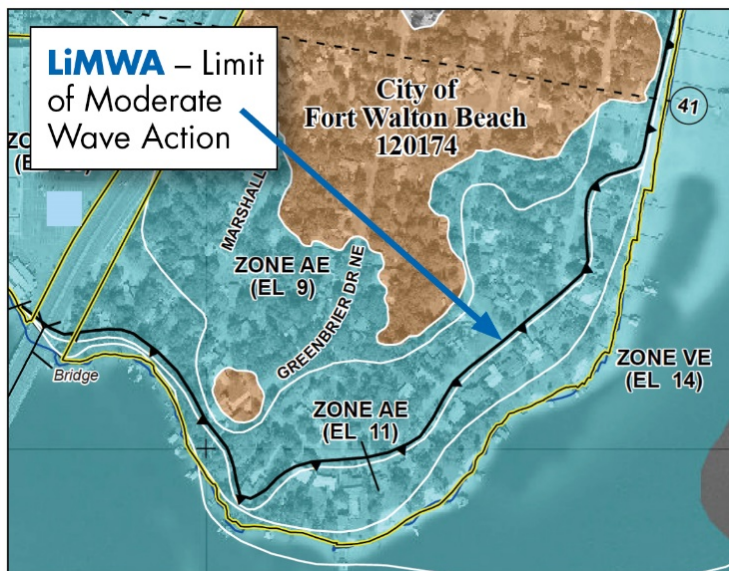
Many of the higher standards described in this Guide affect the design of buildings. Communities in states that adopt building codes and mandate local enforcement should check with the NFIP state coordinator to learn how best to incorporate higher standards. Guidance and sample language to modify the International Codes are included in [*Reducing Flood Losses Through the International Codes: Coordinating Building Codes and Floodplain Management Regulations*](#).

Coastal A Zone Like Coastal High Hazard Area. Coastal high-hazard areas are flood-prone areas where breaking waves are expected to exceed 3 feet high during the base flood. These areas are called Zone V. Pounding waves are very destructive, which is why the NFIP has specific requirements for buildings in these areas to have piling or column foundations. The Zone V construction requirements are summarized in Question 36.



Coastal A Zone

Learn more about Coastal A Zones, LiMWAs and higher construction standards applicable in these coastal hazard areas by downloading FEMA [*Limit of Moderate Wave Action Fact Sheets*](#) (English and Spanish).



Legend

Limit of Moderate Wave Action

Notes to Users

AE Zone has been divided by a Limit of Moderate Wave Action (LiMWA). The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. The effects of wave hazards between the VE Zone and the LiMWA (or between the shoreline and the LiMWA for areas where VE Zones are not identified) will be similar to, but less severe than, those in the VE Zone.

FEMA's post-flood field observations, engineering calculations and laboratory evaluations indicate breaking waves between 1.5 and 3 feet high cause more damage to common perimeter wall (crawl space) foundations than is caused by similar flood depths without waves.

Since 2009, FEMA’s coastal flood studies evaluate wave conditions and delineate the Limit of Moderate Wave Action (LiMWA). The LiMWA is drawn where wave heights are expected to drop below 1.5 feet during base flood conditions (see graphic). The area between the LiMWA and Zone V boundary (or shoreline, if there is no Zone V) is called the Coastal A Zone (CAZ). When FEMA delineates a LiMWA on its FIRM, many communities elect to modify their ordinance to further protect development in the CAZ by requiring Zone V foundation design elements that prevent damage from breaking waves.

Critical Facilities Protection. Require new critical facilities to be located outside the mapped floodplain when feasible and if not feasible, require a higher level of protection (e.g., elevate at least 2 feet above the minimum elevation (the 100-year or base flood elevation) or above the elevation of the 500-year flood). Critical facilities include facilities communities consider essential to deliver services and protect public safety, such as emergency response facilities (fire stations, police stations, rescue squads, emergency operations centers, and emergency shelters), custodial facilities (jails, detention centers and long-term care homes), health care facilities (hospitals), schools and utilities (water supply, wastewater treatment and power). Protection for critical facilities may also include dry floodproofing some areas and adding high-capacity emergency generators and other elements to allow vital functions to continue.



Critical Facilities

Learn more about protecting critical facilities by downloading the FEMA fact sheet [*Critical Facilities and Higher Standards*](#).

Cumulative Substantial Improvement. Modify the basic “50% rule” (see Question 36 Existing Buildings, for minimum requirements) to track the costs of building improvements and repairs over a specified time period and require compliance with current flood protection standards when the accumulated costs add up to 50% or more of the market value of buildings. The NFIP minimum requirement for substantial improvement is a “one time” evaluation – each time an improvement is proposed or repairs are needed, the calculation comparing costs to market value is made. This inevitably leads some building owners to

phase their large-scale improvements deliberately to avoid triggering the “50% rule.” What this means is that owners invest over time, increasing value, yet the buildings remain at risk of flooding. Accumulating those improvement costs over a time frame of 1 to 5 years discourages owners from seeking sequential permits for deliberately phased improvements, while longer periods are selected by communities committed to long-term resiliency by bringing more nonconforming buildings up to code.

Dry Land Access. Requiring roads that serve new subdivisions, critical facilities and manufactured home parks to have the driving surface no more than a specified depth relative to the minimum 100-year or base flood elevation (typically 1 foot below) facilitates evacuation and access by emergency personnel. Care must be taken to provide for drainage, otherwise raised roads can block floodwater.

Enclosure Limitations. Areas below elevated buildings may be enclosed if used only for parking of vehicles, storage and building access (see Question 36 New Buildings, for minimum requirements). To discourage illegal conversion of enclosures, communities may adopt a limitation on size (e.g., less than 300 square feet for parking or less than 100 square feet for a stairwell and storage). Some communities require permit applicants to sign nonconversion agreements and record the agreements in property records to notify future owners of the restrictions on use. Other communities prohibit enclosures entirely to minimize obstructing flow, reduce the impacts of debris in floodwater, and minimize damage to elevated buildings.

Fill: Limitations on Use. In many communities, placement of compacted fill is a common way to elevate buildings. Sometimes individual buildings are constructed on fill and sometimes multiple lots are filled in order to redelineate the floodplain boundary. Using fill can have adverse impacts, including obstructing the storage and flow of floodwater, requiring removal of trees or other beneficial vegetation, causing local drainage problems and preventing infiltration of rain. Fill that is improperly or insufficiently compacted for structural support, or fill that is not “clean” and free of debris can more easily erode during floods, causing structural problems and contributing to waterway

sedimentation. To prevent adverse impacts, some communities prohibit the use of fill to elevate buildings, or strictly regulate the content and compaction of fill based on anticipated future use to support buildings.

Fill: Compensatory Storage. Fill in riverine floodplains can displace floodwater and make flooding worse. Adding a requirement for off-setting, or compensatory, excavation when developers bring fill (dirt or compacted soil to raise a site) into flood-prone areas can reduce the impacts or eliminate the problem. Some communities specify a one-for-one compensatory excavation (one cubic yard of excavation for one cubic yard of fill) that must be handled on site. Other communities require engineering analyses to determine the adequacy of off-setting compensatory excavation. Another way to address the impacts of fill is to limit its use (see Fill: Limitations on Use).

Foundations and Design Certification. Recognizing the importance of designing to account for flood and wave loads in areas subject to high velocity wave action, the NFIP requires building foundations and designs in coastal high hazard areas (Zone V) to be certified by professional engineers or architects. Some communities require all building foundations in all flood zones, including slab foundations on fill, to be designed by registered professionals. This ensures designs account for site-specific flood conditions, such as flood depth, velocity, saturation and erosion of filled areas and potential for damaging debris impacts.

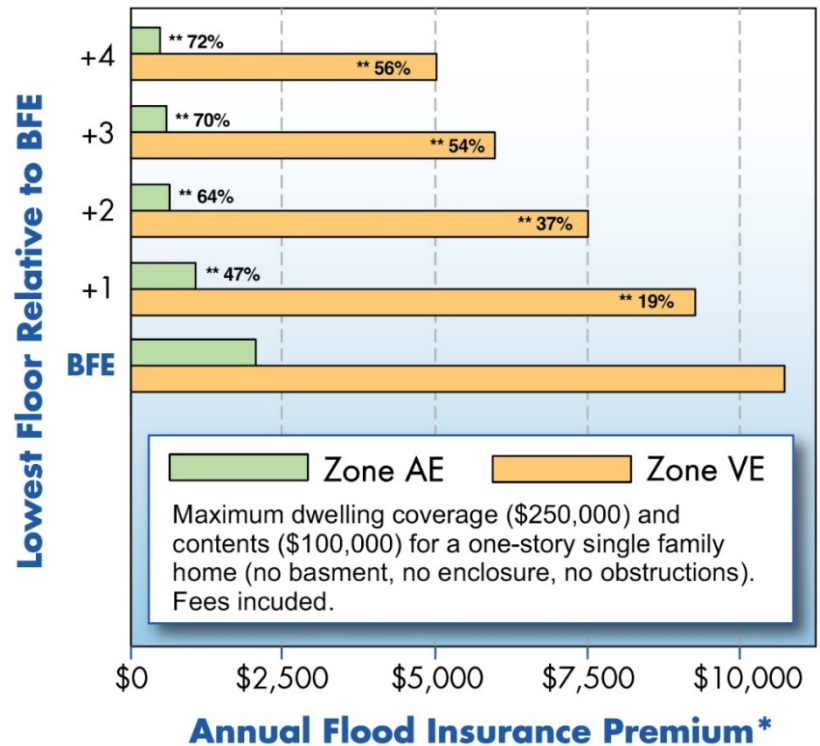
Freeboard: Additional Building Height. Many states and communities exceed the NFIP minimum lowest floor elevation (and dry floodproofing) requirement by 1 foot or more. This additional height, called freeboard, is the most common way communities strengthen floodplain management regulations. Freeboard provides a margin of safety against uncertainty, future increases in flood depths, and flood events that rise

Freeboard in Building Codes

State and local building codes based on the 2015 and later editions of the *International Codes* require at least 1 foot of additional elevation above the base flood elevation, although some states have eliminated this factor of safety. Communities considering adopting freeboard should first check their building codes. Some states allow communities to modify building codes to be more restrictive, including requiring more than just 1 foot of freeboard.

higher than the minimum 100-year (base flood) elevation. The higher buildings are constructed; the less flood damage they experience. This is reflected in lower NFIP flood insurance premiums (graphic). Most of the U.S. population lives in communities that have at least one foot of freeboard.

Building higher, whether just 1 foot or several feet, minimally increases the up-front cost of construction, a point often raised by builders contesting proposals to adopt freeboard. However, the long-term benefits of avoiding or minimizing damage plus lower **annual** insurance premiums, compared to the **one-time** cost, make freeboard a good investment (and attractive to future buyers). In many communities, when property owners have to elevate by more than just a few feet, they elect to raise buildings even higher to use the area underneath for parking.



* Unofficial estimates using 2019 rates; use only for comparison purposes
 ** Savings over at-BFE premium

Annual NFIP premium costs based on lowest floor elevation.

Costs and Benefits of Freeboard



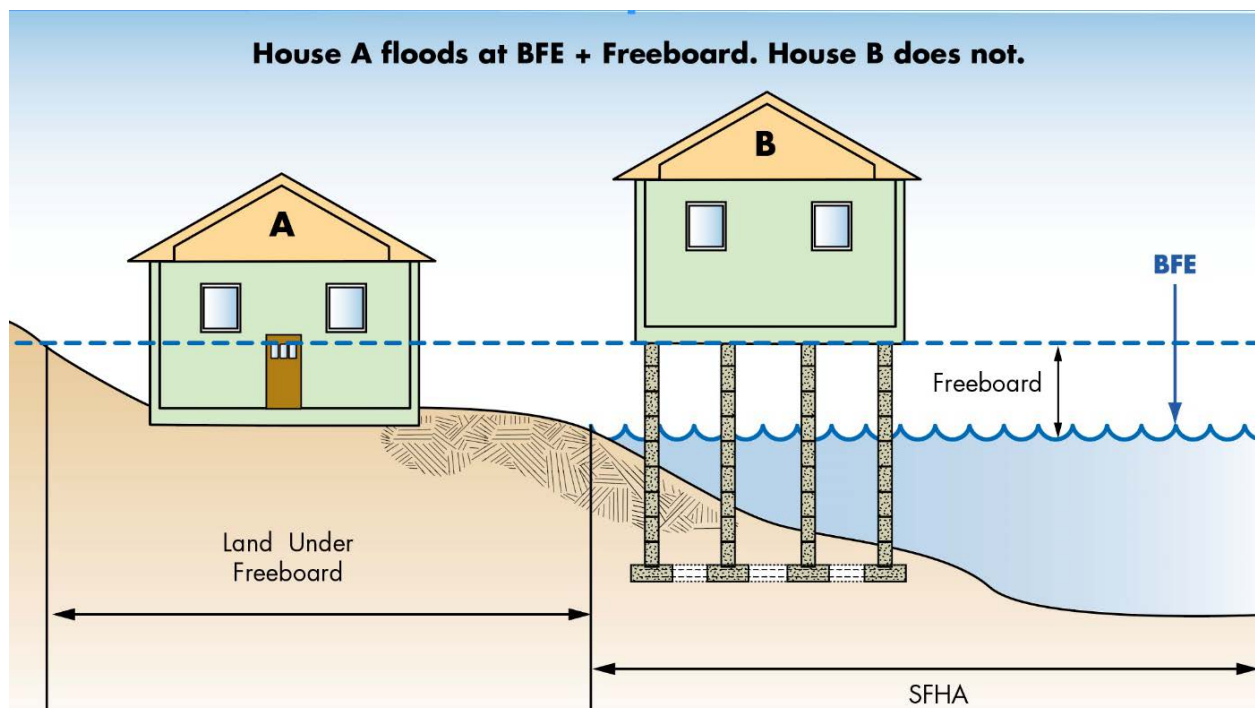
Learn more by downloading ASFPM's brochure [The Costs & Benefits of Building Higher](#), FEMA's [Higher Standards: Adopting Freeboard](#) video, and FEMA Fact Sheet [Building Higher in Flood Zones: Freeboard – Reduce Your Risk, Reduce Your Premium](#).

The National Institute of Building Sciences released [Natural Hazard Mitigation Saves: 2018 Interim Report](#). This update looked specifically at the savings associated with compliance with the flood, wind and earthquake provisions of 2018 *International Codes*. One finding is that at least one foot of freeboard saves \$6 for every \$1 invested.

Freeboard: Regulating Land Outside 100-Year Floodplain, But Below

Freeboard Elevation. While requiring additional building elevation (freeboard) is a fairly common higher standard applied to buildings in the mapped floodplain, much less common is applying floodplain management regulations to the land adjacent to the flood zone that is lower than the flood elevation plus freeboard (graphic). This approach is particularly appropriate where future conditions indicate increased flood risk, such as areas vulnerable to sea level rise and watersheds with significant development pressure. Remember: decreasing **future** flood vulnerability of a structure built today requires action **today**.

Consider this example: a community adopts 2 feet of freeboard. Suppose Building B is “in” the flood zone and must be elevated 2 feet above the base flood elevation, but nearby Building A is just “out” of the flood zone and is allowed to be constructed at grade, with a basement. Now, suppose the next flood rises a foot and a half or 2 feet above the base flood elevation. Building B is not damaged, while Building A is inundated. Regulating land below the freeboard height applies the same factor of safety to all buildings subject to flooding up to that height, providing an equal level of protection to those who develop in areas just outside the FEMA-designated floodplain.



Hazardous Materials. Some hazardous materials pose risks to people and the environment if released into floodwater, and some hazardous materials are highly reactive when contacted by water, causing fires or explosions. The NFIP has no specific requirements for locating facilities that manufacture, store or handle hazardous materials in floodplains. Some communities do not permit such facilities, while others require applicants to demonstrate that alternative locations outside mapped floodplains are not available before processing applications. Some communities require these facilities to be protected to a higher level than homes and commercial buildings (e.g., freeboard of 2 or more feet, or above the 500-year flood elevation, whichever is higher). Emergency operations plans should be required, with detailed, specific actions to be taken by facility managers when flood conditions threaten.



Flooded waste ponds contribute to contamination of floodwater.

Ponds or lagoons that store animal wastes, coal ash and other processing byproducts may be overtopped during floods, or earthen berms and masonry walls may fail, releasing wastes into floodwater.

Location Restrictions Based on Depth and Velocity. The NFIP minimum requirements for development do not require consideration of flood depths and velocities, and flood maps do not distinguish between areas with fast-moving or deep water during the base flood. While evaluation of site-specific conditions is required when designing buildings in Zone V, the same is not required in areas identified as Zone A/AE. Some floodplain areas are predicted to be inundated by 8 feet or more of floodwater and some floodplains in steep mountainous areas not only have very fast-moving flows, but experience rapid onset flooding (flash flooding). Deep floodwater and high-velocity flows pose risks to occupants and emergency services personnel involved in evacuation and rescue. Some communities recognize these very high-risk areas by restricting some or all development.

Low-Density Zoning. This planning approach helps guide development to less flood-prone areas, which limits investments in flood-prone areas and may raise awareness of flood hazards among real estate developers. Less dense zoning

(more acreage per unit) in SFHAs also means fewer buildings, allowing more land area to remain unaltered and available to perform natural floodplain functions, such as storage of floodwater, groundwater recharge, and bio-filtration. Larger lots may also make it more feasible for buildings to be located outside of SFHAs or on higher ground.

Lower Substantial Improvement Percentage. The NFIP substantial improvement requirement (“50% rule”) is described in Question 36 Existing Buildings. Some communities elect to adopt a cost-to-market value threshold of less than 50%. The result is that more buildings are brought into compliance, increasing overall community resilience. Barriers to successful implementation of this measure can arise after flood events, when lawmakers are pressured to return to the minimum 50% threshold. Before responding to calls for change, elected officials should review the history of the provision to understand the rationale behind initial adoption.

Manufactured Home Limitations. Manufactured homes are very vulnerable to flood damage, experiencing significantly more damage per foot of inundation than site-built homes. To provide a reasonable level of protection, some communities:

- Require full elevation of replacement homes in older manufactured home parks and subdivisions, instead of allowing replacement homes to be installed on foundations that are just 36 inches high (described in Question 36 for minimum requirements)
- Prohibit installation (or replacement) in floodways, except in existing manufactured home parks and subdivisions
- Prohibit installation (or replacement) in coastal high hazard areas (Zone V), except in existing manufactured home parks and subdivisions
- Prohibit installation (or replacement) in any flood hazard area
- Prohibit new manufactured home parks or subdivisions from being created in flood hazard areas

Preservation of Natural Areas. Multiple objectives are achieved when undeveloped floodplain areas are identified for conservation or preservation, including development of greenways and passive recreation opportunities and protecting wetlands and wildlife habitat and corridors. Requirements for low-density zoning and subdivision designs can also be used to preserve natural areas. Preservation of natural areas and the beneficial functions of floodplains can be a critical part of a No Adverse Impact approach to floodplain management (see Question 42 for an introduction to the No Adverse Impact approach).

Repetitive Flood Loss (Substantial Damage).

The basic NFIP requirement for buildings that incur substantial damage (the “50% rule,” described in Question 36 Existing Buildings) can be modified to require compliance when buildings are repetitively damaged by flooding. Communities do this more often when the nature of their flood risk is relatively shallow, yet frequent, which means applying the standard substantial damage definition is unlikely to reduce exposure to flooding over the long term. To qualify for NFIP flood insurance coverage called Increased Cost of Compliance (described in Question 33) when buildings are “repetitive loss” as defined by the NFIP, communities must adopt a definition for substantial damage and a requirement that triggers compliance with current standards when buildings sustain repetitive loss. It is important to understand that the repetitive loss provision must be enforced for all buildings that sustain repetitive flood damage throughout the mapped floodplain, not just those that have NFIP insurance policies or those that are seeking FEMA grant assistance.

Barriers to successful implementation of a repetitive flood loss measure can arise after flood events, when lawmakers are pressured to return to the minimum, which evaluates each damaging event without consideration of previous events. Before responding to calls for change, elected officials should



Repetitively Flooded Buildings (Repetitive Loss)

The NFIP defines repetitive loss as “flood related damage on two separate occasions during a 10 year period for which the cost of repairs at the time of each event, on average, equals or exceeds 25% of the market value of the structure before the damage occurred.”

review the history of the provision to understand the rationale behind initial adoption.

Setbacks. Many states and communities adopt setbacks (or buffers) to limit development within specified minimum distances from bodies of water. While the primary reasons may be related to water quality and riparian habitat protection, setbacks can also achieve flood loss reduction benefits by guiding development away from areas subject to erosion or deep floodwater. Depending on the objectives, setbacks may be measured from waterway centerlines, top of bank, normal high water, or the floodway boundary. This measure is particularly useful in communities with waterways that do not meet the FEMA threshold for study (typically less than 1 square mile drainage area), or waterways with only unnumbered Zone A without designated flood elevations or floodways.

Stormwater Management. Most stormwater management programs regulate increases in frequent rain event runoff from specific types of development, usually to achieve water quality objectives. Some programs also control the volume of runoff allowed to leave developed properties. When downstream areas are already experiencing flooding, some programs require new developments to control runoff from more severe rain events, such as storms that might result in the level of flooding used to delineate flood maps (the base, or 100-year flood). A variety of techniques are used to manage runoff, including detention basins (storing water to release after storms) and retention basins (holding water without release, perhaps to facilitate wetlands or groundwater recharge), infiltration (such as rain gardens, rock-filled trenches and porous paving). Rather than many smaller on-site facilities, some communities develop larger regional facilities designed to handle anticipated growth.

Subdivision Design. Ordinances that regulate subdivision design can be written to guide development away from flood-prone areas through lot layout and open space requirements (see graphic). Developers may be required to set aside some or all of the mapped floodplain for open space, stormwater management, or recreational use. Lots can be platted to require building sites outside the floodplain or on high ground.



Subdivisions and flood hazards

The American Planning Association's 2016 [PAS Report 584, Subdivision Design and Flood Hazard Areas](#), complements the 1997 PAS Report 473, *Subdivision Design in Flood Hazard Areas*. The newer report reflects a more comprehensive approach to reducing flood risks through subdivision planning and design.

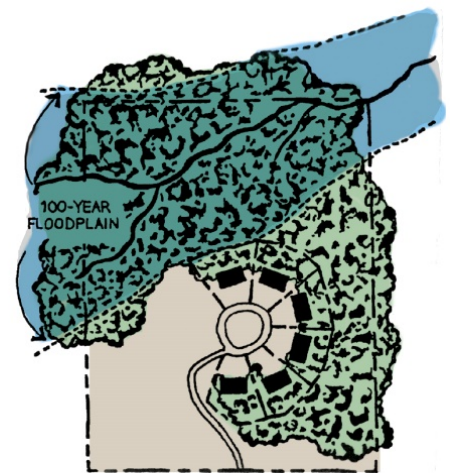


All land subdivided into lots, some homesites and lots partially or entirely in the floodplain.

NOT RECOMMENDED

All land subdivided into lots, some lots partially in the floodplain, setbacks modified to keep homesites on high ground.

RECOMMENDED



Floodplain land put into public/common open space, net density remains, lot sizes reduced and setbacks modified to keep homesites on high ground.

RECOMMENDED

Credit: Adapted from the American Planning Association's *Subdivision Design in Flood Hazard Areas* (PAS Report 473); original design by Tom Bartnik

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