

# Flooding in Iowa:

## Desk Reference for Local Officials



FLOODING IN IOWA



IOWA STATE UNIVERSITY  
Extension and Outreach  
Community and Economic Development

NOTE: MAP AREA SHOWN ON THIS PANEL  
IS LOCATED WITHIN TOWNSHIP 82 SOUTH,  
RANGE 7 EAST AND TOWNSHIP 83 SOUTH,  
RANGE 7 EAST.

# Foreword

***Flooding in Iowa***: Desk Reference for Local Officials is designed to be a resource for local elected and appointed officials seeking basic information on flooding, flood risks, and the National Flood Insurance Program (NFIP). Most local officials have little prior experience in engineering, law, hydrology, or the NFIP, and we have made a deliberate effort to write this publication with as little technical jargon as possible.

The Desk Reference for Local Officials is part of the larger Flooding in Iowa project, a collaborative effort between the Iowa Department of Natural Resources and Iowa State University Extension and Outreach Community and Economic Development. Flooding in Iowa includes twenty-one short web-based videos addressing five broad topics:

- (1) understanding flooding and its causes,
- (2) the history and purpose of the NFIP,
- (3) how floodplains are identified and mapped,
- (4) how floodplains are regulated, and
- (5) the basics of flood insurance.

The videos rely heavily on illustrations and photos to explain common terms and concepts related to flooding, floodplains, and the NFIP. Each video is accompanied by its own set of participant materials.

The Flooding in Iowa project videos, materials (including this Desk Reference), answers to frequently asked questions, and links to other resources can be found at [www.extension.iastate.edu/floodinginiowa](http://www.extension.iastate.edu/floodinginiowa).

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# Part I

## History of the National Flood Insurance Program

### The History of Natural Disasters Leading to Early Flood Control Efforts

In 1927, after months of heavy rain in the northern and central plains, the Mississippi River left its banks and flooded approximately 27,000 square miles. It was an epic disaster. Ten states, including Iowa, were inundated with water up to 30 feet deep in many locations. Fourteen percent of the land area of Arkansas was under water, and the river expanded to a width of 60 miles below Memphis, Tennessee. The flood caused more than \$400 million in damages and killed 246 people in seven states.



Up to that time, government had little involvement in flood control. After the great Mississippi River flood, however, Congress passed the Flood Control Act of 1928. The act charged the Army Corps of Engineers with keeping the waters of the great rivers away from the people by undertaking massive flood control projects, such as levees, dams, channeling, and diversion floodways.

During the next 40 years, Congress passed numerous flood control acts, often in response to flood disasters that occurred somewhere in the United States. The emphasis remained on large-scale structural projects designed to gain control of the nation's rivers. By the late 1960s, however, Congress became concerned with the increasing costs of flood relief, and the general failure of structural flood control projects to reduce flood losses. A major reason for this failure was continued development of homes and businesses in floodplains. With the realization that flood protection programs should not only include structural measures, but also promote the use of policy tools to reduce development in the floodplain, in 1968 Congress ushered in the most significant flood program in the country today. That program is the National Flood Insurance Program (NFIP).

## Goals and Objectives of the National Flood Insurance Program (NFIP)

The passage of the National Flood Insurance Act in 1968 marked a significant shift toward a comprehensive approach to reducing flood losses. The act created the NFIP, which was designed to achieve four goals:

- 1) To emphasize less costly non-structural flood control measures over structural measures such as dams and levees,
- 2) To reduce federal disaster costs by shifting the burden from all taxpayers to floodplain occupants,
- 3) To provide landowners with affordable flood insurance coverage not generally available in the private market, and
- 4) To encourage communities to take an active role in floodplain management to reduce future flood-related losses.

This primarily is accomplished through locally adopted regulations that are designed to:

- a) Reduce the likelihood of flood damage to buildings constructed according to the regulations,
- b) Prevent new developments from increasing the potential for flood damage to existing properties, and
- c) Ensure that the natural beneficial functions of floodplains are maintained or restored.

The NFIP is based on a mutual agreement among local, state, and federal governments. If a community adopts and enforces regulations that meet minimum federal and state standards for development in its floodplain areas, then federally guaranteed flood insurance is made available to property owners in that community. Thus, there are three interconnected components that are key to the success of the NFIP:

- 1) Accurate floodplain mapping,
- 2) Effective enforcement of floodplain regulations, and
- 3) Federally backed flood insurance.

**Accurate mapping.** Accurate mapping is the driving force behind sound floodplain management. The maps provide the foundation for communities to enforce their regulations and for rating insurance.

**Floodplain regulation.** A community's floodplain regulations are designed to ensure that new buildings will be protected from the flood levels shown on the floodplain maps and that development will not make the overall flood hazard worse.

**Flood insurance.** The availability of federally-backed flood insurance is based on a community's participation in the NFIP. A person can purchase flood insurance for any home or business located anywhere within a community that is participating in the program. Premiums for flood insurance vary largely due to a structure's flood risk. That level of risk is analyzed based on flood maps that are created by the Federal Emergency Management Agency (FEMA).



## National Flood Insurance Program Amendments and Reforms

Since 1968 Congress has amended the NFIP several times to address some of its limitations. To better understand the current system, it will be helpful to understand the context of these amendments, and the challenges they were designed to address.

The first major amendment was the Flood Disaster Protection Act of 1973, which was passed as a result of Tropical Storm Agnes in 1972. Agnes caused widespread destruction along the Atlantic coast and cost the nation more in disaster assistance than any other previous disaster. At the time, very few communities participated in the NFIP, and



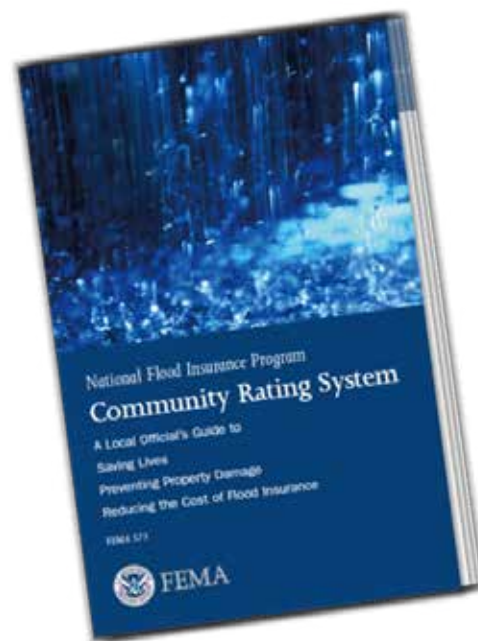
many owners of flood-prone property opted not to purchase flood insurance, instead relying on federal disaster assistance to pay for their recovery. The Flood Disaster Protection Act of 1973 prohibits federal agencies from constructing or providing financial assistance for the construction of buildings in the floodplain in any community that does not participate in the NFIP. The 1973 Act resulted in a dramatic increase in the number of communities joining the NFIP, jumping from 2,200 participating communities in 1973 to 15,000 by 1977.

The Flood Disaster Protection Act also established a mandatory flood insurance purchase requirement for structures with federally-backed mortgages that are located in identified Special Flood Hazard Areas (SFHAs). This requirement increased the number of policies in force from only 100,000 when Agnes made landfall to approximately 1.2 million policies just five years later. Today there are more than 5.5 million flood insurance policies in force nationwide.

Congress acted again in 1994 by amending the Flood Disaster Protection Act with the National Flood Insurance Reform Act. The 1994 Act sought to further decrease the financial burden of flooding on the federal government, taxpayers, and flood victims by increasing compliance with flood insurance purchase requirements and increasing property owners' participation in the NFIP. The 1994 Act accomplishes this by:

- 1) Increasing the maximum amount of flood insurance coverage available to property owners,
- 2) Establishing fines for mortgage lenders that fail to ensure the mandatory purchase of flood insurance on properties located in flood-prone areas,
- 3) Establishing a grant program for states and communities to develop flood mitigation plans and implement mitigation projects,
- and
- 4) Creating the Community Rating System (CRS), which is an incentive program that encourages communities to exceed the minimum federal requirements for development within floodplains in exchange for insurance premium discounts.

Finally, the Flood Insurance Reform Act of 2004 established the Severe Repetitive Loss program and the Repetitive Flood Claims program. These programs were designed to reduce or eliminate the long-term risk of flood damage to residential structures with multiple flood loss claims – known as repetitive loss structures. A 2004 report by the General Accounting Office found that repetitive loss properties accounted for only one percent of total policies, but approximately 30 percent of all program claim costs. The Severe Repetitive Loss Program sought to reduce the claims associated with the most frequently damaged of these properties – known as severe repetitive loss structures – by providing grants for, among other things, acquisition and demolition or relocation, structural elevation, and reconstruction to higher flood-resistant standards.



## The State of Iowa's Historic Role in Floodplain Management

Flood control and mitigation efforts historically have not been confined to the federal government. Following several years of disastrous flooding, the Iowa General Assembly created the Iowa Natural Resources Council (INRC) in 1949. The legislation recognized that the protection of life and property from damage by flooding as paramount to the state's prosperity. The INRC's duties at the time included establishing a comprehensive statewide program for the control, utilization, and protection of surface and ground water resources. The INRC was also authorized to construct flood control projects.

The state of Iowa was among the nation's leaders in recognizing that structural flood control projects were not, in and of themselves, an effective solution to the problems of flood losses. Amendments to the Iowa Code in 1957 and 1965 provided the INRC with regulatory authority over development in the floodplain. After several agency mergers, that authority now resides with the Iowa Department of Natural Resources (IDNR). The IDNR's responsibilities are interwoven with the NFIP and local floodplain management efforts. A permit is required from the IDNR for most types of development in the state's floodplains. The state's requirements for floodplain development are more stringent than those of the NFIP and are included in the regulations that must be adopted by a local community to participate in the NFIP. In addition to its regulatory authority, the IDNR also:

- 1) Provides technical and specialized assistance to local communities on floodplain regulation and enforcement,  
and
- 2) Coordinates with FEMA regarding the state's floodplain mapping needs.



# Part II

## Joining the National Flood Insurance Program

### Benefits of Participating in the NFIP

The NFIP is based on a mutual agreement between a community – which in Iowa means a city or a county - and the federal government. By joining the NFIP, a community commits to adopting and enforcing regulations addressing development in floodplain areas. In return, federally guaranteed flood insurance is then made available to property owners in the community. There are numerous benefits to participation in the NFIP:

- 1) Federally-subsidized flood insurance is made available to all residents within the community,
- 2) Federal grants or loans under programs administered by federal agencies such as the Department of Housing and Urban Development, the Environmental Protection Agency, and the Small Business Administration are available for development in identified flood hazard areas,
- 3) Federal disaster assistance will be available following a federally declared disaster for properties located in identified SFHAs,
- 4) Federally-backed mortgage insurance or loan guarantees will be provided for structures in identified SFHAs; this includes policies written by the Farmers Home Administration, Veterans Administration and others,

and

- 5) For structures covered by flood insurance, claims are paid for damages suffered from flooding even when the event does not result in a federal disaster declaration; it is a little-known fact that fewer than 50 percent of all flood events result in a federal disaster declaration.

### Steps for Joining the NFIP

The NFIP is a voluntary program and there are no fees required to join. In order to join the NFIP, a community must submit to FEMA

- 1) An application form,
- 2) A resolution of intent to participate in the NFIP, and
- 3) Its floodplain management ordinance.

DEPARTMENT OF HOMELAND SECURITY  
FEDERAL EMERGENCY MANAGEMENT AGENCY  
**APPLICATION FOR PARTICIPATION IN THE NATIONAL FLOOD INSURANCE PROGRAM**

O.M.B. NO. 1560-0004  
Expires March 31, 2011

**PAPERWORK BURDEN DISCLOSURE NOTICE**  
Public reporting burden for this form is estimated to average 4 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the form. You are not required to submit this collection of information unless it displays a valid OMB control number. Send comments regarding this burden estimate or any aspect of this form, including suggestions for reducing the burden, to the Paperwork Reduction Project (1560-0004), FEMA, 500 C Street SW, Washington, DC 20472, and Paperwork Reduction Project (1560-0004). NOTE: Do not send your completed form to this address.

1. APPLICANT COMMUNITY NAME (City, town, etc.): \_\_\_\_\_ DATE \_\_\_\_\_  
COUNTY, STATE \_\_\_\_\_

2. COMMUNITY OFFICIAL - CHIEF EXECUTIVE OFFICER (CEO) \_\_\_\_\_ E-MAIL ADDRESS \_\_\_\_\_ TELEPHONE NO. (include area code) \_\_\_\_\_  
ADDRESS (Street or box no., city, state, zip code) \_\_\_\_\_

3. PROGRAM COORDINATOR (If none, if different from above, with overall responsibility for implementing program) \_\_\_\_\_ E-MAIL ADDRESS \_\_\_\_\_ TELEPHONE NO. (include area code) \_\_\_\_\_  
ADDRESS (Street or box no., city, state, zip code) \_\_\_\_\_

LOCATION OF COMMUNITY REPOSITORY FOR PUBLIC INSPECTION OF NFIP MAPS \_\_\_\_\_  
ADDRESS \_\_\_\_\_

4. ESTIMATES FOR THOSE AREAS PRONE TO FLOOD AND/OR MUD/SILT AS OF THE DATE OF THIS APPLICATION

| AREA IN ACRES | POPULATION | NO. OF 1-4 FAMILY STRUCTURES | NO. OF ALL OTHER STRUCTURES |
|---------------|------------|------------------------------|-----------------------------|
|               |            |                              |                             |

5. ESTIMATES OF TOTALS IN ENTIRE COMMUNITY

| POPULATION | NO. OF 1-4 FAMILY STRUCTURES | NO. OF ALL OTHER STRUCTURES |
|------------|------------------------------|-----------------------------|
|            |                              |                             |

7. FOR FEMA REGIONAL USE ONLY

1. FEMA REGIONAL OFFICE \_\_\_\_\_ 2. NAME OF CONTACT \_\_\_\_\_ 3. TELEPHONE NO. \_\_\_\_\_

4. LEVEL OF 44 CFR REG. 65.101 ADOPTED (Check one):  
☐ 65.1 ☐ 65.201 ☐ 65.301 ☐ 65.302 ☐ 65.303

5. CHECK APPROPRIATE BOX:  
☐ EMERGENCY PHASE ☐ REGULAR PHASE

IF REGULAR PROGRAM, SPECIFY FIRM INDEX DATE. IF USING ANOTHER COMMUNITY'S FIRM, GIVE COMMUNITY NAME, CIL, FIRM INDEX DATE AND MAP PANEL NUMBER DEPICTING COMMUNITY.

FEMA Form 81-64, NFIP 08

**Application form.** The one-page community application form—Form 81\_64—can be found at the FEMA Library website at [www.fema.gov/library](http://www.fema.gov/library). The form asks local officials for basic information, including the name and position of the person responsible for administering the community's floodplain management program, the location where the public will be able to inspect local flood maps, and estimates of land area, population, and number of structures in and outside of the floodplain.

**Resolution of intent to participate.** The community's elected council or board must adopt the resolution of intent to participate in the NFIP. Samples of resolutions of intent that can be used by your community can be obtained through the IDNR. The resolution states the community's responsibilities under the NFIP – which will be discussed here shortly - and that the community commits itself to carry out these responsibilities.

**Floodplain management ordinance.** The floodplain management ordinance applies to all lands located within the SFHA as identified by the community's Flood Insurance Rate Map (FIRM). The basic purpose of the NFIP is not to prohibit all floodplain development, but to see that development located in floodplain areas meets standards designed to lessen the physical damages, economic loss, and social disruption caused by floods. The standards found in the community's floodplain ordinance reflect that purpose. An acceptable ordinance must require, at a minimum, that:

- 1) All development in the SFHA is subject to a permitting process,
- 2) New structures in the SFHA must meet standards that address anchoring, construction materials and methods, building design, utilities installation, and other structural matters,
- and
- 3) Existing structures in the SFHA that are substantially improved or are repaired after suffering substantial damage must be brought into compliance with standards for new construction.

**SAMPLE RESOLUTION TO BE USED WHEN APPLYING FOR FLOOD INSURANCE BY COUNTIES ZONING AUTHORITY**

RESOLUTION NUMBER: \_\_\_\_\_

WHEREAS, certain areas of [COUNTY NAME] are subject to periodic flooding causing damages to properties within these areas, and

WHEREAS, relief is available in the form of Federally subsidized flood insurance as authorized by the National Flood Insurance Act of 1968; and

WHEREAS, it is the intent of this Board of Supervisors, to require the recognition and evaluation of flood hazards in all official actions relating to land use in areas having these hazards; and

WHEREAS, this body has the legal authority to adopt land use and control measures to reduce future flood losses pursuant to Chapter 335, Code of Iowa

NOW, THEREFORE, BE IT RESOLVED, that this Board hereby:

1. Assures the Federal Insurance Administration that it will enact as necessary, and maintain in force in those areas having flood hazards, adequate land use and control measures with effective enforcement provisions consistent with the Criteria set forth in Section 60 of the National Flood Insurance Program Regulations,
2. Vests [LOCAL OFFICIAL, OFFICE OR AGENCY] with the responsibility, authority, and means to:
  - a. Assist the Federal Insurance Administrator, at his request, in his delineation of the limits of the area having special flood hazards.
  - b. Provide such information as the Administrator may request concerning present uses and occupancy of the flood plain areas.
  - c. Cooperate with Federal, State, and local agencies and private firms which undertake to study, survey, map, and identify flood plain areas, and cooperate with neighboring communities and the county with respect to management of adjoining flood plain areas in order to prevent aggravation of existing hazards.
  - d. When received from the Administrator, complete and submit those reports which advise the Administrator on the progress made within the community in the development and implementation of flood plain management measures.
  - e. Upon occurrence, notify the Administrator in writing whenever the boundaries of the community have been modified by annexation or loss of authority to adopt and enforce flood plain management regulations for a particular area. Included in such notification will be a map of the community, suitable for reproduction, which clearly delineates the new or deleted areas.
3. Appoints [LOCAL OFFICIAL, OFFICE OR AGENCY] to maintain for public inspection and to furnish upon request, for the determination of applicable flood insurance risk premium rates any certificates of flood-proofing and information on the elevation (in relation to National Geodetic Vertical Datum) of the level of the lowest floor (including basement) of all new or substantially improved structures, and
4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the program.

ADOPTED AND PASSED by the Board of Supervisors of the County of \_\_\_\_\_  
this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

Seal of County \_\_\_\_\_ Chairman \_\_\_\_\_

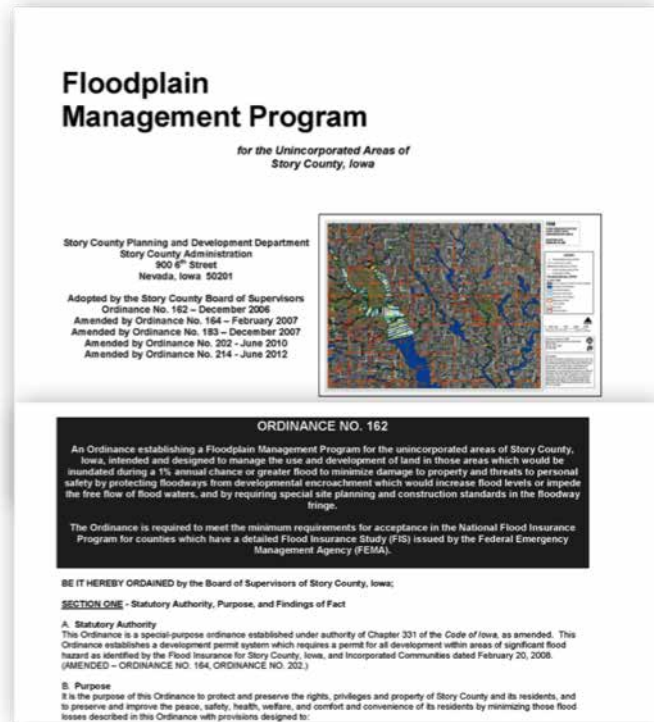
Attest: \_\_\_\_\_ County Auditor \_\_\_\_\_

IDNR also makes available model floodplain management ordinances than can be used by communities.

## Community Responsibilities under the NFIP

A community's responsibilities under the NFIP include:

- 1) Adopting and administering floodplain management regulations that meet the standards established under the NFIP and by the IDNR,
- 2) Issuing or denying floodplain development/building permits,
- 3) Maintaining records of floodplain development,
- 4) Making flood maps and other floodplain development documents available for public  
a. inspection,
- and
- 5) Helping residents obtain information on flood hazards, floodplain map data, flood insurance, and proper construction measures.



## Consequences of Not Participating in the NFIP

If a community has joined the NFIP, but fails to adequately enforce its floodplain management regulations or carry out its other responsibilities, FEMA can take one of two actions against the community:

- 1) Probation,
- or
- 2) Suspension from the program.

**Probation.** Probation occurs when FEMA has determined that the community's floodplain management program does not comply with the requirements of the NFIP; for example, when the community is not adequately enforcing its floodplain regulations. Prior to imposing probation, FEMA notifies all policy holders of the impending probation, telling them that an additional \$50 premium will be charged on all policies sold or renewed during the probation period. FEMA provides the community with 90 days to avoid this sanction by correcting program deficiencies and remedying identified violations. Probation may continue for up to one year after the community has corrected all program deficiencies.

**Suspension from the NFIP.** If, after a period of probation, a community fails to remedy its program deficiencies, it will be suspended from the NFIP. A community suspended under the NFIP may apply to the FEMA Regional Office for reinstatement by submitting evidence that all deficiencies and violations have been corrected, and a resolution reaffirming the community's intent to comply with the NFIP criteria.

In addition to losing the previously discussed benefits of participation in the NFIP, Iowa law now states that any community that has an SFHA identified within its political boundaries on an effective FIRM or Flood Hazard Boundary Map (FHBM), but is not participating in the NFIP, will be ineligible to receive certain types of state financial assistance following future floods. Specifically, those communities will not be eligible to receive the 10 percent non-federal match that the state provides for public assistance grants following presidentially declared disasters. If a community currently does not have an effective FIRM or FHBM that identifies SFHAs within its political boundaries, the community has two years from the effective date of any future map to join the NFIP or risk losing the state's assistance during presidentially declared flood-related disasters.



# Part III

## Flooding

### Watersheds, Rivers, and Floodplains

Hydrology is the study of water distribution, and how water interacts with the land surface and underlying soils and rocks. Understanding basic concepts of hydrology is essential to understanding how floods occur, how floodplains are defined and mapped by FEMA, how flood risks are estimated, and other important aspects of the National Flood Insurance Program.

*Defining and identifying watersheds.* The total land area that drains surface water to a common point (or common body of water) is called a watershed. Synonyms for watershed include river basin, drainage basin, and catchment. Watersheds can be as small as a parcel of ground that drains into a pond or as large as the 2.38 million square miles in South America that drain into the Amazon River and its tributaries. Closer to home, the Mississippi River watershed – including the drainage basins of the Red, Arkansas, Platte, Missouri, Ohio and Tennessee Rivers – drains 1.26 million square miles in the United States and Canada.



States generally contain several watersheds. The entire state of Iowa is located in the Mississippi River watershed; however, many major and minor sub-watersheds can easily be identified by looking at a topographic map of the state. The Hydrologic Unit Code (HUC) is used to classify watersheds by the size of their drainage area. As the HUC number increases, the size of the watershed decreases.

The boundaries of a watershed can be identified by first locating the lowest point, or watershed outlet, on a topographic map showing contour lines representing the elevations of the land. Then higher elevations can be followed until a high point, or ridge, is identified. A watershed's total size, maximum and minimum elevations, shape, slope, and drainage patterns are all important factors that affect drainage and flooding. And, knowing these factors can help hydrologists – scientists who study moving water – estimate flood potential.



**Defining and describing rivers.** Water is carried through and out of a watershed by a river or stream and the tributaries that flow into it. The site at which a tributary joins the main river channel is called the confluence, and the point at which the main river empties into a large water body – such as a larger river, ocean, or gulf – is the river's mouth. The width and depth of a river increases as it proceeds downstream due to increased volumes of water and erosion. Rivers develop many features after years of traveling the same course, and these features affect the likelihood and extent of flooding.

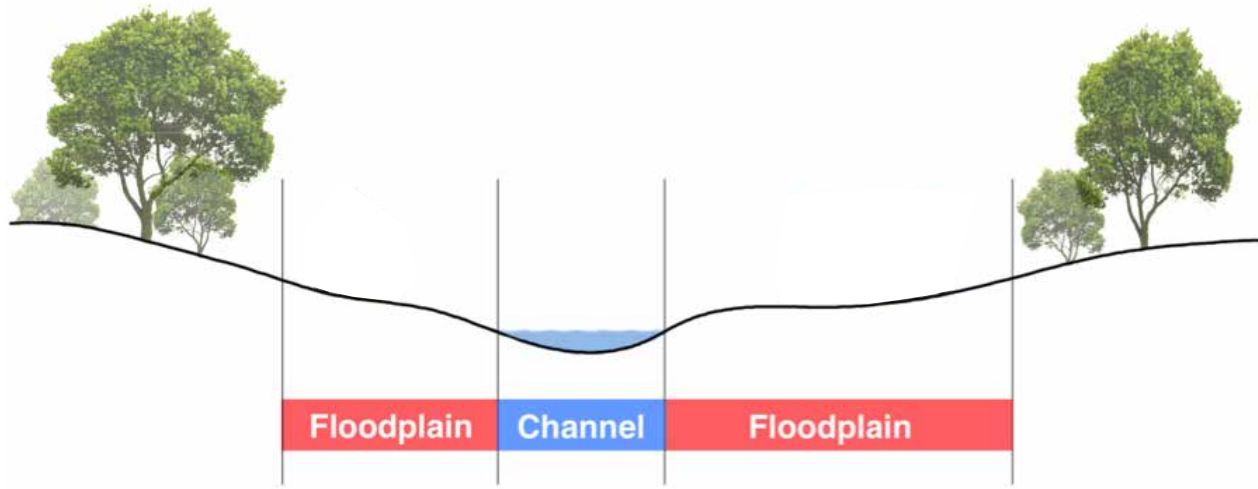
Some rivers travel in relatively direct routes to their destinations, due in most cases to faster water velocity from a steeper channel slope, geologic rock formations that slow erosion, or both. Other rivers develop meanders. Meanders are broad, looping bends in a river caused by the natural behavior of flowing water. The outer edges of meanders suffer erosion as the water scours against them, while the inner sides become areas where geologic material is deposited.

River levels are obviously affected by the runoff of surface waters, but rivers also interact with ground water systems to affect river levels. Channels that are located above ground water systems often lose some water through seepage of water through the soil – known as percolation – down into the groundwater system. These are known as influent, or losing rivers. In contrast, a river channel cut at or below groundwater level gains water and is recharged to a certain degree from the groundwater system. These are called effluent, or gaining rivers. A river can be effluent during parts of the year and influent during other months. Similarly, a river may be influent in some stretches and effluent in others. This explains why some rivers run dry or nearly dry during periods of low precipitation, while others maintain a steady volume of streamflow.



**Describing floodplains.** Floodplains are a natural feature of rivers. They form due to the actions of the water carried downstream by the river. During a flood, water leaves the main river channel and inundates the land areas adjacent to the river. The width of a floodplain depends on many factors, including topography, the size of the watershed being drained by the river, the volume and velocity of water carried by the river, the frequency of flooding, and the nature of the soils found in the watershed. Floodplains may be as narrow as a few hundred feet, or as wide as many miles for larger rivers such as the Missouri and Mississippi.





It is not always possible to identify a river's floodplain simply through observation. Floodplain areas that are frequently inundated can sometimes be identified by the types of plant life and the nature of the soils found in the area; however, in most cases the determination of whether a specific point or parcel of land is part of the floodplain requires more investigation.

## Beneficial Functions of Floodplains

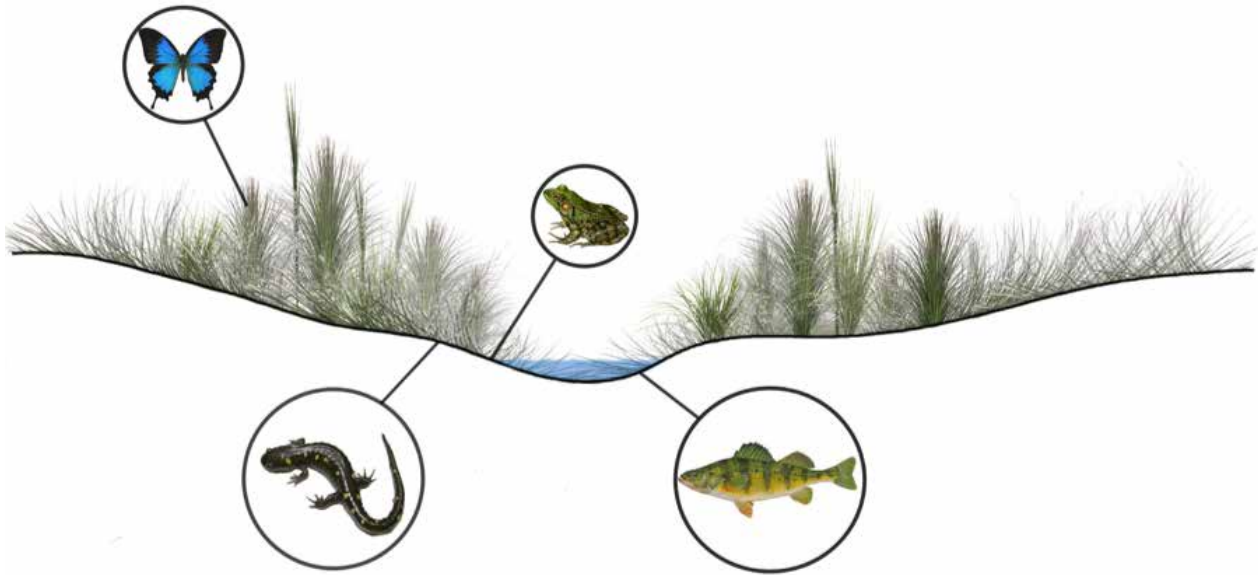
Unfortunately, a river's floodplain is often viewed as something completely separate from a river's active channel. It is only during and after major flood events that the connections between a river and its floodplain become more apparent. The river and its floodplain together form a complex physical and biological system that provides a number of critically beneficial functions. These include:

- 1) **Reducing the number and severity of floods.** Except in narrow, steep valleys, floodplains provide a broad area to spread out and temporarily store flood waters. One acre of floodplain land flooded one foot deep holds 330,000 gallons of water. This reduces downstream flood peaks and velocities. And, in their natural vegetated state, floodplains slow the rate at which incoming overland flow reaches the river channel.
- 2) **Improving water quality.** Water that runs off quickly over the surface is capable of carrying with it large amounts of sediment and debris to the river channel. A vegetated floodplain, however, slows the surface runoff, causing it to drop most of its sediment load on the floodplain. Vegetation also helps filter nutrients and other impurities from incoming floodwaters.

Wetlands are a vital component of many floodplains. Wetlands capture surface waters running toward the river channel and floodwaters that spread over the floodplain during a flood. The storage capacity and vegetation of the wetlands then act to stabilize streamflows and filter out nutrients and impurities.

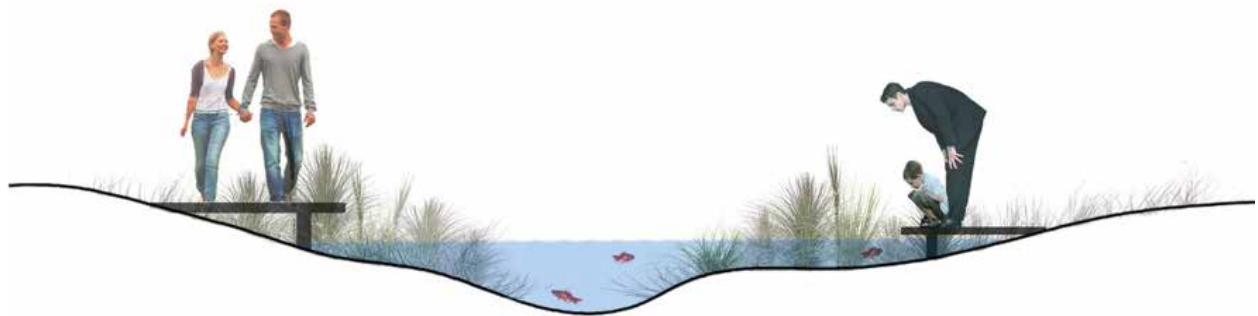


- 3) **Providing habitat for plants and animals.** Floodplains are also home to many types of plants and animals. The floodplain provides habitat for insects, birds, reptiles, amphibians, and mammals. Additionally, vegetated floodplains provide shade for the adjacent rivers and streams, increasing dissolved oxygen levels and consequently improving habitat for aquatic plants and animals.



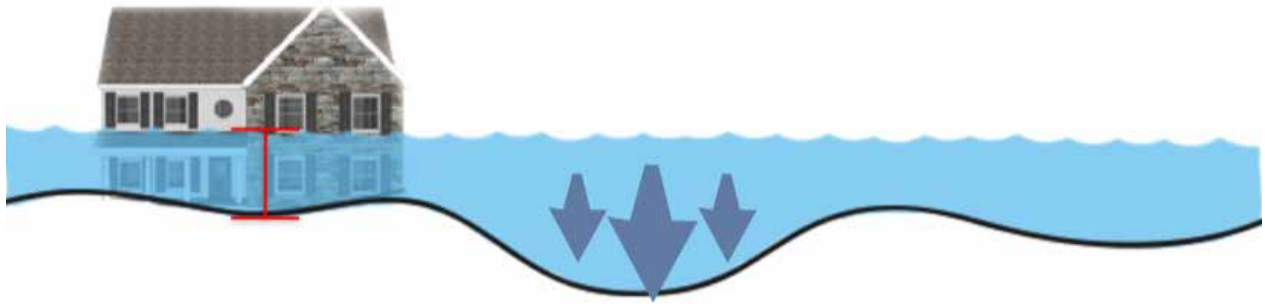
- 4) **Providing community benefits.** Communities that view floodplains as natural assets, instead of problem areas to be “engineered” out of existence, benefit from the results. Parks, bike paths, open spaces, and wildlife conservation areas make communities more appealing to citizens, potential employers, property owners, and visitors.

When a river is divorced from its floodplain with levees, dams, or roadbeds, or when the floodplain itself is altered by clearing vegetation or adding subdivisions, commercial buildings and parking lots, the natural benefits of the floodplain are significantly reduced or lost altogether.

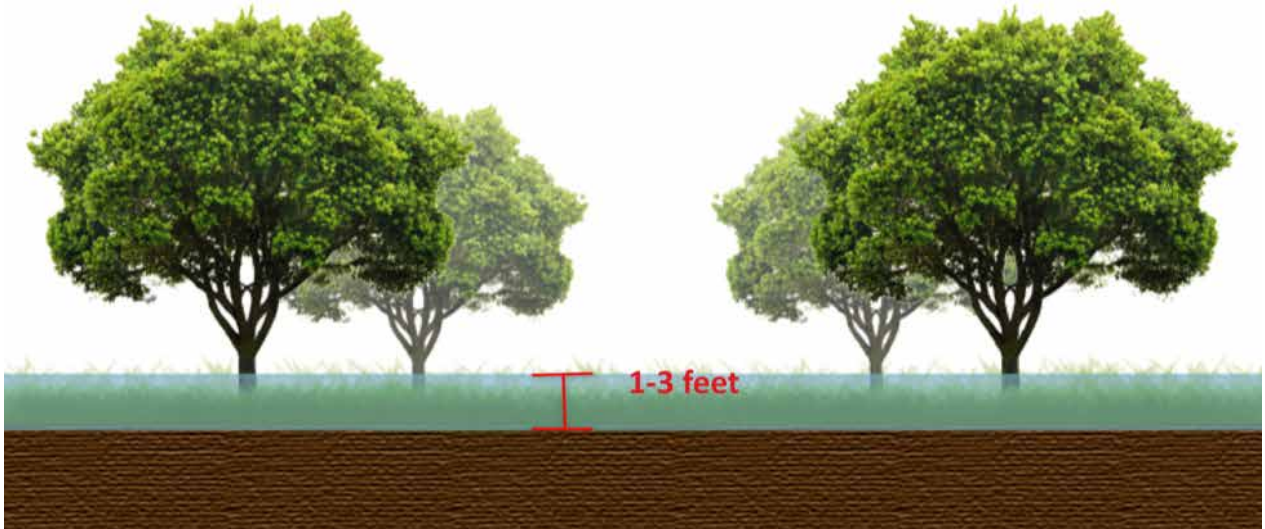


## Common Types of Flooding

**Riverine flooding.** The most common type of flooding in Iowa is riverine flooding, also known as overbank flooding. Riverine flooding occurs when a river channel receives more rain or snowmelt from the watershed than it has capacity to hold. The excess water tops the banks of the channel and spreads across the floodplain. Generally, the larger the river and its watershed the deeper the flood and the longer it will last; however, the destruction from riverine flooding may come not only from the depth and duration of the water, but also the velocity of the flow. In hilly areas with faster moving water, a few inches of floodwaters can damage structures or, worse yet, sweep away pedestrians and automobiles.



**Shallow flooding.** The NFIP defined shallow flooding as flooding with an average depth of one to three feet in areas where a clearly defined channel does not exist. The most common shallow flooding situations are ponding, sheet flow and urban drainage systems.



**Sheet flow.** Where there are no well-defined channels, floodwaters may spread out over a large area at a somewhat uniform depth in what is called sheet flow. Sheet flows typically occur on relatively flat land after an intense or prolonged rainfall when soils are already at or near saturation. During sheet flow, the floodwaters move downhill and cover a wide area.

**Ponding.** In some flat areas, runoff collects in depressions and cannot drain out, creating a ponding effect. Ponding floodwaters do not move or flow away. Floodwaters will remain in the temporary ponds until they infiltrate into the soil, evaporate, or are pumped out. Ponding is common in areas where man-made features have blocked natural surface runoff outlets. An example is in the areas protected by levees along the large rivers. Being in floodplains, these areas are flat and don't drain naturally, especially when a levee blocks the flow to the river. To drain these areas, channels have been built and pumps installed to mechanically move the water past the levee. Often, these man-made systems do not have the capacity to handle heavy rains or intense storms.

**Urban storm water systems.** An urban drainage system is a network that incorporates natural channels, man-made ditches, storm sewers, retention and detention ponds, and other facilities constructed to store runoff or carry it to a receiving stream or lake. When most of the man-made systems were built, they were typically designed to handle the amount of water expected during a storm that had a 10-percent chance of occurring annually – often referred to as a 10-year storm. Larger storms overload them, and the resulting overloaded storm sewers and ditches produce shallow flooding in streets, yards, parking lots, and low-lying areas.

**Flash flooding.** Flash flooding is caused by extreme rainfall occurring over a short period of time. Flash floods often occur in smaller watersheds and in rivers with steep slopes and narrow stream valleys where water velocities are high and warning times are short. It may also occur, or be more severe in urban areas, where impervious surfaces such as roofs, streets, and parking lots convert nearly all rainfall from a severe storm into surface runoff. Understanding and awareness of flash flooding is critically important because flash flooding causes the most flood-related deaths annually in the United States.

## Types of Flooding and the NFIP

It is important to understand that detailed flood studies are conducted differently for riverine flooding than for shallow flooding. The result is that a FIRM probably does not show all floodprone areas in a community. Riverine flood studies involve an analysis of the watershed's hydrology – or characteristics of the watershed that affect the amount of rainfall that will reach the stream – and the characteristics of the river itself that determine the volume of water that the stream and floodplain can carry.

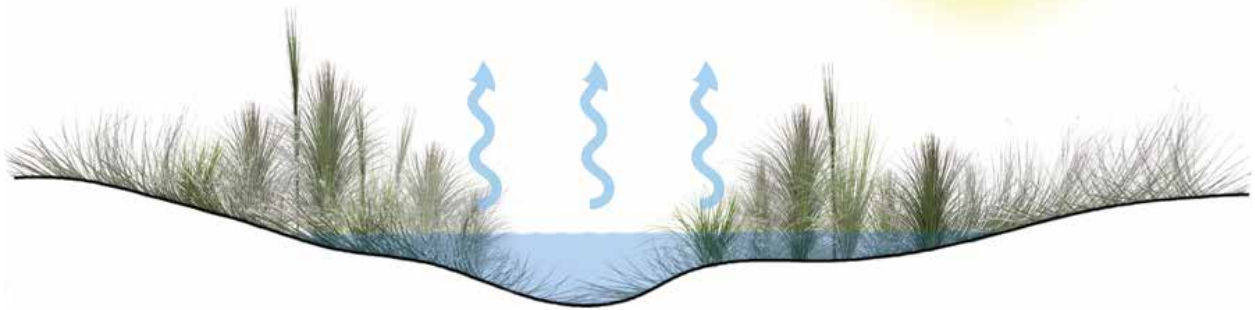
Occasionally the techniques used for riverine studies are used to map shallow flooding areas. If these study techniques are used they will usually produce data for the 100-year flood, but not for other floods. It is important to know, however, that in most cases shallow flooding is mapped based simply on historic flood experiences and a study of the topography. It is also important to know that FEMA generally does not map shallow flooding areas less than one foot deep.

## Primary Factors That Influence Flooding

Generally speaking, precipitation that reaches the earth's surface will rapidly move in one of three directions:

- 1) It may evaporate back into the atmosphere;
- 2) It may infiltrate – or seep – down into the soil and eventually become groundwater;
- or
- 3) It may move along the land as surface runoff until it reaches a river, lake, wetland, or other basin. The surface runoff that results in flooding is a factor not only of the precipitation, but also the amount of that precipitation that infiltrates into the soil.

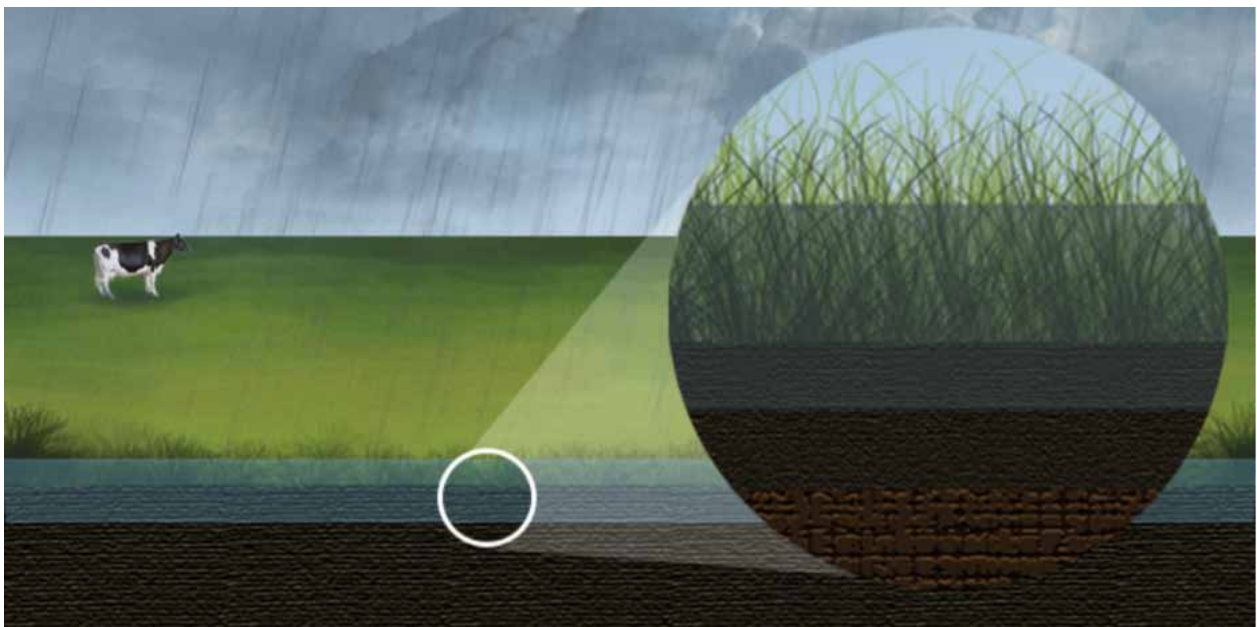




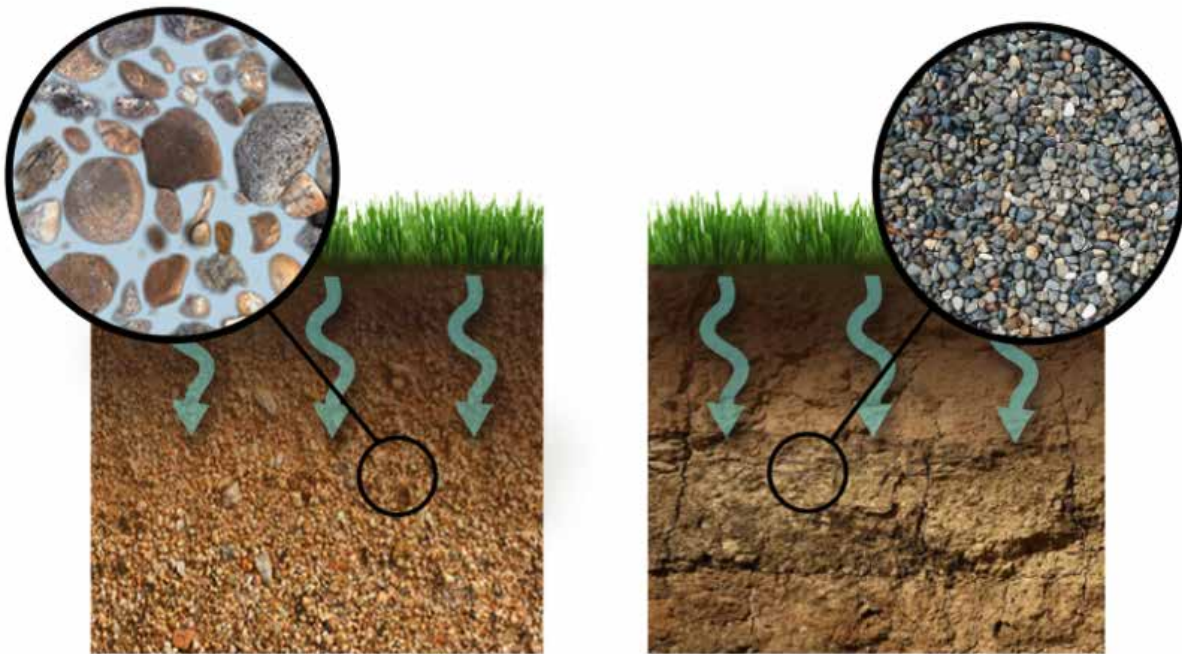
**Precipitation intensity, duration, and geographic distribution across the watershed.** The two characteristics of precipitation events that have the greatest effect on surface runoff are the intensity and duration of the rainfall. The total precipitation volume of a storm is measured by the average intensity of the storm (as measured in inches per hour) and the length of time of the storm event. While the total precipitation volume of a storm is a significant factor leading to surface runoff, to determine whether that surface runoff will result in flooding we must also take into account the geographic distribution of that precipitation across the watershed. A small, intense storm over a small watershed can produce significant flooding if it affects a large percentage of the watershed's total geographic area; however, the same storm would be unlikely to result in severe flooding in a larger watershed because it would affect a smaller percentage of the watershed's total geographic area. In larger watersheds, flooding more often results from precipitation events of a long duration, or from a steady succession of intense precipitation events occurring throughout the watershed.

## Understanding Infiltration

Runoff is produced when precipitation or snowmelt adds water to the soil surface faster than the rate at which it can infiltrate the soil. The excess water remains on the surface and flows downslope as overland flow. For example, if the precipitation rate is 2 inches per hour, but water can infiltrate the soil at the rate of only  $1\frac{1}{2}$  inches per hour, surface runoff is produced at the rate of about  $\frac{1}{2}$  inch per hour. In times of prolonged heavy rainfall, soils may become saturated to the point that the water table may lie at or near the surface in low-lying areas. In these cases, the infiltration rate is at or near zero, such that any rain that falls on these saturated areas becomes surface runoff. Surface runoff may be produced even if the soil is not entirely saturated, if the infiltration rate is less than the precipitation rate. Many factors affect infiltration. Soil characteristics, slope, and vegetative cover are among the most important natural factors, along with others resulting from human alteration of the landscape.

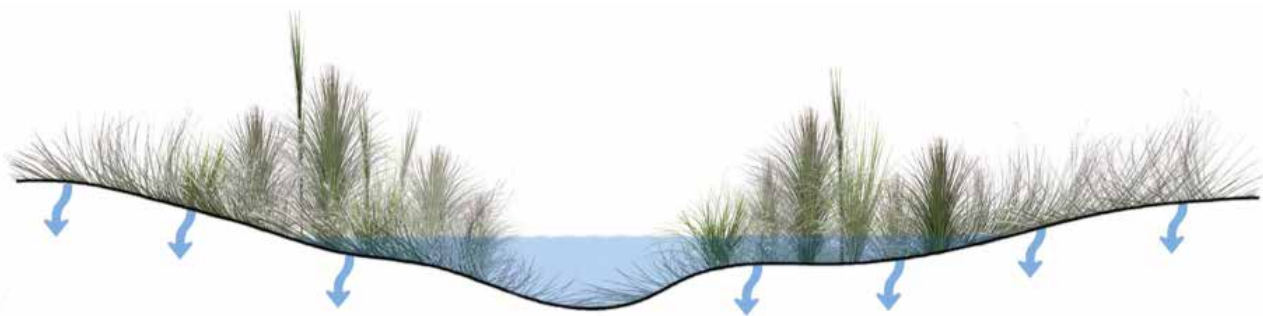


**Soil Characteristics.** The infiltration rate is heavily dependent on the soil's characteristics. Three main factors affect infiltration rates of soils: texture, moisture level, and depth. A soil with a coarse texture, such as a sandy soil, will absorb water more rapidly than one with finer particles such as clay. Drier soils will initially absorb water more rapidly than those that are wet, but as the air pockets between the particles are replaced with water, the infiltration rate decreases. Soils with greater depth to bedrock are able to contain more water than those with shallow depths.



**Slope.** Steep slopes in watersheds tend to generate more runoff than do gentle slopes. On gentle slopes, water may temporarily pond and later soak into the soil. On steep slopes, water cannot pond, which contributes to a shorter time for the rainfall to reach the river channel (known as lag time). Steep slopes usually also have decreased soil depth, which can also limit infiltration.

**Vegetative Cover.** In general, vegetative cover tends to increase the infiltration rate of soils. Some water is usually intercepted by plant surfaces before it can fall to the soil surface. Plant cover and a layer of dead vegetation protect the soil surface from compaction by heavy raindrops, and also slow the delivery of water to the soil surface. Plant stems help slow down water that flows over the soil surface. Plant roots help create openings in the soil. Decayed plant matter helps keep fine soil particles (such as clay) from sticking together, thereby increasing infiltration capacity. When the landscape is completely devegetated, for example, during a construction project or when a farm field lies fallow, a dramatic increase in runoff and soil erosion may result.



While vegetative cover generally increases the infiltration rate of soils, not all vegetative cover affects infiltration equally. Row crops, for example, leave bare soil exposed to rain for much of the growing season, and can result in increased runoff when compared with native vegetation. Tillage practices such as plowing also remove the protective layer of dead vegetation from the land surface.



**Soil Compaction.** Compaction of soils reduces the size of pore spaces and the infiltration rate. Water commonly runs off areas that were compacted through repeated passage of people, large animals, or heavy machinery.

**Urban Development.** Urban development can greatly increase the amount of precipitation that is converted to surface runoff in a drainage basin. Most paved surfaces and rooftops are impervious – meaning they allow no infiltration. They instead divert water directly to storm channels and drains. The increased surface water runoff from impervious surfaces results in a shorter lag time from rainfall to flooding because of the rapid flow of water over smooth surfaces.

Some cities have taken steps to reduce these impacts. Porous pavement materials have been developed that allow some water to pass through and infiltrate into the sand and soil below. Storm runoff can be routed to artificial basins that retain water and allow it to soak in or evaporate. Other “green” practices that affect infiltration rates by holding runoff longer on the site where it falls include green roofs, rain gardens, and rain barrels.








# Part IV

## Floodplain Mapping

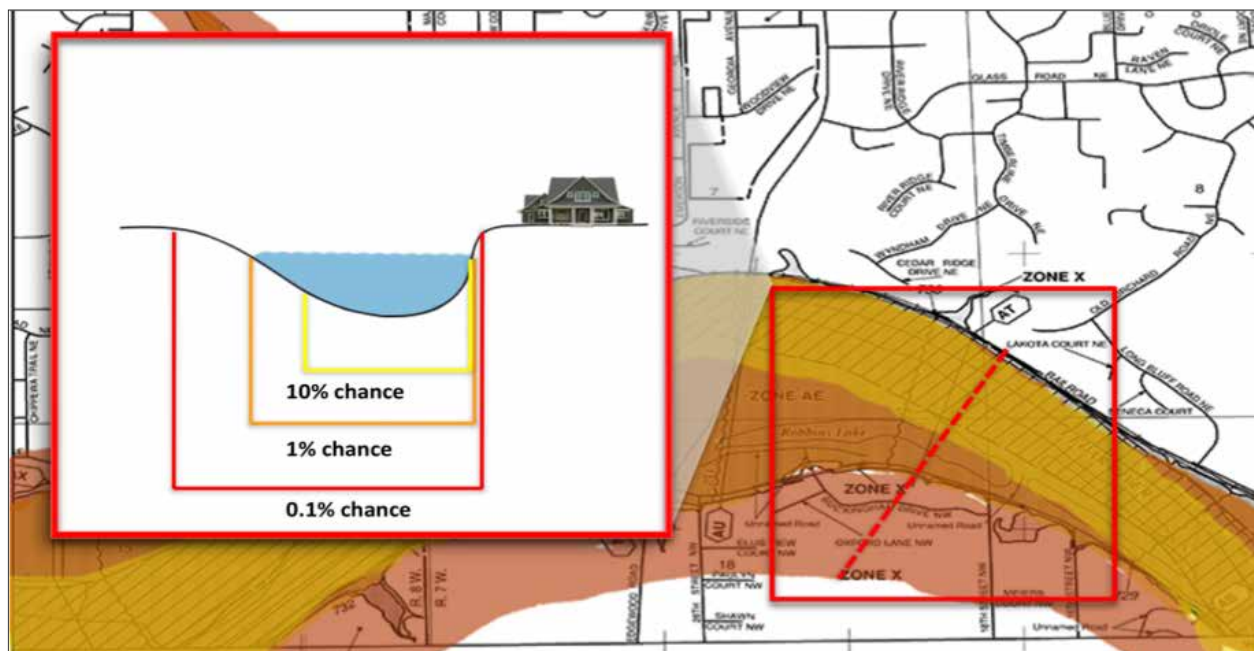
### Understanding Floodplain Maps and Flood Risk

Rivers, streams and lakes are expected to flood. As a result, all bodies of water have floodplains. As discussed in the previous chapter, however, many factors affect the depth, duration, and frequency of flooding for any given water body. Because of this, the same amount of rain falling over the same period of time in two different watersheds is likely to result in very different flood events.

FEMA's Federal Insurance and Mitigation Administration is charged with identifying floodprone areas in the United States, and establishing ways to quantify the actual risk of flooding within those floodprone areas. Studies are conducted to estimate the inundation areas for both relatively common, and less frequent flood events for the same water body. The most commonly-referenced representation of risk in the NFIP is the concept of the 100-year flood. The 100-year flood is the flood that – based on statistical probabilities – has a 1 out of 100 chance of occurring or being exceeded in any given year. Unfortunately, the term 100-year flood is too often interpreted to be a prediction that such a flood could only happen once every 100 years, when in fact it is meant to express the probability of the flood occurring. The 100-year flood is also referred to as the 1%-chance flood, which is a more appropriate description of the risk of such a flood occurring in any given year. A river could experience a 100-year flood twice in the same year, 3 times in 10 years, or only once over the course of 250 years.

| Chance of Flooding Over a Period Of Time                                                        |                                                                                                                      |                                                                                                                    |                                                                                                                     |                                                                                                                       |
|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
|  Time Period | Flood Magnitude                                                                                                      |                                                                                                                    |                                                                                                                     |                                                                                                                       |
|                                                                                                 |  10% 10 %- chance (10-year flood) |  4% 4 %- chance (25-year flood) |  2% 2 %- chance (50-year flood) |  1% 1 %- chance (100-year flood) |
| 1 year                                                                                          | 10%                                                                                                                  | 4%                                                                                                                 | 2%                                                                                                                  | 1%                                                                                                                    |
| 10 years                                                                                        | 65%                                                                                                                  | 34%                                                                                                                | 18%                                                                                                                 | 10%                                                                                                                   |
| 20 years                                                                                        | 88%                                                                                                                  | 56%                                                                                                                | 33%                                                                                                                 | 18%                                                                                                                   |
| 30 years                                                                                        | 96%                                                                                                                  | 71%                                                                                                                | 45%                                                                                                                 | 26%                                                                                                                   |
| 50 years                                                                                        | 99%                                                                                                                  | 87%                                                                                                                | 64%                                                                                                                 | 39%                                                                                                                   |

The table above helps explain the concepts of flood probability and risk. For example, the table shows that, while there is a 1% chance of a 100-year flood occurring in any given year, there is an 18% chance that such a flood will occur within any given 20-year period, and a 26% chance that such a flood will occur during the life of a 30-year mortgage.



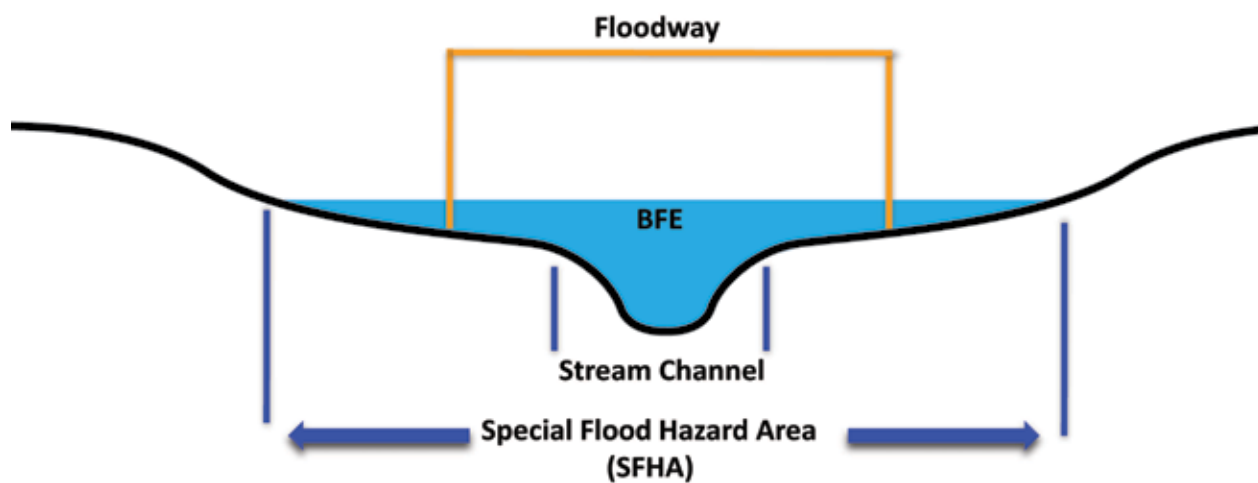
In order to develop a common standard for the entire country, the NFIP adopted the 1%-chance flood as the base flood for both insurance rating and regulation purposes. The choice of the 1%-chance flood was a compromise between using a smaller flood event – say a 10% chance flood which would leave many properties exposed to more frequent damage by flood – and a larger, less frequent flood event – such as a 0.1% (1,000-year) flood, which was considered to be too stringent and an unreasonable requirement for most types of development. FEMA refers to the area inundated by the base flood as the SFHA. The NFIP defines the Base Flood Elevation (BFE) as the elevation that floodwaters would reach at a particular location during the base flood.

The table below shows the relationship between the different terms used by the NFIP to describe the same concepts. From this point forward the term “base flood” will be used to reference the concept of the 100-year and 1%-chance flood, and the term “Special Flood Hazard Area” - or SFHA - will be used to reference the 100-year floodplain.

| Terminology          |  |   |                         |                                   |
|----------------------|--|---|-------------------------|-----------------------------------|
| Common terminology   |  | = | ...means the same as... | ...and the NFIP terminology...    |
| 100-year flood       |  |   | 1%- chance flood        | Base flood                        |
| 100-year flood level |  |   | 1%- chance flood level  | Base flood elevation (BFE)        |
| 100-year floodplain  |  |   | Base floodplain         | Special Flood Hazard Aread (SFHA) |

For regulatory purposes, a community's floodplain management ordinance, and the state of Iowa, require development permits for most types of development located in the SFHA. The placement of development in the floodplain results in an obstruction of flood flows and increase in flood stages; which in turn results in higher flood damages. However, it is possible to minimize the increase in flood stages by reserving a portion of the floodplain for the conveyance of flood flows.

The floodway consists of those portions of the floodplain, including the stream channel, that are reasonably required to carry the base flood event so that restricting the flow will not result in a significant increase in flood stage. The floodway is determined using a hydraulic model that proportionally reduces flow on both sides of the channel until it shows a one foot increase in the base flood elevation. Because the floodway includes those areas closest to the channel, it is also the part of the floodplain where flow depths are deepest and velocities are greatest. And so, it is usually the most dangerous part of the floodplain.



## Limitations in Expressing Risk

It is important to recognize the limitations of the flood study and mapping process in assessing and understanding the real flood risk for any individual property.

**Assessing risk.** Flood studies and the mapping process are good at capturing many of the factors that influence the depth and duration of flooding, but they are not perfect and are limited by the quality and detail of the data and methods used in the analysis.

**Understanding risk.** It is also important to remember that the SFHA shown on a FIRM only represents the area at risk for a specific flood event – the base flood. This should not be interpreted as meaning that areas located just outside the SFHA are not also at risk to damage by flood. Flood events larger than the base flood – such as the 200-year and 500-year events – do occur. So, while it may be true that properties located outside the SFHA may have a lower risk of damage by flood, they should not be considered to be risk free.

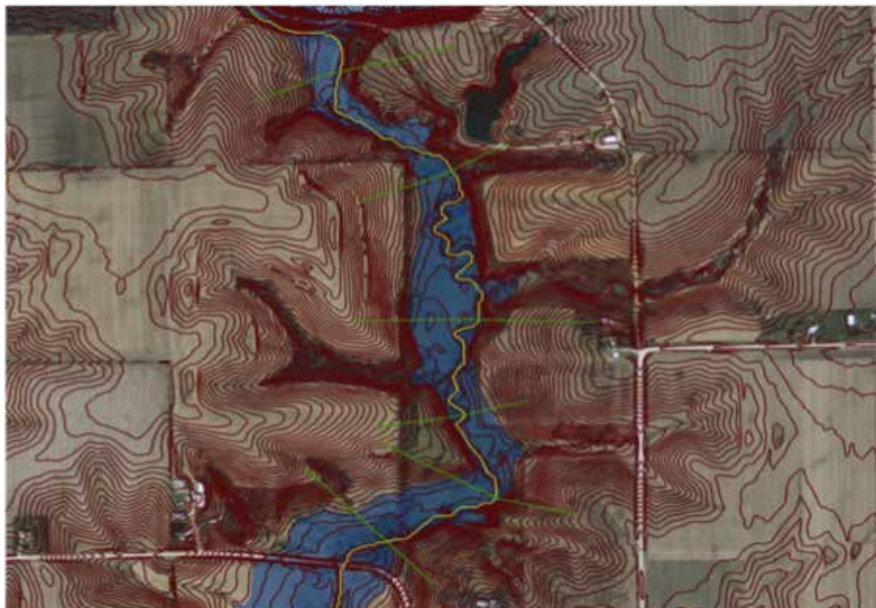
## The History of Floodplain Mapping: Approximate Studies and Detailed Studies

Not all communities' flood maps are the same. FEMA has produced a variety of types of flood maps over the years for use by communities participating in the NFIP.

The National Flood Insurance Act of 1968 directed the Federal Insurance Administration (FIA) to identify all floodprone areas within the United States, and establish flood-risk zones within those floodprone areas. Because the mandate was to map the entire United States, the FIA could not afford to conduct detailed engineering studies or hydraulic analyses. Instead, it used information from existing sources such as soils maps, historical high water records, aerial photographs of previous floods, and topographic maps to identify areas likely to be susceptible to inundation by the base flood event. These map products were known as approximate studies. These approximate determinations of the boundaries of the SFHA were shown on FHBMs, which served as the official NFIP floodplain maps when many communities first joined the NFIP.

As Federal funding became available for floodplain mapping, FEMA performed more thorough flood studies for many communities. Known as detailed studies, they involve:

- 1) Statistical analyses of stream flow and rainfall records, or analyses of runoff in the watershed – known as hydrology,
- 2) Analyses of how floodwaters move through the river and floodplain – known as hydraulics,
- 3) Topographic surveys,
- and
- 4) Information obtained from the community about historical flood events.

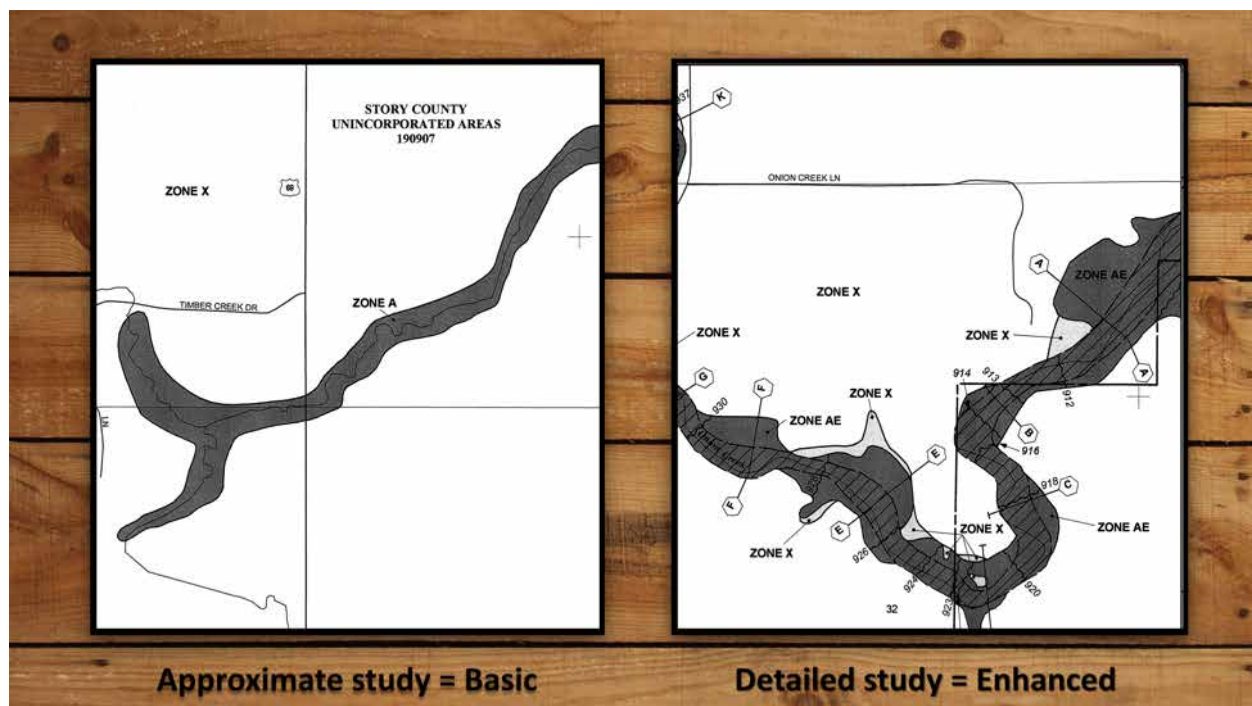


Detailed studies result in the publication of Flood Insurance Studies - known as FIS reports - and new FIRMs, both of which are provided to the community.

FEMA had originally hoped to produce a detailed flood insurance study for all flood-prone communities. Unfortunately, the cost of performing detailed studies can run in excess of ten-thousand dollars per river mile. Due to budgetary constraints, FEMA generally reserves detailed studies for communities where there is

- 1) A high risk of flooding and
- 2) Significant existing development, or potential for future development in the floodplain.





Beginning in the mid-1980's, FEMA began converting the information and boundaries from the flood hazard boundary maps onto new FIRMs for communities that were unlikely to receive a detailed flood insurance study. However, this proved to be more expensive than originally anticipated. As a consequence, for many communities the FHBM was simply converted to a FIRM by letter. This letter instructed the community to permanently mark copies of its FHBM as "FIRMs" and include the new effective date in their title blocks.

FEMA is attempting to change the terms they use to refer to the map products produced by approximate and detailed study methods. As a result, you may hear flood maps produced through approximate mapping methods referred to as "Basic" map products, and those produced through detailed study methods as "Enhanced" map products. However, we will continue to use the terms "approximate study" and "detailed study" in this publication. The information provided on FIRMs based on detailed studies is different in a number of respects from that provided on FIRMs based on approximate studies.

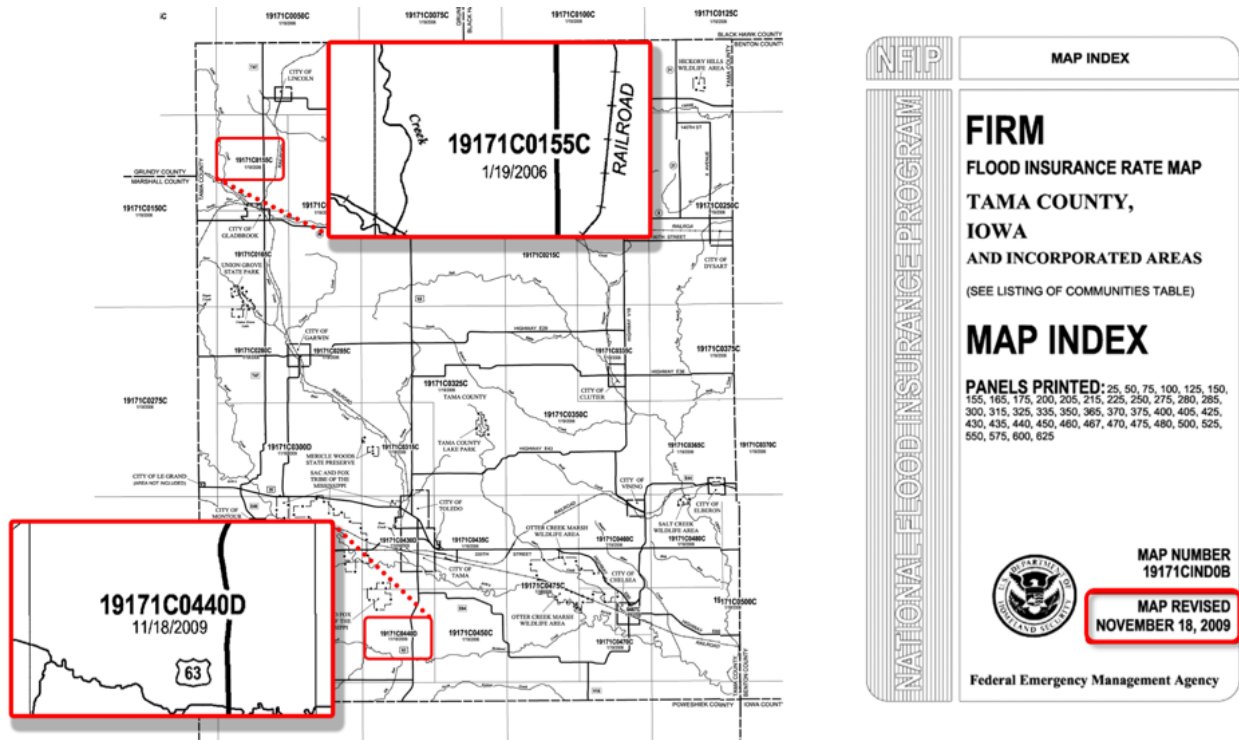
## Overview and Features Shown on FIRMs

A community's FIRM may consist of one or more map panels. For smaller communities, and those with few flood-prone areas, the entire SFHA might be shown on a single FIRM panel. In order to provide maps at a readable scale, FEMA often divides the geographic area of larger communities onto two or more map panels, each having a unique panel number.

The following map features help a reader locate the correct map or map panel.

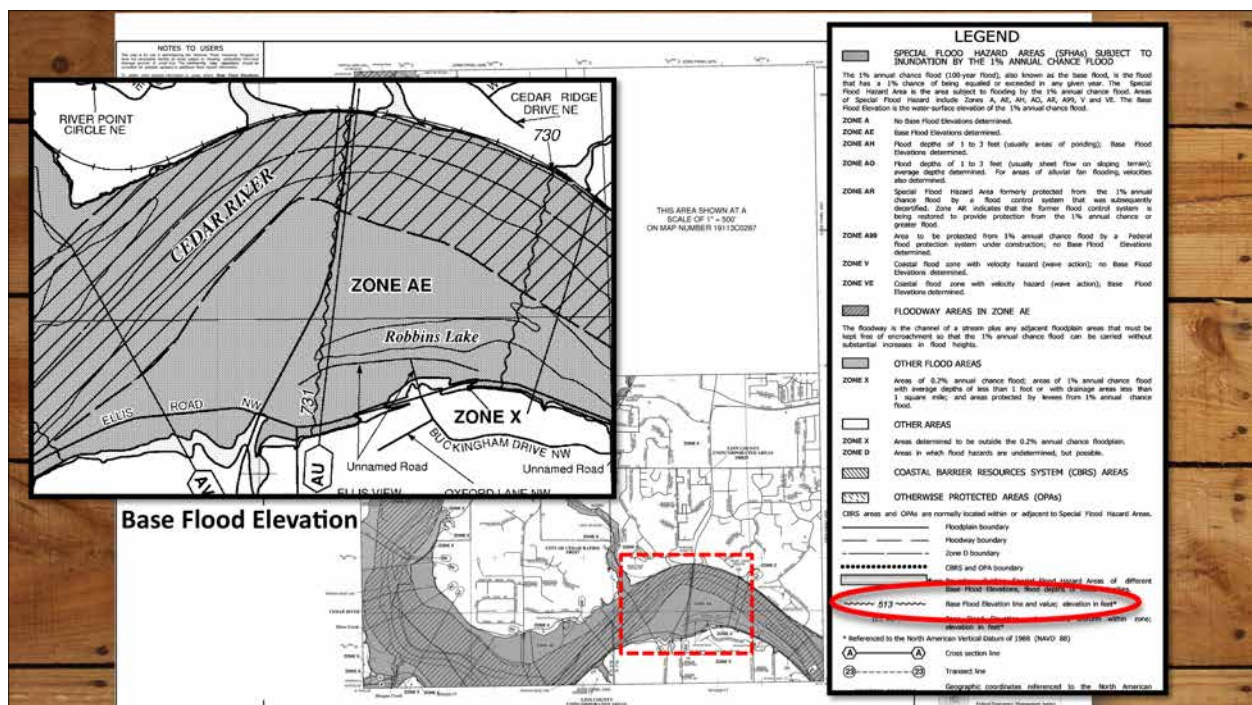
**Map index.** Whenever a community requires more than one panel, a Map Index is prepared. The map index shows the community's boundaries; transportation infrastructure such as streets, highways, and railroads; and water bodies, such as streams and lakes. If the community's FIRM includes more than one panel, the map index will show how the community is divided into those panels. FEMA does not print a map panel for portions of the community that do not contain a SFHA. The map index will indicate which panels are printed.

**Title box.** Every map index and panel has a title box. The title box contains the community name, number, panel number (or page number), map panel suffix (if any), and the effective date or revision date of the map. The community number is a unique six-digit number given to each community. All Iowa community numbers begin with 19.



As revisions to maps and panels occur, FEMA will republish only the map index and those map panels that have been revised. For this reason, it is not unusual for a community's FIRM panels to have different effective dates. The map revision date will be shown in the title box. The panel suffix – a single letter – will be changed with each revision, as well. The first revision will be noted by an "A," the second by a "B" and so forth. You can contact the IDNR if you are unsure whether you have the effective version of a community's FIRM.

**Legend or key.** FIRMS also contain a Legend, or a Key to the map. This provides, among other things, the symbols used to portray information such as the different types of flood risk zones and floodway. The legend also includes the map scale and north arrow. The index for the more recent countywide FIRMs includes a table that lists the original FIRM and identification dates for each community in that county that has been identified as having one or more SFHAs. On older mapping products, this information is shown above the title box on each individual FIRM panel.



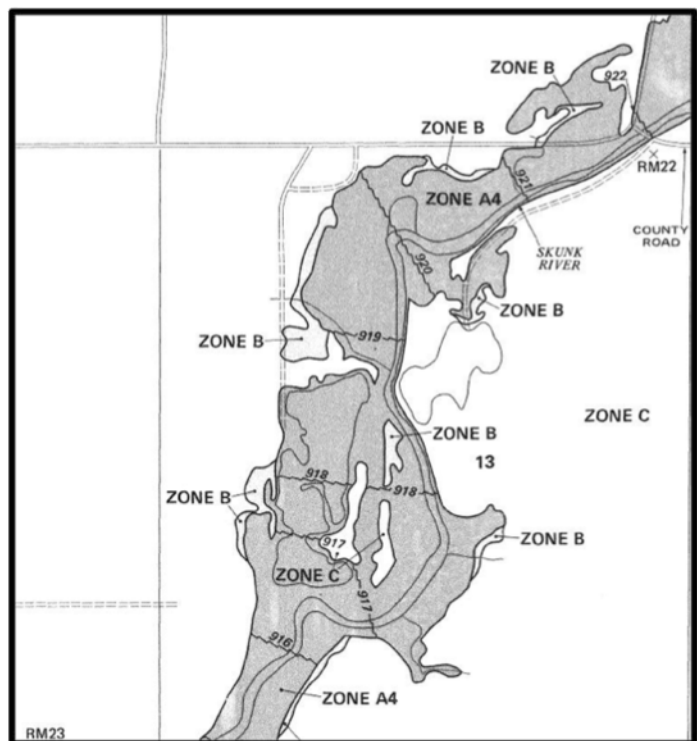
### *FIRMs Based on Detailed Studies*

- 1) The base flood elevation is displayed in whole number increments along the detailed stream reach.
- 2) The floodway is that portion of the floodplain, including the stream channel, that is reasonably required to carry the base flood event so that restricting the flow will not result in a significant increase in flood stage. The width of the floodway is determined by calculating the flow area required to carry the base flood without causing more than a one foot rise in flood stage. For detailed flood studies produced prior to 1986, the floodway was shown on a separate map called the Flood Boundary and Floodway Map, where it was portrayed as a white area on both sides of, and including, the stream channel. Since 1986, the floodway has been included on the FIRM and is shown using diagonal lines.
- 3) Cross-section lines show the location of surveyed valley cross-sections that were included in the hydraulic model performed for the stream reach. The cross-sections are each labeled with a letter. Information, such as the floodway width, average flow velocity, and base flood elevation, are listed for each cross-section location in the Floodway Data Table. This table is included in the flood insurance study text that accompanies a detailed study. The location of these cross-sections is also referenced on the flood profiles included in the text of the Flood Insurance Study.
- 4) The FIS text contains additional information for the community, such as:
  - a) A description of the community and its principal flood problems; it will also include a description of any flood protection measures – such as levees or dams – that exist in the community.
  - b) A description of the hydrologic and hydraulic methods used to conduct the detailed study.
  - c) A table listing the flow frequency analysis for those streams for which a detailed study was performed.

### **Understanding Flood Zones on Floodplain Maps**

The different flood zone designations on a FIRM are meant to illustrate flood risks and are used for insurance and regulation purposes.

- 1) **Zone A** is also known as the “unnumbered A zone.” Areas delineated with Zone A are SFHAs that have been determined using approximate study methods. Because they are based on an approximate study, they show no base flood elevations.
- 2) **Zones A1 through A30** are known as “numbered A zones.” These zones are the result of a detailed study. Numbered A Zones include the base flood elevation and floodway delineation. The number to the right of the letter A represents a risk factor that, at one time, was used for flood insurance rating purposes.
- 3) **Zone AE** replaces numbered A zones on FIRMs produced or revised after 1986. The “E” stands for elevation, meaning it is the result of a detailed study. As with numbered A zones, a Zone AE includes the base flood elevation and floodway delineation.

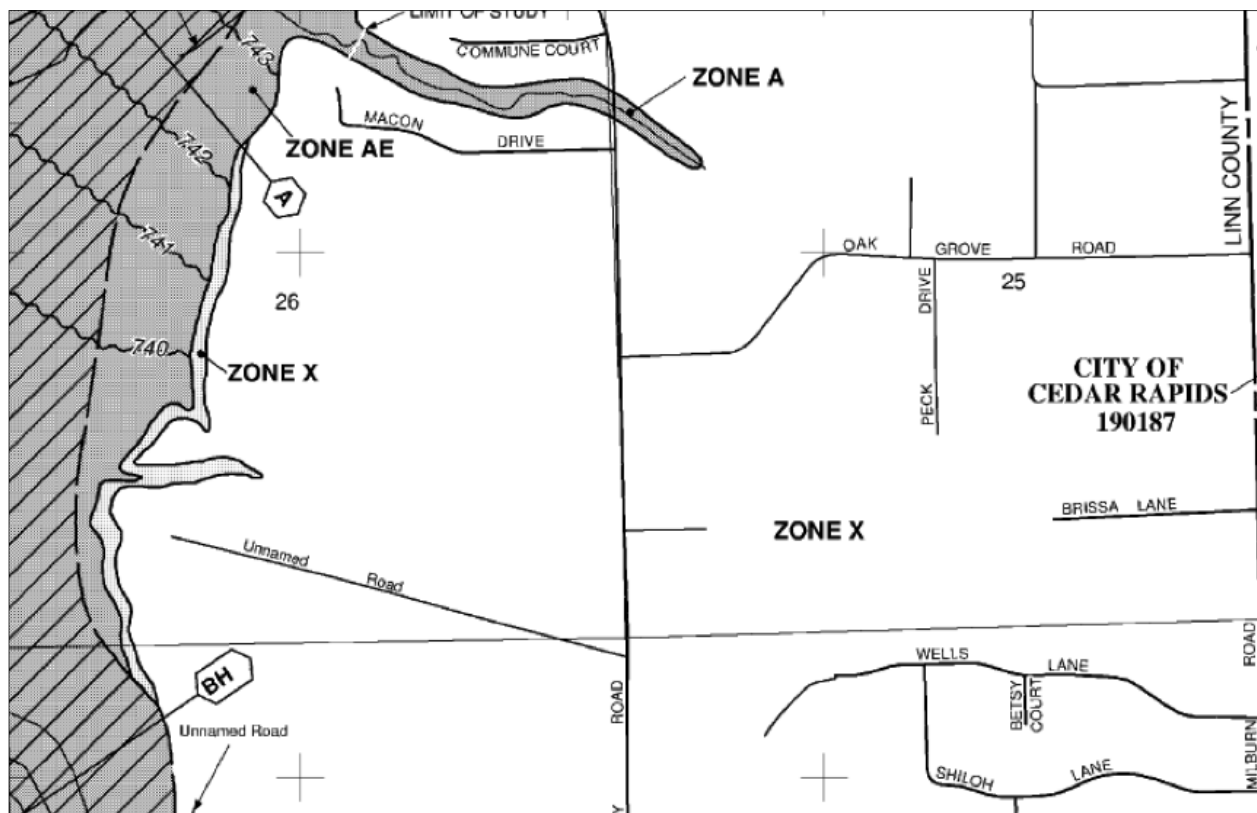




- 4) **Zone AH** represents an area of shallow flooding caused by ponding of flood waters where the average depth for the base flood event is between 1 and 3 ft. Zone AH is based on a detailed study and includes the base flood elevation.
- 5) **Zone AO** represents an area of shallow flooding resulting from sheet flow where the average depth for the base flood event is between 1 and 3 ft. Zone AO is determined by a detailed study. Instead of a base flood elevation, however, the number to the right of AO provides the average depth of inundation at a location for the base flood event; for example, "AO2" indicates that the average depth of inundation is 2 ft.
- 6) **Zone AR** represents areas formerly considered protected from flooding by a currently de-accredited levee or floodwall that is in the process of being rehabilitated to provide protection from the base flood or greater flood event.
- 7) **Zone A99** applies to those areas that will be protected by a Federal flood protection system under construction that has reached targeted construction and funding milestones.

It should be noted that the community's floodplain management regulations require a permit prior the any development in all types of A zones except A99. Lenders must also require the purchase of flood insurance as a condition of any loan for buildings located in any type of A zone, including A99.

- 8) **Zone D** represents areas where no flood hazard analysis has been conducted. D zones are considered to be areas of possible but undetermined flood hazards.
- 9) **Zone B** is found on maps produced before 1986, and is labeled on newer maps as a shaded Zone X. It generally denotes the areas with a 0.2 percent annual chance of flooding, also known as the 500-year floodplain. It may also be used to indicate certain areas subject to the base flood where the average depths are less than one foot or areas where the contributing drainage area is less than one square mile. They can also be used to identify areas that are protected from the base flood event by an accredited levee or floodwall. Zone B and shaded Zone X are important when siting critical facilities.
- 10) **Zone C and unshaded Zone X** are areas generally considered to have minimal risk from flooding. They typically refer to those areas that are determined to be outside the SFHA. On FIRMs produced before 1986, these areas will be labeled as Zone C. FIRMs produced later will refer to these areas as an unshaded Zone X.





**A Letter of Map Amendment (LOMA).** A LOMA can be used to remove a single parcel or building from the SFHA. For buildings constructed before the publication of the first FEMA flood map that identified the structure as being in the SFHA, the property owner must show that the lowest ground elevation where it touches the foundation on the outside of the building – what FEMA refers to as the lowest adjacent grade – is above the base flood elevation. For structures built after the site was first designated as a SFHA, it must be shown that the lowest adjacent grade and the lowest floor – including basement – is above the base flood elevation. An entire lot or parcel can be removed from the SFHA by a letter of map change if the lowest ground elevation within the boundaries of the property is at or above base flood elevation. The services of a licensed professional engineer or surveyor are required to collect the elevation information needed to request a LOMA.

**Letter of Map Revision based on Fill (LOMR-F).** The Letter of Map Revision based on fill, or LOMR-F is appropriate when a structure or property has been elevated above the base flood elevation as a result of the proper placement and compaction of fill. For buildings, it must be shown that the lowest adjacent grade and the lowest floor – including the basement – is at or above the base flood elevation. To remove an entire property that has been filled from the SFHA by a LOMR-F, it must be shown that the lowest ground elevation within the boundaries of the property – and the lowest floor including the basement of any building located on the property – are located at or above the base flood elevation. Additionally, as part of the LOMR-F request, the community must sign a Community Acknowledgement Form stating that the land and any proposed structures that will be constructed on it will be reasonably safe from flooding. It is important to note that FEMA will not approve the request for LOMR-F if the property is located within the floodway.



**Letter of Map Revision (LOMR).** The last letter of map change, a letter of map revision, or LOMR, is less commonly used than the other two because it reflects changes to an effective FIRM that are based on revised hydraulic modeling or other analyses.

A LOMR is normally issued

- 1) After better data for hydraulic modeling becomes available,
- 2) After changes have been made to flood control structures such as dams and levees, or
- 3) After construction projects that alter the hydraulic characteristics of the stream channel and floodplain, such as bridges, culverts and channel realignment. A LOMR usually will not be focused on specific properties or structures. Because the revisions associated with a LOMR will often result in changes to the mapped floodplains, floodways and base flood elevations, FEMA includes an annotated map that documents those changes to those portions of the community's effective FIRM.



The types of floodplain development projects that would require a LOMR are often costly and, once completed, difficult to modify if FEMA fails to approve the request for LOMR. For this reason, FEMA provides a process where the technical analysis and documentation for a project can be submitted for review before the project is constructed. If FEMA agrees that the information provided correctly reflects the anticipated effects of the proposed project on the mapped floodplain, base flood elevation, and floodway, it will approve what is called a conditional letter of map revision, or CLOMR. The project can then be constructed as designed. In order to obtain the final LOMR, the applicant has 6 months from the completion of the project to provide FEMA with as-built plans showing that the finished project does not differ from the one originally approved by the CLOMR. Because it has the effect of changing the mapped floodplain, base flood elevation, and floodway shown on a community's effective FIRM, a request for LOMR or CLOMR must be signed by both a community official and the applicant.

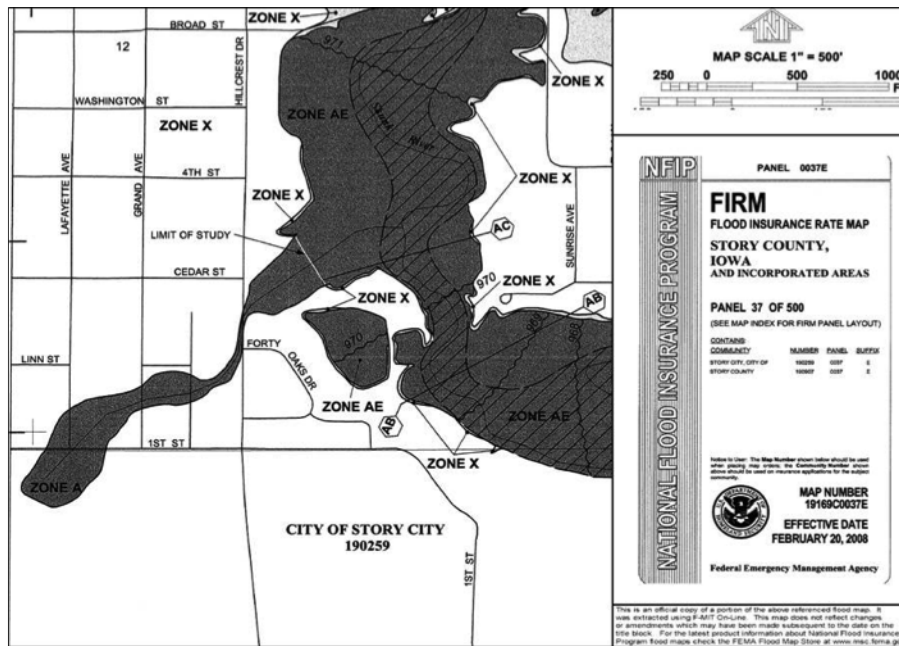
## LOMC: Documentation Needed to Apply

As of 2014, the documentation needed to apply for letters of map change is similar for each type. For most letters of map change, a landowner will need:

- 1) A FEMA application form; there are three different application forms, all of which are available on the FEMA website.

| <div> <div>LOMC</div> <div>Documentation Needed to Apply</div> </div> |                                                    |
|-----------------------------------------------------------------------|----------------------------------------------------|
| <div> <div>FEMA Application Forms</div> </div>                        | <div> <div>Letter of Map Change</div> </div>       |
| MT-EZ                                                                 | LOMA for a single lot                              |
| MT-1                                                                  | LOMA for multiple lots/structures, LOMR-F, CLOMR-F |
| MT-2                                                                  | LOMR, CLOMR                                        |

- 2) Supporting material that verifies the ground elevations for the property. This is usually obtained either from existing documents or by hiring a licensed land surveyor or registered professional engineer. If the letter of map change involves a building that was constructed after the community's FIRM date, an elevation certificate might be available through the local floodplain manager, previous seller or builder, or filed with the property deed.
- 3) Documentation that shows the surveyed location of the property, such as a copy of the plat map for the property or a copy of the deed in combination with a tax map or other suitable map.
- 4) Documentation that shows the location of the property on the effective FIRM, such as a photocopy of the relevant FIRM panel, or a FIRMette, created from the FEMA Map Service Center website.



**Letter of Map Amendment-Out as Shown (LOMA-OAS).** As was mentioned earlier, federally insured lenders must require the purchase of flood insurance as a condition of any loan for structures located in the SFHA. Occasionally, the lender mistakenly determines that a structure is located within the SFHA when the FIRM clearly shows that it is not. These types of problems are usually easy to correct. However, sometimes a lender will refuse to change its determination without a determination by FEMA that the structure is not in the SFHA. A letter of map amendment-out as shown, or LOMA-OAS, can be requested in situations where the entire structure is clearly shown on the effective FIRM as being outside of the SFHA.

| LOT | BLOCK | SUBDIVISION | STREET     | OUTCOME   | DATE OF REVIEW | FLOOD ZONE | 1% ANNUAL FLOOD PROBAB. ELEVATION (FEET) | ADJACENT FLOOD PROBAB. ELEVATION (FEET) | LOWEST ELEVATION (FEET) |
|-----|-------|-------------|------------|-----------|----------------|------------|------------------------------------------|-----------------------------------------|-------------------------|
| 12  | 12    | Tract 100   | 10th St NW | Structure | 8              | ---        | ---                                      | ---                                     | ---                     |

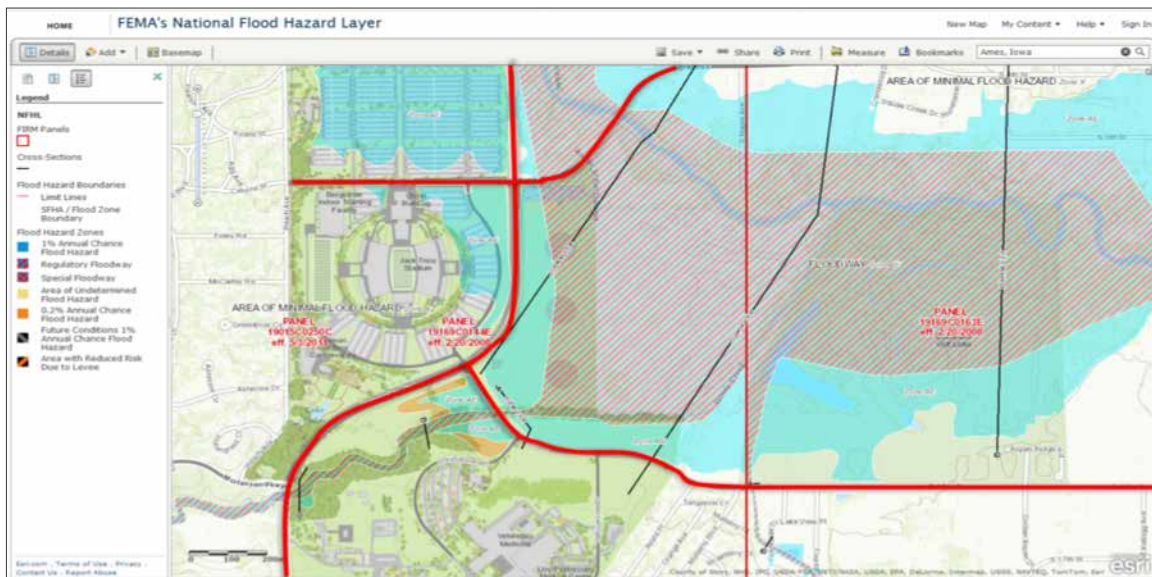
The LOMA-OAS is technically not a letter of map change because it does not actually revise the FIRM – it's simply used to make a determination as to whether a particular structure is located within the mapped SFHA. However, a request for LOMA-OAS is made using the same form used for the LOMA – the MT-EZ. The difference is in the information that is required for the request. If the structure is clearly shown as being outside the mapped SFHA, no survey information is required. Instead, the property owner submits information – including parcel maps and FIRMettes – that document the location of the structure in relation to the SFHA. Instructions for requesting a LOMA-OAS can be obtained from the Iowa Department of Natural Resources.

## Accessing Floodplain Maps and Creating FIRMettes

Flood maps are essential to the insurance and regulatory functions of the NFIP. Lending institutions and federal agencies use these maps to determine whether a property is eligible for certain types of loans or grants and to determine if the purchase of flood insurance would be a condition of a loan. Private citizens and insurance agents may also use these flood maps to identify properties at risk for flood damage. As a result, it is important that everyone know how to access FEMA flood maps. FEMA has made easy access to flood maps a priority and has put in place many options for finding flood maps.

**Community Map Repositories.** Paper copies of FEMA flood maps and flood insurance studies for your community can always be found at your community's map repository—this is usually your city hall or, if you live in an unincorporated area of the county, your county courthouse. The map repository address is sometimes printed on the flood map index of the FIRM.

**Digital Flood Insurance Rate Maps.** The costs associated with printing, storing, and distributing paper maps were once a substantial expense for FEMA. So, since 2003, most flood map products have been produced in a digital format. These Digital Flood Insurance Rate Maps – or DFIRMs – can not only be printed in paper format, but the DFIRM database can be used with a number of software products and online services. This makes it possible to overlay the DFIRM information with newer aerial photography or combine it with other community information layers, such as those for streets, soil types, and critical facilities. FEMA has combined the available DFIRM data for the entire nation into a national database, which is referred to as the National Flood Hazard Layer (NFHL).



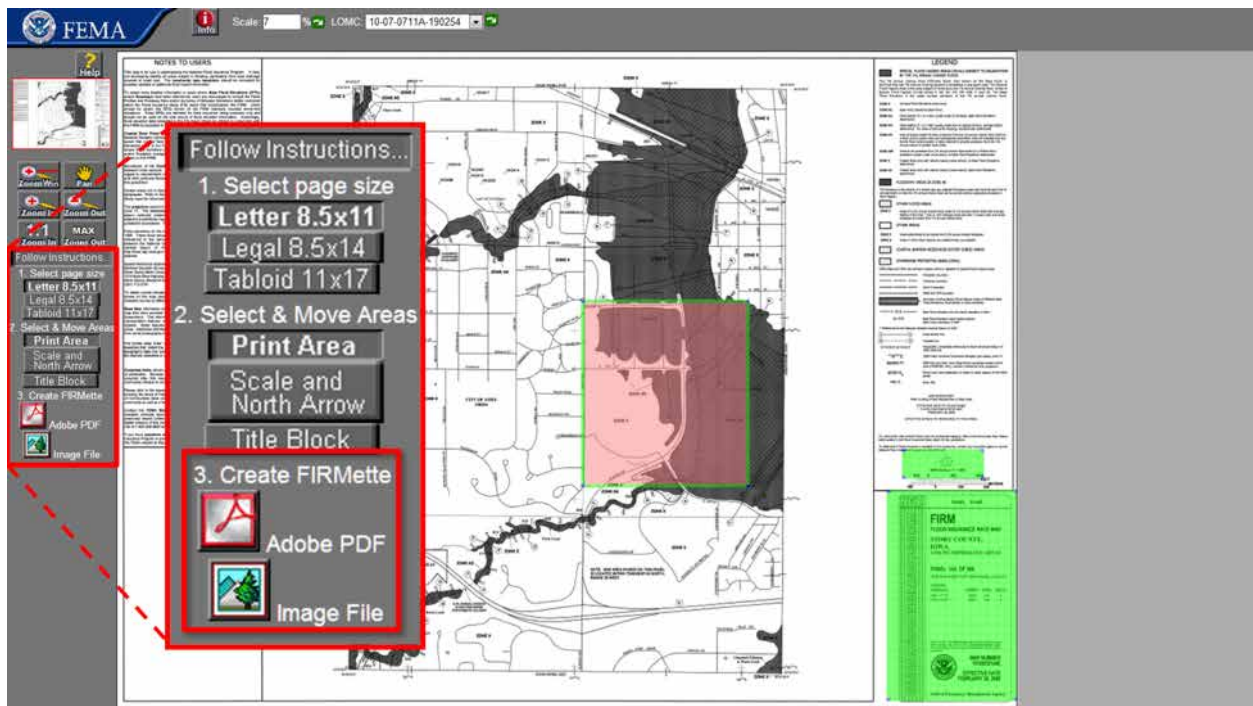


**FEMA Map Service Center.** FEMA created the FEMA Map Service Center at [www.msc.fema.gov](http://www.msc.fema.gov) as an online portal for accessing many mapping tools. The Map Service Center is a repository for both scanned copies of paper flood maps and tools for accessing DFIRM databases. The Map Service Center allows you to search for a particular flood map in a number of ways, including:

- 1) By a specific address,
- 2) By state, county, and community name,
- 3) By map panel ID number if it is known,
- 4) By Community ID number if it is known, using the Quick Order function, or
- 5) By using the “Map Search” function, which allows you to find a general location on a flood map by using land marks such as primary roads and rivers.

FEMA is continually changing and improving the features available at the Map Service Center. As a result, FEMA provides step-by-step tutorials for using most mapping tools on the Map Service Center website. Links to many of these tutorials can be found on the Map Service Center’s home page.

**FIRMettes.** A FIRMette is a section of a FIRM that you can print directly from the Map Service Center. Because a FIRMette is a same-scale snapshot of an official NFIP flood map it can be used for any legal purpose under the NFIP, such as when a copy of a flood map section is required for a Letter of Map Change. The map service center offers users the option to create a FIRMette free of charge. A step-by-step tutorial for creating FIRMettes is available on the Map Service Center website.



## FEMA GeoPlatform

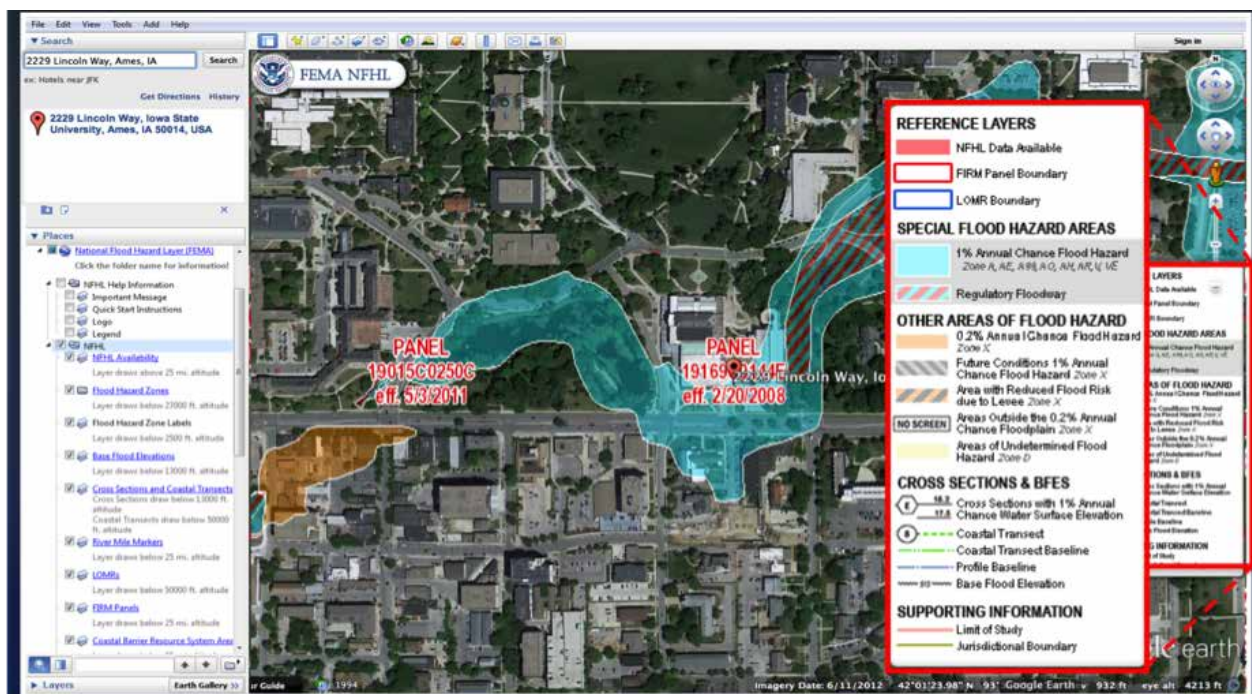
The FEMA GeoPlatform can be found at <http://fema.maps.arcgis.com/home/>. FEMA GeoPlatform allows users to assess their flood risk from within their web browser without having to download any additional software or data; however, the GeoPlatform only provides flood hazard information for areas where DFIRM products have been produced.

## Google Earth

Google has created a tool that integrates the NFHL data set with the features of Google Earth, called “NFHL.” This tool takes advantage of Google Earth’s unique and extremely user-friendly interface to allow users to explore flood hazards in their area. Users must first download Google Earth. After Google Earth is installed, the user will also need the “NFHL” data layer at <https://hazards.fema.gov>. Features that the NFHL data set illustrate include delineations of the floodway, the one percent annual and 0.2 percent annual chance flood hazard zones, locations of letters of map change, and labeled base flood elevations.

As with the FEMA GeoPlatform, Google Earth can only provide flood hazard information for areas where DFIRM products have been produced by FEMA. For more information about how to download and use Google Earth to view flood hazard data, FEMA has prepared a tutorial that can be found at the FEMA Map Service Center at <http://www.fema.gov/library/viewRecord.do?id=3289>.

An overview of FEMA’s Digital Flood Hazard Data Products and tools can be found at FEMA’s Map Service Center Website.







# Part V

## Regulation

### Overview of Regulatory Requirements

**Goals of NFIP floodplain regulation.** The primary goal of the NFIP is to reduce losses and damages that occur due to flooding. The primary method for accomplishing this goal is the establishment of minimum elevation and construction standards for all new and substantially improved existing buildings located in the SFHA. The intent of the NFIP's minimum standards is not to prohibit development, but rather to ensure that development will be constructed in such a way as to be protected from the base flood and to not increase flood hazards.

**Development.** A community participating in the NFIP must require a permit prior to construction of any development in the SFHA as identified on a FEMA flood insurance rate map. The NFIP's definition of development encompasses more than the construction of buildings. The NFIP defines development as "any man-made change to improved or unimproved real estate."

This definition is quite broad and includes not only activities such as the construction of buildings, bridges, roads, levees, and water treatment facilities, but also most modifications to the land itself. Common activities that fall under the definition of development include:

- 1) The construction of new structures,
- 2) Modifications to existing structures,
- 3) Fencing,
- 4) Paving,
- 5) Land clearing, filling, grading, and driving of piles,
- 6) Permanent storage of materials and/or equipment, and
- 7) Excavation, drilling, mining, or dredging.

### Federal and State Floodplain Regulation

Responsibility for regulating development in the floodplain is shared among federal, state, and local governments.

The IDNR has regulatory authority for floodplain development at the state level. A state floodplain development permit from the IDNR is typically required for most types of development located in the floodplain of any stream in a rural area, where the size of the watershed for the stream above the location of the development is more than ten square miles. In an urban area, a permit is required where the size of the watershed for the stream above the location of the development is more than two square miles.

Projects that require a DNR floodplain development permit may also require a Sovereign Lands Permit from the Iowa DNR and a Clean Water Act Section 404 permit from the US Army Corps of Engineers. The Corps is responsible for regulating all construction activities in navigable waterways and the discharge of dredged or fill materials into rivers, lakes, streams, and adjacent wetlands. A joint permit application form has been created that allows individuals to apply for both state permits from the IDNR and Section 404 permit from the Army Corps of Engineers at the same time.



Information about the joint application process can be found at <http://www.iowadnr.gov/InsideDNR/Regulatory-Land/FloodPlainManagement/FloodPlainDevPermits.aspx>.

The IDNR has created a website that provides permit determination checklists for common types of development projects in the floodplain. These checklists can help individuals assess whether a DNR floodplain development permit will be required for their particular type of project. And, if it is determined that an IDNR floodplain permit is required, the checklists also outline the information that's required to be submitted with the application. See also <http://www.iowadnr.gov/InsideDNR/RegulatoryLand/FloodPlainManagement/FloodPlainDevPermits/DeterminationChecklist.aspx>.

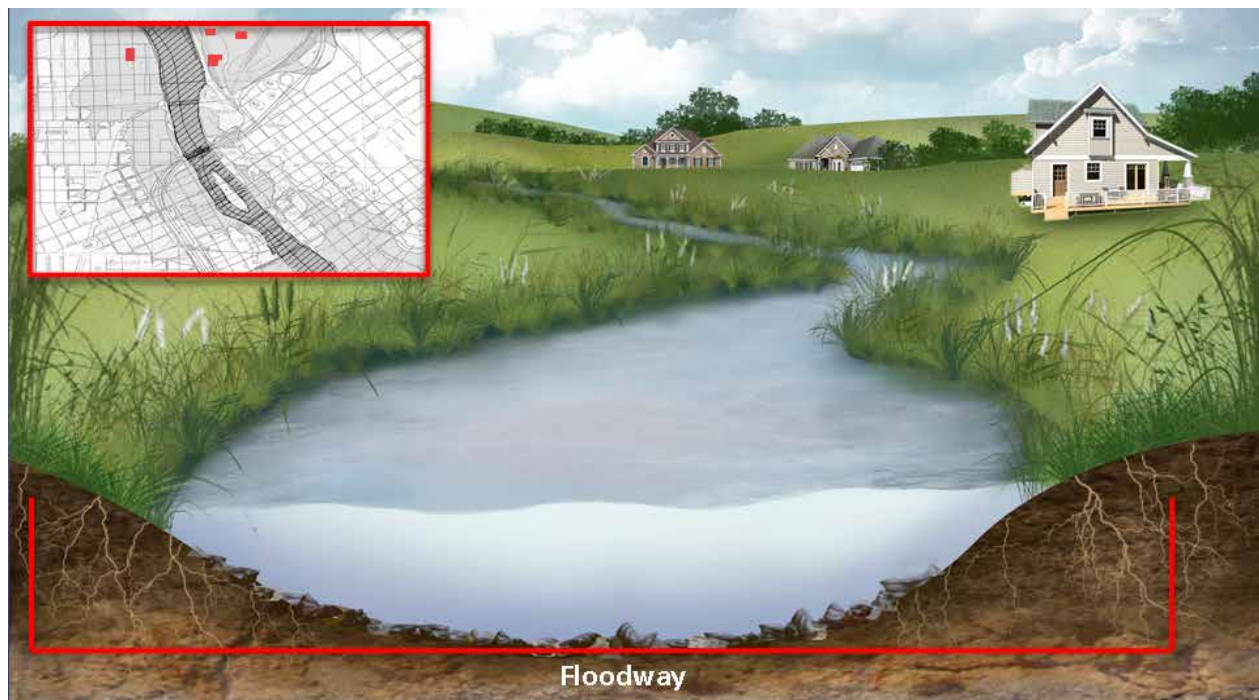
## Local Floodplain Development Regulations

In order for a community to participate in the NFIP, it must adopt a floodplain management ordinance that meets the minimum requirements of both FEMA and the state of Iowa. The floodplain management ordinance requires an NFIP community to establish a local permitting process for any development that occurs in the mapped SFHA. Prior to the start of any development in the SFHA, all necessary federal, state, and local development permits must be obtained.

**Permitting development.** The NFIP defines development as “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, drilling operations or storage of equipment or materials”. As you can see, this definition is quite broad. Any development proposed to be located in the SFHA requires a floodplain development permit from the local community. The community's ordinance requires that development in the SFHA must also obtain all other necessary permits from federal, state and local governments before construction begins. A floodplain development permit is required from the Iowa Department of Natural Resources for most types of floodplain development.

The DNR can delegate a portion of its permit authority to communities that have a detailed flood insurance study. Communities that have been granted delegation of authority can issue permits in lieu of the IDNR for most forms of development such as the placement of structures, fill, and water or wastewater treatment facilities. However, in the case of most communities, both a local and IDNR permit will be required prior to development. A community can contact the IDNR's floodplain management program to determine if it has been granted delegation of authority.

**Development in the floodway.** The floodway is the portion of the floodplain that must be left unobstructed to allow the discharge of the base flood event without increasing flood heights. And, while development can be allowed in the floodway, it cannot result in any increase in the base flood elevation.



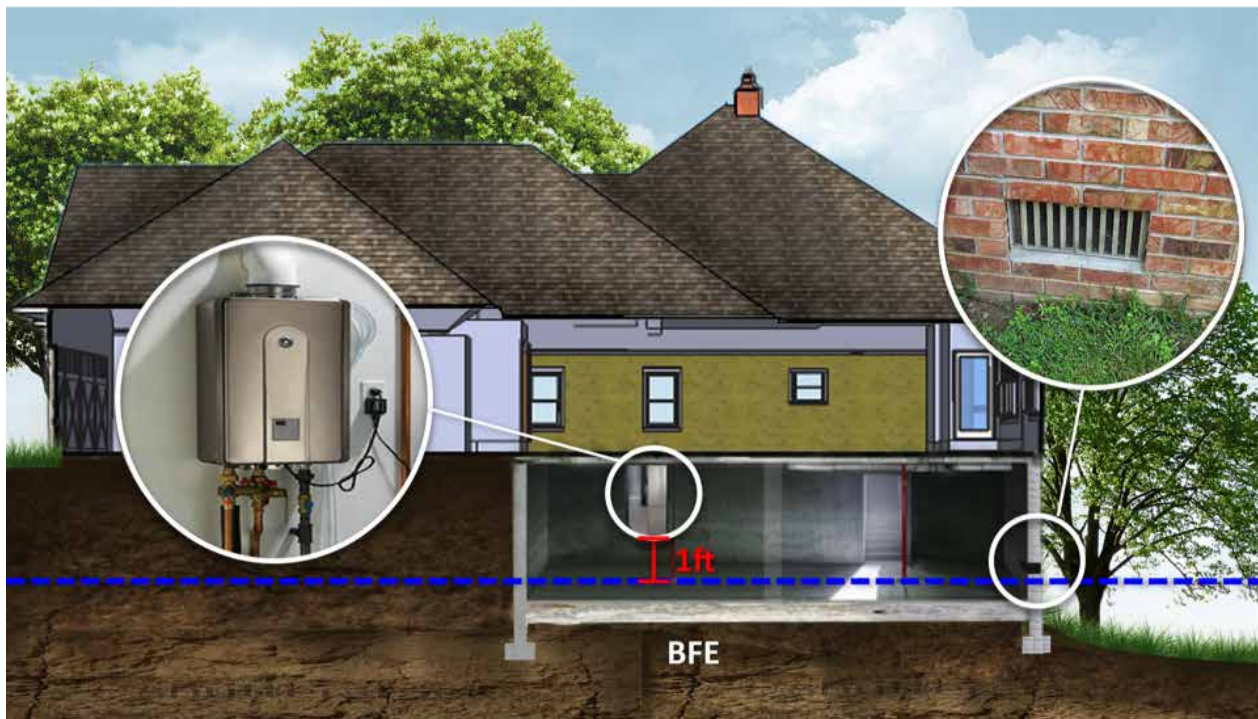
Local ordinances typically permit activities such as agricultural uses, recreational uses such as golf courses, residential uses such as lawns and parking areas, and other open space uses similar to those just mentioned, so long as they do not include the placement of structures, fill, and other obstructions in the floodway. Other types of development may only be allowed when it is demonstrated that they will not result in any increase in flood stages. Applications for proposed development in the floodway must include certification by a registered professional engineer that the project will result in “no-rise” in the base flood elevation. A no-rise certificate ensures that the development project will not increase flood heights.

Not all FIRMs include the delineation of a floodway. The community’s floodplain management ordinance will state that in those circumstances the IDNR should be contacted to determine the location of the floodway.

**Development in the floodway fringe.** The floodway fringe is that portion of the identified SFHA located outside of the floodway. Local regulations allow most types of development in this area, provided that the development satisfies the criteria outlined in the community’s floodplain management ordinance. The criteria are designed to ensure, among other things, that the development will not be damaged by the base flood event.

Elevation is one method that is used to protect buildings located in the floodway fringe from damage by flood and is the only acceptable method for protecting new or substantially-improved residential structures. The community’s floodplain management ordinance requires that the lowest floor for residential structures, including recreational cabins and factory built homes, must be elevated at least one foot above the base flood elevation. The NFIP considers the floor of a building’s lowest enclosed area, including basement, to be the lowest floor for both regulatory and insurance rating purposes.

Elevation is typically achieved through the use of fill, piers, posts, or columns. The lowest floor can also be elevated on walls, crawlspaces, or other similar above-ground enclosures. However, in order for these enclosures to not be considered lowest floor:



- 1) They must be constructed using materials, such as concrete, that are resistant to damage by flood,
- 2) The enclosed area must be unfinished (no carpet, paneling, or drywall) and used solely for low damage potential uses such as parking, building access, or storage,
- 3) Utilities such as furnaces, electrical circuit breakers, and hot water heaters must be elevated at least one foot above base flood elevation,



- 4) Walls must include openings or vents placed on at least 2 walls that are sufficient to allow water to automatically enter and exit the building to help reduce hydrostatic pressure on the structure (doors and windows are not acceptable openings as they do not automatically allow water to flow into and out of the enclosure),  
  
and
- 5) The enclosed area must not be a “basement” as defined by the NFIP.

The NFIP defines a basement as any enclosed area of a building, including any sunken room or sunken portion of a room, which has a floor that is below ground level on all four sides. This is important because what is typically referred to as a “walkout basement” is not considered to be a basement as defined by the NFIP, meaning it can be designed and constructed to satisfy the previously discussed criteria for an enclosure below the lowest floor.



To ensure that a building has been constructed in compliance with these elevation requirements, communities require the individual proposing the development to provide an elevation certificate. An elevation certificate is a document completed by a licensed surveyor or engineer that attests that the lowest floor of the structure is elevated at least one foot above base flood elevation. In the case of structures elevated on a crawlspace or other enclosure, it also confirms whether utilities have been properly elevated and that sufficient vents or openings have been installed in the walls. This information can then be used to ensure compliance with the local floodplain management ordinance or to establish flood insurance premiums. Not all FIRMs provide base flood elevations. In areas where a FIRM does not provide base flood elevations, the community’s local floodplain management ordinance will state that the IDNR should be contacted to determine base flood elevations for that area.

For non-residential buildings, structural flood-proofing methods are an acceptable option for providing flood protection. In order for a structure to be considered structurally flood-proofed, it must be designed, along with utilities and sanitary facilities, to be watertight. The structure’s walls and floors must also be designed to resist the buoyant and dynamic forces associated with the base flood plus one foot. To ensure that proposed flood-proofing measures satisfy these criteria, communities require the individual proposing the development to provide a flood-proofing certificate.

**Accessory structures and recreational vehicles.** Certain accessory structures, such as residential detached garages or sheds, may be exempted from building elevation requirements if they meet certain criteria. Eligible structures may not be used for human habitation, must be designed to have a low flood damage potential, be firmly anchored to prevent flotation, and placed on the site in a way that creates minimal resistance to flood waters.

Recreational vehicles can also qualify for an exemption from elevation requirements. A recreational vehicle is defined as a vehicle that has been built on a single chassis, that is 400 square feet or less in size, and that is self-propelled or

towable. To qualify for an exemption from the elevation requirements, a recreational vehicle must be fully licensed and ready for highway use, and located on one site for less than 180 consecutive days. A recreational vehicle is considered to be ready for highway use when it is on its wheels or jacking system and only attached to the site by quick-disconnect type utilities and has no permanently attached additions. If a recreational vehicle does not meet all of these conditions, then it must comply with extensive elevation and anchoring requirements to ensure that it is protected from the base flood event.

## Substantial Damages and Substantial Improvements

The regulation of new development has already been discussed previously, including the construction of new buildings, in the SFHA. But what happens when the owner of an existing building located in the SFHA wants to make improvements to his building? Local floodplain management ordinances also regulate improvements, repairs, and reconstruction of existing buildings in the SFHA.

**Substantial improvement.** The National Flood Insurance Program defines substantial improvement as any repair, reconstruction, or improvement to a structure for which the cost equals or exceeds 50 percent of the market value of the structure before the start of construction.



Substantial improvements can include remodeling projects, building additions, or rehabilitation projects. In Iowa, a substantial improvement also includes any addition that increases the original floor area of a building by 25 percent or more. All additions constructed after the effective date of the community's first Flood Insurance Rate Map are counted cumulatively in determining whether the total increase in original floor area will exceed 25 percent. If a building is being substantially improved, it becomes subject to the requirements of the community's floodplain management regulations. In the case of most buildings, this will require that the building's lowest floor—including basement—be elevated so that it is at least one foot above base flood elevation. Although elevating a building to comply with this requirement will result in additional expense, it is also one of the most effective means of reducing the risks of future flood-related damages.

**Substantial Damage.** Closely related to the definition of substantial improvement is that of substantial damage. Substantial damage is defined as any damage that occurs to a structure—regardless of the cause—where the cost to repair the structure to its pre-damage condition equals or exceeds 50 percent of the market value of the structure prior to the damage.





If a structure is substantially damaged, it must be repaired in compliance with the requirements of community's floodplain management regulations for new buildings. As was discussed in the previous section on substantial improvements, this will typically require elevating the structure's lowest floor—including basement—to at least one foot above the elevation of the base flood event.

Owners of historic structures located in the SFHA that wish to undertake a construction project that would qualify as a substantial improvement may be exempt from complying with a community's floodplain management regulations for new buildings if three conditions are satisfied:

- 1) First, the historic structure must be registered on either a national registry or a federally-certified local or state inventory.
- 2) Second, the improvements or alterations must not preclude the structure's continued designation as a historic structure.
- 3) Finally, all possible flood damage prevention measures must be incorporated into the project such as relocating all mechanical and electrical equipment above the base flood elevation.

**Determining market value.** To determine whether a structure has been substantially damaged, or whether a project will result in a substantial improvement to a property, the local community must first determine the structure's market value. Market value is typically defined as the amount an owner would be willing, but not obliged to accept, and a buyer would be willing, but not compelled to pay for the structure. The market value of a structure can be obtained from a number of different sources, two of which include

- 1) An independent appraisal by a licensed appraiser, or
- 2) The tax assessed value minus the value of the land.

**Determining cost of improvement or repair.** The NFIP considers the cost of improvement to a structure to be the fair market value of all materials and labor involved with the project, and the cost to repair a damaged structure to be the cost required to restore the structure to its pre-damage condition. Even if materials or labor are donated or discounted, or if the property owner intends to do some of the work himself, the fair market value of the materials or labor should be used to determine the cost of improvement or repair. These costs may be obtained from sources that include

- 1) A contractor's itemized repair estimate,
- 2) The NFIP Proof-of-Loss Statement, or
- 3) Qualified repair estimates from the community's Building Department. Items that are excluded from the calculation of the cost of improvement or repair include plans and specifications, survey costs, permit fees, debris removal (including hauling fees), landscaping, sidewalks, and fences.

Several issues commonly arise when estimating the cost of improvements or repairs. First, when calculating the cost to repair a damaged structure, it is important to include all costs required to restore it to its pre-damaged condition, even if the property owner does not intend to make all repairs at that time. Additionally, the cost of any additional improvements to the structure that the property owner intends to make along with the repairs must also be included in the total cost of the project. Second, property owners will sometimes try to avoid reaching the 50 percent threshold by applying for a permit for only part of an improvement project, then later applying for a second or even third permit to finish the project. FEMA, however, requires that the entire improvement project be counted as one, even if it is accomplished through several permit applications. Third, a property owner may carry out several different repair or improvement projects to the same structure over several years without triggering the need to meet current standards. This has the potential to greatly increase the total damages incurred in a future flood event. To avoid this, a community may include in their regulations a provision for counting improvements and repairs cumulatively.

**Increase Cost of Compliance (ICC) coverage.** A common challenge for owners of substantially damaged structures is the expense of complying with the community's floodplain regulations. However, buildings covered by a standard flood insurance policy may benefit from what is known as Increased Cost of Compliance Coverage, or ICC. When an insured building sustains a direct physical loss due to flooding, and the community determines that the building has been substantially damaged, ICC coverage can provide up to \$30,000 towards the cost of bringing the structure

into compliance with the community's floodplain management regulations. ICC coverage can be applied to the cost to elevate the structure, move it out of the SFHA, or to demolish it. However, in order to be eligible for ICC benefits, the building must be located in the SFHA identified by the community's FIRM. Buildings located in Zones B/C or X are not eligible for ICC benefits.

## Local Floodplain Regulations: Variances

If the community denies a permit for a proposed development because it does not satisfy the requirements of its floodplain management regulations, the applicant has the option of requesting relief or exception from the requirements of those regulations. This is known as requesting a variance.

**The variance process.** Each community has in place a board whose responsibility it is to review requests for variance. In communities with zoning based regulations, variance requests are typically heard by the board of adjustments. In other communities, they may be heard by the City Council or, in the case of counties, the Board of Supervisors.

The image shows three pages of a 'Flood Plain Variance' application form. Page 5 is the title page with the heading 'Flood Plain Variance' and 'Supporting Information'. It includes a note that the form must be filled out completely before the application will be accepted. It also states that the Zoning Board of Adjustment may authorize, in specific cases, such variances from the terms of the flood plain ordinance as will not be contrary to the public interest, where owing to special conditions a strict enforcement of the provisions of the ordinance will result in unnecessary hardship. In order to facilitate review of the application for a Flood Plain Variance, the applicant must address each of the 'Standards' set forth in Section 9.73(6) of the Municipal Code, which are listed below. A note indicates that the applicant's explanation of how the request meets each standard may be attached on a separate sheet if sufficient space is not provided. Page 6 contains criteria (b) and (c). Criterion (b) lists three conditions: (i) A showing of good and sufficient cause; (ii) A determination that failure to grant the variance would result in an unnecessary hardship to the applicant; and (iii) A determination that the granting of the variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, or cause fraud on or victimization of the public. Criterion (c) states that a variance shall only be granted upon a determination that the variance is the minimum necessary, considering the flood hazard to afford relief. Page 7 contains criteria (d) and (e). Criterion (d) lists two conditions: (i) In cases where the variance involves a lower level of flood protection for buildings than what is ordinarily required by this ordinance, the applicant shall be notified in writing over the signature of the Zoning Administrator that: (1) The issuance of a variance will result in increased premium rates for flood insurance up to amounts as high as \$25 for \$100 of insurance coverage; and (2) Such construction increases risks to life and property. Criterion (e) states that all variances granted shall have the concurrence or approval of the Department of Natural Resources. Upon receipt of the Decision and Order from the Zoning Board of Adjustment, the applicant is responsible for submitting all applicable information for concurrence or approval from the Department of Natural Resources. No building permit or zoning permit will be issued until the City receives confirmation of concurrence or approval from the Department of Natural Resources.

A property owner wishing to request a variance must submit their application to the local floodplain manager, who will forward it to the board and schedule a public hearing on the application. At the hearing, the property owner will be given an opportunity to present their case for why they believe the project should not be required to satisfy the requirements of the floodplain ordinance. Individuals with an interest in the outcome of the process—such as the local floodplain management official, owners of neighboring properties, city or county engineers, or others—are also given an opportunity to present their views and information. The board then considers all the testimony and materials submitted during the hearing and makes a decision as to whether the property owner sufficiently justified the granting of a variance for their proposed development. The Iowa Department of Natural Resources, or IDNR, must also review and approve all variances granted by local boards.

**Considerations for granting a variance.** The community's floodplain management regulations include criteria that must be considered when deciding whether or not to grant a variance. Among those criteria are

- 1) A showing of good and sufficient cause;
- 2) A determination that failure to grant the variance would result in exceptional hardship to the applicant; and
- 3) A determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

**Good and sufficient cause.** The community's floodplain management regulations do not anticipate every imaginable situation. And so, the variance process allows an applicant to request an exception for a unique situation. However, the variance must pertain to the land itself—not to the structure, its inhabitants, or the property owner and should not be granted for an issue that can be resolved through other means such as building elevation, even if the alternative is more expensive.

**Exceptional hardship.** A variance should only be granted in situations where a property has physical characteristics so unusual that complying with the ordinance would create an exceptional hardship on the applicant.

Those characteristics should be unique to that property and not be shared by adjacent parcels. Otherwise, similarly situated properties would also be eligible for a variance, which defeats the purpose of the community's floodplain management ordinance. Again, the unique characteristics must pertain to the land itself, not the structure, its inhabitants, or the property owner. The hardship that would result from failure to grant the requested variance must be exceptional, unusual and peculiar to the property involved. Economic or financial hardship, inconvenience, aesthetics, physical handicaps, or personal preferences cannot, as a rule, qualify as exceptional hardships.

**Minimum necessary.** A variance should be a request to vary from the requirements of the community's floodplain ordinance, not to ignore them. For this reason, any variance granted should allow only the minimum necessary deviation from the normal requirements. In the case of a request for a variance from building elevation requirements, this would mean that the variance would not grant permission to construct the lowest floor at grade, but to the level that both provides relief for the applicant while still preserving the integrity of the floodplain ordinance.

**Variances in the floodway.** There are additional considerations associated with variance requests for development located in the floodway. The floodway is that portion of the SFHA that must be left unobstructed to allow the discharge of the base flood event without increasing flood heights. Variances should not be granted for any development within the floodway that would result in any increase in the elevation for the base flood event.



**Situations where a variance might be justified.** Unusual and peculiar physical characteristics of a property may provide instances under which a local community could justify granting a variance request. Some of those physical characteristics of a property may include

- 1) An irregularly shaped lot;
- 2) A parcel with unstable soils; or
- 3) A parcel with unusual geologic conditions below ground.

The following are examples of situations where a variance from the building elevation requirements would not be justified:

- 1) When the property owner cannot afford to comply with the regulations.
- 2) When the elevated building will look different from the others in the neighborhood.
- 3) When the owner cannot climb up steps into an elevated building or addition.

**Impacts of variances.** A variance granted by a community from the building elevation requirements of its floodplain ordinance will not affect the methods used to determine flood insurance rates. And, the increased risk associated with a non-compliant structure will be reflected in higher annual flood insurance premiums. For this reason, whenever the community grants a variance from the normal building elevation requirements, it should inform the property owner that the building will be subject to increased flood insurance rates that could potentially be as high as \$25 per \$100 in coverage.

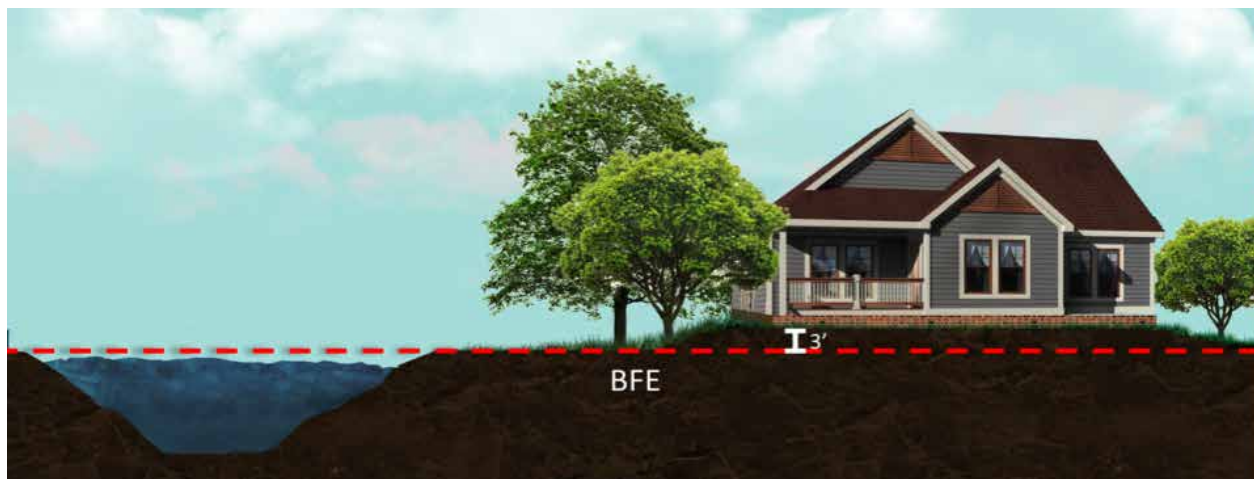
The granting of variances from the community's floodplain ordinance should be a rare occurrence. If FEMA discovers that a community is routinely granting variances that are inconsistent with the objectives of its floodplain ordinance and the NFIP, the community can be subject to probation or suspension from the NFIP. Also, as mentioned earlier, variances from the community's floodplain ordinance requires the approval of the IDNR.

## Local Floodplain Regulations: Beyond Federal and State Minimum Standards

The National Flood Insurance Program, or NFIP, has been effective in requiring development to be protected from damage associated with the base flood event; however, larger floods can and often do occur. In just the last 20 years a number of Iowa communities have been severely impacted by floods that significantly exceeded the base flood event. In light of this, several Iowa communities have chosen to adopt floodplain development standards that exceed the minimum requirements of both the NFIP Iowa Department of Natural Resources.

**Elevation of buildings – freeboard.** The current requirement in Iowa is that the lowest floor of new and substantially improved buildings located in the SFHA must be constructed at least one foot above the base flood elevation. The building elevation requirements in Iowa are more stringent than those of the national flood insurance program, which only requires the lowest floor to be elevated to the base flood elevation. The additional one foot above the base flood elevation required by the state of Iowa is known as freeboard, which is defined by the NFIP as a safety factor above a flood level for floodplain management purposes.

Freeboard is the most common higher regulatory standard adopted by states, and by communities that want to provide a margin of safety against flood risks. Requiring freeboard above the base flood elevation can help protect buildings from floods that are larger than the base flood event. Additionally, requiring freeboard above the base flood elevation may also help better protect floor joists, ductwork and insulation located underneath a structure's lowest floor. It may also compensate for the uncertainties associated with hydraulic and hydrologic modeling and in the limitations of mapping. The extra cost of elevating an additional foot or two above the base flood is often minimal when compared to the total costs of construction. In return, however, the property owner will experience significantly lower flood insurance rates due to the reduced flood risk. As of 2013, seven Iowa communities have elevation requirements for new and substantially improved buildings that exceed the minimum Iowa requirement of one foot above the base flood elevation. Six of those communities required three feet of freeboard above the base flood elevation.





**Cumulative substantial improvement calculation.** The NFIP defines the term “substantial improvement” to mean any improvement to a structure, the cost of which is 50% or more of its market value before the start of construction. The community’s floodplain ordinance requires that substantially improved structures must be brought into compliance with the elevation or flood-proofing requirements for new construction. Over the years, a community may issue a succession of permits for various minor improvements to the same structure without triggering the need for it to satisfy the elevation requirements of the community’s floodplain regulations. This has the potential to greatly increase the total damages incurred in a flood event. To counter this, some communities instead require that the cost of improvements be counted cumulatively over 5 or 10 years, or the life of the structure. If the cumulative cost of improvements made during that period of time equal or exceed 50% of the structure’s market value, the structure must be brought into compliance with the elevation requirements for new construction.



**Cumulative substantial damage.** The NFIP defines substantial damage to mean damage to the structure by any origin where the cost to repair the structure to its pre-damage condition is 50 percent or more of its market value before the damage occurred. The community’s floodplain ordinance requires that substantially damaged structures must be brought into compliance with the elevation or flood-proofing requirements for new construction. It is not uncommon for there to be structures within a community that are regularly damaged by flood, but where the cost to repair those structures after each event never reaches 50% of their market value. Such structures often deteriorate over time.

The solution some communities have chosen to deal with these types of structures is to revise the definition of substantial damage in their floodplain ordinance to cumulatively track a structure’s repair costs over a multi-year period—typically 10 years. And, if the structure’s cumulative repair costs during that period of time equals or exceeds 50% of its market value, it is required to comply with the elevation requirements of a new building. As of 2013, there are 16 Iowa communities that have revised the definition of substantial damage in their floodplain ordinance to cumulatively track repair costs over a multi-year period.

**Beyond the base flood.** The 1% chance, or 100-year frequency flood, is the NFIP’s current standard for floodplain management purposes. The 1% chance flood was adopted by the NFIP as a compromise between smaller, more frequent flood events, such as a 10% chance flood, and larger, more infrequent events. However, in a report prepared for the Iowa legislature following the 2008 floods, Iowa’s Water Resources Coordinating Council, or WRCC, offered several recommendations for reducing the state’s vulnerability to damage by flood. Among them was a recommendation that Iowa adopt the 500-year flood, also known as the two-tenths percent chance flood, as the event to which new development must be protected. This is the flood event that is represented on FIRMs for communities with detailed flood insurance studies as a shaded Zone X. On older FIRMs published before 1986, it is represented as Zone B.



The legislature did not adopt many of the WRCC's recommendations during that session. However, several Iowa communities saw the wisdom of its recommendations and revised their floodplain ordinances to regulate development within the two-tenths percent chance floodplain, and to require that the lowest floors for all new and substantially improved structures be elevated a minimum of one foot above the two-tenths percent chance flood elevation. Regulating development to protect from the two-tenths percent chance flood is an effective way to reduce future losses and may also help to account for changes in the community's vulnerability to flood resulting from potential future climate variability.

***Higher regulatory standards and the Community Rating System (CRS).*** The NFIP's Community Rating System, or CRS, is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. It accomplishes this by awarding points to a community for activities that FEMA has determined to reduce flood damages. The more points earned by the community, the larger the premium discounts for those residents carrying flood insurance. The CRS will be discussed in greater detail in Part VI.



# Part VI

## Flood Insurance

### Mandatory Purchase of Flood Insurance

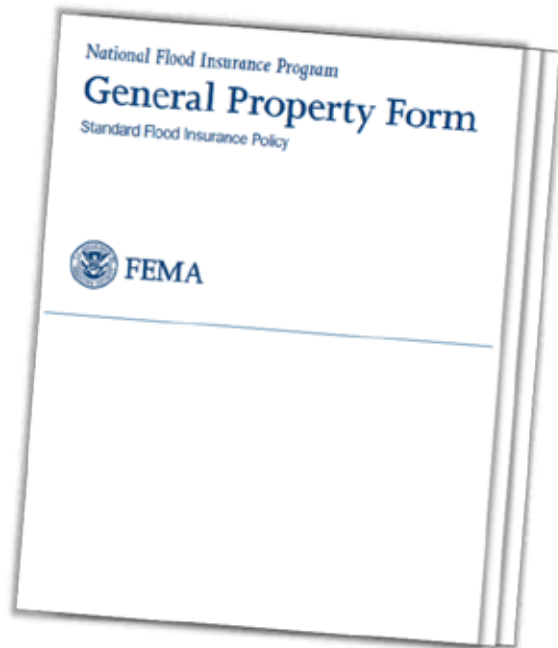
In the early years of the National Flood Insurance Program, very few communities participated in the NFIP, and many owners of flood-prone properties chose not to purchase flood insurance. Instead, they relied on federal disaster assistance to pay for their recovery. The Flood Disaster Protection Act of 1973 helped change this. The Act mandates that federally regulated, supervised, or insured financial institutions and Federal Agency lenders require borrowers to purchase flood insurance for buildings located in the SFHA of a community participating in the NFIP. The National Flood Insurance Reform Act of 1994 further reinforced this requirement by establishing penalties for mortgage lenders that do not comply with the 1973 Act's mandatory flood purchase requirement.

It is the responsibility of lenders to use the current effective flood insurance rate maps to determine whether a building is in a SFHA and therefore subject to the mandatory purchase requirement. Although not required by the NFIP, some financial institutions require flood insurance for properties located outside the SFHA as part of their own risk management process. Lenders make this decision based on the lender's potential exposure to flood risks. Studies have shown that more than 20 percent of NFIP claims come from losses to properties located outside of the mapped SFHA.

### Insurable / Uninsurable Property

**What can be insured.** Flood insurance can be purchased to protect two types of insurable property:

- 1) Buildings
  - and
  - 2) The contents located within insurable buildings.
- Insurance policies for buildings and contents can be purchased separately. The mandatory purchase requirement discussed previously applies to buildings and also to any building contents used as collateral for the loan. That being said, FEMA encourages people to purchase both types of coverage even when it is not required as a condition of a loan transaction.



**Buildings.** A building eligible to be insured under the NFIP is a structure that is principally above ground and affixed to a permanent site. Fifty-one percent of the value of the structure must be above ground. The structure must also have two or more outside rigid walls and a fully secured roof. With few exceptions, flood insurance cannot be purchased for buildings located entirely over water. Manufactured homes that are affixed and anchored to a permanent foundation are considered "buildings" and are eligible for coverage. Building coverage includes:

- 1) The insured building and its foundation elements;
- 2) The electrical and plumbing system;
- 3) Utility equipment, such as furnaces, water heaters, and central air conditioning equipment;
- 4) Large appliances, such as refrigerators and cooking stoves, and built-in appliances, such as dishwashers; and
- 5) Permanently installed carpeting over unfinished flooring.

**Contents.** Flood insurance can be purchased for personal belongings located within an insurable building. This is commonly referred to as contents coverage. Contents coverage includes such items as:

- 1) Clothing, furniture, and electronic equipment;
- 2) Curtains;
- 3) Portable and window air conditioners;
- 4) Portable microwaves and dishwashers;
- 5) Carpeting that is not already included in property coverage; and
- 6) Clothing washers and dryers.

Renters can insure the contents of an eligible building, even if the owner of the building has not insured the building itself. Business owners can also purchase contents coverage for their machinery, equipment, stock, and other property used in their business.



**Items not insured by flood insurance.** NFIP flood insurance covers only buildings and contents. It does not cover land, property, and belongings outside of a building such as trees, plants, driveways, sidewalks, wells, septic systems, decks, patios, fences, seawalls, hot tubs, swimming pools, or most self-propelled vehicles, such as cars and motorcycles. Other losses specifically excluded from flood insurance coverage include:

- 1) Animals and livestock;
- 2) Licensed vehicles;
- 3) Currency, precious metals, and valuable papers, such as stock certificates;
- 4) Living expenses such as temporary housing;
- 5) Damages caused by moisture, mildew, or mold that could have been avoided by the property owner; and
- 6) Financial losses caused by business interruption or loss of use of insured property.

**Coverage for basements.** Under the NFIP, a basement is any area of the building, including any sunken room or sunken portion of a room, that has its floor below ground level on all sides. At one time, the NFIP provided full coverage for items located in basement areas of buildings. However, a 1982 study performed by the Federal Insurance Administration determined that, while policies for buildings with basements accounted for less than 16% of all flood insurance policies, they were responsible for the majority of losses. Since October 1, 1983, coverage for basements has been limited to specific items. Building coverage in basements generally is limited to:

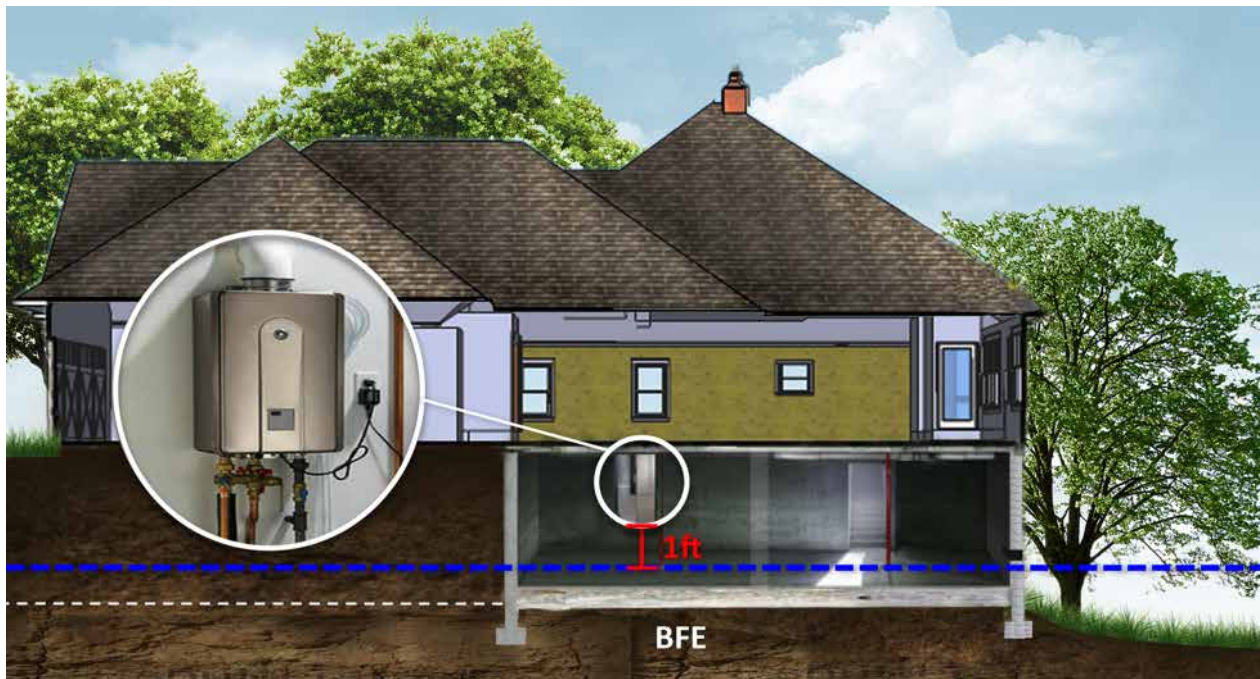
- 1) Foundation elements;
- 2) Essential building equipment such as the furnace, hot water heaters, water softeners, central air conditioners, and heat pumps;
- 3) Electrical wiring and circuit breaker boxes; and
- 4) Fiberglass insulation and unfinished drywall and sheetrock.

For a complete list of basement items covered by building coverage, viewers should review the NFIP Standard Flood Insurance Policy. If contents coverage is purchased, the washer, dryer, and food freezer located in the basement are also covered. However, personal belongings, such as furniture or electronic equipment, located in a basement or improvements made to basements, such as carpeting, finished walls, floors, or ceilings, are not covered under either building or contents coverage.

People are often surprised to learn that the coverage limitations that apply to basements do not apply to what is typically referred to in the Midwest as a walkout basement. This is because unlike a basement, the floor of the typical walkout is not below grade on all four sides and has at least one outside door opening onto ground that is at or below the finished floor level.

**Coverage for enclosures below lowest floor.** Coverage limitations also apply to enclosures used to elevate the lowest floor of the structure above the base flood elevation. These enclosures must be constructed using materials resistant to flood damage, must incorporate vents that allow flood waters to automatically enter and exit the enclosure, and must be unfinished and used solely for low damage potential uses. Additionally, any utilities such as furnaces, electrical circuit breakers, and hot water heaters that are located in the enclosure must be elevated at least one foot above base flood elevation. Because the community's floodplain regulations restrict the design and use of these enclosures flood insurance coverage is generally limited to:

- 1) Foundation elements;
- 2) Essential building equipment such as the furnace, hot water heater, water softener, central air conditioner, and heat pump; and
- 3) Electrical wiring and circuit breaker boxes.



**Coverage minimums and maximums.** If flood insurance is required by a lender through the mandatory purchase requirement, then at a minimum, the building coverage purchased must be at least equal to the lesser of:

- 1) The outstanding principal balance of the loan,
- 2) The total insurable value of the property, or
- 3) The maximum coverage limits available under the NFIP.

However, the lender has the discretion of requiring more than the minimum amount of coverage required by the mandatory purchase requirement. Of course there is no minimum coverage amount required if flood insurance is being purchased voluntarily. As of 2014, NFIP's maximum building coverage limits are \$250,000 per unit for residential buildings and \$500,000 per unit for non-residential buildings. Maximum coverage limits for contents are \$100,000 per unit for the contents of a residential building and \$500,000 per building for the contents of a non-residential building. Additional coverage above the maximums set by the NFIP may be purchased from a number of private insurance companies.



The value of flood damage losses to structures can be calculated based on either Replacement Cost Value or Actual Cash Value. Replacement Cost Value is the actual cost to replace or restore that portion of the property that was damaged. To be eligible for replacement cost coverage, the structure must be a single family dwelling, the policy holder's principal residence, and must be insured at the time of the loss for at least 80 percent of the building's replacement cost or the maximum coverage available, whichever is less. Replacement cost value is also available for residential condominium buildings.

The value for all other losses—meaning losses to structures that do not qualify for replacement cost coverage and all losses for contents—are reimbursed based on Actual Cash Value, which is the replacement cost value at the time of loss minus the value of its physical depreciation. Some building items that experience rapid depreciation, such as carpeting, are always reimbursed on an actual cash value basis, even if the building itself otherwise qualifies for replacement cost coverage.

## Purchasing, Premiums, and Other Benefits

**Purchasing a flood insurance policy.** Flood insurance policies issued under the NFIP are underwritten by the federal government. They can be obtained through local property insurance agents. Agents may sell policies serviced directly through the NFIP. They may also sell policies issued through private insurance companies—known as Write Your Own companies—who have an agreement with the NFIP to issue and service flood insurance policies. Regardless of whether the policy is issued directly from the NFIP or through a Write Your Own insurer, the coverage provided is identical.

To apply for flood insurance for a building, its contents, or both, the insurance agent will work with the client to complete the application form, which requires information such as whether the building is residential or commercial, the construction date of the building, whether the building has a basement or crawlspace, and other details about the structure and its contents. The agent or insurer will use the community's effective FIRM to determine the flood risk zone in which the building is located, and may ask the client to provide an elevation certificate. Using this information, the agent or insurer will determine the rates for establishing the flood insurance premium. They will then submit the completed application, supporting documentation, and premium payment to the underwriter. Flood insurance coverage is available for a 1-year term.

In most cases, a flood insurance policy does not go into effect until 30 days after it is purchased. This is to prevent people from waiting to buy flood insurance until just before the river rises and flood damages are certain. The primary exceptions to the 30-day waiting period include:

- 1) When the flood insurance purchase is prompted by making, increasing, extending or renewing a mortgage loan and
- 2) When, because of a map revision, a building has been newly determined to be within the SFHA.

**Increased Cost of Compliance (ICC) coverage.** When a building covered by a flood insurance policy issued by the NFIP is damaged by flood, and the community determines the building is substantially damaged, up to \$30,000 in additional coverage may be available to assist the property owner with the cost of bringing the structure into compliance with the community's floodplain management regulations. Known as Increased Cost of Compliance coverage, or ICC, this coverage is in addition to the claims reimbursement for damages to the structure and can be used to help pay the costs to elevate, demolish, or relocate a building. For non-residential structures, it can also be applied toward the cost of floodproofing the building.




The image shows two FEMA forms. The top form is the 'U.S. DEPARTMENT OF HOMELAND SECURITY FEDERAL EMERGENCY MANAGEMENT AGENCY PART 2 (FIP 2) OF FLOOD INSURANCE APPLICATION'. It includes sections for 'PROPERTY INFORMATION' and 'FLOOD INSURANCE RATE MAP (FIRM) INFORMATION'. The bottom form is the 'ELEVATION CERTIFICATE', which is used to provide elevation data for a building. It includes sections for 'SECTION A - PROPERTY INFORMATION', 'SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION', 'SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)', and 'SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION'. Both forms have checkboxes for 'New' or 'Renew' and 'Standard' or 'Special' rates.

**Overview of Flood Insurance Premiums.** The process for determining flood insurance premiums can be complex. Generally speaking, however, a number of factors are considered in determining the premium for flood insurance coverage. These include the amount of coverage purchased; the deductible amount selected; the flood zone in which the building is located; building occupancy; and the elevation of the building's lowest floor in relation to the Base Flood Elevation.

## The Community Rating System

The Community Rating System (CRS) was initiated by FEMA to provide communities with an incentive to go above and beyond the minimum NFIP standards for regulating development in the SFHA.

**Overview of the CRS.** The CRS is an incentive-based program that recognizes communities for implementing proactive floodplain management activities that reduce the risk of flooding. Communities are rewarded for adopting more than the minimum regulatory requirements under the NFIP. The reward comes in the form of reductions to the flood insurance premiums of policyholders in communities participating in the CRS.

| <b>CRS</b> Classes, Credit Points, and Premium Discounts                                      |                                                                                                 |                                                                                                        |              |
|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------|
|  CRS Classes |  Credit Points |  Premium Discount (%) |              |
|                                                                                               |                                                                                                 | In SFHA                                                                                                | Outside SFHA |
| 1                                                                                             | 4,500                                                                                           | 45                                                                                                     | 10           |
| 2                                                                                             | 4,000-4,499                                                                                     | 40                                                                                                     | 10           |
| 3                                                                                             | 3,500-3,999                                                                                     | 35                                                                                                     | 10           |
| 4                                                                                             | 3,000-3,499                                                                                     | 30                                                                                                     | 10           |
| 5                                                                                             | 2,500-2,999                                                                                     | 25                                                                                                     | 10           |
| 6                                                                                             | 2,000-2,499                                                                                     | 20                                                                                                     | 10           |
| 7                                                                                             | 1,500-1,999                                                                                     | 15                                                                                                     | 5            |
| 8                                                                                             | 1,000-1,499                                                                                     | 10                                                                                                     | 5            |
| 9                                                                                             | 500-                                                                                            | 5                                                                                                      | 5            |
| 10                                                                                            | 0-                                                                                              | 0                                                                                                      | 0            |

**How the CRS works.** Community participation in the CRS is voluntary. Any community may apply to participate in the CRS if it has been in the Regular Phase of the NFIP for at least one year and is in good-standing with the program. Under the CRS, communities earn points for activities that are determined to reduce flood damages to insurable property, strengthen the insurance aspect of the NFIP, and promote comprehensive floodplain management.

The total points earned by a community will place it into one of 10 CRS classes. Communities in Class 1 receive the greatest premium reductions, while communities in Class 10 receive no reductions. Any community in compliance with the minimum requirements of the NFIP is automatically given a classification of “10,” unless it shows that activities it is implementing warrant a better classification. For every 500 points a community earns, its CRS classification number drops by one. The table below shows the premium discount for policies in communities in each CRS class. Note that the amount of the policy discount for each CRS class also depends on whether the insured property is located in the SFHA.

Communities can earn points for 19 activities organized under four categories:

- 1) Public information,
- 2) Mapping and regulations,
- 3) Flood damage reduction, and
- 4) Flood warning and response.

**Public information.** The seven activities in the public information category provide credits for programs that advise people about flood hazards, encourage the purchase of flood insurance, and provide information about ways to reduce flood damage. These activities can be directed towards all members of the community or towards specific groups, such as flood prone residents or local insurance agents and realtors.

**Mapping and regulations.** The five activities in the mapping and regulations category provide credits for increased flood protection for new and existing development. These activities include mapping SFHAs not identified on the FIRM, preserving open space, protecting natural floodplain functions, enforcing higher regulatory standards, and managing storm water.

**Flood damage reduction activities.** The four activities in the flood damage reduction category credit programs that focus on reducing flood damage to existing development. Credit is provided for the development of a comprehensive floodplain management strategy; acquiring, relocating or retrofitting flood-prone structures; and maintaining and improving drainage systems.

**Flood warning and response activities.** The three activities in the flood warning and response category provide credits for measures that protect life and property during a flood. There is credit for the maintenance of levees and dams and for programs that prepare for their potential failure.

The CRS has obvious benefits for flood insurance policy holders, but it also keeps money in the community that would otherwise go toward the payment of premiums. The potential monetary reward for CRS participation is greatest in communities that have a large number of policy holders. However, lower cost flood insurance premiums are not the only rewards a community receives from participating in the CRS. The creditable activities result, among other things, in:

- 1) Increased awareness by citizens and property owners of individual risk;
- 2) Increased awareness of opportunities to protect life and property;
- 3) Enhanced public safety;
- 4) Reduced damage to public property and infrastructure; and
- 5) Reduced economic disruption and loss.





**CRS and Iowa communities.** The IDNR has several floodplain development requirements that exceed the minimum NFIP criteria. These—and several other State requirements—add up to enough CRS points that it becomes fairly easy for an Iowa community to earn a Class 9 rating. As of 2013 there were five CRS communities in Iowa.

To apply for CRS participation, a community should first inform the FEMA Regional Office that it is interested in applying to the CRS. Insurance Services Office, or ISO, works on behalf of FEMA and insurance companies to review CRS applications, verify communities’ credit points, and perform program improvement tasks. Prior to the community preparing its CRS application, an ISO/CRS Specialist can assist the community in determining which of its existing floodplain management activities qualify for credit points. After the application and documentation have been submitted, the community’s activities and performance are reviewed during a verification visit. After which, FEMA establishes the credit to be granted.



# FEMA

This table below is in the CRS coordinators manual:

| <div> <div>CRS</div> <div>Table 110-2. Credit points awarded for CRS activities</div> <div>    </div> </div> |                         |                       |                       |                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------|-----------------------|------------------------------------|
|  Activity                                                                                                                                                                                                                                                                           | Maximum Possible Points | Maximum Points Earned | Average Points Earned | Percentage of Communities Credited |
| <b>300 Public Information Activities</b>                                                                                                                                                                                                                                                                                                                             |                         |                       |                       |                                    |
| 310 Elevation Certificates                                                                                                                                                                                                                                                                                                                                           | 116                     | 116                   | 46                    | 100%                               |
| 320 Map Information Service                                                                                                                                                                                                                                                                                                                                          | 90                      | 70                    | 63                    | 93%                                |
| 330 Outreach Projects                                                                                                                                                                                                                                                                                                                                                | 350                     | 175                   | 63                    | 90%                                |
| 340 Hazard Disclosure                                                                                                                                                                                                                                                                                                                                                | 80                      | 57                    | 14                    | 68%                                |
| 350 Flood Protection Information                                                                                                                                                                                                                                                                                                                                     | 125                     | 98                    | 33                    | 92%                                |
| 360 Flood Protection Assistance                                                                                                                                                                                                                                                                                                                                      | 110                     | 65                    | 49                    | 41%                                |
| 370 Flood Insurance Promotion                                                                                                                                                                                                                                                                                                                                        | 110                     | 0                     | 0                     | 0%                                 |
| <b>400 Mapping and Regulations</b>                                                                                                                                                                                                                                                                                                                                   |                         |                       |                       |                                    |
| 410 Floodplain Mapping                                                                                                                                                                                                                                                                                                                                               | 802                     | 585                   | 65                    | 50%                                |
| 420 Open Space Preservation                                                                                                                                                                                                                                                                                                                                          | 2,020                   | 1,548                 | 474                   | 68%                                |
| 430 Higher Regulatory Standards                                                                                                                                                                                                                                                                                                                                      | 2,042                   | 784                   | 214                   | 98%                                |
| 440 Flood Data Maintenance                                                                                                                                                                                                                                                                                                                                           | 222                     | 171                   | 54                    | 87%                                |
| 450 Stormwater Management                                                                                                                                                                                                                                                                                                                                            | 755                     | 540                   | 119                   | 83%                                |
| <b>500 Flood Damage Reduction</b>                                                                                                                                                                                                                                                                                                                                    |                         |                       |                       |                                    |
| 510 Floodplain Mgmt. Planning                                                                                                                                                                                                                                                                                                                                        | 622                     | 273                   | 123                   | 43%                                |
| 520 Acquisition and Relocation                                                                                                                                                                                                                                                                                                                                       | 1,900                   | 1,701                 | 136                   | 23%                                |
| 530 Flood Protection                                                                                                                                                                                                                                                                                                                                                 | 1,600                   | 632                   | 52                    | 11%                                |
| 540 Drainage System Maintenance                                                                                                                                                                                                                                                                                                                                      | 570                     | 449                   | 214                   | 78%                                |
| <b>600 Warning and Response</b>                                                                                                                                                                                                                                                                                                                                      |                         |                       |                       |                                    |
| 610 Flood Warning and Response                                                                                                                                                                                                                                                                                                                                       | 395                     | 353                   | 144                   | 37%                                |
| 620 Levees                                                                                                                                                                                                                                                                                                                                                           | 235                     | 0                     | 0                     | 0%                                 |
| 630 Dams                                                                                                                                                                                                                                                                                                                                                             | 160                     | 0                     | 0                     | 0%                                 |



1. The maximum possible points are based on the 2013 Coordinator's Manual.
2. The maximum points earned are converted to the 2013 Coordinator's manual from the highest credits attained by a community as of October 1, 2011. Growth adjustments and new credits for 2013 are not included.
3. The average points earned are converted to the 2013 Coordinator's Manual, based on communities' credits as of October 1, 2011. Growth adjustments and new credits for 2013 are not included.
4. The percentage of communities credited nationally is as of October 1, 2011.
5. Activity 370 (Flood Insurance Promotion) is a new activity in 2013. No community has earned these points.
6. Activities 620 and 630 were so extensively revised that the old credits cannot be converted to the 2013 Coordinator's Manual.

Source: CRS Coordinator's Manual (2013)



# Appendix: Key Terms and Acronyms

## **Actual Cash Value (ACV)**

The cost to replace an insured item of property at the time of loss, less the value of physical depreciation.

## **Approximate (Basic) Studies**

Flood mapping that shows the approximate outline of the base floodplain. An approximate study does not produce a base flood elevation.

## **Base Flood, a.k.a. 1% Chance Flood or 100-year flood**

A flood that has a one percent chance of being equaled or exceeded in any given year. The base flood is also known as the 1% chance flood or the 100-year flood.

## **Base Flood Elevation (BFE)**

The elevation of the crest of the base flood. The base flood elevation is the same as the 100-year flood elevation. Base Flood Elevations (BFEs) are typically shown on Flood Insurance Rate Maps (FIRMs).

## **Basement**

Any area of the building having its floor subgrade (below ground level) on all sides.

## **Building**

A structure that is principally above ground and enclosed by walls and a roof. The term includes manufactured mobile homes, prefabricated buildings, gas or liquid storage tanks, and recreational or travel vehicles installed on a site for more than 180 consecutive days.

## **Community Rating System (CRS)**

A program that provides a flood insurance premium rate reduction based on a community's floodplain management activities. The Community Rating System (CRS) recognizes and encourages community floodplain management activities that exceed the minimum NFIP standards. Depending upon the level of participation, flood insurance premium rates for policyholders can be reduced up to 45%. Besides the benefit of reduced insurance rates, CRS floodplain management activities enhance public safety, reduce damages to property and public infrastructure, avoid economic disruption and losses, reduce human suffering, and protect the environment.

## **Cost of Improvement**

The fair market value of all materials and labor involved with the project

## **Cost of Repair**

The cost required to restore the structure to its pre-damage condition

## **Detailed (Enhanced) Studies**

Flood mapping that produces base flood elevations, floodways, and other pertinent flood data.

## **Development**

Any man-made change to the ground that may affect flood flows. This includes construction of new structures, modifications or improvements to existing structures, fencing, excavation, filling, paving, drilling, mining, dredging, land clearing, grading, or permanent storage of materials and/or equipment.

## **Elevation Certificate**

A form that is used to document the lowest floor elevation of a building. This elevation information is needed to show compliance with floodplain management ordinances.

## **Enclosure**

Enclosures are enclosed walled in areas below the lowest floor of an elevated building. Enclosures below the BFE may only be used for building access, vehicle parking, and storage. Enclosed areas below the lowest floor must be adequately anchored, built using flood resistant building material, and any utilities or service facilities must be designed and/or located to prevent flood damage. Flood insurance coverage for enclosures below the BFE is very limited.

### **Flood Hazard Boundary Maps (FHBM)**

An approximate NFIP map produced for communities that are not in the regular phase of the NFIP or communities that have limited development potential.

### **Flood Insurance Study (FIS)**

A report that provides detailed information about a community's flood hazard areas. The FIS report normally includes topographic information, floodplain and floodway data charts, study information, and stream profiles.

### **Flood Insurance Rate Map (FIRM)**

The map provided to communities in the regular phase of the NFIP. It delineates a Special Flood Hazard Area (SFHA) or floodplain in which regulations apply. FIRMs often include base flood elevations and floodways.

### **Floodway**

The channel of a river or other watercourse and the portion of the floodplain that carries most of the water. Regulations require that the floodway be kept open so that flood flows are not obstructed or diverted onto other properties, thus increasing the water surface elevation more than a designated height.

### **Floodway Fringe**

The portion of the special flood hazard area (SFHA) lying outside the floodway.

### **Freeboard**

An extra margin of safety added to the base flood elevation. Freeboard compensates for the many unknown factors that could contribute to higher flood heights, including wave action, bridge openings, the hydrological effect of urbanization of the watershed, and lack of data. Freeboard is not required by NFIP standards, but communities are encouraged to adopt at least a one-foot freeboard. Freeboard results in significantly lower flood insurance rates due to lower flood risk.

### **Increase Cost of Compliance (ICC) Coverage**

The Standard Flood Insurance Policy has a provision that will pay the policy holder to comply with a State or local floodplain management law affecting repair or reconstruction of a structure suffering flood damage. Mitigation activities eligible for payment are: elevation, floodproofing, relocation, or demolition (or any combination of these activities) of the structure. Policyholders may receive up to \$30,000 under this coverage. The structure must meet certain eligibility criteria, including a substantial damage or repetitive loss determination by a local official.

### **Market Value**

The price a willing buyer and seller agree upon.

### **National Flood Insurance Program (NFIP)**

The federal program of flood insurance coverage and floodplain management created under the National Flood Insurance Act of 1968.

### **No-Rise Certificate**

Any project in a floodway must be reviewed to determine if the project will increase flood heights. A no-rise certificate is certification by a registered professional engineer that the development project in the floodway will not result in an increase in the base flood elevation.

### **Non-conforming Structures**

Any structure built prior to the original adoption of the floodplain zoning ordinance and which is not in compliance with current floodplain regulations.

### **Replacement Cost Value (RCV)**

Replacement Cost Value is the actual cost to replace or restore that portion of the property that was damaged. To be eligible for replacement cost coverage, the structure must be a single family dwelling, the policy holder's principal residence, and must be insured at the time of the loss for at least 80 percent of the building's replacement cost or the maximum coverage available, whichever is less. Replacement cost value is also available for residential condominium buildings.

### **Special Flood Hazard Area (SFHA)**

The land area covered by the flood waters of a base flood. The SFHA is the area where the NFIP's floodplain regulations must be enforced.



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