

Handbook for New Mexico Floodplain Managers

New Mexico Floodplain Managers Association

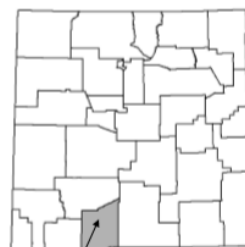
FLOOD INSURANCE STUDY

VOLUME 1 OF 2



DONA ANA COUNTY, NEW MEXICO AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
ANTHONY, CITY OF	350061
DONA ANA COUNTY (UNINCORPORATED AREAS)	350012
HATCH, VILLAGE OF	350013
LAS CRUCES, CITY OF	350332
MESILLA, TOWN OF	350113
SUNLAND PARK, CITY OF	350147

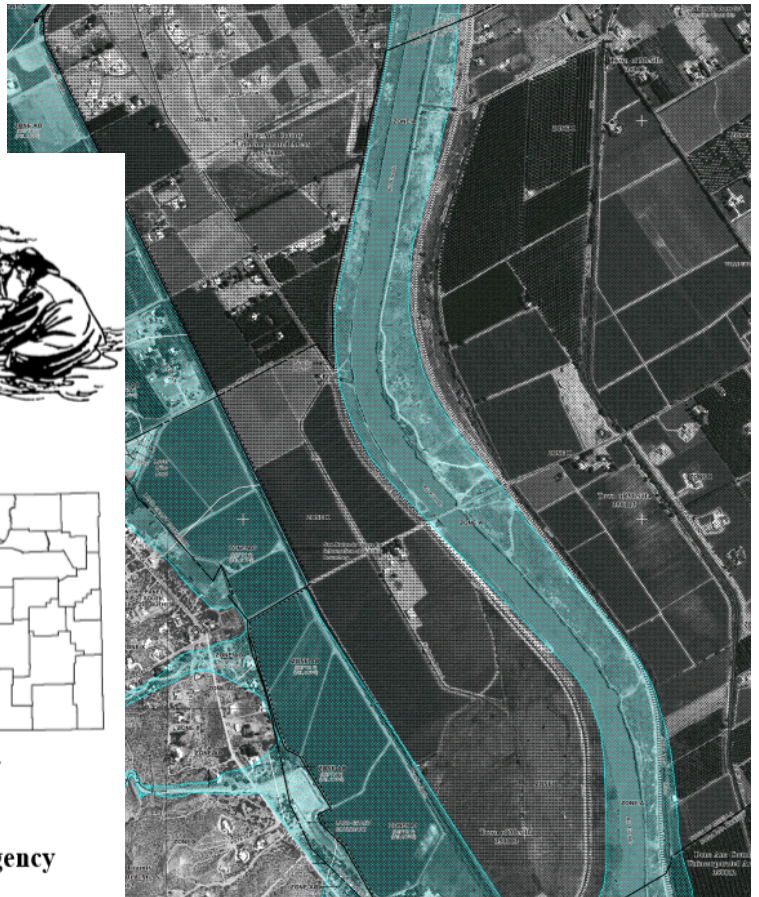


DONA ANA COUNTY



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Federal Emergency Management Agency

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Handbook for Floodplain Managers

TABLE OF CONTENTS

Section	Subject	Page
---	Acknowledgments.....	ii
	Notes to the User.....	iii
1.	Flooding and People	1-1
2.	The New Mexico Floodplain Managers Association.....	2-1
3.	The National Flood Insurance Program	3-1
4.	How Flood Maps Are Prepared.....	4-1
5.	NFIP Maps	5-1
6.	Using Maps and Data	6-1
7.	Maintaining and Revising NFIP Maps	7-1
8.	Community Ordinance.....	8-1
9.	Regulatory Requirements: Maps and Data.....	9-1
10.	Regulatory Requirements: What needs a permit?	10-1
11.	Regulatory Requirements: Floodways.....	11-1
12.	Regulatory Requirements: New Buildings	12-1
13.	Regulatory Requirements: Existing Buildings.	13-1
14.	Additional Regulatory Standards	14-1
15.	Permit Review	15-1
16.	Inspections	16-1
17.	Appeals and Variances	17-1
18.	Enforcement	18-1
19.	Records	19-1
20.	Flood Insurance.....	20-1
21.	The Community Rating System.....	21-1
22.	Disaster Operations	22-1
23.	Hazard Mitigation	23-1
24.	Executive Order 11988.....	24-1
25.	Flood Warning.....	25-1
26.	Mitigation Planning.....	26-1



Table of Contents (continued)

Section	Subject	Page
Appendix A	Model Ordinance.....	A-1
Appendix B	Contacts.....	B-1
Appendix C	References.....	C-1
Appendix D	FEMA Forms	D-1
Appendix E	Flood Zone Designations	E-1
Appendix F	Common Acronyms and Glossary of Terms	F-1
Appendix G	New Mexico Floodplain Management Statutes.....	G-1
Appendix H	NMFMA Constitution.....	H-1
Appendix I	NMFMA Strategic Plan	I-1
Appendix J	NMFMA Resolutions.....	J-1

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Paul Dugie, PE, CFM, NMFMA Treasurer
Nicole Friedt, PE, CFM, NMFMA Chair
JD Padilla, CFM, NMFMA Executive Director
Grant Pinkerton, CFM, NMFMA Executive Director
Shawn Penman, PhD, CFM, NMFMA First Vice Chair
Michele Truby-Tillen, CFM, NMFMA Second Vice Chair
Michael Garcia, CFM, NMFMA Secretary
Jonah Ruybalid, PE, CFM, NMFMA Region I Director
Crystal Ball, CZO, CFM, NMFMA Region II Director
Johnny Montiel, CFM, NMFMA Region III Director

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Much of the text in this *Handbook for Floodplain Managers* was taken directly from the *Floodplain Management Desk Reference* available through the FEMA website at <https://www.fema.gov/floodplain-management-requirements>. Using this public source greatly reduced the cost of preparing this *Handbook*.



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Illustrations

Except as noted, all illustrations are from FEMA, NMFMA, LA Bond Associates, French & Associates or JE Fuller Hydrology and Geomorphology.

Notes to the User

This *Handbook* was prepared by the New Mexico Floodplain Managers Association (NMFMA) for use by its members and others who are involved in floodplain management in New Mexico. It provides detailed information on administering a floodplain management ordinance at the community level.

- Sections **1 through 3** provide **background information** on flooding and the National Flood Insurance Program, the two basic reasons for enacting and enforcing floodplain management ordinances, as well as information about the New Mexico Floodplain Managers Association.
- Sections **4 through 7** review the **flood mapping and data** that provide the flood information used in the ordinance.
- Sections **8 through 14** discuss the **regulatory standards** that should be in an ordinance.
- Sections **15 through 19** cover the **administration** procedures and practices that should be followed to make a floodplain management ordinance effective.
- Sections **20 through 26** review **other aspects** of floodplain management, including insurance, disaster operations, mitigation, and the rules for Federal agencies.
- The **Appendices** include **additional materials**: a model floodplain ordinance, several NMFMA publications, a glossary, references, map examples, FEMA forms and the names and addresses of key state and federal **contacts** who can help a local floodplain management program.

This *Handbook* has two companions. The **Floodplain Management Ready Reference** is a small document that covers the basic points on administering a local floodplain management ordinance. An electronic copy of this *Handbook* and additional state and federal references can be accessed through the NMFMA website.

Common acronyms: Here are some of the acronyms used most often in this reference. Others are listed in the glossary in Appendix D.



Handbook for New Mexico Floodplain Managers

CFR – Code of Federal Regulations (explained in Section 3.5.1)

NMDHSEM – The New Mexico Department of Homeland Security and Emergency Management (listed in Appendix B - Contacts)

FEMA – The Federal Emergency Management Agency (listed in Appendix B - Contacts)

FIRM – Flood Insurance Rate Map (explained in Section 5)

LOMA – Letter of Map Amendment (explained in Section 7.2.1)

NMFMA – New Mexico Floodplain Managers Association (Discussed in Section 2)

NFIP – The National Flood Insurance Program (explained in Section 3)

SFHA – Special Flood Hazard Area (explained in Section 4.2.2)

Basic rules

There are five basic rules to administering a floodplain management program. They are detailed in this reference

Basic rule #1: You must use the latest maps and flood data published by FEMA.

Section 9 reviews the requirements on using maps and data in an ordinance.

Basic rule #2: A permit is required for all development in the SFHA shown on your FIRM.

Section 10 covers what needs a permit.

Basic rule #3: Development must not increase the flood hazard on other properties.

Section 11 discusses how this is done using the floodway concept.

Basic rule #4: New buildings must be protected from damage by the base flood.

Section 12 has the regulatory requirements for new buildings.

Basic rule #5: If the cost of improvements or the cost to repair the damage exceeds 50 percent of the market value of the building, the building must be brought up to current floodplain management standards.

Section 13 covers the rules for existing buildings.

For more information

Additional assistance can be provided by the New Mexico Floodplain Managers Association, the Department of Homeland Security and Emergency Management and the Federal Emergency Management Agency. Their contacts and web sites are listed in Appendix B - Contacts.



1. Flooding and People

CONTENTS

1.1. The Hydrologic Cycle	2
1.2. Riverine Flooding.....	3
1.2.1. Overbank Flooding	4
1.2.2. Flash Flooding	4
1.2.3. Riverine Erosion	5
1.3. Other Types of Flooding	6
1.3.1. Alluvial Fan Flooding	6
1.3.2. Sheet Flow	7
1.3.3. Ponding	7
1.3.4. Playas	7
1.3.5. Urban Drainage	8
1.3.6. Levee and Dam Failures	8
1.3.7. Debris Dams	9
1.4. Natural and Beneficial Floodplain Functions	9
1.4.1. Natural Flood and Erosion Control	9
1.4.2. Biologic Resources and Functions.....	10
1.4.3. Societal Resources and Functions.....	10
1.5. Impact of Development and Other Watershed Changes.....	10
1.5.1. Watersheds	11
1.5.2. Floodplains	12
1.6. Safety and Health Hazards	12
1.6.1. Safety Hazards.....	12
1.6.2. Health Hazards	15
1.6.3. Mental Health	16
1.7. Property Damage	16
1.7.1. Hydrodynamic Forces.....	16
1.7.2. Debris Impact	17
1.7.3. Hydrostatic Forces	17
1.7.4. Soaking	18
1.7.5. Sediment and Contaminants.....	18
1.7.6. Scour and Erosion	19
1.7.7. Subsidence of Piers or Pilings	19

1.1. The Hydrologic Cycle

Floods are part of the Earth's natural hydrologic cycle. The hydrologic cycle involves the continuous circulation of water in the Earth-Atmosphere system. (Figure 1-1) This cycle describes the motion of water from the ground to the atmosphere and back again, accounting for the processes of evaporation, transpiration, condensation, precipitation, runoff, infiltration, and groundwater flow.

You can start a discussion of the hydrologic cycle anywhere. Atmospheric water is in the form of vapor, small droplets and ice crystals. Under the right conditions, these particles become too heavy and will fall as precipitation. Precipitation may be rain, snow, hail, or sleet.

It should be noted that even as the precipitation is falling, some of the water evaporates.

Precipitation lands on the ground, on vegetation, on houses and streets. Some water will evaporate directly from these surfaces. On soils, some of the water soaks in, or infiltrates. The initial infiltration rate for dry soil is high, but as the soil gets wetter, the infiltration rate gets lower.

Whenever the rate of precipitation is greater than the combination of evaporation and infiltration, water accumulates on the surface. Excess precipitation will not immediately begin to shed because of the presence of surface depressions on the ground. These depressions may be natural, resulting from frost heaving of the soil, collapsed rodent tunnels and many other causes, or they may be tire tracks, footprints, farm furrows or other man-made depressions. As water accumulates on the surface, it first fills the depressions and then starts flowing down the slope. This process is called sheet flow. As storm runoff traverses the earth's surface merging with runoff from other areas within the watershed, it transitions from sheet flow to shallow concentrated flow and finally to channelized flow in stream and rivers.

The water that infiltrates during rainstorms and during spring thaws is still part of the hydrologic cycle. If the infiltration continues long enough, the water in the soil moves down to a strata which is saturated. When this layer, called the water table, is reached, the infiltrated water raises the water table. Meanwhile, after the precipitation ends, some of the water moves back to the surface and evaporates. Also, the roots of plants take in water that is transpired through the plants' leaves. When the soil is dry and there is a brief shower, all of the precipitation may either evaporate or be transpired by plants.

Water in the water table, or groundwater, moves through the saturated ground much like water on the surface. If the water table is higher in one spot than another, the groundwater flows toward the lower spot.

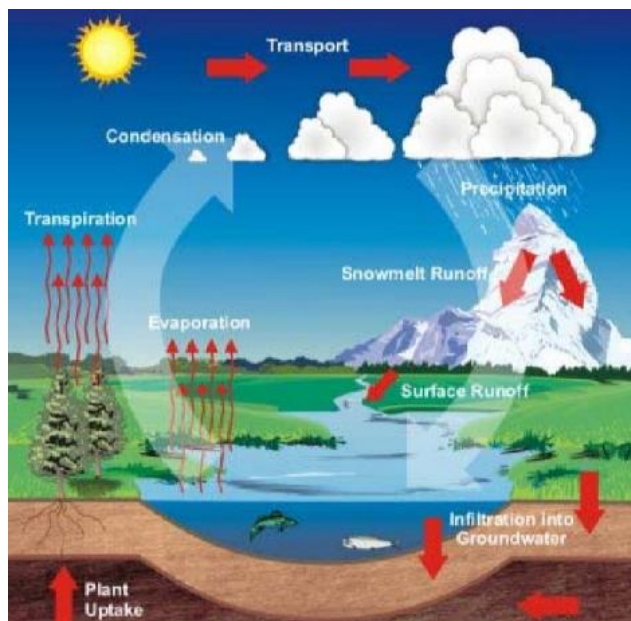


Figure 1-1. The Hydrologic Cycle

Handbook for New Mexico Floodplain Managers

Perennial rivers and streams (those that flow all year long) are generally the location where groundwater meets surface water. Rivers and streams that flow all of the time are supplied by groundwater. Water that infiltrated days, months or years ago somewhere uphill from the river makes its way underground to the river. When it leaves the soil and enters the river or stream, it moves much faster.

When there is excessive precipitation or snowmelt, surface water reaches the streams and rivers and adds to the groundwater already flowing there. If there is enough water, it flows out of the channel and floods the floodplain. The shallower water in the floodplain flows slower than the deeper water in the channel.

If the floodplain is undeveloped, it has two major effects on a flood: it stores water temporarily while the channel is overflowing; and it infiltrates water during the flood. Both of these effects reduce the amount of water moving downstream. Infiltration also temporarily raises the water table. This water reenters the stream soon after the flood has passed.

Water in the streams and rivers eventually reaches the ocean. Throughout these processes, water is evaporating and restarting the hydrologic cycle. Groundwater moves slowly until it reaches a low area on the ground, where it becomes surface water. Surface water evaporates or flows to the ocean, where evaporation continues.

1.2. Riverine Flooding

A watershed is an area that drains into a lake, stream or other body of water. Other names for watershed are basin or catchment area. Watersheds vary in size. Larger ones, with several distinct contributing areas, can be divided into sub-watersheds.

Figure 1-2 shows a watershed and some of the key terms. The boundary of a watershed is a ridge or divide. Water from rain and snowmelt are collected by the smaller channels (tributaries) which send the water to larger ones and eventually to the lowest body of water in the watershed. (main channel)

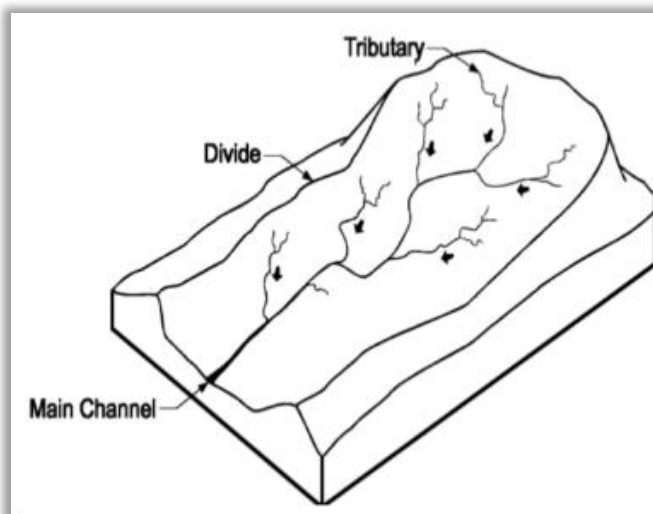


Figure 1-2. Riverine Watershed and Floodplain

Channels are defined features on the ground that carry water through and out of a watershed. They may be called rivers, creeks, arroyos, streams or ditches. They can be wet all the time or dry most of the time.

When a channel receives too much water, the excess flows over its banks and into the adjacent area. Flooding that occurs along a channel is called riverine flooding.

Handbook for New Mexico Floodplain Managers

What happens in a watershed will affect events and conditions downstream. Terrain helps determine the dynamics of riverine flooding. In relatively flat areas, shallow, slow-moving floodwater may cover large areas of land for days. In hilly areas, a flood may come and go in minutes after a heavy rain.

1.2.1. Overbank Flooding

A common type of flooding in New Mexico is called overbank flooding. Overbank flooding occurs when a downstream channel receives more rain or snowmelt from its watershed than it can handle, or a channel is blocked by debris. For either reason, excess water overloads the channel and flows out onto the floodplain.

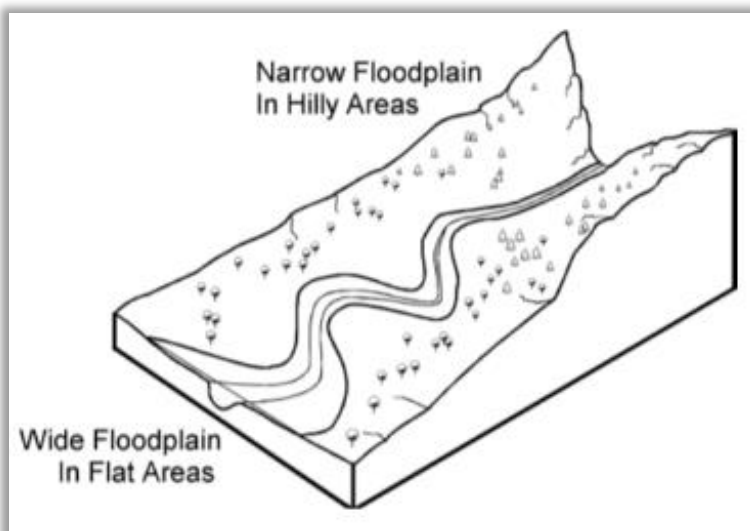


Figure 1-3. Riverine Floodplain

Overbank flooding varies with the watershed's size and terrain. One measure of a flood is the speed of its moving water, which is called velocity. Velocity is measured in feet per second.

Hilly areas have faster moving water, so velocity can pose a serious hazard. In flat areas, the flood may move slowly, making its velocity less of a hazard. High velocity flows can also carry large amounts of sediment and debris, which add to the danger.

Terrain may affect how much warning people have that a flood is building. Conditions on a river that drains a large watershed may warn of a pending flood hours or even days before actual flooding. On the other hand, streams in hilly areas may give no warning that a flash flood is about to strike.

Flood depths vary, as do flood durations. Generally, the larger the river, the deeper the flood and the longer it will last. However, in hilly or mountainous areas with narrow valleys, flooding can be very deep in small watersheds.

Depending on the size of the river and the terrain of its floodplain, flooding can last for days and cover wide areas.

1.2.2. Flash Flooding

A severe storm that drops much rainfall in a short time can generate a flash flood. Flash floods strike quickly and end swiftly.

Areas with steep slopes and narrow stream valleys are particularly vulnerable to flash flooding, as are valley areas at the points where mountain canyons emerge onto floodplains (see "Alluvial Fan Flooding" in Section 1.3.1). In hilly areas, the high-velocity flows and short warning time make flash floods hazardous and very destructive.

Handbook for New Mexico Floodplain Managers

In urban areas, flash flooding can occur where impervious surfaces, gutters and storm sewers speed runoff. Flash floods also can be caused by dam failure, collapse of debris dams or failure of a levee.

Flash floods rank first as the cause of flood-related deaths in the United States. In the 1970s, four flash floods in a five-year period killed 570 people. Flash floods are the #1 weather related killer with approximately 140 deaths recorded in the U.S. each year.

- In 1972, 118 people died along Buffalo Creek in West Virginia when an embankment made of coal refuse washed out, destroying 546 houses and damaging as many more.
- Weeks later, 236 people died when heavy rain and a dam failure inundated the area near Rapid City, South Dakota. Property damage exceeded \$100 million.
- In 1976, heavy rains spawned floods in Colorado's Big Thompson Canyon, killing 139 people.
- The next year, 77 people died in Johnstown, Pennsylvania, when heavy rain overwhelmed a dam, causing \$200 million in damage.

Flash floods in New Mexico can occur in any month, but the threat increases in May and June, or during our severe weather season. A more dramatic increase occurs during Monsoon Season, especially in the months of July and August. Since 1959, 65 New Mexicans have lost their lives in flash floods. Of these recorded fatalities, 55 occurred in a car.

1.2.3. Riverine Erosion

River channels change as water moves downstream, acting on the channel banks and on the channel bottom (the thalweg). This force is made more potent during a flood, when the river's velocity increases.

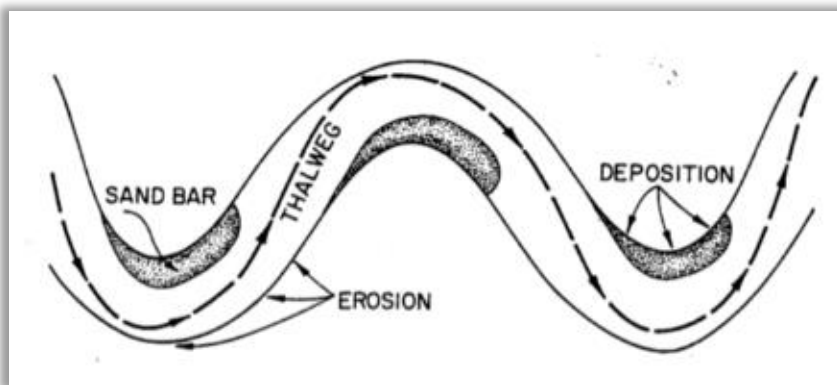


Figure 1-4. Erosion changes the shape of channels

Handbook for New Mexico Floodplain Managers

Several features along a river are affected by this flow of water in different ways. A meander is a curve in a channel. On the outside of a meander, the banks are subject to erosion as the water scours against them. (Figure 1-4) On the other hand, areas on the inside of meanders receive deposits of sand and sediment transferred from the eroded sites. Meanders do not stay in the same place— they migrate slowly downstream and across the flood- plain, reworking the shape and alignment of the channel within the floodplain.

Properties on the outside of curves face a double threat of inundation and undercutting from riverine erosion during floods. (Figure 1-5)



Figure 1-5. Riverine erosion can undercut structures

1.3. Other Types of Flooding

1.3.1. Alluvial Fan Flooding



Figure 1-6. Alluvial fans form where canyons empty into valleys.

Alluvial fans are geologic and topographic features that have been formed where mountain streams and canyons empty out into relatively flat valleys or playas (see Figure 1-6). In the mountains, a stream has a steep slope, and therefore, the velocities are high. Such a stream carries large amounts of sediment. When the stream leaves the canyon and flows into a valley or a playa, the slope flattens out, the velocity decreases, and the sediment is deposited. Over thousands of years, these sediment deposits accumulate and form a fan shaped feature called an alluvial fan.

As successive floods occur on an alluvial fan, the sediment raises the bed of the most recent channel, and the water (and sediment) finds another flow path down the fan. Over thousands of years, the main channel moves from one side of the fan to the other, building the fan-shaped feature.

Alluvial fans are typically found in the arid regions of the western United States. In the West, the mountains are newer and higher, so they have steeper slopes. As the valleys and playas fill with sediments, the change in slope between the mountains and the valleys and playas becomes greater, causing the formation of alluvial fans.

Alluvial fan flooding is particularly difficult to deal with for three reasons.

- Velocity of floodwaters and the debris they carry.
- Sediment and debris deposited by the floodwaters.
- The potential for the channel to move across the fan during the flood.



Handbook for New Mexico Floodplain Managers

Whether you are planning a subdivision or building a road, these three factors add to the difficulty of building anything that will last.

The arid west is subject to another type of flooding that features uncertain flow paths, known as movable streams. When a high-velocity flood runs through an area with sand or loose soil, the erosion and sedimentation can occur so fast that the stream channel can be lowered, filled in or relocated through processes known as degradation, aggradation and migration. In some cases, these processes may occur simultaneously, or one process may occur in one flood and another process in a later event.

1.3.2. Sheet Flow

Where there are inadequate or no defined channels, floodwater spreads out over a large area at a somewhat uniform depth in what is called sheet flow.

Sheet flow occurs after an intense or prolonged rainfall during which the rain cannot soak into the ground. During sheet flow, the floodwaters move downhill and cover a wide area. Sheet flow is typical on some portions of some alluvial fans.

1.3.3. 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 and depressional storage areas until they infiltrate into the soil, evaporate or are pumped out.

Ponding is common in areas where man-made features, such as roads and railroad embankments, have blocked outlets. An example of the latter is in the areas protected by levees along 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.

1.3.4. Playas

There are a number of playas in New Mexico. A playa is a drainage basin with no outlet. Any precipitation that falls within the watershed of a playa drains toward the playa as either surface water or groundwater. The only way it can leave the basin is through evaporation. Over thousands of years, minerals dissolved by floodwater and groundwater have been carried toward the playas and left there when the water evaporates. For this reason, the occasional temporary flooding adjacent to playas has not been much of a problem because there is usually no good water to support development near the playas.

The Great Salt Lake in Utah is perhaps the best-known example of a playa. In New Mexico, the white sands of the White Sands National Monument are formed by the gypsum and other minerals carried to Lake Lucero. As water evaporates from Lake Lucero, the gypsum is left on



Handbook for New Mexico Floodplain Managers

the surface of the lakebed. Since it is lightweight, the prevailing winds from the southwest have formed the vast dunes of “white sand” (gypsum) to the northeast of Lake Lucero.

Other large playas are found west of Lordsburg, north of Carrizozo, and in other parts of New Mexico.

1.3.5. Urban Drainage

An urban drainage system is comprised of the natural channels and man-made ditches, storm sewers, retention ponds and other facilities constructed to store runoff or carry it to a receiving stream. Other features in such a system include yards and swales that collect runoff and direct it to the streams, sewers and ditches.

When most of the man-made systems were built, they were typically designed to handle the amount of water expected during a 10-year or smaller storm. In many smaller communities, all runoff is carried in the streets. Larger storms overload these drainage systems, and the resulting overload produces shallow flooding.

1.3.6. Levee and Dam Failures

Levees and dams are made to hold back large amounts of water. If they fail or are overtopped, they can produce a dangerous flood situation because of the high velocities and large volumes of water released. Levee flooding is caused by overtopping, failure or seepage through or under the structure. It occurs during a flood on the river, so people are usually alerted to a potential problem.

Remember, a perennial river is connected to the water table, so, over time, the water table on the landward side of the levee rises. Even though the levee keeps surface water out of an area, the levee may not prevent rising groundwater from damaging basements, septic tanks and under-ground storage tanks on the landward side when there are prolonged high flows in the river.

A break in a dam, on the other hand, can occur with little or no warning on clear days when people are not expecting rain, much less a flood. Breaching often occurs within hours after the first visible signs of dam failure, leaving little or no time for evacuation. (As noted in the earlier section on flash flooding, three of the four top killer floods in the United States in the 1970s were related to the failure of a dam or dam-like structure).

Dam breaks occur for one of three reasons:

- The foundation fails due to seepage, settling or earthquake.
- The design, construction, materials or operation were deficient.
- Flooding exceeds the capacity of the dam’s spillway.

Proper design can prevent dam breaks. While state and federal dam safety programs help ensure that new dams are properly designed, there are still many private or locally built dams that were poorly designed and maintained.

Handbook for New Mexico Floodplain Managers

1.3.7. Debris Dams

Debris such as logs and brush can collect at shallow parts of a stream, sharp bends, bridges and other “choke points.” If the channel is not kept clear, the debris will build up and form a dam. If the debris dam breaks during high flows (or anytime), the result can be a flood.

The danger from debris dams in New Mexico is particularly severe because such dams may form in undeveloped mountainous areas where they are not observed. When they fail, they may send an unexpected surge of flood water downstream at a time when flooding is already occurring. The threat of debris dams is especially high after forest fires because of the amount of partially burned debris on the ground.

1.4. Natural and Beneficial Floodplain Functions

Floodplain lands and adjacent waters combine to form a complex, dynamic physical and biological system found nowhere else. When portions of floodplains are preserved in (or restored to) their natural state, they provide many benefits to both human and natural systems.

These benefits range from providing aesthetic pleasure to reducing the number and severity of floods, helping handle stormwater runoff and minimizing non-point water pollution. For example, by allowing floodwater to slow down, sediments settle out, thus maintaining water quality. The natural vegetation filters out impurities and uses excess nutrients. Such natural processes cost far less money than it would take to build facilities to correct flood, stormwater, water quality and other problems.

Natural resources of floodplains fall into three categories: water resources, living resources and societal resources. The following sections describe each category’s natural and beneficial functions.

1.4.1. Natural Flood and Erosion Control

Over the centuries, floodplains develop their own ways to handle flooding and erosion with natural features that provide floodwater storage and conveyance, reduce flood velocities and flood peaks, and curb sedimentation.

Natural controls on flooding and erosion help to maintain water quality by filtering nutrients and impurities from runoff, processing organic wastes and moderating temperature fluctuations.

These natural controls also contribute to recharging groundwater by promoting infiltration and refreshing aquifers, and by reducing the frequency and duration of low surface flows.



Figure 1-7. Wetlands store and filter floodwater and help recharge aquifers.
Photo courtesy Mary Saxton

1.4.2. Biologic Resources and Functions

Floodplains enhance biological productivity by supporting a high rate of plant growth. This helps to maintain biodiversity and the integrity of ecosystems. Floodplains provide excellent habitats for fish and wildlife by serving as breeding and feeding grounds. They also create and enhance waterfowl habitats and help to protect habitats for rare and endangered species.



Figure 1-8. The habitat and aesthetic benefits of a river can be seen at the Rio Grande Nature Center in Albuquerque.

1.4.3. Societal Resources and Functions

People benefit from floodplains through the food they provide, the recreational opportunities they afford, and the scientific knowledge gained in studying them.

Wild and cultivated products are harvested in floodplains, where the agricultural land has been made rich by sediment deposits. They provide open space for recreational opportunities or simple enjoyment of their aesthetic beauty.

Floodplains provide areas for scientific study and outdoor education. They contain cultural resources such as historic or archaeological sites, and thus provide opportunities for environmental and other kinds of studies.

Floodplains can increase a community's overall quality of life, a role that often has been undervalued. By transforming floodplains from problem areas into value-added assets, the community can improve its quality of life.

Parks, bike paths, equestrian trails, open spaces, wildlife conservation areas and aesthetic features are important to citizens. Assets like these make the community more appealing to potential employers, investors, residents, property owners and tourists.

1.5. Impact of Development and Other Watershed Changes

Throughout time, floods have altered the floodplain landscape. These areas are continuously shaped by the forces of water – either eroded or built up through deposit of sediment. More recently, the landscape has been altered by human development, affecting both the immediate floodplain and events downstream.

Historically, people have been attracted to bodies of water as places for living, industry, commerce and recreation. During the early settlement of the United States, locations near water provided necessary access to transportation, a water supply and waterpower. In addition, these areas had fertile soils, making them prime agricultural lands.

This pattern of development continued as communities grew. In recent decades, development along waterways and shorelines has been spurred by the aesthetic and recreational value of these sites.

Handbook for New Mexico Floodplain Managers

Because floodplains have attracted people and industry, a substantial portion of this country's development is now subject to flooding. Floodplains account for only seven percent of the nation's total land area. However, they contain a tremendous amount of property value. It is estimated that there are 8 – 12 million homes in our nation's floodplains.

Two problems result from floodplain development:

- Development alters the floodplain and the dynamics of flooding.
- Buildings and infrastructure are damaged by periodic flooding.

Human development and other changes in watershed conditions can have an adverse impact on flooding. Problems arise in two areas: the watershed (where the water comes from) and the floodplain (where it goes).

1.5.1. Watersheds

Urbanization: Development in riverine watersheds affects the runoff of stormwater and snowmelt. Farming, parks, buildings, roads and parking lots replace the natural vegetation which used to absorb water. When rain falls in a natural setting, as much as ninety percent of it will infiltrate into the ground, evaporate or be transpired by plants. In an urbanized area, as much as ninety percent of it will run off. (Figure 1-9)

Urban features alter flood dynamics as well. Storm sewers and more efficient ditches that come with urban drainage systems speed flood flows. The result of urbanization is that there is more runoff in the watershed and it moves faster, increasing flooding downstream. Thus, a 10-year storm may produce the runoff equivalent of a 25-year storm, overloading the man-made drainage system.

Urbanization also changes the timing of flows along the tributaries. If one sub-watershed develops faster than another, the flood will leave sooner than it used to, possibly arriving at the main channel at the same time as the peak arrives from another tributary, causing increased flooding downstream.

Wildfires: Large-scale wildfires dramatically alter the terrain and ground conditions. Normally, vegetation absorbs rainfall, reducing runoff. However, wildfires leave the ground charred, barren, and unable to absorb water, creating conditions ripe for flash flooding and mudflow. Flood risk remains significantly higher until vegetation is restored—up to 5 years after a wildfire. Flooding after fire is often more severe, as debris and ash left from the fire can form mudflows. As rainwater moves across charred and denuded ground, it can also pick up soil and sediment and carry it in a stream of floodwaters. These mudflows can cause significant damage. For

Natural ground cover, 0% impervious surface

15% of the rainwater runs off the land

Rural development, 10% - 20% impervious surface

23% of the rainwater runs off the land

Single family homes, 35% - 50% impervious surface

35% of the rainwater runs off the land

Full urbanization, 75% - 100% impervious surface

61% of the rainwater runs off the land

Figure 1-9. Effects of development on stormwater runoff

Handbook for New Mexico Floodplain Managers

example, in June 2011, the Las Conchas Wildfire charred more than 150,000 acres in New Mexico. One month later, heavy rains flooded the burn area, prompting a Presidential Disaster Declaration.

Farming and ranching: Agricultural practices may increase or decrease the amount of runoff, sedimentation, chemicals and feces in streams. The results of these practices may be most noticeable when there is a drastic change. For example, the quality and quantity of runoff, as well as the sediment load, might change if an irrigated field is abandoned or used for grazing.

1.5.2. Floodplains

The most obvious impact of development on riverine flooding comes with moving or altering channels or constructing bridges and culverts with small openings. Construction and regrading of the floodplain can obstruct or divert water to other areas. Levees and dikes are the best-known examples of this, but even small construction projects have an impact. (Figure 1-10)

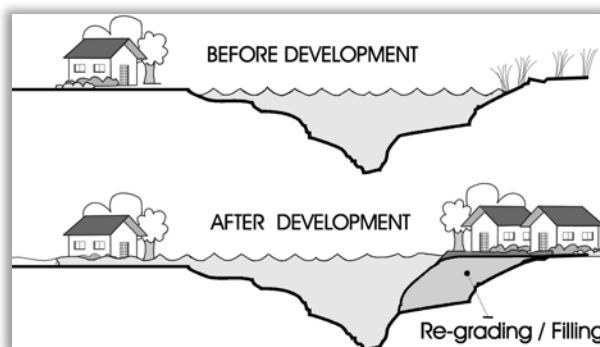


Figure 1-10. Floodplain development can increase flood problems.

Filling obstructs flood flows, backing up floodwaters onto upstream and adjacent properties. It reduces the floodplain's ability to store excess water, sending more water downstream and causing floods to rise to higher levels and flow at higher velocities. Filling also reduces the area available for infiltration and recharging of groundwater levels.

1.6. Safety and Health Hazards

Over eight million families in the United States live in the floodplain. Millions more work in floodplains or drive through them every day. In an average year, floods kill 150 people and cause over \$3 billion in property damage. Nationally, average annual flood losses continue to increase. Knowing the impact of a potential hazard — and guarding against it — is integral to administering a floodplain management program.

1.6.1. Safety Hazards

Each year, more deaths occur due to flooding than from any other thunderstorm related hazard. The Centers for Disease Control and Prevention report that over half of all flood-related drownings occur when a vehicle is driven into hazardous flood water. The next highest percentage of flood-related deaths is due to walking into or near flood waters. People underestimate the force and power of water. Many of the deaths occur in cars swept downstream. Many of these drownings are preventable. A mere 6 inches of fast-moving flood water can knock over an adult. It takes just 12 inches of rushing water to carry away most cars and just 2 feet of rushing water can carry away SUVs and trucks.

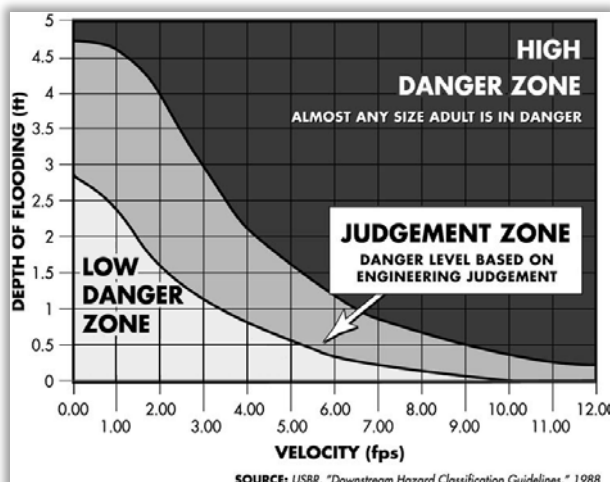


Figure 1-11. Depth and velocity hazard chart.

Drowning in vehicles is the number one cause of flood deaths. The hazards of driving in flooded waters are explained in Figure 1-13. A car will float in only two feet of moving water, which is one reason floods kill more people trapped in vehicles than anywhere else. Often victims put themselves in perilous situations by ignoring warnings about travel or mistakenly thinking that a washed-out bridge is still open.

When utilities are damaged, hazards arise. Electrocution is the second most frequent cause of flood deaths, claiming lives in a flooded area that is carrying a live current created when electrical components short. Floods also can damage gas lines, floors, and stairs, creating secondary hazards such as gas leaks and unsafe structures. If the water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.

Fire can be a result of too much water: floods can break gas lines, extinguish pilot lights, and short circuit electrical wiring – causing conditions ripe for a fire. Fire equipment may not be able to reach a burning building during high water.



Figure 2. Even shallow floodwaters can stop cars and wash people off their feet.

Source: National Weather Service

Flash Floods: How Can a Foot or Two of Water Cost You Your Life?

Nearly *half* of all flash flood fatalities are auto related!



Water weighs 62.4 lbs. per cubic foot and typically flows downstream at 6 to 12 miles an hour.



When a vehicle stalls in the water, the water's momentum is transferred to the car. For each foot the water rises, 500 lbs. of lateral force are applied to the car.



But the biggest factor is buoyancy. For each foot the water rises up the side of the car, the car displaces 1,500 lbs. of water. In effect, the car weighs 1,500 lbs. less for each foot the water rises.



Two feet of water will carry away most automobiles.

Figure 1-13. Effects of shallow water on cars.

Handbook for New Mexico Floodplain Managers

Source: FEMA/ National Weather Service

1.6.2. Health Hazards

Floods bring and leave hazards in the form of animal carcasses, garbage and ponds that can become breeding grounds for germs and mosquitoes. Any flooded items that come in close contact with people must be thrown out, including such things as food, cosmetics, medicines, stuffed animals and baby toys. Clothes and dishes need to be washed thoroughly. Septic systems are put out of operation when under water, adding to the health hazard of a flood.



Figure 1-14. Mold and mildew can grow quickly after a flood

Flood Safety
<p>Do not walk through flowing water. Drowning is the number one cause of flood deaths. Most drownings occur during flash floods. Six inches of moving water can knock you off your feet. Use a pole or stick to make sure that the ground is still there before you go through an area where the water is not flowing.</p>
<p>Do not drive through a flooded area. More people drown in their cars than anywhere else. Don't drive around road barriers; the road or bridge may be washed out.</p>
<p>Stay away from power lines and electrical wires. Electrocutation is also a major killer in floods. Electrical currents can travel through water. Report downed power lines to your utility company or local emergency manager.</p>
<p>Turn off your electricity when you return home. Follow the instructions in Step 2 on page 4. Some appliances, such as television sets, can shock you even after they have been unplugged. Don't use appliances or motors that have gotten wet unless they have been taken apart, cleaned, and dried.</p>
<p>Watch for animals, especially snakes. Small animals that have been flooded out of their homes may seek shelter in yours. Use a pole or stick to seek, poke, and turn items over and scare away small animals.</p>
<p>Look before you step. After a flood, the ground and floors are covered with debris, including broken bottles and nails. Floors and stairs that have been covered with mud can be very slippery.</p>
<p>Be alert for gas leaks. Use a flashlight to inspect for damage. Don't smoke or use candles, lanterns, or open flames unless you are sure that the gas has been turned off and the area has been aired out. Carbon monoxide exhaust kills. Use a generator or other gasoline-powered machine outdoors. The same goes for camping stoves. Fumes from charcoal are especially deadly; only cook with charcoal outdoors.</p>
<p>Clean everything that got wet. Floodwaters pick up sewage and chemicals from roads, farms, factories, and storage buildings. Spoiled food and flooded cosmetics and medicines are health hazards. When in doubt, throw them out.</p>
<p>Take good care of yourself. Recovering from a flood is a big job. It is tough on both the body and the spirit. And the effects a disaster has on you and your family may last a long time. Read Step 1 on page 1 on how to recognize and care for anxiety, stress, and fatigue.</p>

Taken From *Repairing Your Flooded Home*, FEMA P-234, 2010

Handbook for New Mexico Floodplain Managers

Mold, mildew and bacteria grow in damp, flooded areas. One health hazard occurs when heating ducts in a forced-air system are not properly cleaned following inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants.

In the desert, sediment is a particular problem. Flood water, flowing at moderate to high velocities, carries a lot of sediment. If it enters a building, it slows or stops, and the sediment drops out. After a flood, there may be several feet of saturated sediment inside buildings. The weight of this sediment and water may cause damage by pushing the walls out after the flood subsides.

1.6.3. Mental Health

Flooding, especially repetitive flooding, takes a toll on people's mental health. Stress comes from facing the loss of time, money, property and personal possessions such as heirlooms. This is aggravated by fatigue during cleanup and anxiety over lost income, health risks and damage to irreplaceable items. Children and the elderly are especially susceptible to stress from the disruption of their daily routines.

Here are some warning signs of stress. If you see these in people after a disaster, advise them to get help through the local health department or disaster assistance counselors.

- Short tempers, frequent arguments
- Greater consumption of alcohol
- Smoking more than usual
- Getting upset over minor irritations
- Difficulty sleeping, bad dreams
- Aches, pains, stomach problems
- Apathy, loss of concentration
- Depression

1.7. Property Damage

Floods can hurt or kill people, and damage property, in several ways. Knowing the impact of a potential hazard – and guarding against it – is integral to administering a floodplain management program. As a floodplain management administrator, you need to be knowledgeable about the main causes of flood damage. This section discusses the seven ways that floods damage property.

1.7.1. Hydrodynamic Forces

Moving water creates a hydrodynamic force which can damage a building's walls in three ways (see Figure 1-15)

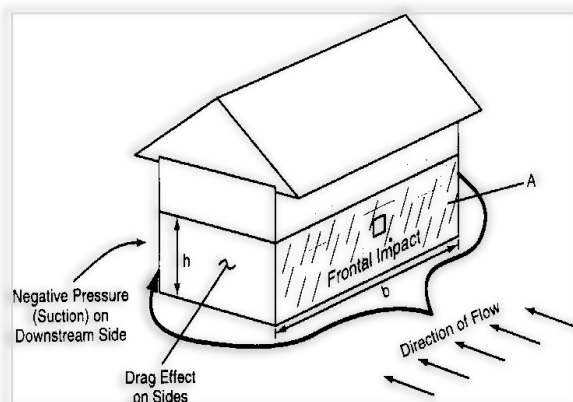


Figure 1-15. Hydrodynamic forces on a building.

- Frontal impact, as water strikes the structure.
- Drag effect, as water runs along the sides of a structure.
- Eddies or negative pressures, created as water passes the downstream side.

The speed of moving water is called velocity, a movement that is measured in feet per second. The faster water moves, the more pressure it puts on a structure and the more it will erode stream banks and scour the earth around a building's foundation. (See Figure 1-5)

Floodwaters moving faster than 5 feet per second comprise a high-velocity flood, requiring special design considerations for buildings, roads, bridges and other manmade structures in its path. While velocity is one factor in determining the potential harm of a flood, the total impact of moving water is related to the depth of the flooding. Studies have shown that deep water and low velocities can cause as much damage as shallow water and high velocities. (See Figure 1-11)

1.7.2. Debris Impact

Debris also increases the hazard posed by moving water. Floodwaters can and will pick up anything that will float — logs, lumber, even propane and farm chemical tanks and vehicles. Moving water will also drag or roll objects that don't float. All of this debris acts as battering rams that can knock holes in walls. (Figure 1-16)



Figure 1-16. Debris can crush a house

1.7.3. Hydrostatic Forces

The weight of standing water puts hydrostatic pressure on a structure. The deeper the water, the more it weighs and the greater the hydrostatic pressure.

Because water is fluid, it exerts the same amount of pressure sideways (lateral pressure) as it does downward. As water gets deeper, it exerts more lateral pressure than shallow water.

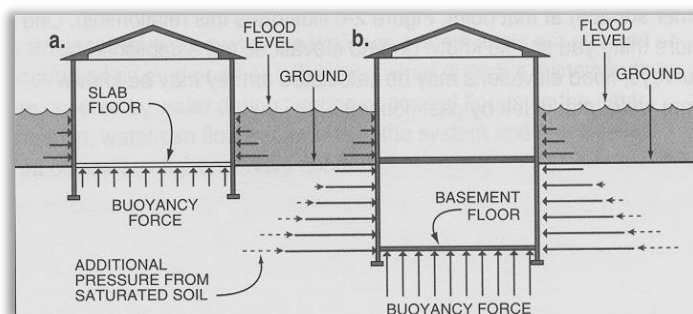


Figure 1-17. Hydrostatic pressure increases with deeper water.

Most walls are not built to withstand lateral pressure. Studies and tests have shown that the lateral force presented by three feet of standing water can be enough to collapse the walls of a typical frame house.

Handbook for New Mexico Floodplain Managers

Basement walls and floors are particularly susceptible to damage by hydrostatic pressure. Not only is the water deeper, a basement is subjected to the combined weight of water and saturated earth. Water in the ground underneath a flooded building will seek its own level – resulting in uplift forces that can break a concrete basement floor. (Figure 1-18)

One proven approach to counter uplift is to fill a basement with clean water before a flood. The weight of the water in the basement acts as a counter force to the hydrostatic pressure, protecting the walls and floor. This, of course, assumes that there is adequate warning time and plenty of clean water.



Figure 3. This basement floor broke from hydrostatic pressure.

1.7.4. Soaking

When soaked, many materials change their composition or shape. Wet wood will swell, and if it is dried too fast it will crack, split or warp. Plywood can come apart. Gypsum wallboard will fall apart if it is bumped before it dries out.

The longer these materials are wet, the more moisture they will absorb. Walls present a special problem: a “wicking” effect pulls water up through wood and wallboard, soaking materials as much as several feet above the actual high-water line. (see Figure 1-19)

Soaking can cause extensive damage to household goods. Wooden furniture and cabinets may get so badly warped that they can’t be used. Other furnishings, such as upholstery, carpeting, mattresses and books, usually are not worth drying out and restoring. Electrical appliances and gasoline engines won’t work safely until they are professionally dried and cleaned.



Figure 1-19. Prolonged exposure to water and “wicking” can destroy wood and gypsum walls.

1.7.5. Sediment and Contaminants

Few floods have clear floodwater, and so they leave a mess made of natural and man-made debris. Stormwater, snowmelt and river water pick up whatever was on the ground, such as soil, road oil, and farm and lawn chemicals (see the floor in Figure 1-14). If a wastewater treatment plant or livestock feedlots were inundated, the floodwaters will likely include untreated sewage.

Many materials, including wood and fiberglass or cellulose insulation, absorb floodwater and its sediment. Even if allowed to dry out, the materials will still hold the sediment and contaminants brought by the flood. Simply letting a flooded house dry out will not render it clean — and it certainly will not be as healthy a place as it was before the flood.

Handbook for New Mexico Floodplain Managers

Especially in the arid west, flooding can leave large amounts of sand, sediment and debris that require major cleanup efforts. After the water recedes or evaporates, these sediments are left on and in a building and its contents. FEMA's book, *Repairing Your Flooded Home*, devotes many pages to proper and healthy clean-up procedures.

1.7.6. Scour and Erosion

A building in a portion of the floodplain where there are erosive forces can be damaged or destroyed even if it is built above the flood elevation. If the channel meanders up against the foundation or fill, and if the flood lasts long enough, the moving water may undercut the foundation or slab, causing the building to subside or even fall into the water (See Figure 1-20).



Figure 1-20. Erosion can destroy a building that is above the flood level.

1.7.7. Subsidence of Piers or Pilings

Buildings and manufactured homes may be severely damaged by the subsidence of the piers or pilings upon which they are placed. If the ground on which the piers or pilings are placed becomes saturated, the piers or pilings may settle into the mud. Severe damage can be caused by differential settling that places stress on building components.



2. The New Mexico Floodplain Managers Association

CONTENTS

2.1. NMFMA Purpose	1-2
2.2. History and Status of the NMFMA	1-2
2.2.1. History	1-2
2.2.2. Highlights in the History of the NMFMA.....	1-8
2.2.3. Status as of January 2020	1-8
2.3. Training and Educational Opportunities	1-9
2.3.1. Conferences	1-9
2.3.2. Other NMFMA Training.....	1-9
2.3.3. Other Training	1-9
2.4. Certified Floodplain Managers (CFMs).....	1-9
2.4.1. The State and National Certification Program.....	1-9
2.4.2. Becoming Certified.....	1-11
2.4.3. Maintaining Certification	1-11
2.5. Other NMFMA Activities	1-11
2.5.1. Legislation	1-11
2.5.2. Improving Floodplain Management Standards	1-11
2.6. Strategic Plan.....	1-12



Handbook for New Mexico Floodplain Managers

2.1. NMFMA Purpose

From the Constitution of the New Mexico Floodplain Managers Association, the purpose of the New Mexico Floodplain Managers Association is the following:

- To promote public awareness of proper floodplain management;
- To promote the professional status of floodplain management and secure all benefits resulting therefrom;
- To promote a liaison between individual concerns with proper floodplain management and to encourage the exchange of ideas;
- To keep individuals concerned with proper floodplain management well informed through education and professional seminars and to provide a method for dissemination of information, both general and technical;
- To inform concerned individuals of pending floodplain legislation and other related management matters; and
- To study and support legislation pertinent and necessary to the effective implementation of floodplain management matters.

In Developing the NMFMA Strategic Plan (see Appendix H), the NMFMA has developed the following “**Mission Statement:**”

It is the mission of the New Mexico Floodplain Management Association to reduce the losses, costs, and human suffering caused by flooding; to further educate all of New Mexico and its citizens about floods, floodplains and floodplain management; and to promote a balance between development and the natural and beneficial functions of floodplains.

From this “Mission Statement,” the Association has the following **Goals:**

1. Reduce losses, costs, and human suffering caused by flooding.
2. Promote leadership in floodplain management.
3. Strengthen Association partnerships with agencies, academia, and other Associations.
4. Encourage the use of effective floodplain management principles and practices through education, outreach, and training.

In the NMFMA *Strategic Plan (2014)*, these goals are expanded, and include the Associations objectives for each of these goals. Please see the *Strategic Plan* in Appendix H for a complete discussion.

2.2. History and Status of the NMFMA

2.2.1. History

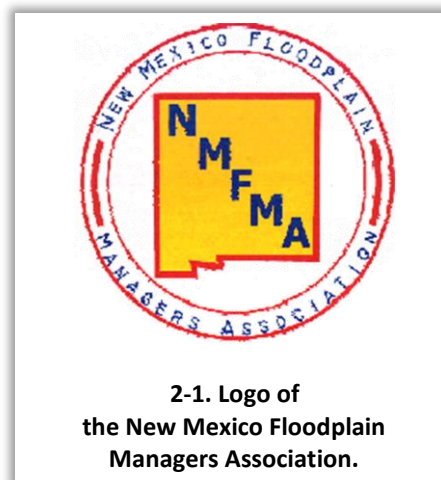
The following history was prepared by Grant Pinkerton, CFM, of Chaves County, and Mike Czosnek, of the City of Socorro in January 2002. It was updated by Leslie A. Bond, CFM, for this Handbook.

The New Mexico Floodplain Managers Association (NMFMA) started with a group of local zoning officials who had become acquainted through the NM League of Zoning Officials (NMLZO). A number of those present were also assigned the duties of local floodplain managers for their communities, and during the early 1990s had no source of training in floodplain

Handbook for New Mexico Floodplain Managers

management. Jack Purcell of the NM Department of Public Safety (DPS), who had recently been assigned as the State Coordinator for the National Flood Insurance Program (NFIP), initiated the development of a training and certification program in the state.

In July of 1994, the first two-day training and certification seminar was held at the Luna Vocational Technical Institute in Las Vegas, NM. Jack Purcell developed a training program that included presentations from various state and federal agencies and local floodplain managers. He also developed the state's first certification examination, and it was given to the participants at the Las Vegas seminar. There were 55 floodplain managers approved at this seminar. The exam was given for the second time at a two-day seminar held in Deming, NM in September of 1994. Many of the state's floodplain managers were certified under the initial program by the end of 1994.



In August 1995, floodplain managers met at a NM Emergency Managers Association (NMEMA) conference in an Albuquerque hotel. A consensus of the floodplain managers in attendance indicated that floodplain managers should form an association of their own. Two of the group spent a couple of the conference days establishing corporation papers, a federal tax ID number, and a bank account for the new Association. The NMFMA corporation certificate and a Constitution and Bylaws fashioned after those of the NMLZO were filed with the Corporation Commission on August 2, 1995. The first officers of the Board of Directors were volunteers.

The first conference sponsored by the NMFMA was held at the Firefighters' Training Academy in Socorro in April, 1996. Membership had grown to about 35 people, and the Association officially adopted changes to the Constitution and Bylaws. Training and certification were offered, and more local floodplain managers were certified under the existing certification program. By the end of this conference, 135 floodplain managers in NM had been certified.

The second conference sponsored by the NMFMA was held at the Firefighter's Training Academy in Socorro in November of 1996, where Association Officers were elected. The 48 voting members present approved another change to the Constitution and By Laws.

By chance, five New Mexico floodplain managers from the Corps of Engineers and consulting firms met at the annual conference of the Association of State Floodplain Managers (ASFPM) in Little Rock, AR in 1997. They agreed that NM needed a strong state association and agreed to help wherever they could. Since then, they have served as officers, Newsletter Editor, committee chairs and Executive Director.

In the Spring of 1997 Leslie Bond of LA Bond Associates offered to begin a newsletter for the Association. The first NMFMA newsletter was mailed in the summer. The newsletter is an invaluable tool which spreads awareness of the Association to those interested in floodplain management. In August of 1997, a conference was held in Roswell, NM. New officers were

Handbook for New Mexico Floodplain Managers

elected. Leslie Bond was officially recognized as the newsletter editor.

During a board meeting in December of 1997 in Socorro, working committees were created: the Education and Program Committee (Cynthia Tidwell, Chair); Constitution and By Laws Committee (Leslie Bond, Chair); Newsletter and Membership Committee (Leslie Bond, Chair); and Legislative Committee (Grant Pinkerton, Chair). Jack Purcell submitted suggested changes to the state statute and the board began discussion on changes in the statutes concerning floodplain management.

In April of 1998, a conference was held in Albuquerque. Two contests were held: one for the best name for the newsletter, and one for the best logo for the association. The newsletter was named “High Waters,” and a logo was chosen. Both awards went to Onesimo Salmeron of Las Vegas. The membership agreed to sponsor the FEMA 4½ day course, “Managing Floodplain Development through the NFIP” in Hobbs or El Paso. Changes to the Constitution and Bylaws were approved, creating four Regional Directors on the Board. The Board decided that the Association would assist two board members to attend the next ASFPM conference in Milwaukee, Wisconsin. A letter was submitted from the 1997-1998 Board to the 1998-1999

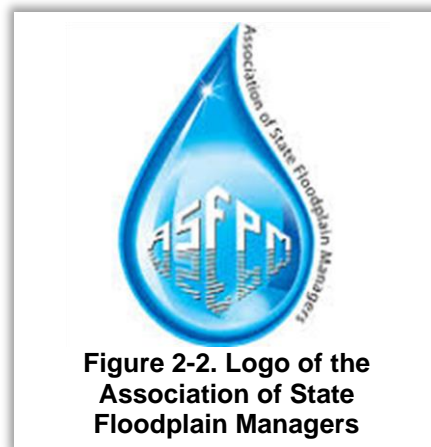


Figure 2-2. Logo of the Association of State Floodplain Managers

Board with the following recommendations: to pursue Chapter membership with ASFPM; to create a training package for newly appointed local floodplain managers; to adopt continuing education requirements for certification based on ASFPM criteria; and to create an Executive Director position.

In October of 1998, the Fall conference was held in Albuquerque. The voting members present elected a new board, including four Regional Directors.

In November of 1998, the Board appointed Les Bond as Executive Director of the Association. The Board also appointed Shelley Cobau of the Southern Sandoval County Arroyo and Flood Control Authority as Newsletter Editor. The Certification Committee was established, and the Board approved NMFMA’s application for chapter membership with ASFPM.

In January of 1999, the first legislation designed to effect changes in the enabling act that would give communities the authority to adopt floodplain management ordinances was introduced in the State Legislature. Representative Dara Dana from Roswell sponsored the bill. Letters were sent to all legislators from NMFMA explaining the aspects of the bill and the need for change. NMFMA was not available at any of the committee hearings to testify and the bill died in committee.

Handbook for New Mexico Floodplain Managers

In February of 1999, the Board approved the purchase of a telephone for the executive office, began sending annual invoices to all NMFMA members, and approved the creation of the NMFMA website with Leslie Bond as Web Master. In March 1999, NMFMA's application for chapter membership was approved by ASFPM.

In April of 1999, the Spring conference was held in Albuquerque. Another change to the Constitution and Bylaws was approved. It was decided that NMFMA should pursue the creation of a NM certification program fashioned after the national program under development by the ASFPM. Grant Pinkerton of Chaves County volunteered to take the lead in this effort.

In August of 1999, NMFMA sponsored an insurance seminar in Roswell and three elevation certificate workshops in Roswell, Las Cruces, and Albuquerque. In September 1999, Elvidio Diniz of Resource Technologies, Inc. was appointed to fill the vacant Vice Chair position. Bob Perry of Red River represented the NMFMA at an ASFPM Chapter Retreat in Madison, Wisconsin. The Board approved a Memorandum of Understanding with the Department of Public Safety (DPS) that allowed DPS to provide funds for the NMFMA newsletter. The Board also approved the purchase of a display board for the Association.

In October of 1999, the Fall conference was held in Albuquerque. The membership approved a change to the Constitution and Bylaws and elected new officers. Diane Calhoun of Halff Associates volunteered to serve as Newsletter Editor.

In February of 2000, the Board adopted a resolution policy. On April 12, 2000 the NMFMA Certified Floodplain Manager (CFM) Program was accredited by ASFPM.

In April of 2000, the Spring conference was held in Albuquerque. Diane Calhoun taught a one-day FPM refresher course prior to the conference and the first NM CFM exam was given. Twelve New Mexico floodplain managers were certified through the ASFPM accredited NM CFM program.

At the May 2000 Board meeting, the Board approved Resolution 2000-01 offering reciprocity to all CFMs certified by ASFPM or by any ASFPM accredited CFM program.

In September of 2000, the Fall conference was held in Red River. This was the first time for NMFMA and the NM League of Zoning Officials (NMLZO) to participate in a joint conference. The NMFMA membership adopted 12 resolutions that established the association's position



Figure 2-3. NMFMA conferences provide training for floodplain managers.

Handbook for New Mexico Floodplain Managers

concerning the needs for floodplain management in New Mexico. A white paper with details of the 12 resolutions was also adopted. The membership officially adopted a simplified logo for the Association and discussed proposed legislation for the 2001 session. Diane Calhoun taught the one-day FPM refresher course prior to the conference. NMFMA decided to include this course with each conference. The CFM exam was given for the second time and 7 more NM floodplain managers were certified.

In February of 2001, the Spring conference was held in Albuquerque in conjunction with the ASFPM Arid West conference. House Bill 452 was introduced in the House by Representative Dan Foley (Roswell), and Senate Bill 145 was introduced in the Senate by Senator Stuart Ingle (Portales). The membership approved Goals and Objectives for NMFMA for the year 2001 and approved changes to the Constitution and Bylaws. Diane Calhoun's course was a standard part of the conference, the CFM exam was given for the third time, and 10 more CFMs were certified.

After being approved by both the House and the Senate, Senate Bill 145 was signed by the Governor in March 2001. This bill requires that NM communities with floodplain regulations must have all permits for floodplain development reviewed by a CFM.

In October of 2001 the fall conference was held in Las Cruces. The refresher course was given the day prior to the conference and the exam was given for the fourth time. Nine more CFMs were certified, bringing the number of NM CFMs to 43. The business meeting focused on the importance of committees in accomplishing the goals and objectives of the Association. A number of the members volunteered to serve on the Training and Education and the Legislative Committees.



Figure 2-4. NMFMA publications.

In early 2002, the Board approved printing the *Call for Action*, a publication explaining floodplain management in New Mexico and calling for specific actions by the NMFMA, DPS, the New Mexico Legislature and FEMA. This document was distributed to NMFMA members, legislators and all communities in New Mexico. Two brochures were also designed and printed.

In April 2002, the spring conference was held in Socorro. It included a "Floodplain Management Symposium" on Friday morning. The refresher course was given the day prior to the conference, and the exam was given for the fifth time.

In June 2002, the NMFMA received the Tom Lee State Award for Excellence from the ASFPM. This award cited the CFM legislation that was signed into law in 2001.

In October 2002, the fall conference was held in Ruidoso Downs. The refresher course was given the day prior to the conference and the exam was given.

In November 2002, the NMFMA and DPS cosponsored the 4 ½-day course "Floodplain

Handbook for New Mexico Floodplain Managers

Management through the NFIP” in Santa Fe. This course was taught by FEMA Region VI staff. Thirty floodplain managers took the course, 21 took the CFM exam at the conclusion of the class, and 19 passed the exam.

In late 2002, the Board of Directors drafted a “Strategic Plan” for the NMFMA. This plan was adopted in April 2003 after review by the membership.

In early April 2003, the Governor signed legislation sponsored by NMFMA that requires all communities with identified flood hazards to adopt floodplain management ordinances and join the NFIP.

The 2003 spring conference was held in Albuquerque. In addition to the refresher course, the NMFMA sponsored half-day workshops for lenders and insurance agents, and a full-day course in geomorphology. This was the first NMFMA conference to have exhibitors. The CFM exam was administered again. As of May 1, 2003, there were 92 Certified Floodplain Managers in New Mexico, and 52 of the 74 NFIP communities had CFMs on staff.

In May 2003, the NMFMA received its second Tom Lee State Award for Excellence from the ASFPM. This award cited the *Call for Action*, the “Strategic Plan” and the legislation requiring ordinances and NFIP participation. In June 2003, the NMFMA contracted for the development of the first *Handbook for New Mexico Floodplain Managers*.



Figure 2-5. NMFMA members receiving the 2003 Tom Lee Award in St. Louis.

Since 2003, the NMFMA has amended its Bylaws three times on June 15, 2006, April 10, 2008, and September 22, 2011. NMFMA introduced Policy P 05-1: Dues for New Members on March 10, 2005, specifying the membership status and dues owed by individuals who have attended a conference within that calendar year. Policy P 06-1: Nomination of Officers and Regional Directors and Policy P 06-2: Election of Officers and Regional Directors were released on June 14th of 2006. Policy P 10-1: Filing the annual financial report to the IRS was released on July 17, 2010 and Policy P 11-1: Sponsorship Recognition was released on July 16, 2011. In addition, Resolution R 06-1, was adopted by the membership to reinforce the need for community review of building and placement permits for manufactured homes in any community with identified flood hazards on October 19, 2006. In August of 2014 the NMFMA Board also approved and updated Strategic Plan for the Association.

Up until the Fall 2018 Conference hosted in Ruidoso, NM, the NMFMA continued to provide a spring and fall conference annually. However, beginning in 2019, NMFMA has altered the schedule to provide one conference annually in the spring of each year and provide other training opportunities around the State during the traditional fall timeframe. As of January of 2020, NMFMA has 233 members and there are 166 Certified Floodplain Managers in both the



Handbook for New Mexico Floodplain Managers

private and public sectors, certified through NMFMA. NMFMA is also currently in the process of updating this Handbook to better reflect the current FEMA Floodplain Management requirements.

2.2.2. Highlights in the History of the NMFMA

August 1995:	NMFMA incorporated.
April 1996:	First NMFMA conference.
November 1996:	First election of officers.
Spring 1997:	First NMFMA newsletter published.
December 1997:	First committees established.
April 1998:	Board of Directors expanded to 9 members.
November 1998:	Executive Director appointed.
January 1999:	First NMFMA legislation introduced; failed.
February 1999:	Executive Office established with permanent address and telephone number for NMFMA; web site established.
March 1999:	NMFMA became a chapter of ASFPM.
August 1999:	NMFMA sponsored workshops on flood insurance and elevation certificates.
April 2000:	NMFMA CFM program accredited by ASFPM. First NM floodplain managers became CFMs.
September 2000:	First joint conference (NMLZO); 13 resolutions passed to improve floodplain management in NM.
February 2001:	NMFMA cosponsored ASFPM Arid West Conference; second NMFMA legislation introduced.
March 2001:	Legislation adopted requiring NM communities to have CFMs. April 2002: <i>Call for Action</i> published and distributed.
June 2002:	NMFMA received Tom Lee Award from ASFPM.
November 2002:	NMFMA cosponsored FEMA course in Santa Fe.
April 2003:	Legislation adopted requiring communities to adopt ordinances, join NFIP.
April 2003:	Board adopted "Strategic Plan."
May 2003:	NMFMA received second Tom Lee Award from ASFPM.
January 2014:	Grant Pinkerton became NMFMA Executive Director
August 2014:	Board adopted 2014 "Strategic Plan."
April 2019:	NMFMA cosponsored ASFPM Arid Regions Conference. First annual conference for NMFMA members.

2.2.3. Status as of January 2020

- Established April 1995, incorporated as a nonprofit organization. Chapter of ASFPM March 1999.
- Nine-member Board of Directors (Chair, Vice Chair, Second Vice Chair, Secretary, Treasurer, four Regional Directors).
- Eight Board meetings each year.



Handbook for New Mexico Floodplain Managers

- One membership meeting each year. One conference each year.
- Newsletter replaced with direct email correspondence to membership and website blog.
- Operational committees (Conference, Training and Education).
- Accredited CFM program; Certification Board; 166 CFMs.
- Executive Director: J.D. Padilla, CFM
- Web site: www.nmfma.org
- 2020 membership: Approximately 233.

2.3. Training and Educational Opportunities

2.3.1. Conferences

The NMFMA sponsors one conference each year, normally in April and assists in providing additional training opportunities every fall around the State. The Spring (April) conference is hosted by participating municipalities around the State and is held in different locations every year to promote attendance statewide. The Spring conference is specified in the Bylaws as the time for the annual meeting, when election of officers and directors occurs. NMFMA conferences start after lunch on Wednesday and end at noon Friday to make it easier for community officials to attend without spending three nights away.

2.3.2. Other NMFMA Training

The NMFMA provides other training for floodplain managers in conjunction with its conferences and at other times during the year. Training associated with conferences is offered on Tuesday or on Wednesday morning.

2.3.3. Other Training

From time to time, the NMFMA sponsors training provided by other organizations. For example, we have sponsored the FEMA course, “Managing Floodplain Development Through the NFIP,” and we have sponsored courses for insurance agents, real estate agents, lenders, engineers, and surveyors. Information regarding available on-line and in-person training opportunities are announced on the NMFMA website or are provided via email to the membership.

2.4. Certified Floodplain Managers (CFMs)

2.4.1. The State and National Certification Program

The Association of State Floodplain Managers has a certification program for floodplain managers. People interested in professional certification submit an application form, which includes a signed code of professional conduct. Once approved, the applicant is eligible to take the exam. Examinations are given at each annual Association conference and other locations throughout the nation.

Handbook for New Mexico Floodplain Managers

The NMFMA Certification Program is one of six state certification programs chartered by ASFPM. The NMFMA program is overseen at every step by ASFPM, and floodplain managers who are certified by the NMFMA are recognized nationally.

The CFM designation is valid indefinitely, provided that the applicant complies with the biennial (every two years) renewal requirements: payment of a renewal fee and submittal of proof of continuing education credits. The continuing education requirement can be met through attendance at floodplain management conferences or workshops, formal courses, home study courses, and other approved technical meetings.



Figure 2-6. Certified Floodplain Manager logo © ASFPM.

What is a Certified Floodplain Manager? At a recent conference, the Chair of the ASFPM Certification Board of Regents answered this question with the following:

I think the simplest way to put it is that Certified Floodplain Managers are people who know their stuff. They have a proven level of expertise in:

- Floodplain mapping,
- The requirements and standards of the National Flood Insurance Program,
- The requirements and standards of their state floodplain management programs, and
- The administrative procedures needed to make floodplain management work at the community level.

How do we know this? Because a certified floodplain manager has passed a rigorous closed book test. It isn't easy. The CFM exam measures a person's knowledge of a community's responsibilities under the NFIP and related floodplain management topics. Many exam takers take the EMI 273 course and then take the CFM exam immediately after and do not pass. While designed to provide basic training on NFIP minimum requirements for local officials administering floodplain management programs, it only refreshes part of what is tested on the CFM exam. ASFPM provides a list of study materials to help prepare for the test at <https://www.floods.org/certification-program-cfm/getting-certified/cfm-exam-study-guide/>.

Why should you want to go through the pain and suffering of preparing for and taking an exam? Let me list four benefits of becoming certified.

- First, you will have confidence in your level of knowledge. You can't pass the exam unless you know your stuff.
- Second, being certified tells others that your professional capabilities have been recognized by a national program.
- Third, certification is the motivation for continuing education. You can't stay certified unless you stay abreast of developments in the field by attending workshops, conferences, or training courses.



Handbook for New Mexico Floodplain Managers

- Fourth, it can help you in the job market. If you are an employer – you can count on CFMs to know their stuff.

2.4.2. Becoming Certified

To become a Certified Floodplain Manager (CFM) in New Mexico, a person must fill out and submit an application package to the NMFMA and pass a written examination. All details on applying for certification are on the NMFMA website at www.nmfma.org. They may also be obtained from J.D. Padilla, CFM, Chair of the NMFMA Certification Board. Call J.D. at 575-840-3027.

The NMFMA certification examination is offered on Wednesday morning prior to each NMFMA conference and at other times. Check the NMFMA website, www.nmfma.org for future examination dates. ASFPM has recently created the CFM Study Guide which is designed to help those preparing to take the CFM exam. This document can be found on the NMFMA website under the CFM Certification tab.

2.4.3. Maintaining Certification

Certified floodplain managers must earn continuing education credits (CECs) each year, report these CECs to the NMFMA Certification Board, and be recertified every two years. A CFM must earn 16 hours of CEC each two years, and no more than 12 hours are accredited in any one year. Training that is directly pertinent to floodplain management is credited at one hour = one hour. That is, one hour of training provides one hour of CEC. Other training courses that are loosely related to floodplain management may receive less credit per hour. For example, a training course in building permit procedures may receive CEC credit, but not at the rate of one hour of training equals one hour of CEC. CECs are obtained by attending NMFMA conferences and training and by taking other training approved by the NMFMA Certification Board.

2.5. Other NMFMA Activities

2.5.1. Legislation

From time to time, the NMFMA will seek legislative action to enhance floodplain management in New Mexico. Such action is initiated by the NMFMA Board of Directors and implemented by the NMFMA Legislative Committee.

Recent legislative initiatives have been undertaken in response to floodplain management resolutions adopted by the membership. Future legislation may result from our interaction with other state and federal agencies, changes in the NFIP, a desire to improve floodplain management standards in New Mexico, or for other reasons.

2.5.2. Improving Floodplain Management Standards

The NMFMA membership includes floodplain management professionals who are familiar with a wide range of standards in use in other states and communities. The membership may choose to improve the floodplain management standards in New Mexico by educating our



Handbook for New Mexico Floodplain Managers

membership on the advantages of such standards, providing technical manuals that include such standards, revising the statutory requirements for communities, or by other means. Some of those higher standards are discussed in this *Handbook*.

2.6. Strategic Plan

For several years now, the NMFMA has adopted annual “Goals and Objectives.” These are necessary for the Board and the committees to know what is to be done during the year. In 2002, the Board decided it was time to develop a plan with a longer time frame and with a broader look at the needs of New Mexico floodplain managers and the NMFMA. The Board and Committee Chairs met in High Rolls for a retreat in September 2002 and developed the Strategic Plan. The Strategic Plan was revised in August of 2014.

The NMFMA has grown in size and stature over the years. Other state associations looked to NMFMA for advice on their website at <http://nmfma.clubexpress.com>, the CFM program and other aspects of the organization. In 2002 and 2003, NMFMA received the highest award given by the ASFPM for state programs. The NMFMA is only the second state association to consider a strategic plan.

This “Strategic Plan” will guide NMFMA efforts and growth for years to come. It includes things the Association do not have the capability or money to do immediately but recognize the need for. It will provide a basis for future Boards of Directors and Committee Chairs as they develop their annual goals and objectives. It is an ambitious plan that will allow your association to continue to meet your needs as floodplain managers.

This Strategic Plan serves as an ever-changing statement of what the NMFMA is and what it strives to become. With continued input from members and stakeholders, the NMFMA leadership will periodically update the Strategic Plan to remain in tune with critical issues and priorities in floodplain management. The “Strategic Plan” is included as Appendix H.



3. The National Flood Insurance Program

CONTENTS

3.1. History	1-2
3.1.1. Insurance	1-2
3.1.2. Flood Control.....	1-2
3.1.3. Floodplain Management.....	1-2
3.1.4. Creation of the NFIP.....	1-3
3.1.5. Evolution	1-3
3.1.6. Disaster Programs	1-4
3.2. How the NFIP Works	1-5
3.2.1. Mapping	1-5
3.2.2. Insurance.....	1-6
3.2.3. Regulations.....	1-7
3.3. NFIP Roles and Responsibilities.....	1-7
3.3.1. The Community Role.....	1-8
3.3.2. The State Role	1-8
3.3.3. The Federal Role	1-9
3.4. Joining the NFIP.....	1-10
3.5. The NFIP's Regulations.....	1-11
3.5.1. 44 CFR.....	1-11
3.5.2. Community Types	1-12
3.6. Compliance.....	1-14
3.6.1. CRS Reclassification.....	1-14
3.6.2. Probation.....	1-14
3.6.3. Suspension	1-14
3.6.4. Sanctions for Non-Participation.....	1-15

3.1. History

3.1.1. Insurance

Historically, people at risk from flooding could only hope for help from their neighbors and charitable organizations in the event of a flood.

Government assistance varied from community to community, and flood insurance was scarce. During the 1920s, the insurance industry concluded that flood insurance could not be a profitable venture because the only people who would want flood coverage would be those who lived in floodplains. Since they were sure to be flooded, the rates would be too high to attract customers.

3.1.2. Flood Control

It wasn't until the great Mississippi River flood of 1927 that the federal government became a major player in flooding. As defined by the Flood Control Acts of 1928 and 1936, the role of government agencies was to build massive flood control structures to control the great rivers, protect coastal areas and prevent flash flooding. The 1936 Act authorized construction of some 250 projects for both flood control and relief work.

Until the 1960s, such structural flood control projects were seen as the primary way to reduce flood losses. Public policy emphasized that flood losses could be curbed by controlling floodwater with structures, such as dams, levees and floodwalls.

During the 1960s, there was a growing questioning of the effectiveness of this single solution. Disaster relief expenses were going up, making all taxpayers pay more to provide relief to those with property in floodplains. Studies during the '60s concluded that flood losses were increasing, in spite of the number of flood control structures that had been built.

3.1.3. Floodplain Management

One of the main reasons structural flood control projects failed to reduce flood losses was that people continued to build in floodplains. In response, federal, state and local agencies began to develop policies and programs with a "non-structural" emphasis, ones that did not prescribe projects to control or redirect the path of floods. Since the 1960s, flood protection programs evolved from heavy reliance on flood control, or structural measures, to one using a combination of many tools.

As a result of this evolution, we no longer depend solely on structural projects to control floodwater. U.S. floodplain policies are now multi-purpose and result in a mix of solutions to suit many situations.

Instead of "flood control," we now speak of "floodplain management." Floodplain management is officially defined by the federal government's *Unified National Program For Floodplain Management* as "a decision-making process that aims to achieve the wise use of the nation's floodplains." "Wise use" means both reduced flood losses and protection of the natural resources and functions of floodplains.



Handbook for New Mexico Floodplain Managers

Where floodplain development is permitted, floodplain management results in development and construction measures that minimize the risk to life and property from floods and the risk to the floodplain's natural functions posed by human development.

3.1.4. Creation of the NFIP

By the late 1960s, Congress had become concerned with problems related to the traditional methods of dealing with floods and flood damage — construction of structural projects and federal disaster assistance. Both were proving to be quite expensive, with no end in sight.

Congress concluded that:

- Although federal flood programs were funded by all taxpayers, they primarily helped only residents of floodplains.
- Flood protection structures were expensive and could not protect everyone.
- People continued to build and live in floodplains, thus still risking disaster.
- Disaster relief was both inadequate and expensive.
- The private insurance industry could not sell affordable flood insurance because only those at high risk would buy it.

In 1968, Congress passed the National Flood Insurance Act to correct some of the shortcomings of the traditional flood control and flood relief programs. The act created the National Flood Insurance Program to:

- Transfer the costs of private property flood losses from the taxpayers to floodplain property owners through flood insurance premiums.
- Provide floodplain residents and property owners with financial aid after floods, especially smaller floods that do not warrant federal disaster aid.
- Guide development away from flood hazard areas.
- Require that new, substantially improved and substantially damaged buildings be constructed in ways that would minimize or prevent damage in a flood.

Congress charged the Federal Insurance Administration (which at that time was in the Department of Housing and Urban Development) with responsibility for the program.

3.1.5. Evolution

Participation in the NFIP grew slowly. In 1972, Hurricane Agnes devastated a wide area of the eastern United States. Disaster assistance costs were the highest ever, leading Congress to examine why the NFIP was so little used. Investigators found that few communities had joined the NFIP — there were fewer than 100,000 flood insurance policies in force nationwide.

To remedy this, the Flood Disaster Protection Act was passed in 1973, requiring that buildings located in identified flood hazard areas have flood insurance coverage as a condition of federal aid or loans from federally-insured banks and savings and loans, and as a condition for

Handbook for New Mexico Floodplain Managers

receiving federal disaster assistance. These “sanctions” for non-participation (see section 3.6.4) make it hard for any community that wants federal assistance for properties in floodplains to avoid joining the NFIP.

The 1973 Act spurred participation in the program dramatically. By the end of the decade, more than 15,000 communities had signed on and about two million flood insurance policies were in effect (see Figure 3-1).

In 1979, the Federal Insurance Administration (FIA) and the NFIP were transferred to the newly created Federal Emergency Management Agency (FEMA). During the early 1980s, FIA worked to reduce the program’s dependence on its authority to borrow from the Federal Treasury.

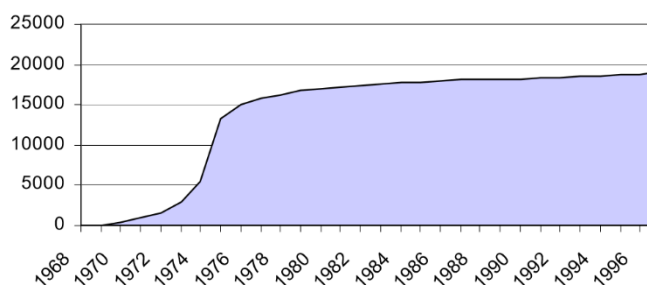


Figure 3-1 NFIP Community Participation

Through a series of rate increases and other adjustments, the program has been self-supporting since 1986. The NFIP is funded primarily through premium income, which pays all the costs of administration, mapping, and claims.

Since 1973, the program has been amended several times. The most important changes came under the National Flood Insurance Reform Act of 1994 which fine-tuned various aspects of the program, such as authorizing the Community Rating System, increasing the maximum amount of flood insurance coverage, strengthening the mandatory purchase requirement, and establishing a grant program for mitigation plans and projects.

The Reform Act strengthened the provisions that mandate the purchase of flood insurance that were created in the 1973 Flood Disaster Protection Act. The resulting improved enforcement and the initiation of a flood insurance advertising campaign known as “Cover America” boosted sales of flood insurance policies again. By the August of 2003, there were nearly 4.4 million flood insurance policies in force.

By January of 2004, the number of participating communities was 19,937 out of 22,000 with identified floodplains. There are 104 participating communities in New Mexico, out of 110 that have identified floodplains.

3.1.6. Disaster Programs

Concurrent with the evolution of the NFIP, federal disaster programs were evolving. Over the years the Federal cost share has been reduced in order to get states and communities to shoulder more of the burden.

With the passage of the Robert T. Stafford Disaster Relief and Emergency Act (known as the Stafford Act) in 1988, disaster assistance funding started including funding for mitigation projects to reduce future flood damage. Like the NFIP statutes, the Stafford Act was amended after the 1993 floods. Mitigation funding levels were increased. Currently, FEMA administers



Handbook for New Mexico Floodplain Managers

three programs that provide funding for eligible mitigation planning and projects that reduces disaster losses and protect life and property from future disaster damages. The three programs are the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) Program, and the Pre-Disaster Mitigation (PDM) Program.

- HMGP assists in implementing long-term hazard mitigation planning and projects following a Presidential major disaster declaration
- PDM provides funds for hazard mitigation planning and projects on an annual basis
- FMA provides funds for planning and projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP) on an annual basis

HMGP funding is generally 15 percent of the total amount of federal assistance provided to a state, territory, or federally recognized tribe following a major disaster declaration. PDM and FMA funding depends on the amount congress appropriates each year for those programs. These programs are discussed in Section 23.4.

In the 1990's, the NFIP also began funding mitigation projects through a new insurance mechanism called Increased Cost of Compliance. Policy holders can receive an additional claim payment to fund flood protection projects that are required by the community's floodplain regulations. This program is discussed in Section 13.4.3.

3.2. How the NFIP Works

The NFIP is based on a mutual agreement between the federal government and the community. Federally guaranteed flood insurance is made available in those communities that agree to regulate development in their mapped floodplains. If the communities do their part in making sure future floodplain development meets certain criteria, FEMA will provide flood insurance for properties in the community.

There are three basic parts to the NFIP—mapping, insurance, and regulations. These three parts are interconnected and mutually supportive.

3.2.1. Mapping

FEMA has prepared a floodplain map and developed flood hazard data for most communities in the country. The maps and data are used for several purposes:

- Communities, states and federal agencies use them as the basis for regulating new floodprone construction.
- Insurance agents use them when rating flood insurance policies.
- Lenders and federal agencies use them to determine when flood insurance must be purchased as a condition of a loan or financial assistance.

The Federal Emergency Management Agency's (FEMA) Flood Map Service Center (MSC) is the official government distribution center for digital flood hazard mapping products created by FEMA in support of the National Flood Insurance Program (NFIP). Products and services are accessible online at <http://msc.fema.gov>. Flood mapping products include:



Handbook for New Mexico Floodplain Managers

- Effective FIRM, FIS, and any amendments or revisions. These are the regulatory products for a community on which FEMA has delineated both the special areas and the risk premium zones applicable to the community. Some older flood maps are called Flood Hazard Boundary Map (FHBM) or Flood Boundary and Floodway Maps (FBFM). Most communities in New Mexico have had their FHBMs replaced by Flood Insurance Rate Map.
- Risk MAP Flood Risk Products: Flood Risk Products are non-regulatory resources that greatly help officials and the public assess, visualize and communicate local flood risk. Flood Risk Products that may be available for communities include Flood Risk Maps (FRM), Flood Risk Reports (FRR), and Flood Risk Databases (FRD).

The flood insurance rates for post-FIRM buildings are based on how protected they are from the mapped hazard. Therefore, both the NFIP's regulations and insurance coverage depend on the accuracy and utility of the maps.

Buildings that pre-date the FIRM are treated differently than buildings built after the flood hazard was made public on the FIRM. These existing structures are called "pre-FIRM" buildings, while new construction is called "post-FIRM."

The NFIP's maps and flood studies are covered in depth in Sections 4 through 7.

3.2.2. Insurance

Flood insurance can be purchased to cover any building located in a participating community — even buildings not located in a mapped floodplain. Coverage is for damage by a "flood." A flood is defined by the NFIP as a "general and temporary condition of partial or complete inundation of normally dry land areas from:

- (1) "The overflow of inland or tidal waters" or
- (2) "The unusual and rapid accumulation or runoff of surface waters from any source"

The official definition also includes mudflows and erosion.

Flood insurance premiums for post-FIRM buildings are based on the degree of flood protection they are provided. Therefore, it is very important for communities to ensure that new buildings in the floodplain are constructed properly.

The flood insurance premium rates for pre-FIRM buildings are subsidized by the NFIP. Owners of these policies do not pay "actuarial" rates, i.e., rates based on the true risk the building is exposed to.

No matter whether a building is pre-FIRM or post-FIRM, with flood insurance, owners of floodprone properties pay more of their share toward flood relief. And they get claims paid when needed; they do not have to wait for a disaster declaration for assistance for financial recovery.

Since its creation in 1968, the NFIP has paid out over \$66 billion in flood insurance claim payments nationally for big and small floods. Insurance provides relief for all floods, including



Handbook for New Mexico Floodplain Managers

those not severe enough to warrant federal disaster aid.

Flood insurance and its relation to construction regulations are discussed in more detail in Section 20.

3.2.3. Regulations

The NFIP underwrites flood insurance coverage only in those communities that adopt and enforce floodplain regulations that meet or exceed NFIP criteria. Buildings built in accordance with these regulations have a lower risk of flooding and can be insured at lower rates.

The community's floodplain regulations are designed to ensure that new buildings will be protected from the flood levels shown on the FIRM and that development will not make the flood hazard worse. Over time, exposure to flood damage should be reduced, as the stock of the floodplain's older pre-FIRM buildings is replaced. Eventually a community should have only post-FIRM buildings subject to little or no flood damage.

The NFIP construction regulations focus on protecting insurable buildings, but they also provide a degree of protection to other types of development. These criteria are detailed in Sections 10 through 13.

It should be noted that the NFIP's regulations are *minimum standards*. States and communities are encouraged to adopt and enforce additional or more restrictive rules where they will better protect property from local flooding conditions. Suggested additional standards are discussed in Section 14.

Floodplain regulations are often controversial and difficult to enforce. Many people want the freedom to build what they want without government controls. In some areas, they may not be aware they need a local permit to build.

As a result of public opposition, a community may be inclined to not fully enforce all of the provisions of its ordinance, which puts its participation in the NFIP in peril. If the community does not fulfill its NFIP obligations to the federal government and allows construction in violation of its regulations, three things can happen:

- New buildings will be subject to damage by the base flood (100-year or 1% flood).
- Insurance on an improperly constructed building may be very expensive.
- FEMA can impose sanctions on the community to encourage it to correct its floodplain management program, up to and including suspending the community from the NFIP. The sanctions are discussed in Section 3.6.4.

3.3. NFIP Roles and Responsibilities

The National Flood Insurance Program is founded on a mutual agreement between the federal government and each participating community. Local, state and federal governments, and private insurance companies must share roles and responsibilities to meet the goals and

Handbook for New Mexico Floodplain Managers

objectives of the NFIP.

The community's role is of paramount importance. Residents and property owners can get flood insurance only if the community carries out its responsibilities.

3.3.1. The Community Role

A community is a governmental body with the statutory authority to enact and enforce development regulations. In New Mexico, the NFIP definition of "community" means cities, towns, villages and counties. Counties qualify only for their unincorporated areas. Pueblos and Indian reservations are also "communities" under the NFIP definition.

The community enacts and implements the floodplain regulations required for participation in the NFIP. The community's measures must meet regulations set by the New Mexico statutes and the New Mexico Department of Homeland Security and Emergency Management.

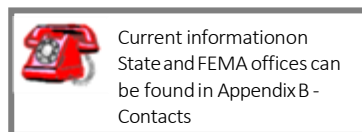
A participating community commits itself to:

- Issuing or denying floodplain development permits.
- Inspecting all development to assure compliance with the local floodplain management ordinance.
- Maintaining records of floodplain development.
- Making flood maps and elevation and floodproofing certificates available for public inspection.
- Assisting in the preparation and revision of floodplain maps.
- Helping residents obtain information on flood hazards, floodplain map data, flood insurance, and proper construction measures.
- Cooperating with neighboring communities' floodplain management activities.
- Designating an office or official as responsible to implement the community's commitments.

3.3.2. The State Role

Each governor has selected a state coordinating agency for the NFIP. In New Mexico it is the Department of Homeland Security and Emergency Management (NMDHSEM). Within the NMDHSEM, the Office of Emergency Management is responsible for:

- Ensuring that communities have the legal authorities necessary to adopt and enforce floodplain management regulations.
- Establishing minimum state regulatory requirements consistent with the NFIP.
- Providing technical and specialized assistance to local governments.
- Coordinating the activities of various state agencies that affect the NFIP.



New Mexico participates in the Community Assistance Program (CAP). Under CAP, NFIP funds are available on a 75 percent / 25 percent cost share to help the state coordinating agency provide technical assistance to communities and to monitor and evaluate their work. Communities can contact the State

Handbook for New Mexico Floodplain Managers

Floodplain Coordinator at NMDHSEM for technical assistance in meeting NFIP requirements.

Other agencies are also active. For example, within the Regulation and Licensing Department, the Division of Manufactured Housing and the Construction Industries Division have certain responsibilities for the placement of manufactured housing and for construction of buildings in floodplains in some communities.

3.3.3. The Federal Role



The Federal Emergency Management Division (FEMA) within the Department of Homeland Security (DHS) administers the NFIP through its Regional Offices And its Mitigation Divisions.

There are ten FEMA Regional Offices, each with a Mitigation Division which coordinates the NFIP with states and communities. Region VI covers the states of Arkansas, Louisiana, New Mexico, Oklahoma and Texas.

The Regional Office is responsible for:

- Assisting the state NFIP coordinating agencies.
- Assessing community compliance with the minimum NFIP criteria.
- Advising local officials responsible for administering the ordinance.
- Answering questions from design professionals and the public.
- Helping review and adopt new maps and data.
- Providing engineering data and documentation for existing flood studies.
- Administering Hazard Mitigation Grant and Hazard Mitigation Assistance Programs.
- Providing information and training on the flood insurance purchase requirements.

The FEMA Mitigation Division in Washington, D.C., sets national policy for floodplain regulations, researches floodplain construction practices and administers the flood hazard mapping program. The Division has mapped more than 100 million acres of flood hazard areas nationwide and designated some six million acres of floodways along 40,000 river miles.

The Mitigation Division also administers the insurance portion of the program. It sets flood insurance rates, establishes coverage, monitors applications and claims, and markets flood insurance.

The NFIP is operated as a self-supporting program. All NFIP expenses, including claims payments, floodplain management, and administration and, until recently, flood hazard mapping, are paid through insurance premiums, fees on insurance policies, and fees from map revision requests. Congress has recently provided supplemental funding to accelerate the NFIP's Map Modernization program.

Private insurance companies write and service most NFIP flood insurance policies through an arrangement with FEMA called the Write-Your-Own Program. The NFIP also contracts for agent training and other assistance through regional insurance offices. They can be reached through the FEMA Regional Offices.



3.4. Joining the NFIP

Although there is no Federal law that requires a community to join, the New Mexico Statutes Amended (NMSA 1978) require all communities with identified flood hazards to adopt floodplain management ordinances and join the NFIP. Also, as discussed later in Section 3.6.4, a nonparticipating community faces sanctions, such as loss of Federal aid for insurable buildings in the floodplain. These make participation very important for many communities.

To join, a community submits an application form, a resolution of participation and its floodplain management ordinance.

This *Handbook* has a model resolution and ordinance in Appendix A. The resolution states the community's intent to participate and cooperate with FEMA. The community agrees to "maintain in force...adequate land use and control measures consistent with the [NFIP] criteria" and to:

- (i) Assist the Administrator in the delineation of the floodplain,
- (ii) Provide information concerning present uses and occupancy of the floodplain,
- (iii) Maintain for public inspection and furnish upon request, for the determination of applicable flood insurance risk premium rates within all areas having special flood hazards, elevation and floodproofing records on new construction,
- (iv) Cooperate with agencies and firms which undertake to study, survey, map, and identify floodplain areas, and cooperate with neighboring communities with respect to the management of adjoining floodplain areas in order to prevent aggravation of existing hazards,
- (v) Notify the Administrator whenever the boundaries of the community have been modified by annexation or the community has otherwise assumed or no longer has authority to adopt and enforce floodplain management regulations for a particular area.

The community must also adopt and submit a floodplain management ordinance that meets or exceeds the minimum NFIP and State criteria. These criteria are explained in Sections 8 through 13.

As shown in Figure 3-1, most communities joined in the 1970s. At that time they were provided with a Flood Hazard Boundary Map which showed only the approximate boundaries of the floodplain. Generally, they entered the "Emergency Phase" whereby their regulatory responsibilities were limited because of the limited flood hazard data provided on the map.

Most of New Mexico communities in the NFIP have received a Flood Insurance Study and a new FIRM with more detailed flood hazard data. Two communities within the State remain in the Emergency Program.

The FIRM and flood data are discussed in Sections 4 through 6. After a period to review and appeal the draft map and study, the community is given six months to adopt the new data in a more comprehensive ordinance.



Handbook for New Mexico Floodplain Managers

Whether the community receives a Flood Insurance Study or has had its map specially converted, it is converted to the “Regular Phase” on the effective date of the new FIRM. That is also the date that differentiates “pre-FIRM” buildings from “post-FIRM buildings.”

If the ordinance is not adopted in time, the community is suspended from the NFIP. The FIRM still goes into effect on the same date and is used by lenders and Federal agencies for determining where loans can be issued, and federal assistance can be provided.

As of the end of August 2003, 97% of the NFIP communities were in the Regular Phase.

3.5. The NFIP’s Regulations

For a community to participate in the National Flood Insurance Program, it must adopt and enforce floodplain management regulations that meet or exceed the minimum NFIP standards and requirements. These standards are intended to prevent loss of life and property, as well as economic and social hardships, that result from flooding.

The NFIP standards work – as witnessed during floods in areas where buildings and other developments have been built in compliance with them. Nationwide each year, NFIP-based floodplain management regulations help prevent more than \$700 million in structural damage.

It is important to underline that the NFIP criteria are minimums. Communities are encouraged to enact their own higher regulatory standards, as discussed in Section 14.

3.5.1. 44 CFR

The NFIP requirements can be found in Chapter 44 of the *Code of Federal Regulations* (44 CFR). Revisions to these requirements are first published in the *Federal Register*, a publication the Federal Government uses to disseminate rules, regulations and announcements.

Most of the requirements relative to a community’s ordinance are in Parts 59 and 60.

Figure 3-2 shows how the regulations are organized. The sections are referred to in shorthand, such as 44 CFR 60.1 — Chapter 44, *Code of Federal Regulations*, Part 60, Section 1. In this reference, excerpts are shown in boxes:

44 CFR 59.2(b) To qualify for the sale of federally-subsidized flood insurance a community must adopt and submit to the Administrator as part of its application, flood plain management regulations, satisfying at a minimum the criteria set forth at Part 60 of this subchapter, designed to reduce or avoid future flood, mudslide (i.e., mudflow) or flood-related erosion damages. These regulations must include effective enforcement provisions.

As noted in Section 3.3.1, when a community joined the NFIP, it agreed to abide by these regulations. When the community’s FIRM was published, it had to submit its ordinance to FEMA to ensure that it met these requirements.

NOTE: Periodically, the NFIP regulations are revised to incorporate new requirements or clarify

Handbook for New Mexico Floodplain Managers

old ones. These changes are published in the Federal Register. Some revisions require local ordinance amendments. A community may or may not have made the amendments needed to stay updated. Local staff should check periodically with NMDHSEM or the FEMA Regional Office to verify that the ordinance is currently in full compliance with the latest NFIP and state requirements.

3.5.2. Community Types

NFIP regulations identify minimum requirements that communities must fulfill to join and stay in the program. The requirements that apply to a particular community depend on its flood hazard and the level of detail of the data FEMA provides to the community. The specific requirements are in Section 60.3, and apply to communities as follows:

- 60.3 (a) FEMA has not provided any maps or data.
- 60.3 (b) FEMA has provided a map with approximate A Zones.
- 60.3 (c) FEMA has provided a FIRM with base flood elevations.
- 60.3 (d) FEMA has provided a FIRM with base flood elevations and a map that shows a floodway.
- 60.3 (e) FEMA has provided a FIRM that shows coastal high hazard areas. (V Zones, which are not relevant in New Mexico)

Two important notes:

The NFIP requirements are minimums. As noted in 44 CFR 60.1(d), “Any floodplain management regulations adopted by a State or a community which are more restrictive than the criteria set forth in this part are encouraged and shall take precedence.”



Communities are encouraged to enact regulatory standards that exceed the NFIP's minimums and that are more appropriate for local conditions. The Community Rating System (CRS) is a part of the NFIP that rewards communities that implement programs that exceed the minimums. It is explained in more detail in Section 21.

These requirements are cumulative. A 60.3 (c) community must comply with all appropriate requirements of sections 60.3 (a) and (b). For example, 60.3 (a) includes basic requirements for subdivisions and utilities that are not repeated in the later sections. All communities in the NFIP must comply with these subdivision and utility requirements.

For example, a 60.3 (c) community must use the base flood elevations provided on the FIRM. If that community has an approximate A Zone without a BFE, it must comply with the requirements of 60.3 (b) for that area.

The details of the requirements of 44 CFR 60.3 are explained in Sections 8-13. These sections are organized by subject matter, so they do not correspond with the sections in 44 CFR. Where appropriate, the specific section numbers are referenced.



Handbook for New Mexico Floodplain Managers

Part 59 — General Provisions

Subpart A — General

- 59.1 Definitions
- 59.2 Description of program
- 59.3 Emergency program
- 59.4 References

Subpart B — Eligibility Requirements

- 59.21 Purpose of subpart
- 59.22 Prerequisites for the sale of flood insurance
- 59.23 Priorities for the sale of flood insurance under the regular program
- 59.24 Suspension of community eligibility

Part 60 — Criteria for Land Management and Use

Subpart A — Requirements for Flood Plain Management Regulations

- 60.1 Purpose of subpart
- 60.2 Minimum compliance with flood plain management criteria
- 60.3 Flood plain management criteria for floodprone areas
 - (a) When there is no floodplain map
 - (b) When there is a map, but not flood elevations
 - (c) When there are flood elevations
 - (d) When there are final BFE's/ floodway mapped
 - (e) When there are final BFE's/ map with coastal high hazard areas
 - (f) When there are final BFE's/identified flood protection restoration areas
- 60.4 Flood plain management criteria for mudslide-prone areas
- 60.5 Flood plain management criteria for erosion-prone areas
- 60.6 Variances and exceptions
- 60.7 Revisions of criteria for flood plain management regulations
- 60.8 Definitions

Subpart B — Requirements for State Flood Plain Management Regulations

Subpart C — Additional Considerations in Managing Flood-Prone, Mudslide (i.e., Mudflow)-Prone, and Flood-Related Erosion-Prone Areas

Figure 3-2. 44 CFR Parts 59 and 60.

3.6. Compliance

A community's floodplain management program and permit records are reviewed periodically by the FEMA Regional Office or the New Mexico Department of Homeland Security and Emergency Management (NMDHSEM). FEMA or NMDHSEM staff may inspect records as part of a Community Assistance Visit (CAV) or Community Assistance Contact (CAC).

If a community doesn't uphold its part of the agreement and fails to adequately enforce its floodplain management regulations, FEMA has recourse through three approaches:

- Reclassification under the Community Rating System
- Probation
- Suspension from the program

3.6.1. CRS Reclassification



The Community Rating System (CRS) provides a discount in the flood insurance premiums for properties in communities that participate in the CRS. The CRS is explained in Section 21. As of August 2019, 11 of the 104 NFIP communities in New Mexico participate in the Community Rating System. CRS Communities that are deemed to no longer be in full compliance with the NFIP requirements can be reclassified to Class 10. Should that happen, residents would lose their CRS flood insurance premium discounts.

3.6.2. Probation

Probation represents formal notification to the community that FEMA regards the community's floodplain management program as non-compliant with the NFIP criteria.

Prior to imposing probation, FEMA provides the community a 90-day written notice and lists specific deficiencies and violations. It also notifies all policy holders of the impending probation, telling them that an additional \$50 premium will be charged on policies sold or renewed during the probation period. The objective of this surcharge is to bring the policy holders' attention to the fact that their community is not compliant and failure to correct the problems may lead to suspension.

The community has 90 days to avoid this sanction by correcting deficiencies and remedying identified violations. Probation may be continued for up to one year after the community corrects all program deficiencies. This ensures that the community has truly changed its ways and become compliant and that all policies holders are advised of the situation when their policies are renewed.

3.6.3. Suspension

If, after a period of probation, a community fails to remedy its program deficiencies, it will be suspended from the NFIP. Suspension means the community is no longer in the NFIP. It is subject to the sanctions for non-participation that are explained in the next section.



Handbook for New Mexico Floodplain Managers

FEMA grants a community 30 days to show why it should not be suspended and then gives it a 30-day suspension letter. FEMA may also conduct a written or oral hearing before suspension takes effect.

A community can automatically be suspended if, following due notice, it failed to adopt revisions to its floodplain ordinance in response to flood map revisions or amended minimum NFIP criteria. It can also be suspended within 30 days for knowingly making its ordinance noncompliant.

A community suspended under the NFIP may apply to the FEMA Regional Office for reinstatement by submitting the following:

- A local legislative or executive measure reaffirming the community's intent to comply with the NFIP criteria.
- Evidence that all program deficiencies have been corrected.
- Evidence that any violations have been remedied to the maximum extent possible.

FEMA may reinstate the community to full program status, bring it to a probationary status, or withhold reinstatement for up to one year after a satisfactory submission from the community.

A community will also be suspended if, following due notice, it fails to adopt revisions to its floodplain ordinance in response to flood map revisions or amended minimum NFIP criteria. Communities have a 6-month period after a new or revised map is issued to update their floodplain management regulations to incorporate the new data and make any other necessary changes. If at the end of the 6 months the community has not adopted a compliant ordinance, it is automatically suspended.

It is not uncommon for communities to be suspended for failure to adopt compliant ordinances. Sometimes communities get a late start revising their ordinance and cannot complete the ordinance adoption process in the allotted 6 months. These communities are reinstated into the NFIP upon adoption of the ordinance provided no non-compliant development has taken place during the suspension.

3.6.4. Sanctions for Non-Participation

A community that

- does not join the NFIP
- has withdrawn from the program, or
- is suspended from the program faces the following sanctions:
 - Flood insurance will not be available. No resident will be able to purchase a flood insurance policy.
 - If the community withdraws or is suspended, existing flood insurance policies will not be renewed.
 - No direct Federal grants or loans for development may be made in identified flood



Handbook for New Mexico Floodplain Managers

hazard areas under programs administered by Federal agencies such as HUD, EPA, and the Small Business Administration. State agencies may also deny financial assistance for floodplain properties.

- Federal disaster assistance will not be provided to repair insurable buildings located in identified flood hazard areas for damage caused by a flood.
- No Federal mortgage insurance or loan guarantees may be provided in identified flood hazard areas. This includes policies written by FHA, VA, and others.
- Federally insured or regulated lending institutions, such as banks and credit unions, must notify applicants seeking loans for insurable buildings in flood hazard areas that:
 - There is a flood hazard and
 - The property is not eligible for Federal disaster relief.

These sanctions can be severe on any community with a substantial number of buildings in the floodplain. Most communities with a flood problem have joined the NFIP and are in full compliance with their regulatory obligations.



4. How Flood Maps Are Prepared

CONTENTS

4.1. The Mapping Effort	4-3
4.1.1. Map Accuracy.....	4-3
4.1.2. FEMA's Mapping Program	4-3
4.2. Flood Study Terminology	4-4
4.2.1. The Base Flood.	4-4
4.2.2. Special Flood Hazard Area	4-6
4.2.3. Flood Insurance Study	4-6
4.3. Community Involvement In Flood Studies	4-7
4.4. Riverine Flood Studies	4-8
4.4.1. Hydrology	4-9
4.4.2. Hydraulics.....	11
4.4.3. Cross Sections	4-11
4.4.4. Datum.....	4-12
4.4.5. Flood Profile	4-13
4.4.6. Floodplain Mapping	4-15
4.4.7. Floodway Analysis	4-16
4.5. Other Flood Studies.....	4-18
4.5.1. Shallow Flooding Studies.	4-18
4.5.2. Approximate Studies.....	4-19



4.1. The Mapping Effort

4.1.1. Map Accuracy

A floodplain map's accuracy depends on the purpose for which it was prepared and the resources put into it. Some maps were prepared just to show general areas subject to flooding. Others are done for a flood control project. The latter need to be more accurate and are, therefore, more expensive.

NFIP flood maps were prepared for the purpose of insurance rating and land-use regulations. FEMA has had a limited budget for mapping, so NFIP maps will not show every flood problem that has been reported or that could exist. In many cases, they may not provide flood elevations.

It is possible for a community or a developer to conduct a new study which might be more accurate or have more information. Therefore, it's important to know how maps are prepared and the process for updating and revising them. How maps are prepared is the subject matter of this section. Updating and revising FEMA's maps to account for new information is covered in Section 7.

4.1.2. FEMA's Mapping Program

The National Flood Insurance Act of 1968 directed the Federal Insurance Administration (FIA) to:

- Identify all floodprone areas within the United States.
- Establish flood-risk zones within floodprone areas.

To implement this directive, FEMA has conducted flood studies and produced various forms of maps. The flood studies analyze the terrain and the factors that affect flooding. This information is used to draw the maps that delineate the boundaries of the floodplain.

The initial flood study and mapping efforts of the NFIP were focused on identifying all floodprone areas within the United States. Using flood data and floodplain information from many sources — such as soils mapping, actual high water profiles, aerial photographs of previous floods, topographic maps, etc. — the approximate outline of the base floodplain for specific stream reaches was overlaid on available community maps, usually United States Geological Survey topographic quadrangle maps.

Today these documents are referred to as Flood Hazard Boundary Maps and they were based on approximate studies. Most communities used a Flood Hazard Boundary Map when they first joined the NFIP.

As money was appropriated by Congress, FEMA performed more detailed studies for many communities, resulting in the publication of Flood Insurance Study reports and Flood Insurance Rate Maps (FIRMs). These studies provide communities with data needed to adopt and implement more comprehensive floodplain management measures and to enter the Regular Phase of the NFIP.



Handbook for New Mexico Floodplain Managers

Flood Insurance Studies, also referred to as detailed studies, were carried out for developed communities and for those areas experiencing rapid growth. They are used to guide future development within flood hazard areas and to provide the information needed for new construction allowed in already developed areas.

Today, almost every community in the NFIP has a FIRM, which may have areas mapped in detail based on the flood insurance study, mapping based on an approximate study, or some floodplains mapped using each approach. The areas mapped with an approximate study are where there was little or no development and/or little expectation of development when the mapping was done.

Additional studies have been conducted by other agencies, but FEMA's studies and maps are what a community must use as a minimum for managing floodplain development.

4.2. Flood Study Terminology

Before describing how flood studies are developed, we first need to introduce some of the common terms used in floodplain analysis and in the NFIP. The following terms are integral for understanding the basis for flood studies and flood maps:

- The base flood
- Special Flood Hazard Area
- Flood Insurance Study
- State review

4.2.1. The Base Flood

Floods come in many sizes — with varying degrees of magnitude and frequency.

Rivers and lakes are expected to flood, as all bodies of water have floodplains. But each river and lake is different, and each has its own probability of flooding. Probability is a statistical term having to do with the size of a flood and the odds of that size of flood occurring in any year.

For each river, hydrologists assign statistical probabilities to different size floods. This is done to understand what might be a common or ordinary flood for a particular river verses a less likely or a severe flood for that same river.

In order to have common standards, the NFIP and the State of New Mexico adopted the same baseline flooding probability. The NFIP calls this standard the base flood. The State of New Mexico calls it the 100-year flood (1% flood). These terms mean the same thing.

The term 100-year flood (1% flood) is often misconstrued. Commonly, people interpret the 100-year flood definition to mean “once every 100-years.” This is **wrong!** A community could have a 100- year flood two times in the same year, two years in a row, or four times over the course of 100-years. A community could also not have a 100-year flood over the course of 200 years.

To avoid confusion (and because probabilities and statistics can be confusing), the NFIP uses the term “base flood.” A 100-year, or 1% flood, base flood is defined as having a one-percent

Handbook for New Mexico Floodplain Managers

chance of occurring in any given year. The terms “base flood,” “100-year flood,” and “one-percent annual chance flood” are often used interchangeably.

The base flood was chosen as a compromise between excessive exposure to flood risk from using a lower standard (such as a 10-year flood which is a more frequent flood) and applying such a high standard (say, a 1,000-year flood which is a less frequent flood) that it would be considered excessive and unreasonable for the intended purposes of regulating new development and requiring the purchase of flood insurance.

To restate, the 100-year flood, the base flood, refers to a flood that has a one-percent-chance of occurring or being exceeded in any given year. The terms base flood, 100-year flood and one-percent annual chance flood are used interchangeably throughout the NFIP.

Another term used is the “500-year flood.” This has a 0.2% chance of occurring in any given year. While the odds are remote, it is the standard used for protecting critical facilities, such as hospitals and power plants.

4.2.2. Special Flood Hazard Area

The land area covered by the floodwaters of the base flood is the or base floodplain. On NFIP maps, the base floodplain is called the Special Flood Hazard Area (SFHA). The SFHA is the area, designated as Zone A, AE, A1-30, AO, or AH depending on the amount of flood data available, where the NFIP’s floodplain management regulations must be enforced by the community and

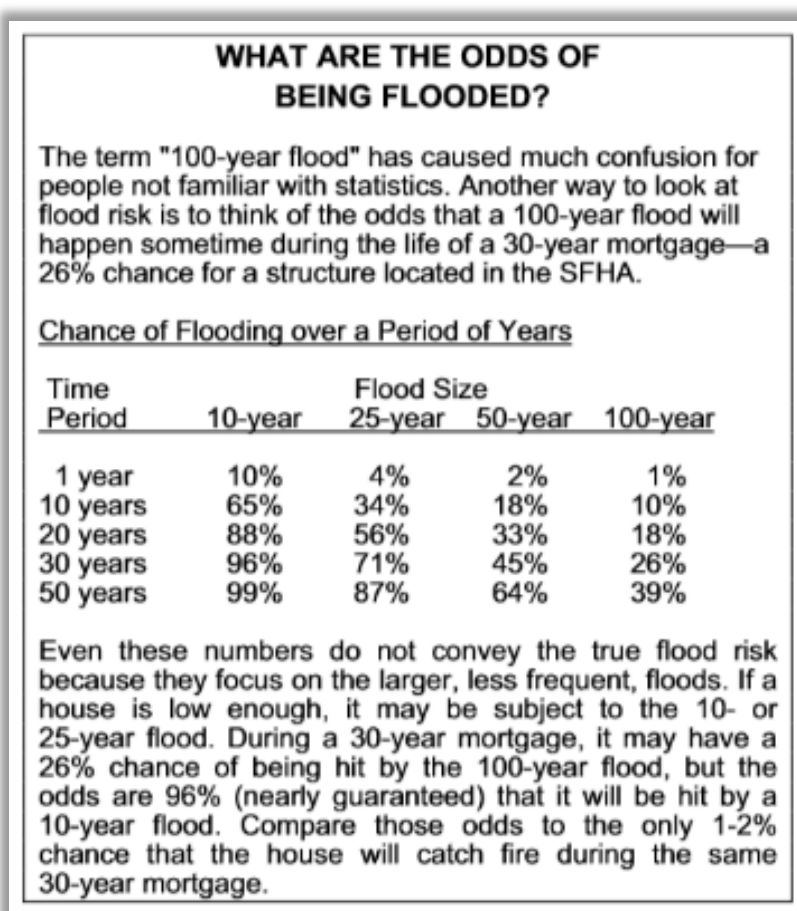


Figure 4-1. Flood probabilities.

Technical terms

Base flood = 100-year flood = 1% chance flood

Base flood elevation (BFE) = 100-year flood level

Base floodplain = 100-year floodplain = Special Flood Hazard Area = SFHA

Handbook for New Mexico Floodplain Managers

the area where the mandatory flood insurance purchase requirement applies. The computed elevation to which floodwater is anticipated to rise during the base flood is the base flood elevation or in NFIP terms, the base flood elevation (BFE).

4.2.3. Flood Insurance Study

When a flood study is completed for the NFIP, the information and maps are assembled into a Flood Insurance Study (FIS). An FIS is a compilation and presentation of flood risk data for specific watercourses, lakes, and ponding flood hazard areas within a community. If a community has more than one identified hazard then the study results of each hazard analysis is combined and included in the FIS.

The FIS report and associated maps delineate the SFHA and sometimes the 500-year (0.2% flood) floodplain, designate flood risk zones and establish Base flood elevations. They serve as the basis for rating flood insurance and for regulating floodplain development and carrying out other floodplain management measures.

Most studies have three components:

- The FIS — Flood Insurance Study
- The FIRM — Flood Insurance Rate Map
- The Flood Boundary and Floodway Map (included in studies prepared before 1986. Since 1986, floodways have been shown on the FIRM.)

The FIS report includes:

- An appraisal of the community's flood problems in a narrative that describes:
 - the purpose of the study
 - historic floods
 - the area and streams studied
 - the engineering methods employed
 - the firm or agency that prepared the study
 - explanations of revisions and revision dates for the FIS
- A vicinity map of the community and, often, photographs of historic floods.
- Tables summarizing various study data.
- Computed flood profiles for various recurrence probabilities, usually the 10-, 50-, 100-, and 500-year (10%, 2%, 1%, and 0.2%) floods.

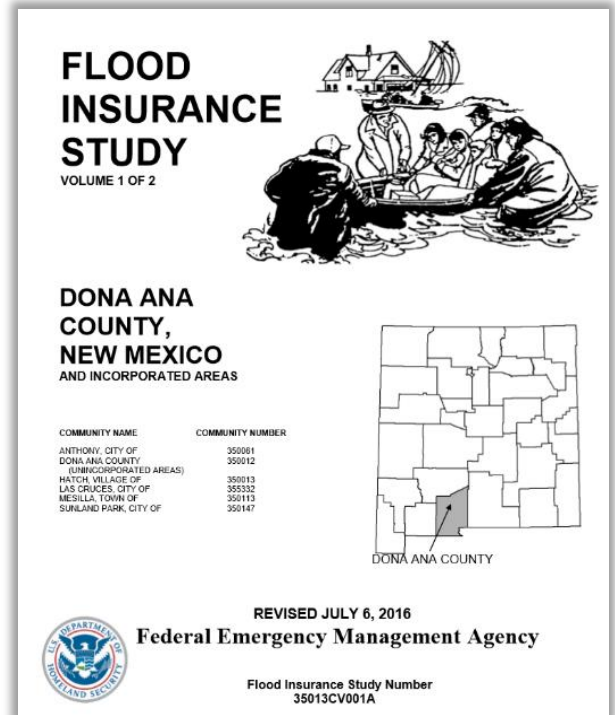


Figure 4-2. Cover of a county-wide Flood Insurance Study



4.3. Community Involvement in Flood Studies

It is important that the community understand the floodplain mapping process and the procedures FEMA uses to produce floodplain maps.

FEMA contracts with a firm or agency to conduct flood insurance studies and restudies. There are several reasons why FEMA will go to the considerable expense of contracting for a floodplain study or restudy:

- A reach of an unmapped floodplain is developed or developing. FEMA wants to provide the community with the floodplain management tools it needs to manage new development and redevelopment. FEMA also wants to establish fair and reasonable flood insurance rates for existing and future development in the area.
- If the floodplain had a detailed study done at an earlier time, it may need to be revised. There are several possible reasons for this:
 - The topography (ground elevations) of the floodplain has changed due to development, erosion or sedimentation.
 - The hydrology has changed due to changes in the watershed above the stream, or because there is more hydrologic data available.

The community Floodplain Administrator and his/her staff do not have to be flood hydrologists or engineers to provide information that will make the flood maps more accurate and useful for floodplain management purposes. Later in this Section, you will learn how these studies are done. There are several things the community Floodplain Administrator can do during the study process:

- Help determine the areas that need detailed studies. The community has the best sense of where future development will occur. FEMA and the study contractor will have a “time and cost” meeting with community officials to decide what areas to study. Make your community’s wishes known during that meeting.
- Provide good base maps to the study contractor. Any recent maps or aerial photography the community can provide will improve the floodplain maps, making them easier to use, with correct and current street locations and names, and other information that will make it easier to locate floodplain properties.
- Provide any flood information the community has. If there are photos of flood elevations (high water marks) on buildings, provide those. If you mapped the area flooded in a recent flood, provide that information. Assist the study contractor in obtaining flood history from local newspapers.
- Look at the study information as it is developed. Try to understand the hydrology, the topographic maps, the cross sections and the floodplain maps. The hydrologists and engineers who do flood insurance studies can make mistakes, and they are easier to fix while the study is under way than after it is completed.



4.4. Riverine Flood Studies

Detailed flood studies are conducted differently for different types of flooding, which are:

- Riverine flooding of rivers, streams or other waterways and
- Shallow flooding, ponding and sheet flow.

As noted in Section 1, there are other types of flooding, such as alluvial fans and dam breaks. This section does not cover how these areas are studied because each situation is unique.

Riverine flooding occurs in rivers, streams, ditches or other waterways that are subject to overbank flooding, flash floods and urban drainage system flooding. Riverine studies involve the collection and analysis of information about the river's watershed, the topography or the lay of the land along the river, precipitation and the characteristics of the river itself.

For purposes of riverine flood studies, the study of the watershed's behavior is called hydrology and the study of the river or stream's behavior is called hydraulics. The results of a riverine study are flood peak discharges, flood depths and flood profiles, which are used to describe the SFHA.

4.4.1. Hydrology

Hydrology includes the study of a watershed's behavior during and after a rainstorm. A hydrologic analysis determines the amount of rainfall that will fall on a watershed, the amount of rainfall that will be absorbed by the soil or trapped on the surface in natural detention ponds and puddles, and the rate at which the remaining rainfall will reach the stream channel.

The rainfall that reaches the stream is called runoff. The rate at which runoff reaches the stream and flows downstream is the flood discharge. Discharges are measured in cubic feet per second, or "cfs". For perspective, a cubic foot of water is about 7.5 gallons, and one cubic foot per second is about 450 gallons per minute.

Significant development or other changes in the watershed (both within a community and any upstream) can significantly change the flood discharges. Often, the increase in impervious areas associated with urbanization causes increase in stream discharges. In addition, new technical data such as new regional equations, new design storms, and in some circumstances, increase in the length of gage records, might significantly affect the base discharge estimation.

Runoff amounts and discharge rates vary depending on soil type, ground slope, land use, vegetative cover and the presence of storm sewers. In general, more runoff occurs on unforested land, on paved and developed urban land, and on steeper slopes. Discharge rates generally increase as the size of a watershed increases.

There are several methods of hydrologic analysis used to estimate the flood discharge peaks used in support of a floodplain study. The hydrologist may use historical stream gage records, or regional regression equations, or a hydrologic computer model incorporating physical watershed parameters.

River gages with many years of flood record are generally the best source of data to estimate infrequent floods such as the 100-year flood (1% flood). If watershed conditions remain relatively constant, the longer the gage record, the more statistically reliable the gage analysis. River gage records are used when available; however, river gages are expensive to install and maintain. In addition, gage records become inconsistent and less valuable if the contributing watershed has undergone significant physical changes such as upstream dams, levees, and urban development during the period of record.

Where river gages are not available or are unusable, the hydrologist may compute discharge peaks using regional regression equations. The US Geological Survey (USGS) has developed regional regression equations for most areas in the United States. The equations were developed based on discharge peaks recorded at stream gages in an area similar to the area under study. The validity of the equations depends on the number of gages used in the analysis, the length of gage records used in the analysis, and the similarity of the gaged basins to the watershed under study.

A hydrologic analysis based on stream gage discharges or regional regression equations provide peak discharges only. If the hydrologist is interested in flood volumes, he may develop a computerized rainfall/runoff model using a computer program such as HEC-HMS, a hydrologic modeling software developed by the U.S. Army Corps of Engineers Hydraulic Engineering Center. Other agencies have developed other rainfall/runoff models. A

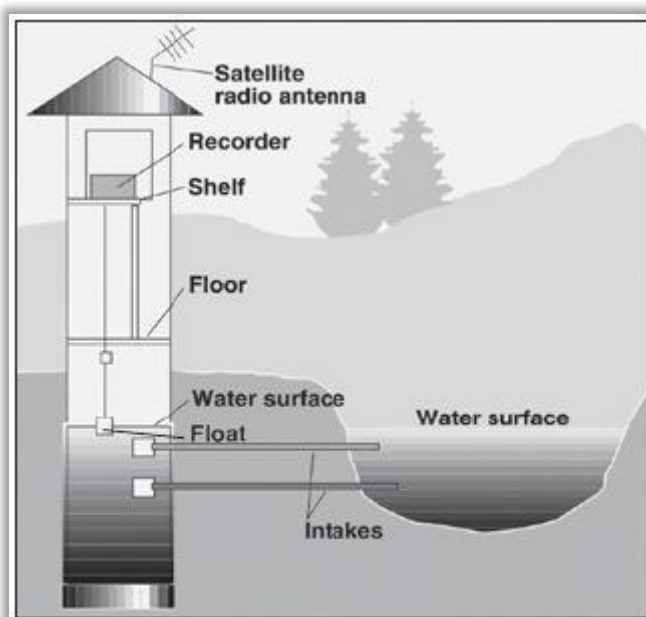


Figure 4-3. Schematic of one type of stream gage. Water from the stream at the right enters the "stilling well" at the left. The level is recorded at time intervals. Water level is converted to an estimate of the discharge.

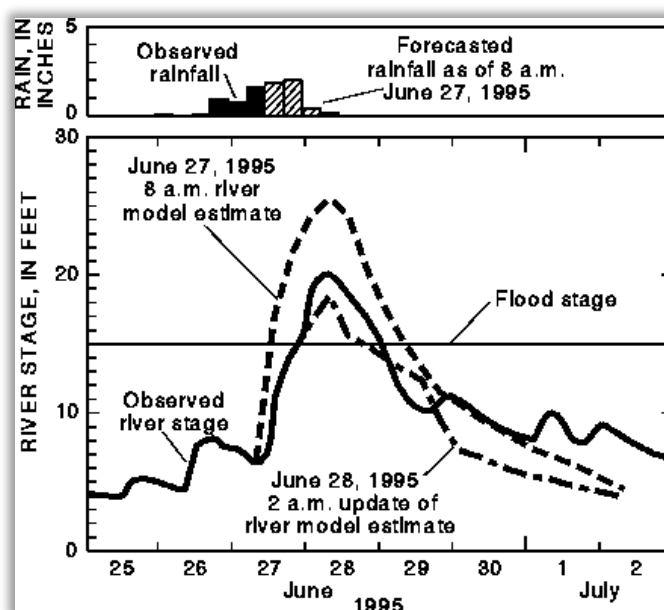


Figure 4-4. Hydrographs. This figure shows measured flood elevations from a stream gage over a period of 7 days. The solid line is the record of flood elevations from the stream gage. The other lines show the results of rainfall/runoff models.



Handbook for New Mexico Floodplain Managers

rainfall/runoff model allows the hydrologist to incorporate numerous physical watershed characteristics and rainfall and snowmelt data into the analysis. The model can be calibrated to discharge peaks computed using the stream gage records or regional regression equations. The results of the model include flood hydrographs, which represent discharge versus time, and provide the flood volume, valuable information for planning purposes. A summer thunderstorm and a snowmelt runoff flood could conceivably have the same peak discharge. However, in New Mexico, the summer thunderstorms are often the result of short, intense storms, and the total volume of runoff will be relatively small. The snowmelt flood may last for several days while the snow melts, and the total volume of runoff will be much larger.

Upon completion of the hydrologic analysis, the hydrologist or engineer has flood discharges for various size rainstorms that are estimated at various concentration points along a stream, such as at the confluence with another stream and at the mouth of a tributary stream. These discharges are then used in the hydraulic analysis to determine the depth and extent of the floodplain.

It is important that floodplain managers understand both the benefits and constraints of hydrology. A hydrologic study is as good as the data upon which it is based. Unfortunately, in New Mexico, we have few stream gages and rainfall gages with adequate periods of record. In addition, we simply have very little rain, and stream and rain gages can operate for years without recording flood data. When a hydrologist initiates a study in your community, you must supply as much data as possible. The community often has records of high-water marks, rainfall depths from backyard gages, or photographs of flood events that the hydrologist would not have access to without local assistance. The floodplain manager should also work closely with the hydrologist during the course of the study to ensure that the results are reasonable based on local experience.

4.4.2. Hydraulics

For purposes of floodplain analysis, hydraulics is the study of floodwaters moving through the stream and the floodplain. Hydraulic analysis combines:

- Flood hydrology, i.e. the discharges.
- The cross section data on how much area there is to carry the flood.
- Stream and floodplain characteristics — “roughness,” slope, locations and sizes of structures. Water will flow faster where the slope is steeper and the floodplain is “smooth,” e.g., where there are no trees and buildings to cause turbulence. It can be seen that redeveloping an area can change the hydraulics of a flood.

Changes in hydraulic conditions of a stream usually occur when new bridges, culverts and road crossings are constructed, and when there are changes in the physical characteristics of the stream. If a bridge or culvert is not properly sized, it can cause flood waters to back-up, which increases flood levels upstream. Although most bridge openings and culverts are designed to allow stream flows associated with frequent storm events to pass without such backwater effects, they may still cause increases in the base flood elevation. Therefore, any bridges

Handbook for New Mexico Floodplain Managers

culverts, or other road crossing that have been constructed since the analyses for the effective FIS and FIRM were completed should be evaluated for their potential effect on the base flood and the associated floodway. In addition, any significant changes in the stream channel or floodplain geometry could affect the floodplain and floodway. One should always ask the questions: 1) has any portion of the floodplain been filled? 2) has the stream channel migrated or changed location because of significant erosion and/or depositions? 3) have any portions of the stream been channelized, widened, or dredged? 4) have there been significant changes in the vegetation in the floodplain? Aerial photographs are useful tools in evaluating changes in stream channels and floodplains.

The data are usually processed using a computer model, most commonly HEC-RAS, which was developed by the U.S. Army Corps of Engineers' Hydrologic Engineering Center.

The hydraulic study produces flood elevations, velocities and floodplain widths at each cross section for a range of flood flow frequencies (Figure 4-6). These elevations are the primary source of data used by engineers to map the floodplain.

A Flood Insurance Study usually produces elevations for the 10-, 50-, 100-, and 500-year floods (10%, 2%, 1%, and 0.2% flood), although many may just show the 100-year(1%) elevations. Elevations for the other frequency floods are typically used for other floodplain management purposes. For example, the 50-year flood data may be used for placing bridges and culverts and the 500-year (0.2%) for siting critical facilities.

4.4.3. Cross Sections

The hydraulic analysis examines the areas through which floodwater will flow, and this requires a determination of the channel shape, ground elevations along the channel, and obstructions to flow (such as buildings, bridges, and other developments). The hydraulic analysis uses cross sections to describe the channel in the computer model. A cross section is a graphical depiction of the stream and the floodplain at a particular point along the stream. The cross section is taken at right angles to the flow of the stream, and at each point along the cross section, the engineer has established a distance and an elevation.

Cross sections are measured at locations along the stream that are representative of local conditions and at the location of each bridge or other major obstruction that serves to constrict the channel capacity. A typical cross section is shown in Figure 4-5.

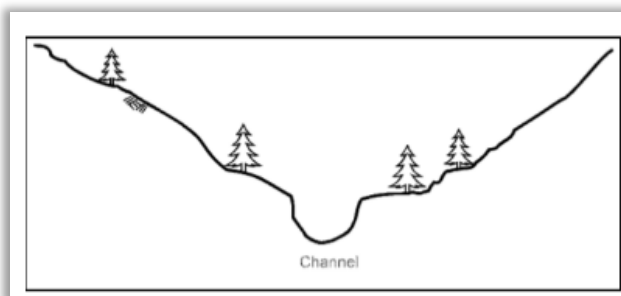


Figure 4-5. Surveyed cross section

In the hydraulic model, the two-dimensional cross sections measured at specific lengths along the channel become a three-dimensional representation of the channel capacity when combined in the hydraulic model. To completely depict the carrying capacity of the channel or floodplain, surveyors and engineers estimate the roughness factor along the channel and

Handbook for New Mexico Floodplain Managers

floodplain to determine how fast the floodwater will flow. Roughness factors are related to ground surface conditions, and they reflect changes in floodwater velocity due to ground friction. For example, water will flow faster over mowed grass and pavement than it will over an area covered in bushes and trees, or planted in tall crops.

The slope of the channel is a major factor in determining how much water will flow through a cross section, or how high the water will be for a particular discharge. The steeper the channel, the faster water will flow. When a given discharge flows through a cross section at a faster rate, the flood elevation is lower.

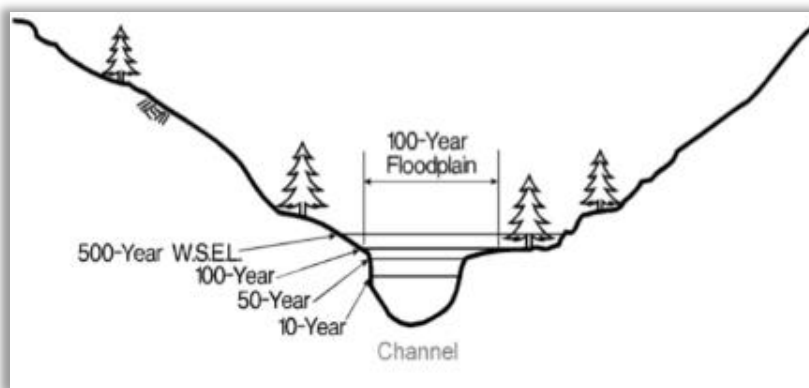


Figure 4-6. Cross section with flood elevations.

Cross section locations are shown on a FIRM with a line and a letter recorded in a hexagon at each end. Generally, the more changes there are in topography (e.g., steep river banks changing to large flat overbank area), the more cross sections are needed to define the floodplain accurately.

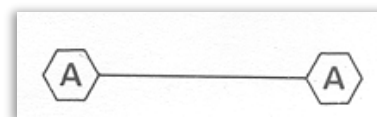


Figure 4-7. Designation of a cross section

4.4.4. Datum

To locate the true elevations at a site, surveyors have established elevation reference marks or benchmarks that are referenced to a common vertical elevation reference called a datum. The use of a datum ensures uniformity of references to land elevations and avoids misinterpretation of flood elevations.

Established reference marks and benchmarks with a recorded elevation allow surveyors to describe the changes in the ground levels or stream characteristics as elevations relative to the referenced datum. They are also used by surveyors to determine the elevations of buildings that are at risk of flooding.

The most frequent users of vertical datum include floodplain managers, surveyors, engineers, builders, and insurance agencies and companies. Historically, the most common vertical datum used by FEMA has been NGVD29 (See “About Datums and Elevations,” below). Many existing documents (e.g., Flood Insurance Rate Maps [FIRMs], Elevation Certificates, Flood Insurance Studies [FISs]) provide elevation values based on the old datum.

When working with these documents, elevation values based on different vertical datums cannot be used together directly. All the information being used (elevation values on FIRMs, Elevation Certificates, other maps and documents) must be reviewed to ensure they are all

Handbook for New Mexico Floodplain Managers

based on the same datum,

- Determine what datums are used on the documents.
- If the datums are the same, continue to use the maps and other information together.
- If the datums are different, stop and convert all the elevation numbers to the same datum before using the information.

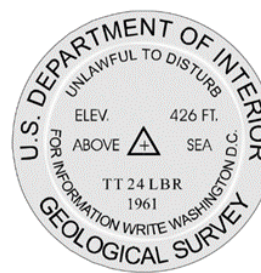
Every user of elevation data on FEMA's products needs to be aware of the datums on which their elevation values are based, differences in datums among the different data sources they are using, the required datum conversion, and how to apply it.

A portion of the collected survey information is used in the hydrologic analysis, but the surveyed cross sections and other survey information are the building blocks of the hydraulic analysis and mapping efforts.

About Datums and Elevations

A vertical datum is a base measurement point (or set of points) from which all elevations are determined. Without a common datum, surveyors would calculate different elevation values for the same location. Historically, that common set of points has been the National Geodetic Vertical Datum of 1929 (NGVD29). However, as a result of advances in technology, an updated vertical datum was created and has been officially adopted by the Federal Government as a new basis for measuring heights: The North American Vertical Datum of 1988 (NAVD88).

NAVD88 is more compatible with modern surveying and mapping technologies like Global Positioning Systems (GPS). It also is more accurate than the previous national vertical datum, NGVD29, which no longer is supported by the Federal Government. There are now 600,000 permanent benchmarks associated with the NAVD of 1988. See FEMA's Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix B (2003), for further information.



4.4.5. Flood Profile

The hydraulic computer program gives elevations at each cross section, but flood elevations at locations between the cross sections need to be determined as well. This is done by plotting the elevations at the cross sections on a graph and connecting the plotted points. Such a graph is called a flood profile.

Handbook for New Mexico Floodplain Managers

Each stream for which there is a detailed study will have a profile in the community's FIS. Figure 4-8 is a portion of a profile for a stream in Doña Ana County. The legend, which is normally at the bottom right corner of the profile has been pasted in the upper left corner of Figure 4-8. It shows the symbol for each flood profile plotted. Bridges are indicated with an "I" shaped symbol, which represents the distance from the bridge's low chord (lowest beam) to the top of the roadway.

The bottom of the graph (the horizontal axis or x-axis) shows the distance along the stream, which is commonly called stationing. For stationing, start at the mouth of a stream (its point of discharge into a larger body of water) and look upstream. When profiles are plotted, the slope of the stream bed will rise as the graph is read from left to right.

River distances are measured in either feet or stream miles. For most profiles the distance is measured above the mouth of the stream or above its confluence (where it meets with another stream). Sometimes, it is measured from another easily located point, such as a dam or bridge. The left and right sides of the graph (the vertical axis or y-axis) show elevation in feet (NGVD88).

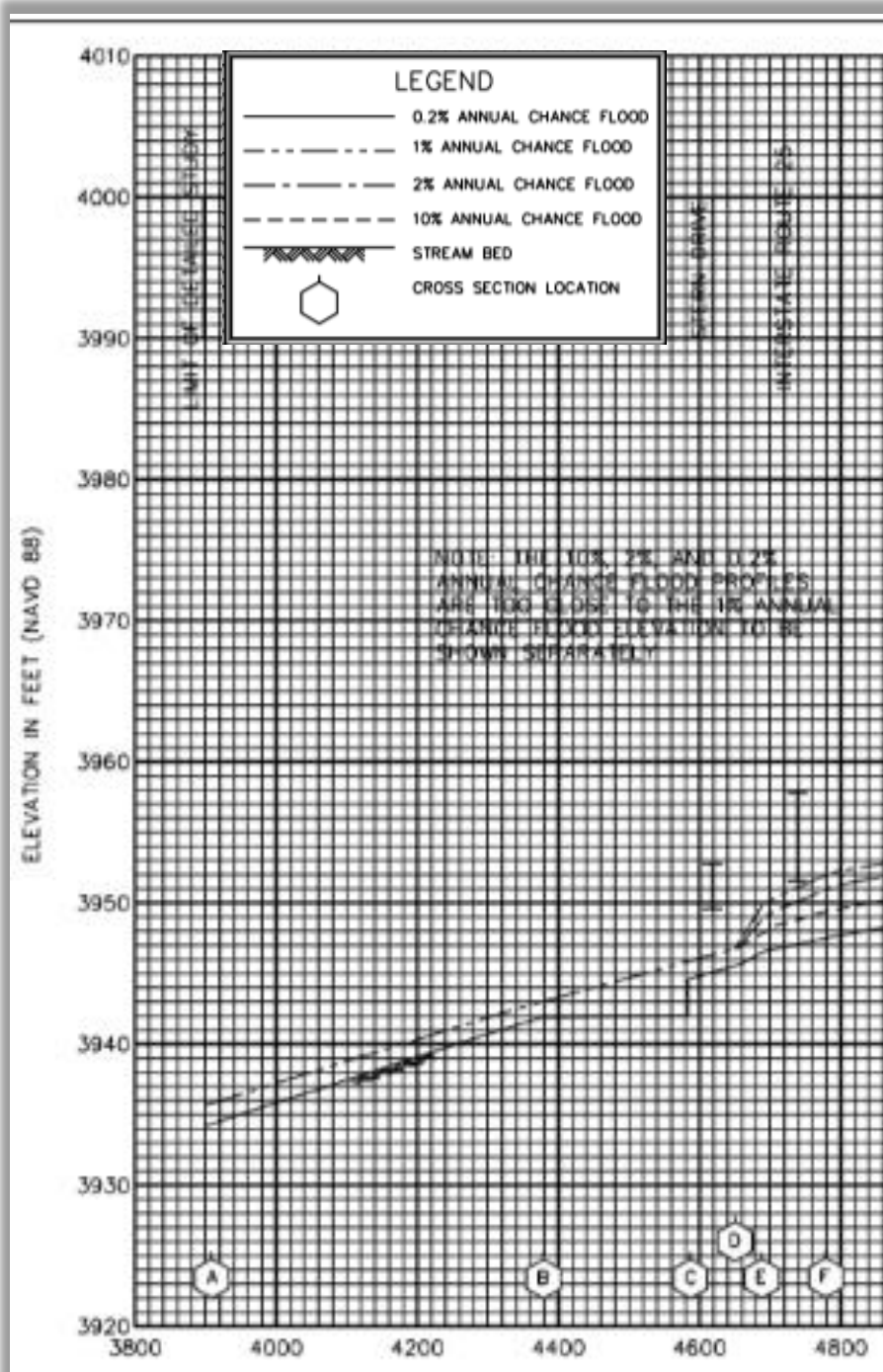


Figure 4-8. Profile. The elevations for the 10-, 50-, 100- and 500-year floods from Sections A-F are plotted on the graph and the points are connected by lines to create the flood profile. Also shown is the ground elevation and the cross-section of the bridge at Stern Drive.

From this profile, you can see that the ground elevation at station 4000 is about 3,936.0 feet above mean sea level. Each vertical division on this chart is 1.0 foot. The base flood elevation (the second line from the top) at this point is about 3,937.3 feet, so the depth is about 1.3 feet above the low point in the channel.

At Interstate 25, the ground elevation is about 3,947 feet and the base flood elevation is about 3,951.0 feet, so the depth of flooding there is about 4 feet. Additional information is provided on the profiles, such as corporate limits and confluences with smaller streams. Profiles also provide a picture of stream characteristics, such as steep sections of the stream bed and where restrictive bridge openings cause floodwaters to back up.

4.4.6. Floodplain Mapping

The next step in the mapping process is to transfer the flood elevation data onto a map showing ground elevation data. This is called a topographic map or contour map because points with the same elevation are connected by a contour line. The topographic or contour map is often referred to as the base map.

The most common topographic maps used are produced by the U.S. Geologic Survey. Some communities have prepared their own topographic maps and provided them to FEMA to improve the accuracy of their floodplain maps.

The base flood elevations from the cross sections and profiles are plotted on the topographic map. Floodplain boundary lines are drawn connecting these plotted points using the contour lines as a guide. The completed map describes the base floodplain (the SFHA).

It is important to remember that floodplain map boundaries are only as accurate as the topographic map on which the floodplains are drawn. The topographic contour interval will provide information as to the accuracy of the maps. Detailed topographic maps will have the precision to support topographic contour intervals of one or two feet, whereas less detailed maps will have much broader contour interval spacing. USGS topographic quadrangle maps in New Mexico usually have topographic contour intervals of 10 or 20 feet, which do not accurately capture stream channels that are three or four feet deep.

Correlating map features with ground features requires care because maps do not always

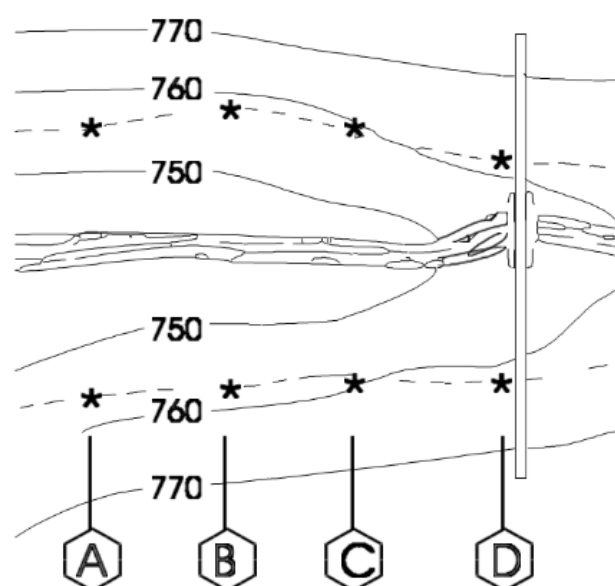


Figure 4-9. Flood elevations from a profile like Figure 4-8 are transferred to the contour map to delineate the floodplain boundary.



Handbook for New Mexico Floodplain Managers

represent exact conditions on the ground. Use the map to determine whether a property is in or out of the floodplain for regulatory purposes. If ground elevation data shows a mapped floodplain to be above the base flood elevation, the property owner should be advised to request a Letter of Map Amendment which will officially amend the map to reflect the new data. This process is explained in Section 7.

It must be noted that lenders (and others who must read the FIRM to determine if flood insurance is required) must go by the map. They cannot make on-site interpretations based on data other than the FIRM. However, they may recommend that the property owner submit a request for a map revision or map amendment so the map can be officially changed to reflect the more accurate data (see Section 7).

Many NFIP maps show floodplains that were mapped using approximate study methods. For these studies, engineers use flood data and floodplain information from a variety of sources such as actual high-water profiles, aerial photographs of previous floods, topographic maps, and soil survey maps. Using this information and experienced engineering judgment, the engineer overlays the approximate outline of the base floodplain for specific stream reaches on the best available topographic map, usually USGS topographic quadrangle maps. An approximate study shows the estimated boundary of the SFHA. The study does not establish base flood elevations (BFE) or designated floodways.

Many flood sources have been studied by other federal, state, and local agencies. Such studies often do not meet the NFIP standards for an FIS; however, the studies may contain valuable flood hazard information, which may be incorporated into NFIP maps as approximate studies.

4.4.7. Floodway Analysis

The final step in preparing most riverine flood studies is to produce the floodway analysis, which identifies where encroachment by development will increase flood elevations significantly and worsen flood conditions and where it can and cannot be allowed.

The floodway is the stream channel and that portion of the adjacent floodplain which must remain open to permit passage of the base flood. Floodwaters generally are deepest and swiftest in the floodway, and anything in this area is in the greatest danger during a flood.

Handbook for New Mexico Floodplain Managers

The remainder of the floodplain is called the floodway fringe (Figure 4-8) where water may be shallower and slower. NFIP minimum standards provide that other areas outside the boundaries of the floodway can be developed without further analysis. Consequently, most communities permit development in the floodway fringe if the development is elevated or otherwise protected to the base flood level (or any higher state or local standards). Development in the floodway is allowed if it can be demonstrated that no rise in the base flood elevation will occur. It is recommended, however that floodway development be discouraged or even prohibited because of the hazardous nature of this area.

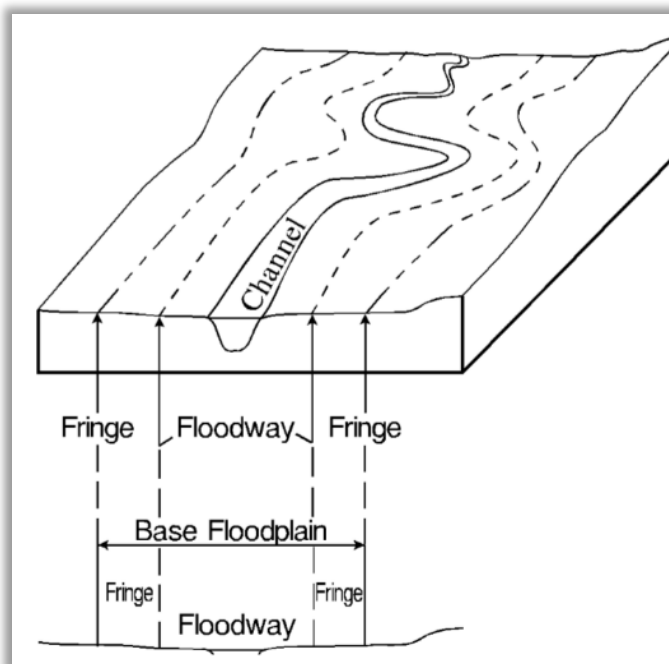


Figure 4-10. Floodplain cross section and floodway map.

A floodway analysis establishes the boundaries of the floodway or “encroachment limits” using these floodplain management concepts:

- Properties on both sides of a river or stream should be treated equitably. The degree of obstruction permitted now for one side of the river should be permitted in the future on the other side.
- An increase in the base flood elevation will not exceed one foot resulting from the floodway encroachment limits.
- To the extent feasible, the floodway encroachment limits will be located:
 1. To avoid the need to seek removal of a lawful existing structure in order to safely convey the base flood.
 2. To minimize any increase in the base flood elevation where such an increase will adversely affect an existing lawful structure.
 3. To avoid imposing restrictions on a lawful structure’s improvements or replacement.

A floodway analysis is done with a computer program that can make the necessary calculations of the effects of further development. Beginning at both edges of the floodplain, the computer model starts “filling” the floodplain. This proportionally “squeezes” the floodwater toward the channel and causes the flood level to rise. At the point where this process reaches a 1-foot rise, the floodway boundaries are drawn (Figure 4-11).

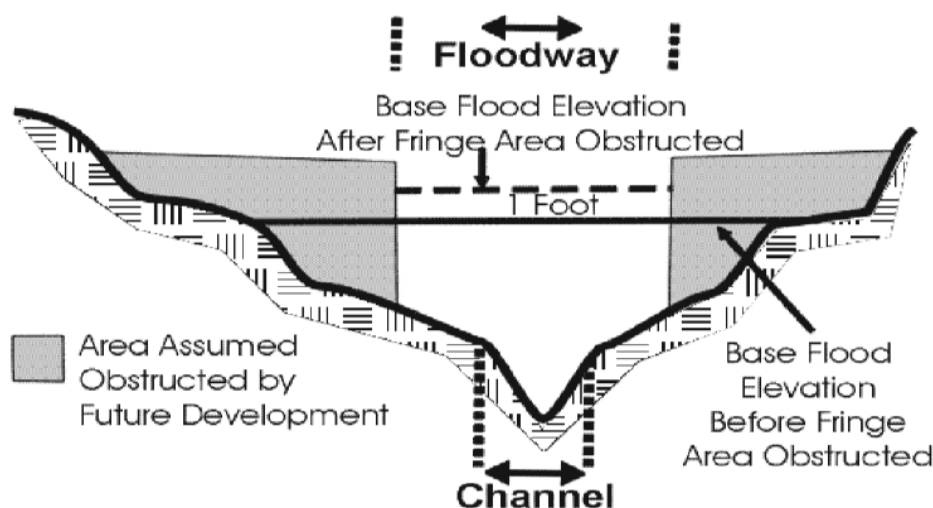


Figure 4-11. Computer floodway analysis

The floodway boundaries at each cross section are transferred to the topographic or contour map that shows the SFHA boundaries (see Figure 4-9). The plotted points are connected to show the floodway and floodway fringe on the floodplain map.

Not every cross section will show an exactly 1-foot rise. Topographic conditions and the need to “smooth out” the floodway line will result in some cross sections having surcharges of less than 1 foot.

Allowing flood heights to rise up to 1 foot is a compromise standard. Prohibiting any rise in flood heights would prohibit most types of development. On the other hand, allowing development to cause greater increases in flood heights can cause great problems for others.

A floodway analysis should be prepared with close coordination between the modeling engineer and those who are responsible for community planning and floodplain management.

The number of possible floodway configurations is almost limitless. Therefore, in choosing a regulatory configuration, the interests of individual property owners and the community as a whole must be weighed.

For a variety of reasons, many floodplains in New Mexico do not have floodways delineated. Where there is a floodplain with flood elevations or flood depths, but no floodway, the community must do its best to ensure that new development does not increase the flood elevation.

Some of these floodplains are on alluvial fans, where it is difficult to delineate floodways by the encroachment method. Where alluvial fans are not developed, it may be possible for the community to designate “administrative floodways” along the most active flow paths. In the development of administrative floodways, the community designates areas along flow paths that are preserved as open space. In the areas between these floodways, the community may



Handbook for New Mexico Floodplain Managers

require development to be elevated a foot or two above the flood elevation or flood depth, and they may require that fill be engineered to prevent scour.

Some floodplains without floodways are in relatively flat urbanized or agricultural areas where there is no defined channel. In urbanized areas, the community must ensure that flood flows down streets are not impeded. In agricultural areas, zoning densities should be kept as low as possible, and extensive obstructions to flow, such as masonry walls around large lots should be prohibited. In both cases, new development and redevelopment must be elevated to or above the flood elevation or depth.

4.5. Other Flood Studies

4.5.1. Shallow Flooding Studies

For the NFIP, shallow flooding is defined as flooding with an average depth of one to three feet in areas where a clearly defined channel does not exist. Shallow flooding can exist in any of the following situations:

- **Ponding:** In flat areas, water collects or “ponds” in depressions.
- **Sheet flow:** In steeper areas where there are no defined channels or on flat plains, water will spread out over the land surface.
- **Urban drainage:** Local drainage problems can be caused where runoff collects in yards or swales or when storm sewers back up.

For the purposes of the NFIP, shallow flooding is distinguishable from riverine flooding because it occurs in areas where there is no channel or identifiable flow path.

Shallow flooding is mapped based on historic flood experiences and a study of the topography. In some areas, the techniques used for riverine studies are used. The result will either be a base flood elevation (i.e., in NGVD) or a base flood depth (i.e., in feet above the ground). A shallow flooding study usually produces data for the base flood, but not for other floods.

These areas are usually designated as an “AO” or “AH” Zone on a FIRM (see Figure 5-15 in the next section). Note that FEMA generally does not map shallow flooding areas less than one foot deep. Therefore, a FIRM probably does not show all floodprone areas in a community.

4.5.2. Approximate Studies

Detailed studies are expensive — a riverine study typically costs \$5,000 to \$10,000 per mile of stream that is to be mapped — so it is not cost effective to perform a detailed study in watersheds where there is little or no development and none is anticipated, such as in rural areas.

Many NFIP maps show floodplains that were mapped using approximate study methods. Using flood data and floodplain information from a variety of sources — such as soils mapping, actual high water profiles, aerial photographs of previous floods, topographic maps — the approximate outline of the base floodplain for specific stream reaches was overlaid on available



Handbook for New Mexico Floodplain Managers

community maps, usually United States Geological Survey topographic quadrangle maps.

An approximate study shows the estimated boundary of the SFHA. It does not establish base flood elevation or BFE, as there are no elevation data in the FIS report and therefore no designated floodways. The boundaries are drawn on the best available topographic map using knowledge of past floods and the judgment of experienced engineers. Many flooding sources have been studied by other federal, state or local agencies. Such studies that do not meet the NFIP standards for an FIS often contain valuable flood hazard information which may be incorporated into NFIP maps as approximate studies. Those types of studies typically cover developed or developing areas. They often contain flood elevation profiles that can be used as "best available data" for floodplain management purposes.



5. NFIP Maps

CONTENTS

5.1. Types of Maps	5-3
5.1.1. Flood Hazard Boundary Map	5-3
5.1.2. Flood insurance study maps	5-3
5.2. General Map Features	5-4
5.2.1. Map Index	5-4
5.2.2. Community NFIP Number	5-6
5.2.3. Title Box	5-7
5.2.4. Map Revision Date	5-7
5.2.5. Map Scales and North Direction	5-8
5.2.6. Elevation Reference Marks	5-8
5.2.7. FIRM Zones	5-8
5.3. Map Formats	5-8
5.3.1. Flood Insurance Rate Map — Old Format	5-8
5.3.2. Flood Boundary and Floodway Map	5-11
5.3.3. Flood Insurance Rate Map — New Format	5-12
5.4. Special FIRM Features	5-14
5.4.1. Lakes and Playas	5-14
5.4.2. Shallow Flooding FIRMs	5-14
5.4.3. Countywide FIRMs	5-15
5.5. Digital FIRMs	5-16
5.5.1. Digital Flood Insurance Rate Map	5-17
5.5.2. Digital Flood Insurance Rate Map — Digital Line Graph	5-17

5.1. Types of Maps

5.1.1. Flood Hazard Boundary Map

Flood Hazard Boundary Maps (FHBMs) were initially prepared to provide flood maps to many communities in a short period of time. They were made in the 1970's and early 1980's without benefit of detailed studies or hydraulic analyses for nearly all floodprone communities in the nation (over 21,000). They were intended for interim use in most communities until more detailed studies could be carried out.

FHBMs are still being used where detailed Flood Insurance Studies have not been prepared or cannot be justified. They are to be used for floodplain management, in conjunction with other local studies and other available data.

On the FHB, the Special Flood Hazard Area (SFHA) is designated as a shaded area labeled "Zone A," and no base flood elevations are given (see Figure 5-1).

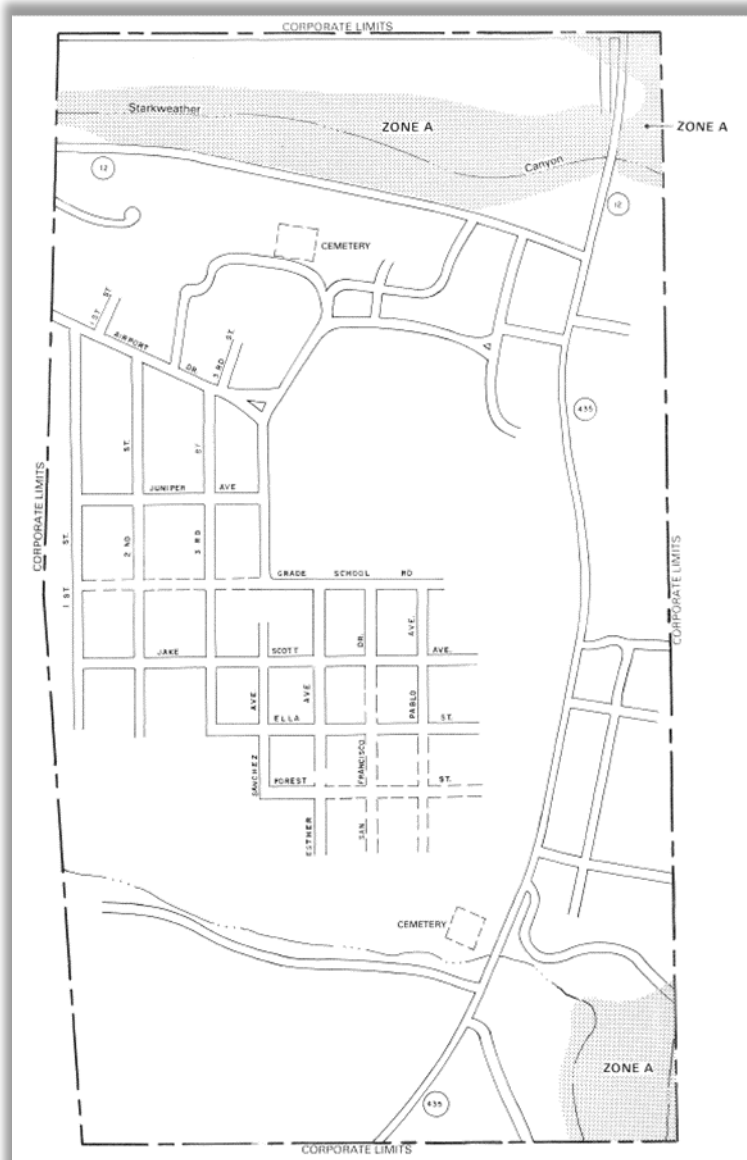


Figure 5-1. Flood Hazard Boundary Map for Reserve, NM

In some cases, FEMA simply converted the FHB to a Flood Insurance Rate Map (FIRM) by issuing a letter to the community stating that the FHB shall be considered a FIRM without printing a new map. This process is called a "special conversion" – converting the community from the Emergency Phase to the Regular Phase of the NFIP. (These phases of the National Flood Insurance Program are discussed in Section 3.4).

5.1.2. Flood Insurance Study Maps

Maps published with a FEMA Flood Insurance Study are:

- The **Flood Insurance Rate Map** (the FIRM), which is published in an old format in studies prepared before 1986 and a new format in studies prepared after 1986.



Handbook for New Mexico Floodplain Managers

- The **Flood Boundary and Floodway Map** (the FBFM or Floodway Map), which was included in studies prepared before 1986.

The maps help permitting officials identify Special Flood Hazard Areas (SFHAs), determine the location of a specific property in relation to the SFHA, gauge the base flood elevation at a specific site, and locate regulatory floodways.

The flood maps, particularly the FIRM, come in many formats because of the mapping of additional hazards, the need for more regional flood maps and the increased use of computer-generated maps. Several general features are included on all maps.

Originally, the FIRM, were designed for use by insurance agents and lenders. The Floodway Maps were directed toward the floodplain management aspects of the NFIP and intended for use by local administrators and floodplain managers.

Now, and in newer studies, all floodway and floodplain boundary information is presented on the FIRM. With these changes, the FIRM are more easily used by community officials for floodplain management, by lenders to determine the need for flood insurance, by insurance agents to rate policy applications, and by land surveyors, engineers, property owners and others to determine flood hazards in a given location.

5.2. General Map Features

This section applies to Flood Insurance Rate Maps and Flood Boundary and Floodway Maps. Flood maps are either flat or Z-fold. Flat maps are on 11-inch-by-17-inch “ledger” size paper. Z-fold maps are on larger pages and get their name from the way they are folded.

Although most communities have Z-fold maps, for ease of reproduction and inclusion with this reference, the excerpts in Appendix G are photocopies on 8½” x 11” paper. The original uses blue shading while the copies are in black and white.

All flood maps are prepared with general features or elements that include:

- an index
- community name and NFIP number
- a title block
- a legend (or key to map)
- panel or map number information
- an arrow pointing north on the map
- a scale to relate distance on the ground to distance on the map
- effective date or revision date information

In this section we will discuss the map index, elevation reference marks, and map scales and direction. Other map features will be presented as we discuss FIRM and Floodway Maps.

5.2.1. Map index

In small communities, the floodplain area is small, and all of it can be shown on one panel. The phrase “Only Panel Printed” on the title boxes of the FIRM and Floodway Map show that



Handbook for New Mexico Floodplain Managers

everything is on the one panel. These communities have no map index.

Many communities, especially counties, are geographically too large to fit on one map or panel at a usable scale. So, maps for these communities are divided into two or more panels with unique panel numbers. Whenever a community requires more than one panel, a map index for both the FIRM and Floodway Map is prepared. The title blocks for a FIRM index and a Floodway Map index are shown in Figure 5-2.

The map index shows the community's boundaries, highlighting prominent features such as major highways, railroads and streams. The map index shows how the community is displayed on the various panels. Panels having no identified flood hazard areas (or no floodways on a Floodway Map) are not printed as indicated by an asterisk "*."

Figures 5-3 and 5-4 are from the map indexes for Santa Rosa, NM. In Santa Rosa's case, there is only one FIRM panel and one floodway panel. In cases where floodways are not mapped for a particular area, the Floodway Map panel may not be printed. It is not uncommon to have more FIRM panels printed than Floodway Maps for a given community.

The number of panels that have been printed appear in the title box ("Panels Printed: 1"). Sometimes the entire panel is in one flood zone (e.g., there is no floodplain for that area of the community) and is not printed. The flood zone for that panel is noted directly on the map index.

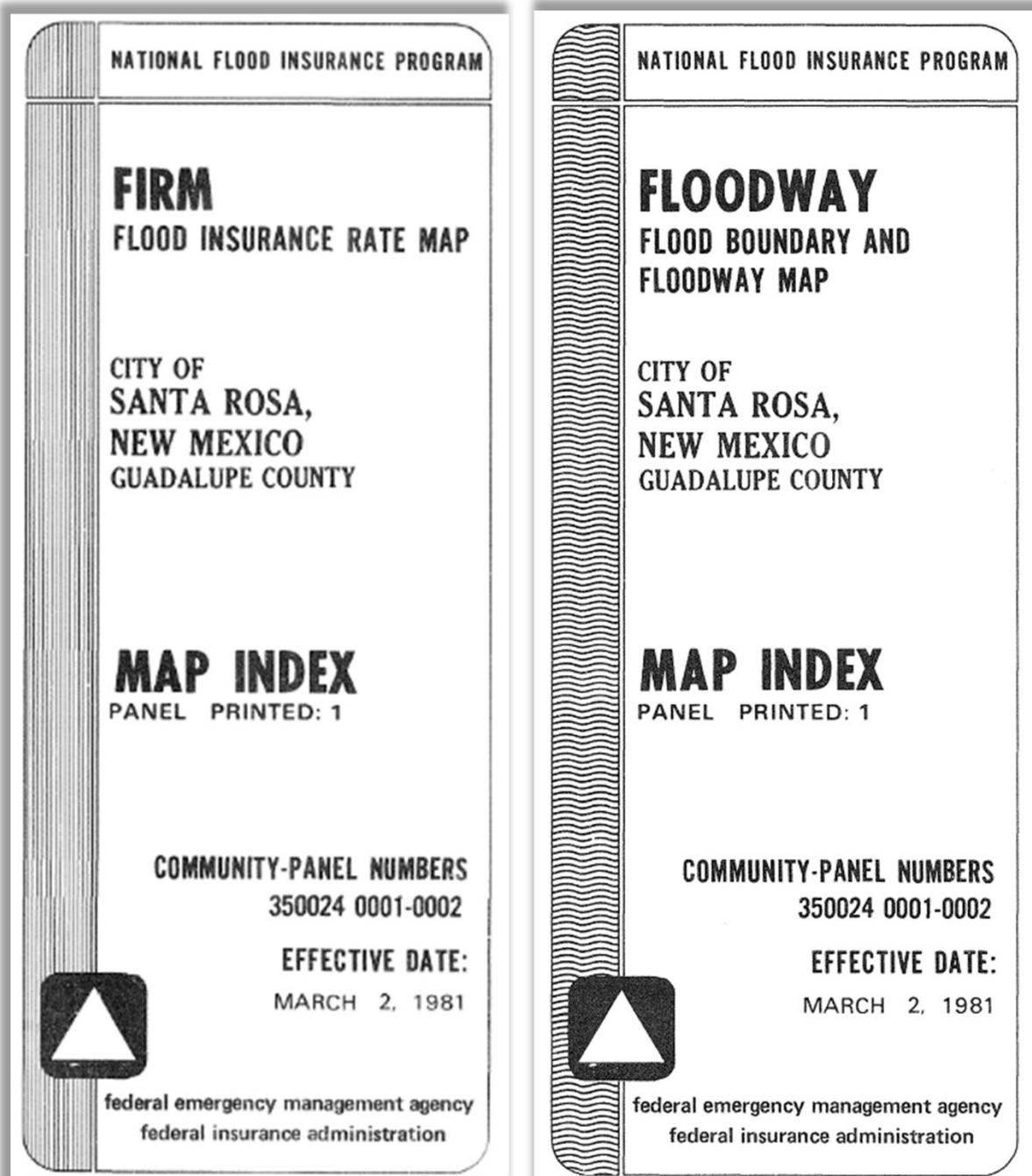


Figure 5-2. Santa Rosa's FIRM and Floodway Map Index Title

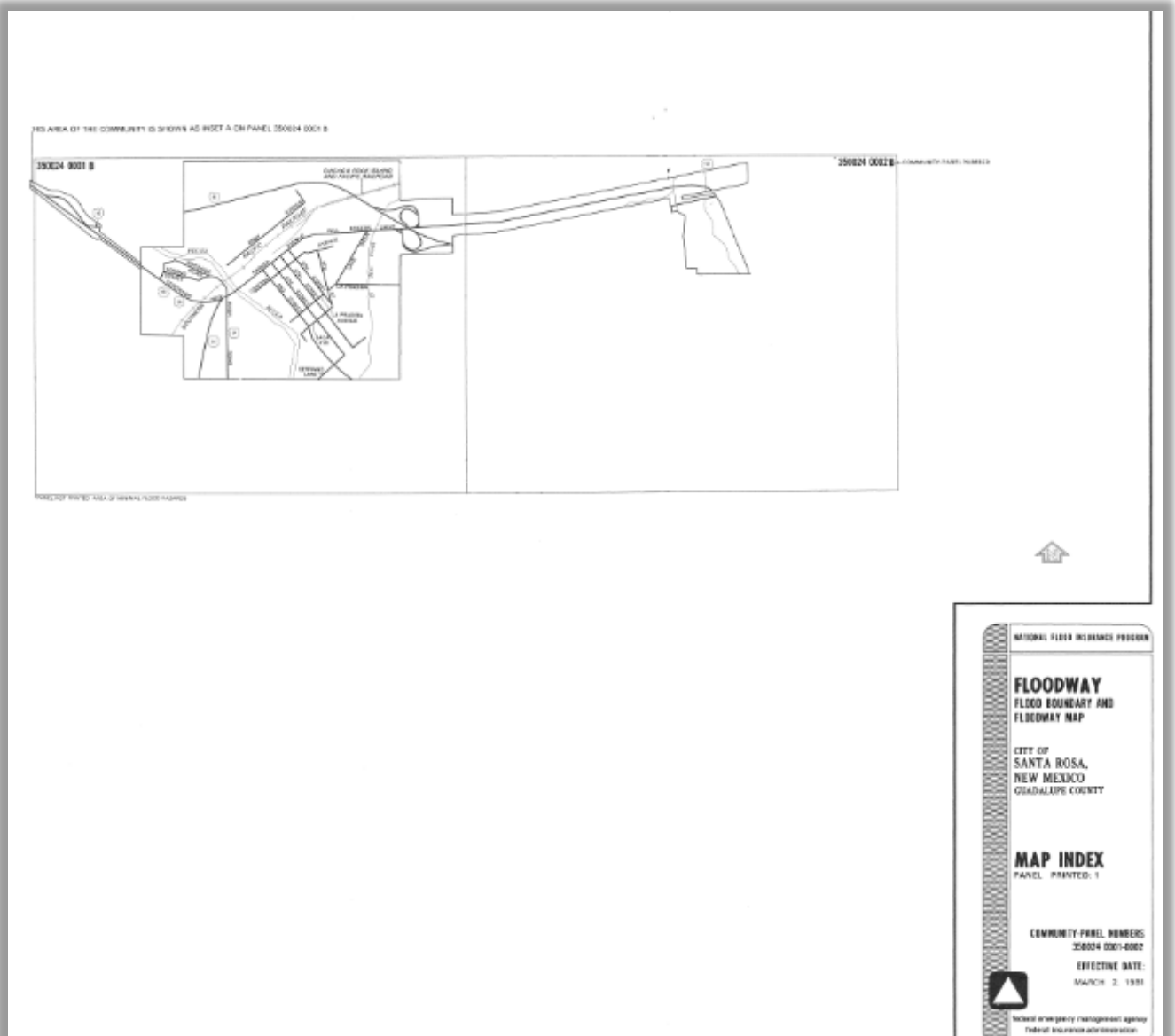


Figure 5-3. Santa Rosa's Floodway Map Index.

5.2.2. Community NFIP Number

Every community that has been mapped by the NFIP is given a six-digit number by FEMA. In New Mexico, all community numbers start with "35."

Handbook for New Mexico Floodplain Managers

5.2.3. Title Block

The title block is the lower right portion of the opened map for both the map index and the FIRM panels. See Figure 5-4.

In the title block are:

- the community's name
- the panel number (on the Map Index, all of the panel numbers are listed)
- the six-digit community identification number – “350001” followed by the panel number. The “C” indicates that this is a county-wide map.
- map panel suffix – a letter, e.g., “G” or “D” which indicates the number of revisions that have been made.
- map effective or map revision date. In this case, the revision date for panel number 5001C0050 is 9/26/2008, even though the revised date of the FIRM Index Map is 11/4/2016. The current FIRM Index map will always have the date of the latest revised panel.

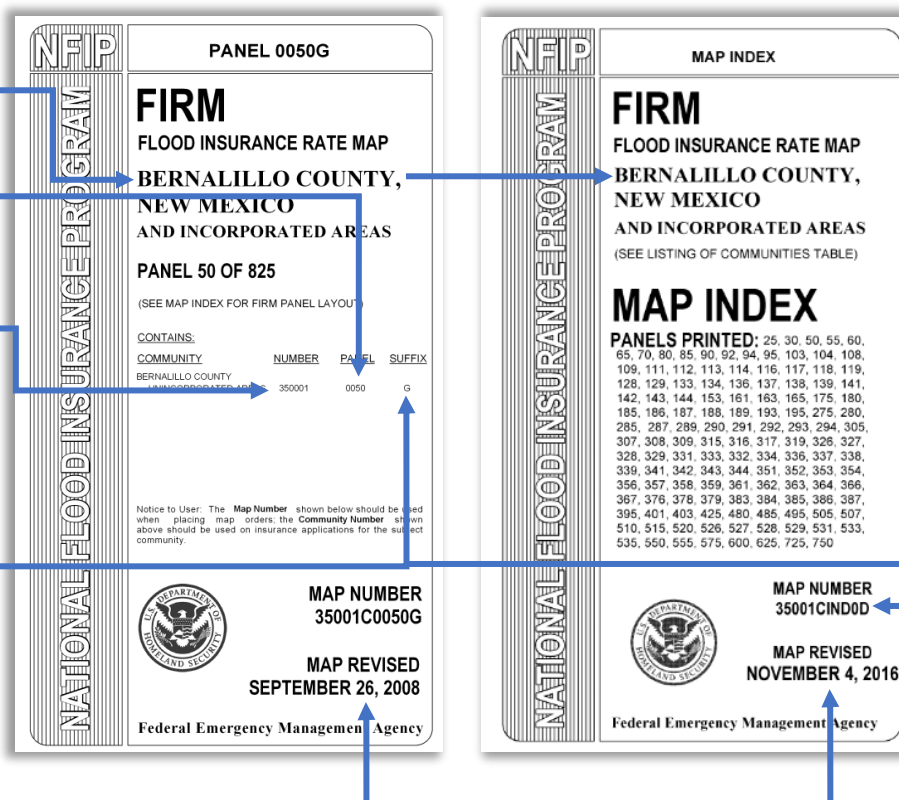


Figure 5-4. Title Blocks for Bernalillo County's FIRM Index and FIRM Panel 0050

5.2.4. Map Revision Date

The date in the title block shows the map's most recent revision. As changes occur within a community which result in a change in flood elevations or floodplain delineation, FEMA republishes only the map index and changed map panels. Any revised panels are given a new map effective date and a new suffix letter. Some FIRMs have map panels with different effective dates. Note Bernalillo County's FIRMs in Figure 5-4.

The map index shows the current effective map date for all the FIRM panels or that of the most recently revised panel. With each revision comes a new panel suffix. When not sure of the current version of an NFIP map, check the “Community Status Book” on FEMA's website (see Appendix B).

Handbook for New Mexico Floodplain Managers

5.2.5. Map Scales and North Direction

Different map scales are used on FIRM and Floodway Maps, depending on the size of the mapped area for a community and depending on the base map that is used. The map scale in Figure 5-5 is 1 inch = 600 feet (one inch equals 600 feet).

Be aware that different scales may be used for a single community with more than one map panel.

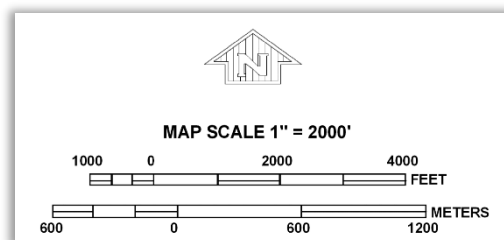


Figure 5-5. Map Scale and north arrow

An arrow pointing north is shown on all maps, including the map index. For FIRMs and Floodway Maps, the north direction arrow is located near the map scale. Generally, New Mexico maps have north at the top of the map. However, sometimes the north direction on the map is “turned” to maximize the mapped area that can be shown on a panel, and to minimize the number of panels. Be sure to check the north arrow on any map you use.

5.2.6. Elevation Reference Marks

Elevation reference marks are located on FIRMs and Floodway Maps. For these two types of maps, locations are identified with a small “x” and the designation “ERM” or “RM” simply followed by a reference mark number. For the newer Digital FIRMs (DFIRMs), locations are identified with a small “x” and the designation “ERM” or “RM” followed by the panel number and the number of the reference mark. Descriptions of the marks, including their elevations, appear either on FIRM panels, on Floodway Maps, or in the FIS text. Note that some ERM and RM descriptions may appear on a different map panel than the mark itself due to space limitations.



Figure 5-6. Reference marks on a FIRM.

ERMs and RMs are important sites. They provide a ground elevation reference for surveyors to start from when they determine the elevation of a building, a cross section, or topography for a site. Occasionally, an ERM cannot be found as described on the FIRM or Floodway Map because new construction or some other change in the area has obliterated the monument. In these instances, the next closest ERM may be used. Alternatively, USGS, USC&GS, or NGS benchmarks, which are marked on most USGS 7.5 minute series topographic maps, may be used.

5.2.7. FIRM Zones

Flood Insurance Rate Maps will show different floodplains with different zone designations. These are primarily for insurance rating purposes, but the zone differentiation can be very helpful for other floodplain management purposes. The more common zones are listed in Figure 5-7.



Handbook for New Mexico Floodplain Managers

Zone A	<p>The 100-year or base floodplain. There are six types of A Zones:</p> <p>A The base flood mapped by approximate method, i.e., 100-year flood elevations are not provided. This is often called an unnumbered A Zone or an approximate A Zone.</p> <p>A1-A30 These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a base flood elevation (old format).</p> <p>AE The base floodplain where base flood elevations are provided. AE Zone delineations are now used on new format FIRMs instead of A1-A30 Zones.</p> <p>AO The 100-year floodplain with sheet flow, or shallow flooding. 100-year flood depths (feet above ground) are provided.</p> <p>AH Shallow flooding base floodplain, such as ponding, 100-year flood elevations are provided.</p> <p>AR The 100-year floodplain that results from the decertification of a previously accredited flood protection system that is in the process of being restored to provide a 100-year or greater level of flood protection.</p>
Zone V	The base floodplain subject to coastal high hazard flooding. There are three types of V Zones: V, V1-30 and VE that correspond to the similar A Zone designations.
Zone B and Zone X (shaded)	Area of moderate flood hazard, usually the area between the limits of the 100- year and 500-year floods. It can also be an area of the 100-year flood (1) with average depths of less than one foot, (2) with a drainage area less than one square mile or (3) protected by levees from the base flood.
Zone X (unshaded)	Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. B Zones may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain.
Zone D	Area of undetermined but possible flood hazard.

Figure 5-7. Flood Insurance Rate Map zones.

Note that the special flood hazard area (SFHA) includes only A and V zones.
There are no V zones in New Mexico.

5.3. Map Formats

5.3.1. Flood Insurance Rate Map— Old Format

The FIRM is used to determine:

- Whether a property is in the floodplain.
- The flood insurance zone that applies to the property.
- The approximate base flood elevations (BFE) at the site.

This section discusses the format used for FIRMs issued before 1986.

Dates: Several dates may be listed in the FIRM legend, including:

- Initial Identification — date of the first Flood Hazard Boundary Map.
- Any dates or revisions to the FHBM that have occurred since the initial identification.
- Flood Insurance Rate Map Effective — the date of the initial FIRM. This is the date that determines whether a building is “pre-FIRM” or “post-FIRM.”
- Flood Insurance Rate Map Revisions — dates of subsequent revisions to the FIRM.

Handbook for New Mexico Floodplain Managers

The FIRM also will show:

Base floodplain or SFHA. Designated by the dark-shaded areas on traditional FIRMs (Insurance Zones A, A1– A30, AE, AO, AH). On more recent DFIRMS this area is designated by a hatched area with light blue dots.

500-Year floodplain. Designated by the lighter-shaded areas (Insurance Zone B) on traditional FIRMs. On more recent DFIRMS this area is designated by a hatched area with black dots.

Base Flood Elevation (BFE). The water surface elevation of the base flood at that point of the stream is denoted in whole numbers by wavy lines running across the floodplain. Note that in riverine floodplains, the base flood elevation on the FIRM is the approximate elevation rounded to a whole number. The flood elevations in the profile are more accurate and can usually be determined to 0.1 foot. AH Zones and some AE Zones have the base flood elevation noted in parentheses beneath the zone designations.

Zone break line. The thin white line separates flood insurance rate zones within the base floodplain.

Approximate floodplain areas. The base floodplain areas are delineated using approximate methods. No base flood elevations are shown in approximate floodplain areas; these areas are classified as (unnumbered) A Zones. Unnumbered A Zones are common in New Mexico. They are also used in parks or public lands that won't be built on.



Figure 5-8. Example of unnumbered A Zone on a FIRM. The detailed study is designated by the "AE" and "AO" Zone

The Rio Grande floodplain is shown as a Zone A, i.e., a Special Flood Hazard Area mapped using approximate study methods.

FIRM example: An example of a DFIRM with SFHAs using both approximate and detailed study methods is shown in Figure 5-8. Note the white line that separates the approximate SFHA (the Zone A) to the east from the detailed studied areas (the Zone AE and AO) to the west. Note also the approximate Zone A to the west has no wavy lines showing the base flood elevation.

5.3.2. Flood Boundary and Floodway Map

The Flood Boundary and Floodway Map is also known as the FBFM or, simply, the Floodway Map. The Floodway Map shows how the floodplain is divided into the floodway and floodway

Handbook for New Mexico Floodplain Managers

fringe where streams are studied in detail. They also show general floodplain areas where floodplains have been studied by approximate methods.

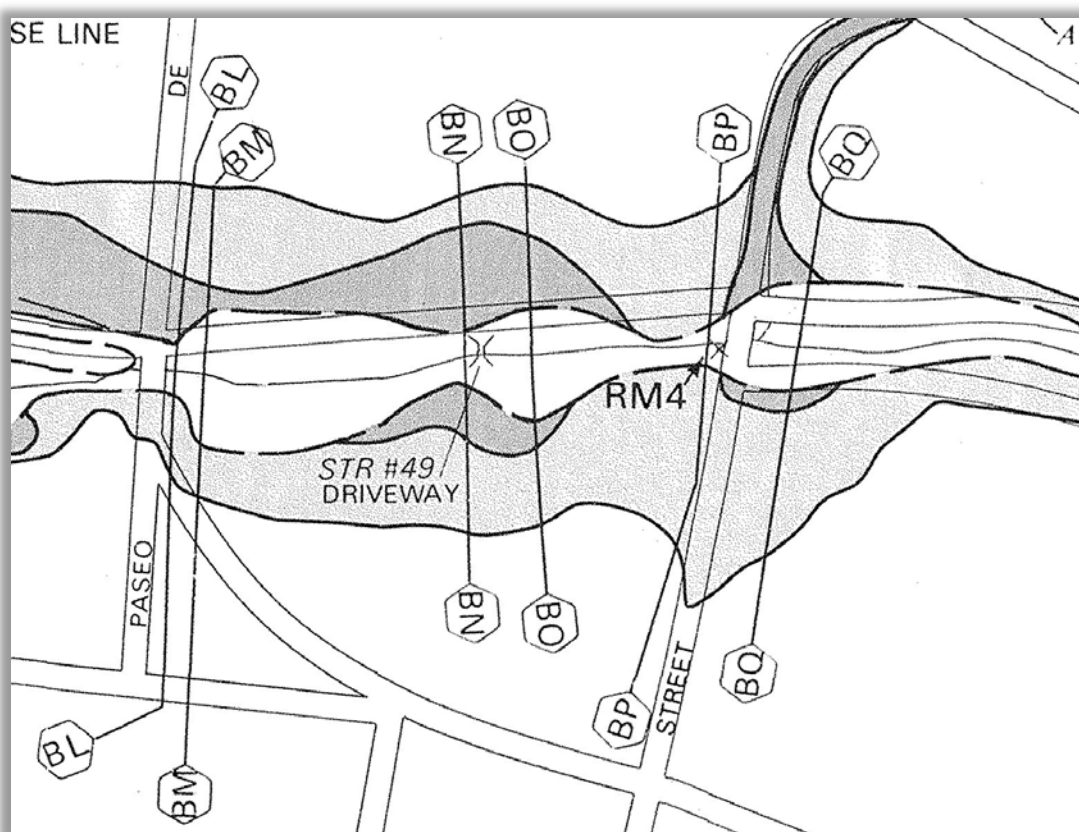


Figure 5-9. A portion of the Floodway and Flood Boundary Map for Santa Fe

Floodway Maps have these features:

Title block: Includes the community name, county name, panel number, community number, and the map date. The panel numbers and effective dates may be different from the FIRM panel numbers.

Map scale: The Floodway Map may have a different scale than the FIRM for the same community.

Cross section line: These lines represent the location of some of the surveyed cross sections used in the computer model of the stream for calculating base flood elevations. These cross sections can be used to relate a specific point on the Floodway Map to the flood profile and floodway data table.

Floodway: The base floodplain has been divided into two areas, the floodway and the floodway fringe. The white area adjacent to and including the channel is the floodway. The shaded area is the floodway fringe.

Handbook for New Mexico Floodplain Managers

One problem with this method of delineating floodways is that sometimes people confuse the white floodway with the white area representing land that is free from flooding. Also, because the floodway was mapped separately, often property owners, lenders, real estate agents and others do not have easy access to the Floodway Maps and did not know of the severe flood hazard associated with the floodway.

Newer FIS reports have corrected this problem – they do not have separate FIRM and Floodway Maps. Floodways are delineated on the newer FIRMs as a diagonally hatched area (see Figures 5-11 and 5-12). No base flood elevations or flood zone names are shown on the Floodway Map. If a map panel area does not include any detailed study streams or floodways, a Floodway Map will not be printed; only a FIRM panel will be printed.

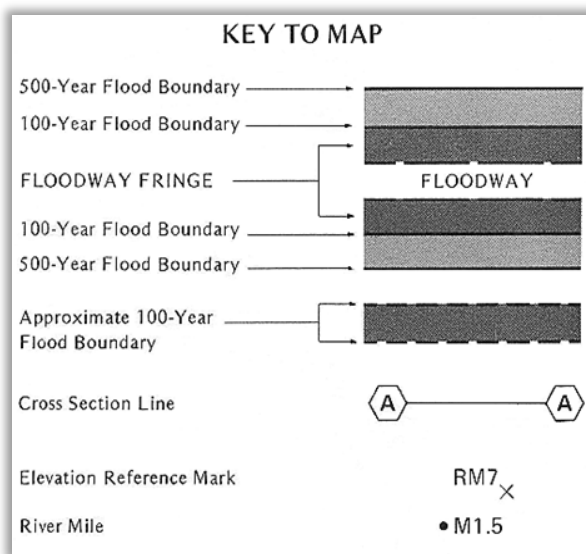


Figure 5-10. Floodway map legend.

Floodway Fringe: The floodway fringe is shown as a shaded area outside of the floodway but still within the base floodplain. The flood fringe and the floodway together comprise the special flood hazard area.

500-year floodplain: Lighter shaded areas adjacent to, but outside of the 100-year (1%) floodplain delineate the 500-year (0.2%) floodplain for streams studied in detail.

Approximate floodplain areas: base floodplain areas that are determined using approximate methods. The limits of the approximate floodplain on the Floodway Map are shown as dashed lines. An example is in Figure 5-11.

5.3.3. Flood Insurance Rate Map — New Format

Flood maps have been redesigned over the years since the first FIS reports were prepared in the late 1960s, making them easier to use. A new format for FIRMs was introduced in 1986 that includes:

- Floodways and other floodplain management information, such as cross section locations, that was previously provided on separate Flood Boundary and Floodway Maps (Floodway Maps). (Generally, Floodway Maps are no longer being prepared).
- Simplified flood insurance zone designations. The previous Zones A1-A30 were replaced by the designations AE; Zones B and C were replaced by Zone X. The 500- year floodplain is still shown as lightly “shaded” portions of Zone X.

Figure 5-11 is an example of a new format FIRM with a floodway and Figure 5-12 is the legend for the new format.

5.4. Special FIRM Features

5.4.1. Lakes and Playas

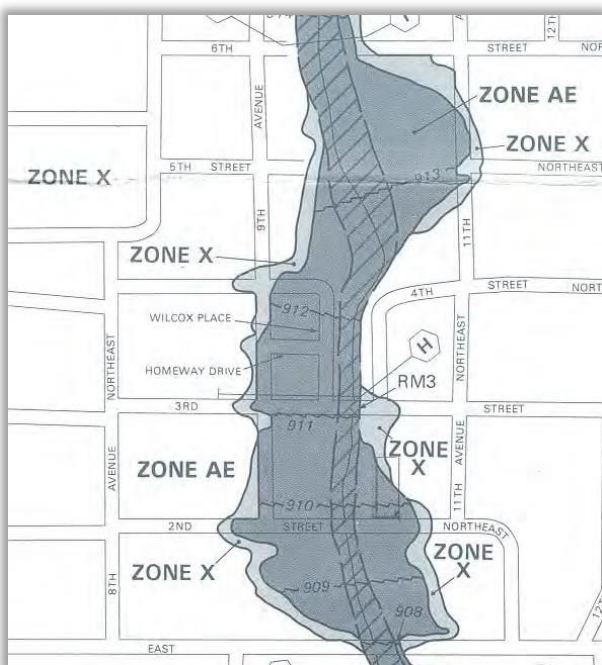


Figure 5-11. Floodway in new FIRM format.

Most lakes and playas have a whole number base flood elevation shown in parentheses below the flood zone. The actual base flood elevation is obtained from the FIS. However, some long lakes, especially reservoirs, have a higher base flood elevation at the upstream end than at the outlet. These types of lakes and reservoirs have base flood elevation shown with wavy lines, the same as riverine base flood elevation. They also appear on the stream profiles in the FIS report.

Where studies have been carried out for playas, lakes and reservoirs, information on base flood elevations is contained in Section 3 of the FIS report. A *Summary of Stillwater Elevations* is provided as a table in the FIS (Figure 5-14). Note that base flood elevations are rounded to one-tenth of a foot in the table but are shown in parentheses in whole numbers on the FIRM. For the most accurate flood elevation, use the “base flood elevation” from the table, not the FIRM.

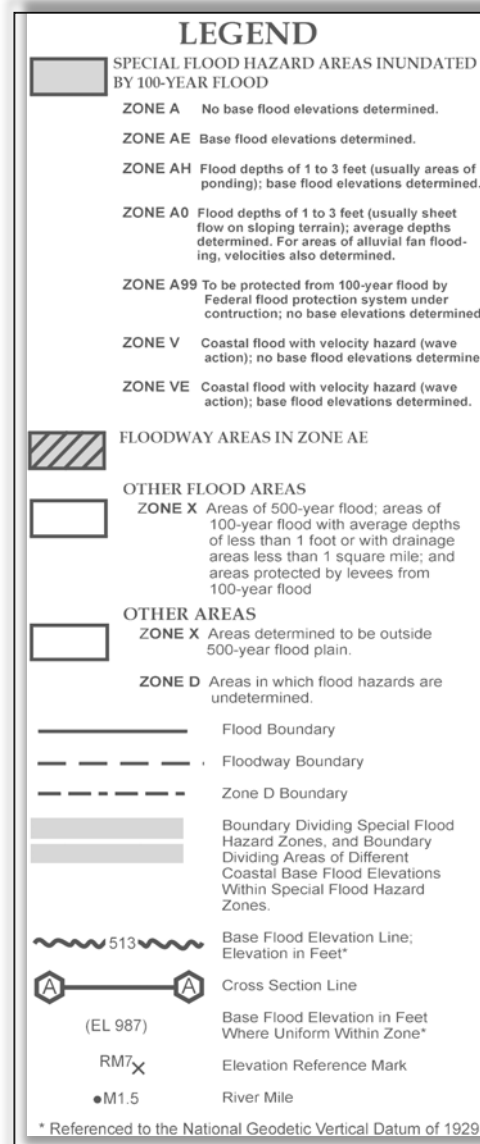


Figure 5-12. New FIRM Legend Format

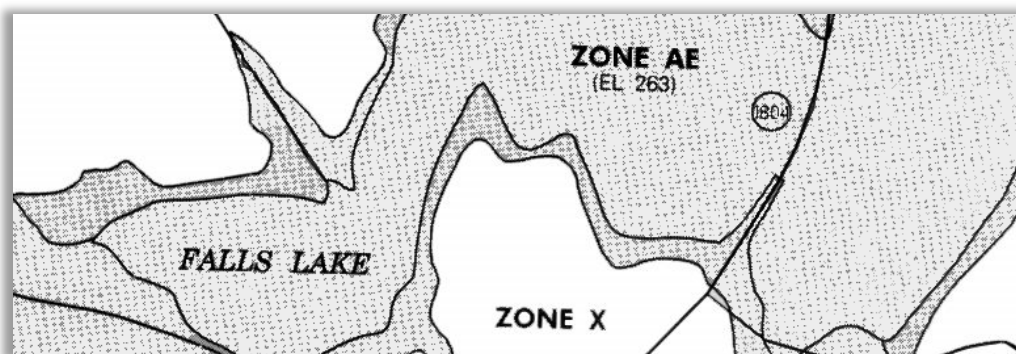


Figure 5-13. FIRM with lake floodplain

Flooding Source and Location		Elevation (ft. NGVD)			
		10-year	50-year	100-year	500-year
Falls Lake	Entire shoreline	256.9	260.7	262.5	266.0

Figure 5-14. Summary of Stillwater elevations for a lake floodplain.

5.4.2. Shallow Flooding FIRMs

Under the NFIP, ponding or sheet flow constitutes shallow flooding, which is mapped based on historic flood experiences and study of the topography.

Two methods can be used to display shallow flooding. An AO Zone may or may not show the base flood depth. A “Zone AO (Depth2’)” designates that the base flood is 2 feet deep. We don’t know how high the base flood is in relation to sea level, but we do know that the base flood should be no deeper than two feet above the ground.

Figure 5-15 provides an example of the other way FEMA maps a ponding area: using an AH Zone with a base flood elevation. This shows an area where floodwaters pond designated as “Zone AH.” Note that the base flood elevation in this shallow flooding area is 4,956 (feet above sea level).

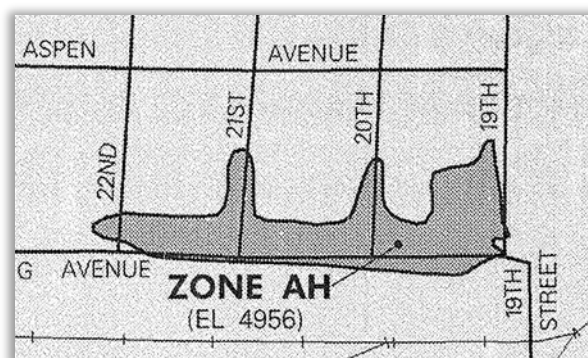


Figure 5-15. Shallow flooding areas shown as AH Zones

5.4.3. Countywide FIRMs

Countywide FIRM maps show flood hazard information for all geographic areas of the county, including incorporated cities, towns and villages.

Handbook for New Mexico Floodplain Managers

Previously, maps were prepared for each jurisdiction. County FIRMs, for example, only showed the flood hazards identified in the unincorporated areas of the county and did not show any flood information inside the corporate limits of a municipality. In countywide mapping, once the countywide map is produced, all of the identified flood hazard areas within the boundaries of the county are shown on one set of maps along with all floodway information maps.

The countywide FIRM format has a number of advantages, and one in particular is that the user can see the relationship and simultaneous effect of each floodplain on a number of communities. In addition, FIRMs do not need to be updated when municipal boundaries change. Although boundaries might change, communities will continue to find the flood hazard information they need on the same countywide FIRM. Figure 5-16 shows the title box of a countywide FIRM panel.

Note: The FIRM panel has a number with five digits and the letter “C,” which stands for “countywide.” Do not confuse the 5 digit map panel number with the 6 digit NFIP community number.

All previous map dates for each floodprone community in a countywide FIS are located on the community map history Table (Figure 5-17). The initial FIRM date for each community is shown on the FIRM index. These are the “post-FIRM” dates for insurance rating. Don’t confuse them with the effective date of the latest FIRM panel, which is shown in the title block.

An example of a countywide FIRM, showing the Special Flood Hazard Areas across community boundaries is shown in Figure 5-18. Figure 5-17 shows the Listing of Communities. This table lists the communities within the county, the panels that they can be found on and their identification and post-FIRM dates.

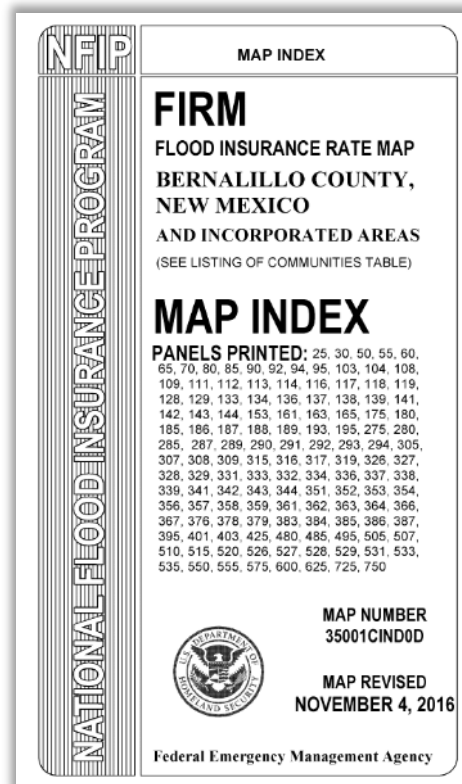


Figure 5-16. Title box of countywide FIRM Panel

Handbook for New Mexico Floodplain Managers

LISTING OF COMMUNITIES						
COMMUNITY NAME	COMMUNITY NUMBER	LOCATED ON PANEL(S)	INITIAL ID DATE	INITIAL NFIP MAP DATE	INITIAL FIRM DATE	MOST RECENT FIRM PANEL DATE
ALBUQUERQUE, CITY OF	350002	0085, 0090, 0092, 0094, 0095, 0103, 0104, 0108, 0109, 0111, 0112, 0113, 0114, 0116, 0118, 0119, 0128, 0129, 0133, 0136, 0137, 0138, 0139, 0141, 0142, 0143, 0144, 0161, 0163, 0305, 0307, 0309, 0317, 0319, 0326, 0327, 0328, 0329, 0331, 0332, 0333, 0334, 0336, 0337, 0338, 0339, 0341, 0342, 0344, 0351, 0352, 0353, 0354, 0356, 0357, 0358, 0359, 0361, 0362, 0363, 0364, 0366, 0367, 0376, 0378, 0386, 0527, 0531, 0533, 0535, 0555	AUGUST 20, 1976	AUGUST 20, 1976	OCTOBER 14, 1983	NOVEMBER 4, 2016
BERNALILLO COUNTY (UNINCORPORATED AREAS)	350001	0025, 0030, 0050, 0055, 0060, 0065, 0070, 0080, 0085, 0090, 0092, 0094, 0095, 0103, 0104, 0108, 0109, 0111, 0112, 0113, 0114, 0116, 0117, 0118, 0119, 0128, 0129, 0133, 0134, 0136, 0137, 0138, 0141, 0142, 0153, 0161, 0163, 0165, 0175, 0180, 0185, 0186, 0187, 0188, 0189, 0193, 0195, 0225, 0275, 0280, 0285, 0287, 0289, 0290, 0291, 0292, 0293, 0294, 0305, 0306, 0307, 0308, 0309, 0315, 0316, 0317, 0318, 0319, 0326, 0327, 0328, 0329, 0331, 0332, 0333, 0336, 0337, 0338, 0339, 0341, 0342, 0343, 0344, 0351, 0352, 0353, 0354, 0356, 0357, 0358, 0359, 0361, 0362, 0363, 0364, 0366, 0367, 0368, 0369, 0376, 0377, 0378, 0379, 0383, 0384, 0385, 0386, 0387, 0390, 0395, 0401, 0403, 0425, 0450, 0480, 0485, 0505, 0507, 0510, 0526, 0527, 0528, 0529, 0531, 0533, 0535, 0555, 0575, 0600, 0625, 0650, 0800, 0825	DECEMBER 20, 1974	DECEMBER 20, 1974	SEPTEMBER 15, 1983	NOVEMBER 4, 2016
EDGEWOOD, TOWN OF	350018	0180, 0185, 0187, 0195, 0225	DECEMBER 20, 1977 ^a	DECEMBER 20, 1977 ^a	NOVEMBER 4, 1988 ^a	AUGUST 16, 2012
ISLETA, PUEBLO OF	350057	0475, 0480, 0485, 0490, 0495, 0505, 0510, 0515, 0520, 0528, 0529, 0533, 0535, 0550, 0555, 0575, 0600, 0625, 0675, 0700, 0725, 0750, 0775, 0800	FEBRUARY 9, 2000 ³	FEBRUARY 9, 2000 ³	FEBRUARY 9, 2000 ³	AUGUST 16, 2012
LAGUNA, PUEBLO OF ²	350003	0050, 0055, 0065, 0275, 0289, 0290, 0293, 0475, 0480, 0485, 0490, 0675	NOVEMBER 29, 1977	NOVEMBER 29, 1977	JULY 16, 1996 ⁴	SEPTEMBER 26, 2008
LOS RANCHOS DE ALBUQUERQUE, VILLAGE OF	350123	0109, 0116, 0117, 0118, 0119, 0136	NOVEMBER 5, 1976	NOVEMBER 5, 1976	JANUARY 3, 1983	AUGUST 16, 2012
NAVAJO INDIAN RESERVATION ²	350091	0025, 0030, 0050, 0065, 0250, 0275, 0280, 0287, 0290	AUGUST 2, 1977 ⁵	AUGUST 2, 1977 ⁵	JANUARY 3, 1986 ⁷	SEPTEMBER 26, 2008
RIO RANCHO, CITY OF	350146	0080, 0085, 0090, 0095, 0103, 0108	APRIL 15, 1992	APRIL 15, 1992	APRIL 15, 1992	AUGUST 16, 2012
SANDIA, PUEBLO OF	350087	0128, 0129, 0133, 0134, 0153, 0161	SEPTEMBER 6, 1977 ⁶	SEPTEMBER 6, 1977 ⁶	SEPTEMBER 15, 1983 ⁸	AUGUST 16, 2012
TJERAS, VILLAGE OF	350135	0384, 0385, 0401, 0403	JULY 2, 1976	JULY 2, 1976	JANUARY 6, 1983	AUGUST 16, 2012

Figure 5-17. List of Communities in Countywide FIRM

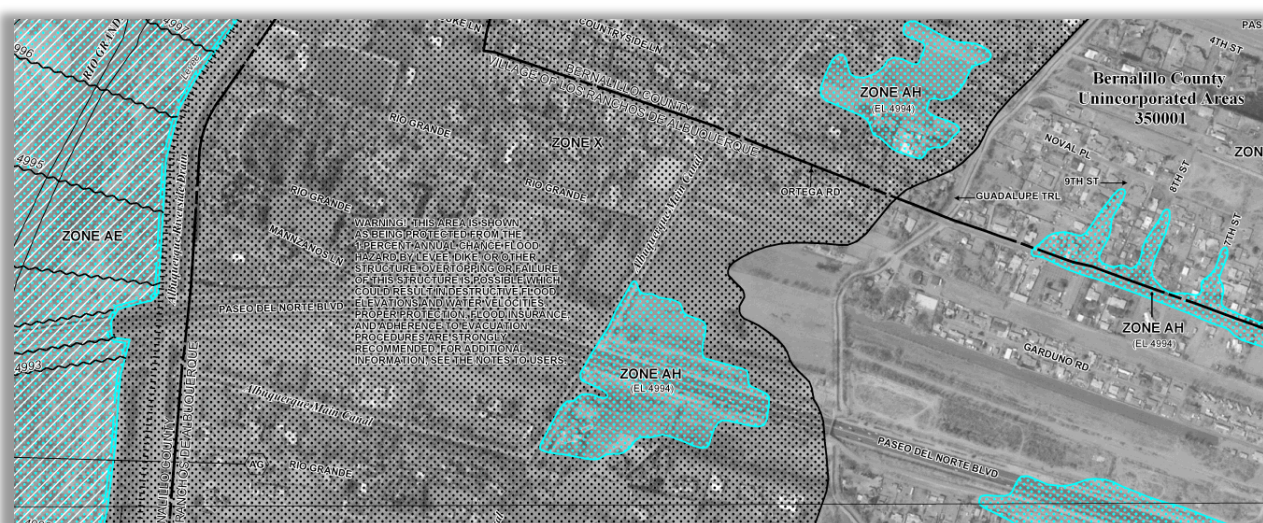


Figure 5-18. Example of Countywide DFIRM from Bernalillo County

5.5. Digital FIRMs

FEMA is modernizing the map creation process by digitizing FIRMs. The conversion of FIRMs to a digital format has many benefits. For example, they can be revised and updated easily with just a few keystrokes and they can be incorporated in the community's mapping system and tied in with other geographic information systems, such as the zoning map.

Users must bear in mind that the simple conversion of FIRMs to a digital format does not

Handbook for New Mexico Floodplain Managers

inherently improve the engineering quality of the product. Many of the same difficulties with interpretation of flood risk data — and the requirement that users apply sound judgment in methods selected for decision making and map interpretation — remain unchanged.

FEMA charges a fee for all digital FIRM data products. Any questions regarding these products may be directed to FEMA (see Appendix B).

5.5.1. Digital Flood Insurance Rate Map (DFIRM)

The Digital Flood Insurance Rate Map (DFIRM) is comprised of all digital data required to create the hardcopy FIRM. This includes base map information, graphics, text, shading and other geographic and graphic data. An example of a hard-copy paper DFIRM is shown in Figure 5-19.



Figure 5-19. Hardcopy DFIRM

The DFIRM is generally produced in a countywide format, where all flood hazards for the county and incorporated communities are shown on one set of maps. It can be used for floodplain management purposes in a manner similar to other flood maps, but it can also be combined with other digital map information to create new information for planning purposes. Currently 21 New Mexico Counties have received DFIRMs. These maps are the most recent data available and can be used in GIS. DFIRM maps may contain both detailed elevation data and approximate boundaries. DFIRM data is available for viewing at the [National Flood Hazard Layer interactive map](https://www.fema.gov/national-flood-hazard-layer-interactive-map). DFIRMs can also be accessed from the FEMA Flood Map Service Center (msc.fema.gov).

5.5.2 Digital Flood Insurance Rate Map — Digital Line Graph

The Digital Flood Insurance Rate Map — Digital Line Graph (DFIRM-DLG) is intended to be the primary means of transferring flood-risk data depicted on FIRMs to Geographic information systems (GIS). GIS are computer-based map systems that allow the user to keep a map updated easily and to correlate geographic information with other data, such as tax records on properties.

The Digital Flood Insurance Rate Map — Digital Line Graph (DFIRM-DLG) is a database created



Handbook for New Mexico Floodplain Managers

by extracting certain flood risk data from the DFIRM. The DFIRM-DLG does not include base map information, nor does it include graphic data required to create a hardcopy FIRM.

Communities whose digital base mapping files were used as the base map for the DFIRM will find that they may easily use the DFIRM-DLG files for determination of flood zones and for enforcement of regulations.



6. Using Maps and Data

CONTENTS

6.1. Using FIS Reports	6-3
6.1.1. FIS Report Contents.....	6-3
6.1.2. Flood Discharges.....	6-4
6.1.3. Floodway Data Table	6-5
6.1.4. Relating Report Data to Maps and Profiles	6-7
6.2. Using Flood Maps	6-8
6.2.1. Locating a Site.....	6-8
6.2.2. Determining Mileage (Stationing)	6-9
6.2.3. Base Flood Elevations from Maps	6-10
6.2.4. Locating the Floodway Boundary.....	6-10
6.3. Using Profiles	6-10
6.3.1. Profile Features	6-11
6.3.2. Determining Base Flood Elevations.....	6-11
6.3.3. Relating Flood Elevations to the Ground	6-12
6.3.4. Relating Profiles to Maps	6-13

6.1. Using FIS Reports

The majority of Flood Insurance Study (FIS) reports use the same outline and numbering system. In this section we will highlight the report's contents, explore the report's data, tables and profiles and describe how they are related to the FIRM and Floodway Map.

Can't find your community's FIS? Call the FEMA Map Information exchange (FMIX) at (877) FEMA-MAP (1-877-336-2627)

The most important reason for using a FIS and flood map is to determine whether or not a site is located in a Special Flood Hazard Area (SFHA) and/or a floodway and to determine the Base Flood Elevation (BFE).

Important: Because the elevation determinations for riverine floodplains are typically used to establish flood elevations for construction in SFHAs and other purposes, accuracy is critical. You should have another person double check your determinations before using them in the permit application process.

6.1.1. FIS Report Contents

The countywide FIS for Eddy County has an outline map of New Mexico. Note that the location of the county is identified on the outline map by the red infill area. The date of the FIS, Communities, and the community identification numbers are also indicated on the cover.

The six-digit community identification number is unique for each community in the NFIP. The first two numbers identify the state the community is in. All New Mexico community identification numbers start with "35," the state identification number for New Mexico.

Section 1 of all FIS reports state

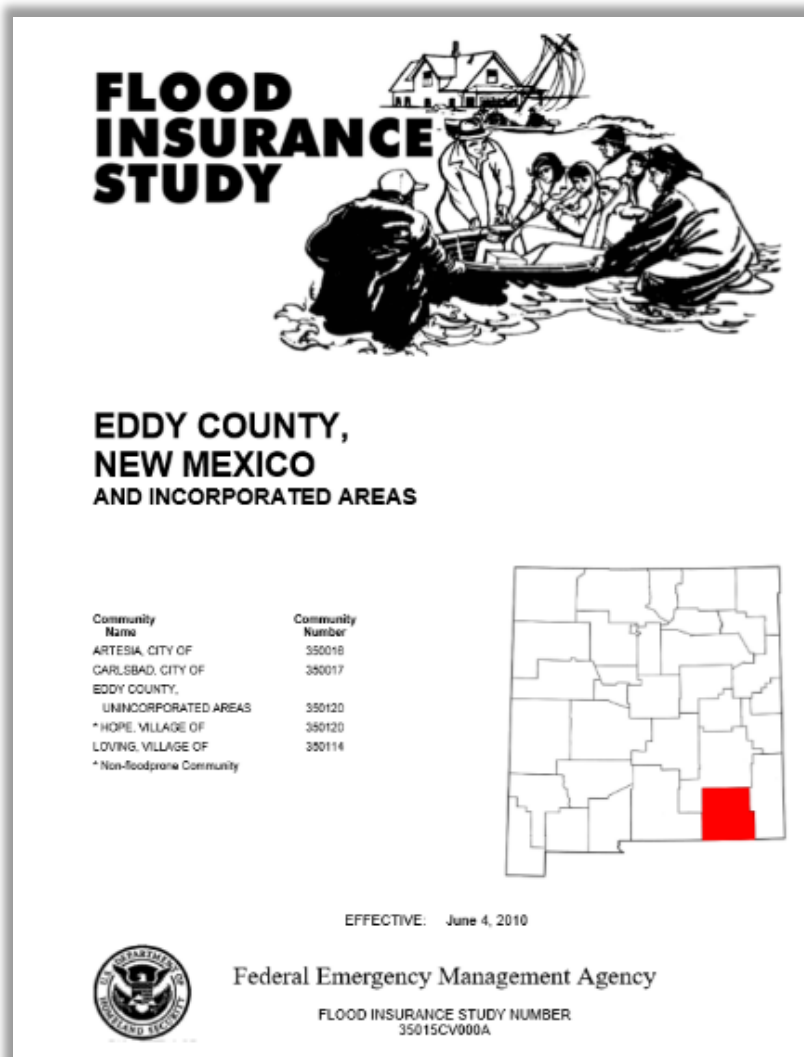


Figure 6-1. Cover of a Flood Insurance Study



Handbook for New Mexico Floodplain Managers

the purpose of the FIS, authority of and acknowledgments by its authors, and coordination steps taken during the preparation of the study.

Section 2 provides background information on the community(ies), its flood problems, which areas were studied and what flood protection measures are in effect.

Section 3 discusses the engineering methods used. Section 3.1 covers the hydrologic analysis — how much water will flow through the floodplain during peak floods. Section 3.2 describes the hydraulic analysis — how high the water will get. (Development of this information was described in Section 4 of this reference).

Section 4 in the FIS text discusses how the flood map was prepared from flood data for floodplain management applications. Section 4.1 covers mapping the floodplain boundaries — where the water will go. If the study included a floodway determination, Section 4.2 describes the floodway study and mapping. Section 4 also includes the floodway data table. (How to interpret and use these and other data is covered a few pages later).

Section 5 covers data related to flood insurance, some of which you will not need to use. This section can be a useful reference, as it describes the flood insurance zones identified on the map.

Completing the FIS report are three self-explanatory sections: Section 6 - Flood Insurance Rate Map, Section 7 – Other Studies, Section 8 – Location of Data, and Section 9 – Bibliography and References.

Most riverine FIS reports include flood profiles as an exhibit at the end of the document.

If the FIS is a revision of an earlier FIS, there will be a discussion of the revisions in a Section 10.

6.1.2. Flood Discharges

A Flood Insurance Study that has stream reaches studied in detail will have a “Summary of Discharges” table. Figure 6-2 is an excerpt from the Carlsbad FIS.

Table 2 in the FIS summarizes the peak amount of water discharge for various flood frequencies at locations within the study area. (The hydrologic study procedures for arriving at these amounts were discussed in Section 4.3 of this reference). The sizes of the drainage areas (watersheds) contributing to the water runoff producing the floods are also shown in the table.

From Figure 6-2, the 100-year discharge for Hackberry Draw upstream of Marquess Street is 3,020 cubic feet per second (cfs). This means that during the peak of the 100-year flood (1% flood), 3,020 cubic feet of water will pass this point each second. Further downstream, upstream of the Southern Canal, the 100-year discharge for Hackberry Draw is 3,600 cfs.

Those administering the local ordinance may never have a need for these data. They are, however, important in making subsequent calculations of flood elevations as part of the hydraulic engineering study.

Table 2. Summary of Discharges

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second)			
		10-percent	2-percent	1-percent	0.2-percent
DARK CANYON DRAW	451.0	*	*	110,000	*
EAGLE CREEK					
East of Artesia City Limits	193.7	1,720	3,650	4,840	7,410
West of 26 th Street	187.1	1,240	1,390	2,160	3,270
East of 26 th Street	187.3	1,240	1,440	2,210	3,270
HACKBERRY DRAW					
Upstream of Southern Canal	9.0	*	*	3,600	*
Upstream of Marquess Street	6.0	*	*	3,020	*
Above Hackberry Draw Dam	4.5	*	*	2,660	*
PECOS RIVER					
Downstream of Dark Canyon Draw	846.0	*	*	136,000	*
Upstream of Dark Canyon Draw	395.0	*	*	69,000	*
SOUTH EAGLE CREEK					
East of Artesia City limits	2.0	*	*	1,810	*
WASHINGTON AVENUE SHALLOW FLOODING	1.1	*	*	1,780	*

* Data Not Available

Figure 6-2. Carlsbad, NM, FIS Table 2 – Summary of Discharges.

6.1.3. Floodway Data Table

The floodway data table (Table 1) in Section 4 of the FIS report presents data from the hydraulic analysis in the report. An example of this table is reproduced in Figure 6-4.

All numbers in the table are calculated at each floodplain cross section. The first two columns under “Flooding Source” identify the cross sections used in the FIS and their distance from some reference point, often the mouth of a river or the point where a stream reaches a river or other stream. The reference point may also be the corporate limits of the community, a street crossing, or other identifiable point. The footnotes at the bottom of the floodway data table identify this reference point.

In the Eddy County FIS on the Pecos River, the starting point for cross sections on the Pecos River is the Lower Tansil Dam. From Figure 6-4, you can see that cross section AA is 15,175 feet upstream from the dam, while cross section AH is 21,055 feet, just over a mile further upstream from the dam. The locations of the cross sections are shown on the Carlsbad FIRM (cross sections R through AF are shown on the portion of the firm in Figure 6-5. The location of cross section R is the line across the floodplain with the “R” in the hexagon at both ends near the bottom of Figure 6-5.

Remember that a floodway’s width usually is not symmetrical; it varies with the topography at each cross section. The next three columns (“Floodway”) provide data at each cross section. At cross section AB on the Pecos River, the floodway is 430 feet wide. That means from the floodway boundary on one side of the stream at this cross section to the floodway boundary on the other side of the stream is 430 feet. This is useful for double-checking the width of the floodway portrayed on the FIRM or Floodway Map.

Figure 6-3 is a representation of the description of cross section AA given in Figure 6-4.

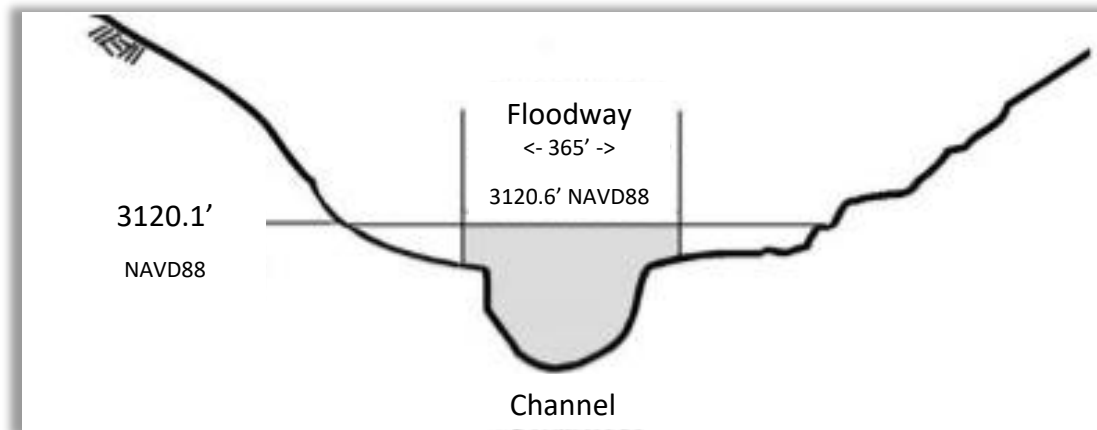


Figure 6-3. Representation of cross section AA of the Pecos River

The cross-sectional area of the floodway here is 7,826 square feet. This is the cross-sectional area of the floodway below the elevation of the base flood at this location (the shaded area of Figure 6-3). The average or mean velocity of the base flood in the floodway is 8.8 feet per second. This is an average velocity. Velocities will generally be higher in the channel than in the over bank areas. Similar data are provided at each of the other cross sections. As you look down the mean velocity column, you can see that velocity is highest at cross section V and lowest at cross section AG.

Of the last four columns under “Base Flood Water Surface Elevation,” you should be concerned only with the first one, “Regulatory.” This is equivalent to the BFE. This states the regulatory flood elevation which community floodplain managers must use for regulation of floodplain development. The other columns depict the increase in water-surface elevation if the floodplain is encroached upon so that the water-surface elevation is increased no more than 1 foot. This amount of encroachment is used to define the floodway width. Notice that at no cross section is the increase more than 1.0 foot (e.g., if the fringe was completely filled in).

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Pecos River (cont.)								
S	9,874	1,214	8,697	7.9	3,112.9	3,112.9	3,113.9	1.0
T	10,394	390	8,767	7.9	3,114.0	3,114.0	3,115.0	1.0
U	11,430	415	7,482	9.2	3,114.8	3,114.8	3,115.6	0.8
V	12,180	387	7,294	9.5	3,115.3	3,115.3	3,116.1	0.8
W	12,290	362	7,431	9.3	3,115.9	3,115.9	3,116.7	0.8
X	12,790	470	8,807	7.8	3,117.4	3,117.4	3,118.0	0.6
Y	13,630	400	8,397	8.2	3,118.6	3,118.6	3,119.2	0.6
Z	14,520	435	8,442	8.2	3,119.1	3,119.1	3,119.7	0.6
AA	15,175	365	7,826	8.8	3,120.1	3,120.1	3,120.6	0.5
AB	15,765	430	10,101	6.8	3,121.3	3,121.3	3,121.9	0.6
AC	16,715	405	9,395	8.2	3,121.7	3,121.7	3,122.4	0.7
AD	17,480	300	7,471	9.2	3,122.1	3,122.1	3,122.7	0.6
AE	18,130	424	8,265	8.3	3,122.8	3,122.8	3,123.5	0.7
AF	18,855	410	8,289	8.3	3,123.4	3,123.4	3,123.9	0.5
AG	19,785	415	9,255	7.5	3,124.0	3,124.0	3,124.6	0.6
AH	21,055	350	7,559	9.1	3,124.5	3,124.5	3,125.1	0.6
¹ Feet above Lower Tansill Dam.								
FEDERAL EMERGENCY MANAGEMENT AGENCY EDDY COUNTY, NM AND INCORPORATED AREAS					FLOODWAY DATA			
					PECOS RIVER			
TABLE 4								

Figure 6-4. Eddy County, NM, FIS Table 1 – Summary of Discharges.

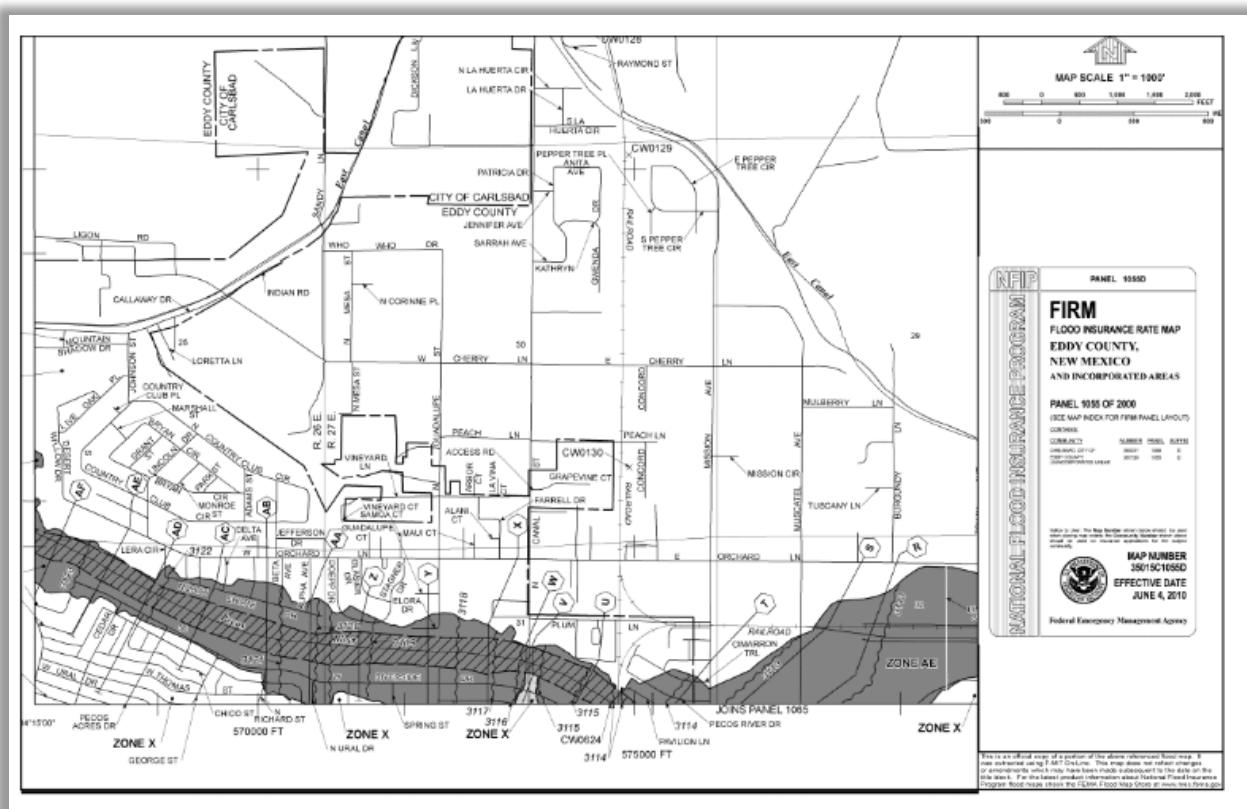


Figure 6-5. Eddy County, NM, FIRM Panel 1055 – Location of Cross Sections.

6.1.4. Relating Report Data to Maps and Profiles

Section 4 of this reference describes the data that are developed and used in preparing an FIS for a community. Each set of data is used for calculations needed to produce additional data for the Flood Insurance Study.

The data contained in the FIS report are consistent with those found on the accompanying profiles and FIRM. For example, the base flood water surface elevations at each identified cross section can be found in the floodway data table, read from the flood profiles and interpolated from the FIRM. Within the limits of map accuracy, you should obtain the same answer regardless which source you use.

In the same way, the distances between cross sections, or their distance from some reference, can be found using any or all of the above data sources. Again, the answers should be about the same.

The elevations of the computed profiles contained in the FIS report are used with ground elevation data to determine the limits of the various zones shown on the FIRM. Again, flood elevations can be determined at any location along the studied stream using either the flood profiles or the FIRM. All the data fit one another. If obvious mistakes are found, please advise the FEMA Regional Office.



Handbook for New Mexico Floodplain Managers

Note: Due to the limited detail and large scale of the base maps used for most FIRMs, the study contractor must interpolate between contour lines when mapping the floodplain boundaries. This is why you may find discrepancies when actual ground elevations are surveyed: the maps are just the best available graphic representations of the base flood elevations.

Here's the order of precedence for identifying the base flood elevation at a particular location:

- The most accurate base flood elevations are found in the Floodway Data Table (for a riverine floodplain) and the Summary of Stillwater Elevations table (for a lake). These base flood elevations are listed to 0.1 foot. However, the Floodway Data Table is only good for sites on or next to a cross section.
- The next most accurate source of elevation data is the profile. This is a plot of the cross-section data but is difficult to read accurately.
- The least accurate source of elevation data for a riverine floodplain is the FIRM. Base flood elevations are rounded to the nearest whole foot. However, the FIRM is the only source of base flood elevations for AO and AH Zones.

Base flood elevations take precedence if there is a dispute between the base flood elevation and the boundaries of the SFHA shown on the maps. As a local permit administrator, you can make your decisions based on the most accurate source of data.

It must be noted that banks (and others who must read the FIRM to determine if flood insurance is required) must go by the map. They cannot make on-site interpretations based on data other than the FIRM. However, they may recommend that the property owner submit a letter of map revision or map amendment so the map can be officially changed to reflect the more accurate data (see Section 7).

Again, only FEMA can amend or correct the maps. Discrepancies should be brought to FEMA's attention through a request for a map change, such as a Letter of Map Amendment (LOMA) (see Section 7).

Reading and using flood profiles, the last set of data contained in a Flood Insurance Study report, is covered later in this section.

6.2. Using Flood Maps

In addition to use of regulatory products including FIRMS and FIS reports, becoming familiar with the available non-regulatory products and how they can be used is important for floodplain managers. FEMA has developed a series of resources for using Base Level Engineering (BLE) data and products, including Flood Depth Grids and Water Surface Elevation Grids. Many of these resources are identified specifically in other sections where applicable. These and other BLE Tools and Resources are provided by FEMA can be accessed at <https://www.fema.gov/media-collection/base-level-engineering-ble-tools-and-resources>.

Handbook for New Mexico Floodplain Managers

6.2.1. Locating a Site

How easily you can locate a site on an NFIP map will depend on your familiarity with properties in the community and with the scale of the flood maps.

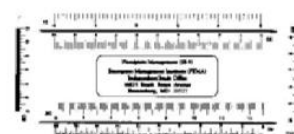
To locate a site, follow these steps. Remember to check your north arrow. The top of the map is not always north.

1. If your community has more than one map panel, use the Map Index to determine which panel to use. Use map landmarks —highways, streets or streams —to find the site on the index.
2. Find the map panel for the area containing the site. Be sure the map panel is the most recent one — compare its suffix letter with the suffix letter for that panel on the current map index. Remember, in many communities, panels will have different effective dates due to revisions that do not affect the whole community (see the discussion in Section 5.2.4).
3. If there is an asterisk on the panel number on the Map Index, either no flood hazard has been identified in that area or it is entirely one flood zone and the panel was not printed. Most likely the panel's area is all D or X Zone, outside the SFHA.
4. Locate the site as accurately as possible. Use a detailed street or road map as well as the tax assessor's plat map to identify the property boundaries, if necessary.
5. For situations near the floodplain boundary, you may have to obtain the distance on the ground between the site and one or more identifiable points, such as the centerline of a road or street, a bridge, or some other feature on the map. Locate these points on the flood map.
6. Once you have located the site and the identifiable point, convert the distances to the map scale and plot the site on the map.

6.2.2. Determining Mileage (Stationing)

In order to identify the base flood elevation at a development site, the stream mileage — or stationing — for the site must be determined. The stationing of a site will allow us to read the flood profiles.

1. Locate your site on the Floodway Map or the newer version of the FIRM, that shows cross sections. Identify which labeled cross sections are nearest to your site, both upstream and downstream.
2. Check the map scale used for the panel. The scale is in the map legend or key.
3. Use an engineer's scale to measure the distance from the site to the nearest cross section. It would be worthwhile to measure the distances to both cross sections to check accuracy. If the stream curves, follow all bends and curves.
4. If the X axis on your profile is in feet, convert these distances to miles by dividing by 5,280. When converting to miles, we lose a little accuracy.





Note: You may be called on by a bank or lender to determine if a property is in or out of the SFHA. Communities should be aware that lenders are legally responsible for determining if a flood insurance policy is required for a loan.

Under the 1994 National Flood Insurance Reform Act, if someone other than a lender provides map information to decide if a flood insurance policy is required for a loan, the information must be guaranteed. This information is usually provided on FEMA's Standard Flood Hazard Determination Form which can be downloaded from:

<https://www.fema.gov/media-library/assets/documents/225>

Note that if you are asked to sign such a form, you are guaranteeing the accuracy of the determination, so you may assume some liability for your action.

6.2.3. Base Flood Elevations from Maps

Base flood elevations are shown on the FIRMs as whole numbers. For A1-30 and AE Zones for lake floodplains, use the base flood elevation printed in parentheses below the flood zone designation. No interpolation is necessary. The same holds true for AH Zones with whole number base flood elevations (see Figure 5-15).

For other numbered A Zones and AE Zones, read the base flood elevation from the nearest wavy "base flood elevation line." Refer to the map legend or key if you are unsure of the line markings.

Zone A areas indicate approximate floodplain boundaries. No detailed study has been performed to determine base flood elevations in these areas. In Zone A areas, Base Level Engineering analyses, accessible through the estBFE tool, can be used as Best Available Information. Guidance regarding this application of BLE data can be found [here](#).

There are no base flood elevations in AO Zones with base flood depths. Instead, the equivalent flood protection level is the number of feet shown in parentheses after the "Zone AO." This is not an elevation above sea level, it is the depth of flooding measured above ground level.

6.2.4. Locating the Floodway Boundary

If the site is at a surveyed cross section, floodway width data from the floodway data table may be used as a more accurate measure than field and map measurements. Remember that the width listed in the table is the distance from the floodway boundary on one side of the stream to the floodway boundary on the other side of the stream.

If the floodway width measured on the map at that site is at a cross section, the map should be used because it is the floodway officially adopted by the community. If there is a significant difference between the map width at the site and the closest cross section width in the Floodway Data Table, contact the FEMA Regional Office for an interpretation.

Most sites won't fall conveniently on a cross section, so here are the steps using the map:

1. Locate the site on the map and select the correct engineer's scale for the map scale.
2. Using an engineer's scale, measure the distance from the floodway boundary to a nearby feature on the ground. For streets, use either the right of way or the center of the street, just use the same approach on the map and on the ground.
3. Run the same measurement on the ground to locate the floodway boundary at the site.
4. If any portion of the site is determined to be within the floodway, then the floodway provisions of your ordinance apply.



6.3. Using Profiles

As discussed in Section 6.3.4, a flood profile is a graph of computed flood elevations at the floodplain cross sections. It can be used to determine elevations of floods of various frequencies at any location along the studied stream.

A profile also contains other useful information, such as location data for bridges, stream beds, stream crossings and cross sections.

6.3.1. Profile Features

Up to four flood levels are shown on the flood profile fold-out sheets at the back of the FIS report: the 10-, 50-, 100- and 500-year floods (i.e., the 10%, 2%, 1% (base) and 0.2% floods). Some profiles have all four, some may have only the base flood.

Only the base flood is used for compliance with NFIP standards. The 500-year (0.2 % flood) is often used as the protection level for critical facilities. The others are useful for other floodplain management applications, such as septic system design and location, bridge and culvert design, urban stormwater management, and determining how frequently a site or facility will flood.

In addition to the flood elevation lines, FIS profile sheets contain:

- a plot of the stream bed
- the locations of the cross sections used in the FIS and shown on the FIRM. (a letter within a hexagon)
- the location of dams
- the location of bridges, roads and other stream crossings. These are usually depicted as a large "I" with the bottom of the "I" representing the elevation of the bottom or "low beam" of the crossing.

The data are plotted on a grid to facilitate their interpretation. With few exceptions, the large grid squares are one inch on each side and are divided into 10 squares in both directions. This greatly aids in making measurements.

The left side or Y-axis shows elevation in feet NAVD 88. Each large square represents five, 10 or 20 feet.

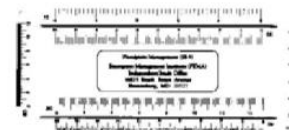
6.3.2. Determining Base Flood Elevations

There are three ways to find the base flood elevation. The first is the most accurate, the third one described here is the least accurate.

Floodway Data Table: If the site is at or very close to a cross section, use the information in the Floodway Data Table. The Floodway Data Table is discussed in Section 6.1.3.

Flood profiles: Here are the steps to determine the base flood elevation for a site using the flood profiles in the FIS report:

1. Using the FIRM, locate features near the site that appear on the profile, such as a bridge or cross section.
2. Follow the stationing procedures described in the previous section to determine the site's distance (in stream miles) from a cross section or other feature that appears on the profile.
3. Find the feature(s) on the flood profile for that stream.
4. Check the scale used for the profile and using an engineer's scale, measure the distance from the feature(s) to the site.
5. Find the site's location on the appropriate flood profile line and read the elevation on the Y axis. You can draw a straight line to the left or right edge of the graph, count squares or use an engineer's scale. Remember to use a different scale if the scale on your Y axis is different than the scale for the X axis.
6. A surveyor can establish the flood elevation at the site so the owner or builder will know how high base flood elevation is predicted to be.



FIRM: The third way to determine the base flood elevation is on the FIRM. The wavy lines represent approximate base flood elevations. This approach should only be used to verify that you did not make a one foot or ten-foot error when you read the profile.

Other types of floodplains: AH Zones and other areas where the base flood elevation is listed in parentheses below the zone designation on the FIRM, use that elevation. There is no profile for these zones. Except for lake floodplains with stillwater elevation tables to 0.1 foot, the FIRM is the most accurate source for base flood elevations.

6.3.3. Relating Flood Elevations to the Ground

If the site is clearly outside the boundary of the base floodplain, no floodplain regulations apply.

If it cannot be determined whether the site is in or out of the floodplain, then additional information and/or investigation will be needed. In this instance, ground elevation and lowest floor elevations of any structures will be needed for the site. The applicant will have to hire a surveyor if he or she wants to prove that the property is outside the mapped floodplain.

If the survey finds that the site is on ground higher than the base flood elevation, the site is outside the floodplain and the owner should be advised to apply for a Letter of Map



Handbook for New Mexico Floodplain Managers

Amendment or Map Revision to officially show the property is out of the SFHA (see Section 7.2). Until the FIRM is changed, the local administrator is bound to enforce the regulations based on the current map.

It must be noted that banks (and others who must read the FIRM to determine if flood insurance is required) must go by the map. They cannot make on-site interpretations based on data other than the FIRM. However, they may recommend that the property owner submit a letter of map revision or map amendment so the map can be officially changed to reflect the more accurate data (see Section 7.2).

6.3.4. Relating Profiles to Maps

Elevation data shown on the flood profiles are directly related to the base flood shown on the FIRM. Within the limits of map accuracy, you should obtain the same elevation whether you use the map or profile.

However, the flood profiles should always be used to determine flood elevations along rivers and streams.

If you find obvious mistakes or discrepancies between the tables, profiles and FIRM, contact the FEMA Regional Office.



7. Maintaining and Revising NFIP Maps

CONTENTS

7.1. Revising NFIP Maps.....	7-3
7.1.1. Revising to Correct an Error in Non-Flood-Related Features.....	7-3
7.1.2. Revising to Include Better Ground Elevation Data.....	7-4
7.1.3. Revising to Reflect Changes in Ground Elevations in the Floodplain.....	7-4
7.1.4. Revising to Reflect Different Flood Data	7-4
7.1.5. Revising to Submit New Flood Data	7-4
7.1.6. To Reflect a Flood Control Project.....	7-4
7.2. Types of Map Changes.....	7-5
7.2.1. Letter of Map Amendment (LOMA)	7-5
7.2.2. Letter of Map Revision Based on Fill (LOMR-F).....	7-8
7.2.3. Letter of Map Revision (LOMR)	7-8
7.2.4. Conditional Letter of Map Revision (CLOMR)	7-8
7.2.5. Areas to be Protected by a Flood Control Project.....	7-8
7.2.6. Fees.....	7-9
7.3. Requesting Map Changes	7-9
7.3.1. Step 1: Obtain FEMA Forms	7-9
7.3.2. Step 2: Prepare Needed Information	7-10
7.3.3. Step 3: Mail FEMA Form and Necessary Attachments:.....	7-11
7.3.4. Step 4: FEMA Forwards the Request.....	7-11
7.4. Maintaining Maps.....	7-11
7.4.1. Keeping FIRMs Updated	7-11
7.4.2. Tracking Changes.....	7-12
7.4.3. Ordering Maps.....	7-13



7.1 Revising NFIP Maps

NFIP maps are vital to effective enforcement of a community's floodplain management responsibilities. They are also key to accurate flood insurance rating and fair determinations of the flood insurance purchase requirement. A community participating in the NFIP is obligated by its agreement with FEMA to submit new or revised map information when it becomes available.

44 CFR 65.3 Requirement to submit new technical data. A community's base flood elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information becomes available, a community shall notify [FEMA] of the changes by submitting technical or scientific data.

Lenders, insurance agents, and communities must use the published flood maps. Lenders are affected by changes in a FIRM as they enforce the mandatory flood insurance purchase requirements.

Communities are affected by changes in a FIRM and a Floodway Map as they enforce floodplain management regulations. Consequently, uniform procedures have been established for requesting and administering map changes.

No map is perfect, and no flood situation is static. From time to time, FEMA, communities or individuals may find it necessary for a FIRM or Floodway Map to be updated, corrected or changed. Common reasons why a map may need to be changed include:

7.1.1. Revising to Correct an Error in Non-Flood-Related Features

Maps may contain minor errors, such as streets or corporate limits in the wrong location (or corporate limits changed by annexation). For these instances, the local government should send the correct information to its FEMA Regional Office.

If a community has several annexations each year that affect the floodplain, a revision request should be submitted only once a year. Since it is expensive to reprint and redistribute flood maps, corporate boundary changes are usually made only when maps are revised for new or better flood data.

The community does not need a new map, however, if it has annexed an area that is shown on the adjacent community's FIRM. It can regulate floodplain development using that FIRM and flood data, if the community adopts the adjacent community's FIRM. This would clarify the regulatory flood data for newly annexed properties and areas in the community's extraterritorial jurisdiction.

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP PANEL
SEPTEMBER 20, 1996
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
April 2, 2002 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to add roads and road names, to reflect updated topographic information, and to incorporate previously issued Letters of Map Revision.
November 19, 2003 - to update corporate limits and to incorporate previously issued Letters of Map Revision.
September 26, 2008 - to update corporate limits, to change Special Flood Hazard Areas, to add roads and road names, to incorporate previously issued Letters of Map Revision, to reflect updated topographic information, to change Base Flood Elevations, to add Base Flood Elevations.
For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

Figure 7- 1. The FIRM panel shows the history of map revisions.



7.1.2. Revising to Include Better Ground Elevation Data

As noted earlier, maps do not always represent site-specific ground elevations. If detailed topographic data shows errors in the floodplain boundaries, copies of the more detailed information should be submitted to FEMA. If the base flood elevation is known (or has been more accurately computed since the map was made), it should be included in the submittal.

Where the best available maps do not clearly show a property higher than the base flood elevation, certification of the property's elevation is needed. The certification must be signed by a licensed surveyor and must show the elevation. If a building is on the property, the elevation of the adjacent lowest grade and the lowest floor (including basement) of the structure must be shown.

7.1.3. Revising to Reflect Changes in Ground Elevations in the Floodplain

If there has been a substantial change in ground elevation — for example, fill is placed in the floodplain in order to raise building sites above the base flood elevation — the applicant may request a map change to reflect the new ground elevation information. Revising to reflect new fill requires documentation that the fill was placed according to NFIP criteria.

7.1.4. Revising to Reflect Different Flood Data

A request may be made to revise the existing study, based on a new flood study. The study would reflect new information, such as a new, larger bridge opening. Otherwise, the applicant must demonstrate that the original study was in error or that the new study is based on more accurate or better technical data.

7.1.5. Revising to Submit New Flood Data

When a flood study is prepared for a development in an unnumbered A Zone, the data can be submitted to FEMA for later incorporation into the FIS or revised FIRM.

7.1.6. To Reflect a Flood Control Project

If a new levee, reservoir or channel modification affects the flow of the base flood, the community must request that the map be revised to reflect the new conditions or new (lower) base flood elevations. The map cannot be changed until the project is constructed and/or operating. It is important to note that many small projects, such as channel clearing, low level dams, private levees, land treatment or retention basins in new subdivisions, do not have a measurable effect on the base flood and therefore, do not warrant a map change. The request for a change needs to be carefully prepared by an engineer who knows the FEMA flood study guidelines.

7.2. Types of Map Changes

There are two overarching categories under which changes are made to regulatory flood maps. The first is through a map revision, processed as a Physical Map Revision (PMR). A PMR is an action whereby one or more map panels are physically revised and republished.



Handbook for New Mexico Floodplain Managers

Community flood hazard maps are updated through a FEMA-initiated study or restudy of flood hazards and subsequent revision of the NFIP flood maps, community-initiated revision under Part 65 of the NFIP regulations, or the Cooperating Technical Partners (CTP) initiative. Each year, FEMA initiates studies and restudies of flood hazards in communities across the U.S. for the creation, as well as the revision, of community flood hazard maps. Because of funding constraints, however, FEMA can study or restudy only a limited number of communities each year. As a result, FEMA prioritizes study and restudy needs based on a cost-benefit approach whereby the highest priority is given to studies where development is greatest and where maps are most outdated. The CTP initiative is an innovative program created to foster partnerships between FEMA and participating NFIP communities, as well as regional and State agencies that have the capability to become more active participants in the FEMA Flood Hazard Mapping Program. Communities can participate in a number of ways, which may include development of updated hydrologic and hydraulic modeling, and mapping, refinement of approximate Zone A floodplain boundaries, digital base map data sharing, and digital topographic data development.

When processing physical map revisions, the effective date of a map is changed, as shown in Figure 7-1. The map revision approach is expensive and is done only if the change affects a large area.

The other more common process for initiating a map change is generally referred to as a Letter of Map Change (LOMC). This is a general term used to refer to the several types of revisions and amendments to FEMA maps that can be accomplished by letter. They include Letter of Map Amendment (LOMA), Letter of Map Revision (LOMR), and Letter of Map Revision based on Fill (LOMR-F). These mechanisms are discussed below.

7.2.1. Letter of Map Amendment (LOMA)

Occasionally, individual structures or parcels of land may be inadvertently included in the Special Flood Hazard Area (SFHA). In other cases, it may be difficult for to determine whether a structure or parcel of land is in the SFHA. A LOMA provides an administrative procedure for FEMA to review information submitted by a property owner who believes the property has been inadvertently included in a designated SFHA. A LOMA does not physically revise the FIRM. However, because a LOMA officially amends the effective NFIP map, it is a public record that the community must maintain.

LOMA requests require elevation information for the subject property except requests where the property is entirely and clearly shown outside of the SFHA on the effective FIRM. In lieu of field surveyed elevation data, it may be possible to make use of available Light Detection and Ranging (LiDAR) data. By the end of 2020, New Mexico will have statewide LiDAR coverage available for use. Guidance regarding the use of LiDAR data for this purpose can be found in [FEMA's MT-1 Technical Guidance document](#).

In addition, Base Level Engineering data can provide Base Flood Elevations to assist the determination of the LOMA review for possible removal of the mandatory purchase requirement for flood insurance from a structure and/or portion of a property. The LOMA



Handbook for New Mexico Floodplain Managers

process requires two elevations to provide a more site-specific and data rich review of flood risk at the site of interest. The LOMA process will require determination of the Base Flood Elevation at the property. Where the FIRM does not provide BFE information, the Estimated BFE Viewer can assist in determining the BFE at the proper location. Resources available on the application of BLE data in the LOMA process can be found in FEMA Guidance Documents titled [BLE and Letter of Map Amendment \(LOMAs\)](#) and [Letter of Map Amendment \(Out as Shown\)](#).

- For buildings built **before** the site was designated as a Special Flood Hazard Area, (i.e., before the initial identification date when the first Flood Hazard Boundary Map was published), it must be shown that:

1. The building was built and the fill was placed before the initial identification date (shown below the FIRM or FHBM legend, see example in Appendix G) and
2. The lowest adjacent grade (LAG) is above the base flood elevation.

Lowest Adjacent Grade

Lowest Adjacent Grade (LAG) is the lowest point of the ground level immediately next to the building, where soil touches the foundation. This includes bottom of basements, patios, decks, porches, posts, and piers. LAG is not the same as top of foundation, lowest opening, building pad elevation, or first floor.

- For buildings built **after** the site was designated as SFHA, it must be shown that:
 1. The lowest floor (including basement) is above the base flood elevation and
 2. The lowest adjacent grade (LAG) is above the base flood elevation.
- For vacant lots, it must be shown that the *lowest elevation* within the boundaries of the property is above the base flood elevation. Otherwise, a Conditional Letter of Map Amendment or CLOMA can be requested. A CLOMA informs the builder and others (such as the bank financing the project) that when the project is completed, it will qualify for a LOMA.

FEMA has designed a web-based tool for licensed land surveyors and professional engineers (referred to as Licensed Professionals or LPs) and other FEMA permitted Certified Professionals (CPs) to submit LOMA requests, known as an [electronic Letter of Map Amendment \(eLOMA\)](#). The eLOMA tool is designed to replace the traditional LOMA process by allowing LPs and CPs to expedite LOMA requests that meet eLOMA criteria and potentially generate an instant determination from FEMA.



Federal Emergency Management Agency

Washington, D.C. 20472

July 25, 2000

MR. AND MRS. @#\$%^&*+
1234 W. @#\$%^&*+ STREET
CLIVE, IA 50325

CASE NO.: 00-07-534A
COMMUNITY: CITY OF CLIVE, POLK COUNTY, IOWA

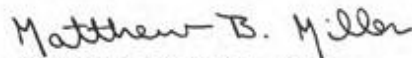
COMMUNITY NO.: 190488

DEAR MR. AND MRS. @#\$%^&*+:

This is in reference to a request that the Federal Emergency Management Agency (FEMA) determine if the property is located within an identified Special Flood Hazard Area, the area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood), on the effective National Flood Insurance Program (NFIP) map. Using the information submitted and the effective NFIP map, our determination is shown on the attached Letter of Map Amendment (LOMA) Determination Document. This determination document provides additional information regarding the effective NFIP map, the legal description of the property and our determination.

Additional documents are enclosed which provide information regarding the subject property and LOMAs. Please see the List of Enclosures below to determine which documents are enclosed. If you have any questions about this letter or any of the enclosures, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, 12101 Indian Creek Court, Beltsville, MD 20705.

Sincerely,



Matthew B. Miller, P.E., Chief
Hazards Study Branch
Mitigation Directorate

LIST OF ENCLOSURES:

LOMA DETERMINATION DOCUMENT (REMOVAL)

cc: State/Commonwealth NFIP Coordinator
Community Map Repository
Region

Figure 7- 2. First page of a LOMA.



Handbook for New Mexico Floodplain Managers



Page 1 of 4	Date: August 03, 2018	Case No.: 18-06-2947A	LOMA					
 Federal Emergency Management Agency Washington, D.C. 20472								
LETTER OF MAP AMENDMENT DETERMINATION DOCUMENT (REMOVAL)								
COMMUNITY AND MAP PANEL INFORMATION		LEGAL PROPERTY DESCRIPTION						
COMMUNITY	CITY OF SUGAR LAND, FORT BEND COUNTY, TEXAS	Lots 2 through 6, 12 through 16, 21, 22, and 23, Block 1, Gardens of Avalon, Section One; Lots 2 through 6, 9 through 18, and 22 through 27, Block 1, Gardens of Avalon, Section Two; Lots 1 through 8, 10, 11, and 13 through 17, Block 2, Gardens of Avalon, Section Three; Lots 1, 5 through 16, and 21 through 24, Block 2, Gardens of Avalon, Section Four; Lots 6 through 15, and 21, Block 1, Waters of Avalon, Section One; Lots 3 through 7, 12 through 15, and 17 through 20, Block 2, Waters of Avalon, Section Two; Lots 1 through 9, and 14 through 20, Block 1, Waters of Avalon, Section Three.						
	COMMUNITY NO.: 480234							
AFFECTED MAP PANEL	NUMBER: 48157C0260L; 48157C0270L; 48157C0280L; 48157C0290L DATE: 4/2/2014; 4/2/2014; 4/2/2014;							
FLOODING SOURCE: GARDENS OF AVALON LAKE; BRAZOS RIVER		APPROXIMATE LATITUDE & LONGITUDE OF PROPERTY: 29.562460, -95.629056 SOURCE OF LAT & LONG: LOMA LOGIC DATUM: NAD 83						
DETERMINATION								
LOT	BLOCK/SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NAVD 88)	LOWEST ADJACENT GRADE ELEVATION (NAVD 88)	LOWEST LOT ELEVATION (NAVD 88)
2-6	1/One	Gardens of Avalon	--	Property	X (shaded)	--	--	67.5 feet
Special Flood Hazard Area (SFHA) - The SFHA is an area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).								
ADDITIONAL CONSIDERATIONS (Please refer to the appropriate section on Attachment 1 for the additional considerations listed below.)								
LEGAL PROPERTY DESCRIPTION ZONE A DETERMINATION TABLE (CONTINUED) LEVEE PROTECTED								
<p>This document provides the Federal Emergency Management Agency's determination regarding a request for a Letter of Map Amendment for the property described above. Using the information submitted and the effective National Flood Insurance Program (NFIP) map, we have determined that the property(ies) is/are not located in the SFHA, an area inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This document amends the effective NFIP map to remove the subject property from the SFHA located on the effective NFIP map; therefore, the Federal mandatory flood insurance requirement does not apply. However, the lender has the option to continue the flood insurance requirement to protect its financial risk on the loan. A Preferred Risk Policy (PRP) is available for buildings located outside the SFHA. Information about the PRP and how one can apply is enclosed.</p> <p>This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, Engineering Library, 3601 Eisenhower Ave Ste 500, Alexandria, VA 22304-6426.</p>								
 Luis V. Rodriguez, P.E., Director Engineering and Modeling Division Federal Insurance and Mitigation Administration								

Figure 7- 3. Second page of a LOMA.



Handbook for New Mexico Floodplain Managers

7.2.2. Letter of Map Revision Based on Fill (LOMR-F)

A LOMR-F removes a structure or property from the base floodplain based on the placement and proper compaction of fill outside the floodway. Fill is considered to be those materials placed to raise the ground after the first NFIP map was produced for the area of the map revision. A LOMR-F officially revises the current FIRM to show that a particular structure/property has been elevated by fill and removed from being located in a designated SFHA. A LOMR-F physically revises the FIRM.

This process involves existing conditions but does not involve revisions to base flood elevations or floodway boundaries. LOMR-Fs compare lowest lot elevation to base flood elevation for undeveloped properties and compares LAG and lowest floor (including basement) to the base flood elevation for existing structures. In order for a building to be removed from the SFHA, the LAG and lowest floor (including basement) must be at least one foot above the base flood elevation.

The “lowest floor (including basement)” does not mean the first floor or lowest habitable floor. Certification of LAG, lowest floor and fill compaction is required as well as community acknowledgment of the project.

7.2.3. Letter of Map Revision (LOMR)

Changes to floodplain boundaries and flood elevations may be made to an existing FIRM. A LOMR is normally based on revised hydraulic modeling and usually will not involve specific lots, properties or structures. Base Level Engineering (BLE) makes skeleton models available for use and may be used to prepare LOMR and CLOMR submittals. Depending on the conditions present, BLE models can be used to varying degrees in the LOMR process. Information on the application of BLE data in the LOMR process is found in FEMA’s [BLE and Letters of Map Amendment \(LOMAs\)](#) guidance document.

A LOMR must be obtained before a building permit can be issued. Most LOMRs require a processing fee. A LOMR officially revises the current FIRM to show changes in the limits of floodplains, floodways or flood hazard risk zones. A LOMR physically revises the FIRM and sometimes the FIS.

Any interested party can request a LOMR. However, because if issued, it will revise official regulatory data for that site, a request for a LOMR must have the approval of the community. Because a LOMR officially revises the effective NFIP map, it is a public record that the community must maintain.

7.2.4. Conditional Letter of Map Revision (CLOMR)

The CLOMR allows for approval of anticipated map revisions based on proposed modifications or conditions that are expected to exist in the future. Under this process, engineering data may be submitted for a proposed project or future condition with a request that FEMA review the data and issue a CLOMR describing the revisions that may be made upon completion of the proposed work.



Handbook for New Mexico Floodplain Managers

FEMA only requires a CLOMR for proposed revisions involving the floodway. The letter does not revise an effective NFIP map, it indicates whether the project, if built as proposed, would be recognized by FEMA. This process normally involves revised modeling and requires submittal of certified as-built plans of initial filling, grading, etc., so that a LOMR may be issued. As-built elevations must match proposed elevations. There is normally a processing fee for a CLOMR.

Note: Building permits cannot be used based on a CLOMR, because the CLOMR does not change the NFIP map.

7.2.5. Areas to be Protected by a Flood Control Project

FEMA will issue a Letter of Map Revision to communities that have areas subject to inundation by the base flood but ultimately protected upon completion of an under-construction Federal flood protection system. The base floodplain is designated as an “A99” Zone. This designation will be changed to an X Zone when the flood control project is completed. The flood insurance purchase requirement remains in effect in an A99 zone floodplain, but the rates are reduced to X Zone rates.

To qualify for an A99 Zone, the project must be 100% authorized, 60% appropriated and 50% expended. FEMA’s requirements are outlined in 44 CFR Subpart 61.12.

7.2.6. Fees

A processing fee is charged for LOMRs, CLOMRs and CLOMAs. There is no fee for requesting a LOMA. See the [Flood Map – Related Fees](#) section of the FEMA website for information on fees.

7.3. Requesting Map Changes

This section provides step by step instructions on how to submit a request to FEMA to revise a FIRM or Floodway Map.

FEMA’s maps are based on the best available information at the time the study was completed. As better information becomes available or as changes are proposed in the floodplain, the floodplain maps should be updated. Each of the methods described below requires an applicant to submit data for FEMA to review and approve.

The applicant is often the party that would benefit the most from a new map. Usually, this is the property owner who wants to eliminate the flood insurance purchase requirement or the extra floodplain building regulations. In some cases, the community submits a map revision. If the request is for a map revision (i.e., a change in the regulatory data), the request must have the community’s concurrence before FEMA will approve it.

The applications and a list of the necessary supporting information can be downloaded on FEMA website (see Appendix D).

7.3.1. Step 1: Obtain FEMA Forms

To request a map change to reflect better ground elevation data, or to reflect a new study that



Handbook for New Mexico Floodplain Managers

has already been done, use one of the following FEMA forms which can be downloaded from the web sites listed in Appendix D. For requests that cannot be processed by eLOMA, FEMA has developed the Online LOMC tool to allow applicants to submit their requests electronically. This tool is a convenient way for applicants to upload all information and supporting documentation and check the status of their request online. Users can submit requests through this tool instead of filing the paper form via mail. You can find additional information about FEMA's Online LOMC Tool at www.fema.gov/onlinelomc.

MT-1: Letter of Map Amendment (LOMA), Conditional Letter of Map Amendment (CLOMA) Letter of Map Revision (Based on Fill) (LOMR-F), Conditional Letter of Map Revision (Based on Fill) (CLOMR-F)

MT-2: Letter of Map Revision (LOMR), Conditional Letter of Map Revision (CLOMR) Physical Map Revision

MT-EZ: Letter of Map Amendment (LOMA) for a single lot

See Appendix H on obtaining copies of the FEMA MT forms. The MT-EZ is the shortest and simplest of the three forms. A copy is included in Appendix D.

7.3.2. Step 2: Prepare Needed Information

With the exception of the MT-EZ, requests for map changes should be completed by a qualified engineer. The most common reason a map change request is denied is that the applicant did not submit adequate technical data to validate the change. Whether using the web-based tools or submitting a paper application the following information will be necessary.

Information Needed to Request a Map Amendment or Revision. Most often, requests for map revisions will be made because of better ground elevation data or because of permitted filling. Anyone (local governments or individuals) can request a map revision of this type.

The request should generally include the following information:

- A completed application for LOMA/R.
- Copy of the effective FIRM panel on which the structure and/or property location has been accurately plotted)
- A copy of the recorded deed or plat, indicating the legal description of the property and the official recording information (deed or plat book volume and page number) and bearing the seal of the Recorder of Deeds.
- A map which shows the location of the property, either:
 - A subdivision plat
 - An official county, city, and/or subdivision map indicating the lot location
 - A subdivision map indicating the lot location sealed by a surveyor or engineer
- If the revision involves a building:
 - A plat of survey that shows the location of the building on the lot
 - the elevation of both the lowest floor (including basement) and the lowest adjacent grade to the structure
 - the type of structure (slab, crawlspace, or full basement)



Handbook for New Mexico Floodplain Managers

— the date construction was started

- Form 2 – Elevation Form. If the request is to remove the structure, and an Elevation Certificate has already been complete for the property, it may be submitted in lieu of Form 2. If the request is to remove the entire legally recorded property, or a portion thereof, the lowest lot elevation must be provided on Form 2.

Information Needed to Request a Floodway Revision. A request to change a floodway map can only be submitted by a local government or must be concurred with by the local government. Communities interested in changing the floodway boundaries should contact FEMA for assistance.

Note that no floodway revision will be granted unless the revision still meets the requirements of the NFIP and DNR regulations. Requests to revise a floodway may be initiated through contact with FEMA, but review by NMDHSEM will be required before the revision is final.

7.3.3. Step 3: Mail FEMA Form and Necessary Attachments:

FEMA encourages electronic submission through the [Online LOMC tool](#). This tool is a convenient way for applicants to upload all required information and supporting documentation and check the status of their request online. Users can submit requests through this tool instead of filing the paper form via mail.

However, for requests submitted via mail, FEMA encourages the submission of all required data in digital format. Applications can be submitted to the LOMC Clearinghouse. See Appendix B for the correct mailing address.

7.3.4. Step 4: FEMA Review and Determination

FEMA will review and evaluate the application for completeness and accuracy. If the submittal is determined to be incomplete, additional data will be requested, resulting in additional review time. Once FEMA grants the revision, the letter is sent to the applicant, the local community(ies) and the State NFIP coordinator. The letter is also filed in the Map Service Center.

Note that a bank still has the prerogative to require the purchase of a flood insurance policy on a building that has been removed from the SFHA.

Additional information on map changes can be found in [Answers to Questions about the NFIP](#), questions 89 – 101.

7.4. Maintaining Maps

7.4.1. Keeping FIRMs Updated

The FEMA Flood Map Service Center (MSC) is the official online location to find all flood hazard mapping products created under the NFIP, including FIRMs. Effective FIRMs and any amendments or revisions that apply to them may be accessed through the site's Address Search, in addition to the full range of products accessible through the Search All Products function.

Handbook for New Mexico Floodplain Managers

However, as the primary repository for NFIP maps and studies, it is important that the community maintain adequate copies and keep them updated. It should have at least one master map that includes all the changes, annexations, map revisions, etc.

It is also important to keep copies of old, revised maps and studies. They provide a historical record of what was known and the basis of what was required in the past. For example, a property may not have been shown in the SFHA on an old FIRM, so there were no building requirements. If that property is later flooded, the community would need to show the old map as the basis for the community's action.

Similarly, people who purchased flood insurance based on the FIRM zone in effect at the time are entitled to keep that FIRM zone as the basis for their rates. It would be doing citizens a valuable service if the community were able to have a copy of an old FIRM.

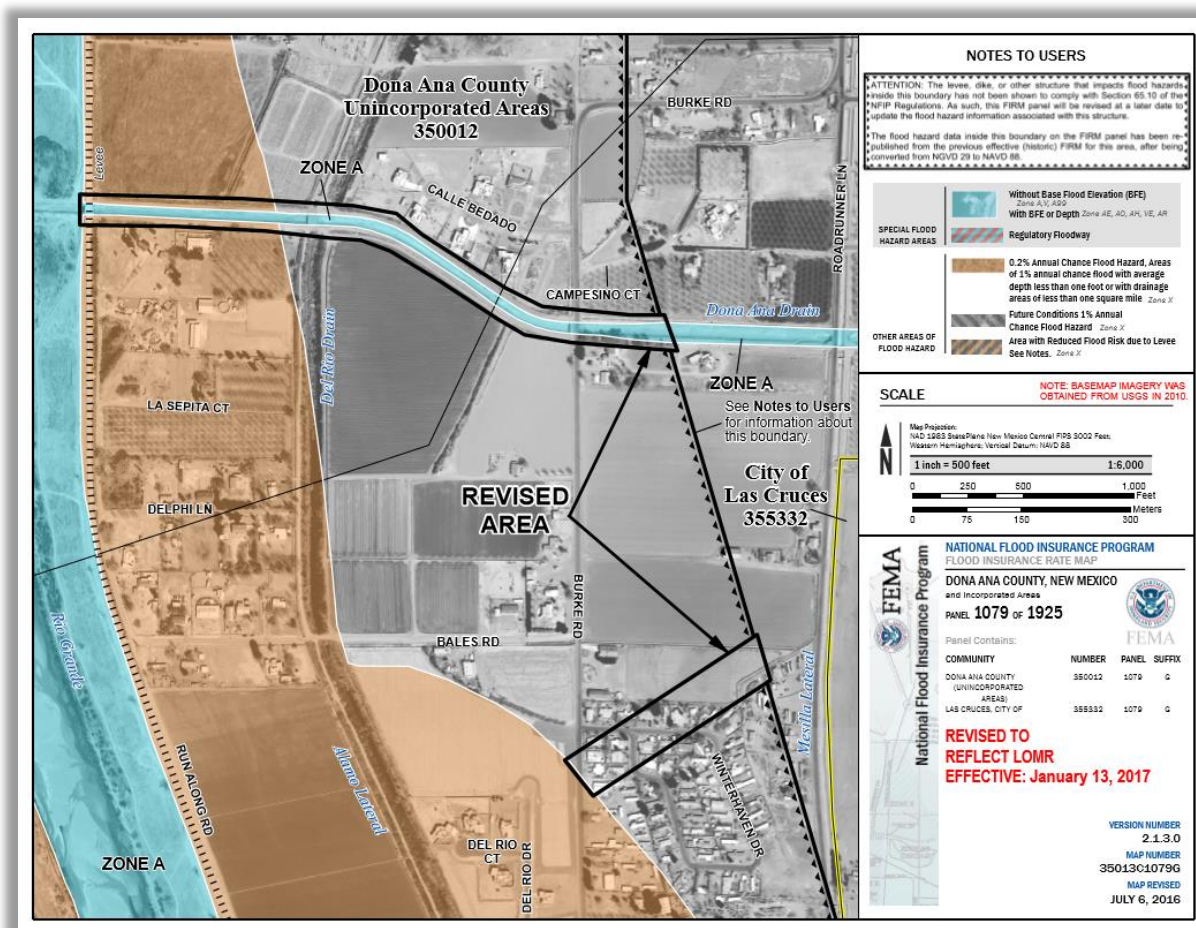


Figure 7- 4. Example of a map revision.

Communities should always work off the most current Flood Insurance Rate Map (FIRM) and Flood Boundary Floodway Map. The map user needs to be sure that the data reflects annexations, LOMAs, LOMRs, and other changes.

Handbook for New Mexico Floodplain Managers

7.4.2. Tracking Changes

Because LOMAs and LOMRs officially amend or revise the effective NFIP map, they are public records that the community must maintain. LOMAs and LOMRs should be noted on the community's master flood maps and filed by panel number in an accessible location.

When a Flood Insurance Study is revised, it will have a section that explains what changes were made to the previously adopted data. Generally, the revision will incorporate all past LOMRs, but not necessarily all past LOMAs (they may be too small to be reflected on the map).

There are two products that can help a community ensure that its file of LOMAs and LOMRs is complete.

1. The FIS Data List identifies the current map panels (FIRM and Floodway), panel by panel and gives the effective date for each. It also lists the current Flood Insurance Study (FIS) report date and all the LOMAs and LOMRs in effect within the community.
2. The Summary of Map Actions (SOMA) is issued when a FIRM is revised. It details the status of all map changes after the new FIRM becomes effective. The SOMA categorizes LOMAs by those that were incorporated into the new FIRM, those that could not be incorporated due to map scale limitations but will be revalidated, and those that will be superseded by updated flood hazard information.

Additionally, all revisions related to each map panel can be viewed on the MSC website, as in Figure 7-5 below.

Effective Products (156) [?](#)

FIRM Panels (111) [DL ALL](#)

Please note: Searches often result in many map files listed under a given section. You can determine the Product ID for the individual map panel needed by looking at the Map Index file. The index map files have "IND" within the Product ID and appear at the start of the list. These index files show an overview of a jurisdiction and how it is subdivided into map panels with the Product ID for each panel shown.

Show entries

Showing 1 to 100 of 111 entries

Previous **1** 2 Next

Product ID	Effective Date	LOMC	Size	Download	View
35013CIND0A	07/06/2016		0MB	DL	VIEW
35013C0100G	07/06/2016		94MB	DL	VIEW
35013C0125G	07/06/2016		96MB	DL	VIEW
35013C0150G	07/06/2016		72MB	DL	VIEW
35013C0200G	07/06/2016	LOMC	94MB	DL	VIEW
20-06-1186A-350012	03/24/2020	LOMA		DL	
35013C0225G	07/06/2016		90MB	DL	VIEW
35013C0250G	07/06/2016		94MB	DL	VIEW
35013C0275G	07/06/2016		88MB	DL	VIEW
35013C0300G	07/06/2016		100MB	DL	VIEW
35013C0325G	07/06/2016		97MB	DL	VIEW
35013C0350G	07/06/2016		95MB	DL	VIEW
35013C0375G	07/06/2016		90MB	DL	VIEW

Figure 7 - 5. Example of data available through the MSC.



Handbook for New Mexico Floodplain Managers

7.4.3. Ordering Maps

In October 2009, FEMA took a major step forward in the modernization of the flood mapping program and eliminated the regular distribution of paper maps. Since that time, only the communities getting new flood maps have received a paper copy of their map from FEMA. All other users receive digital flood map products.

Digital copies of effective Flood Hazard Boundary Maps (FHBMs), Flood Insurance Rate Maps (FIRMs), Flood Insurance Rate Map Databases (FIRM DBs) and Flood Insurance Study (FIS) reports may be downloaded from the FEMA Flood Map Service Center (MSC). The MSC is the official public source for flood hazard information produced in support of the NFIP.

For more information on the flood hazard mapping products available from the MSC, you may contact the FEMA Map Information eXchange (FMIX) toll free, either by telephone at 1-877 FEMA MAP or by email at FEMAMapSpecialist@riskmapcds.com.



8. Community Ordinance

CONTENTS

8.1. The Ordinance.	8-3
8.1.1. Types of Ordinances	8-3
8.1.2. Contents	8-5
8.1.3. CRS Credit	8-7
8.2. The Legal Basis	8-8
8.2.1. Statutory Authority	8-8
8.2.2. Findings of Fact.....	8-8
8.2.3. Statement of Purpose	8-8
8.2.4. Methods of Reducing Flood Losses	8-8
8.2.5. Other Local Governments	8-8
8.2.6. Taking	8-9
8.2.7. Liability.	8-12
8.3. The Administrator.....	8-14
8.3.1. Duties.....	8-14
8.3.2. Dealing with the Public.....	8-17
8.3.3. Qualifications.....	8-20
8.3.4. Training.....	8-20
8.3.5. The Emergency Management Institute.....	8-21

8.1. The Ordinance

The community floodplain management ordinance is the legal basis for floodplain management in your community. Floodplain maps, preferably with flood elevations and floodways, provide the technical basis for making decisions under the ordinance, but the ordinance says exactly what a community may and may not require of developers of floodplain land.

If your community already has a floodplain ordinance, you might compare it with the NMFMA model ordinance (see Appendix A) and see if it has all of the provisions your community needs to protect new development and redevelopment from flood damage in the future.

If your community has not yet adopted a floodplain management ordinance, the NMFMA model ordinance is a complete example of a “stand-alone” ordinance (see Section 8.1.1).

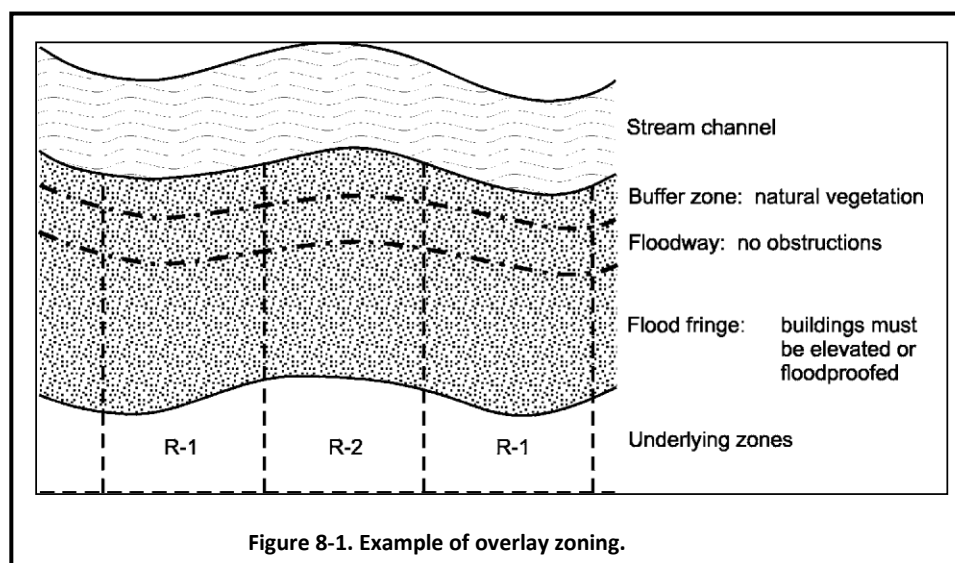
Before sending a floodplain management ordinance to your governing body for adoption or revision, have it reviewed by your community’s legal counsel, and have it approved by the FEMA Regional Office.

8.1.1. Types of Ordinances

Floodplain regulations are usually found in one of four types of rules: zoning ordinances, building codes, subdivision regulations and “stand alone” ordinances. Each is explained below.

Zoning ordinance

A zoning ordinance regulates development by dividing the community into zones or districts and setting development criteria for each district. Two approaches address development in floodprone areas: separate districts and overlay zoning.



In a separate district, the floodplain can be designated as one or more separate zoning districts that only allow development that is not susceptible to damage by flooding. Appropriate



Handbook for New Mexico Floodplain Managers

districts include public use, conservation, agriculture, and cluster or planned unit developments that keep buildings out of the floodplain, wetlands and other areas that are not appropriate for intensive development.

Overlay zoning adds special requirements in areas subject to flooding. The areas can be developed in accordance with the underlying zone, provided the flood protection requirements are met. As illustrated in Figure 8-1, there may also be setbacks or buffers to protect stream banks and shorelines or to preserve the natural functions of the channels and adjacent areas.

Building codes

A building code establishes construction standards for new buildings. The code may or may not set site or location requirements as a zoning ordinance does. These requirements are implemented through subdivision or zoning ordinances or other land development regulations.

Applicable statewide codes in New Mexico include:

- The International Codes (I-Codes) of the International Code Council include the International Building Code (IBC), the International Residential Code (IRC), the International Existing Building Code (IEBC), and several codes covering building utility systems. The I-Codes are consistent with all NFIP requirements related to the construction of flood resistant buildings.

Many, but not all NFIP regulatory requirements appear in parts of these codes.

FEMA worked closely with the International Code Council in developing their codes to assure consistency with NFIP requirements. Those NFIP requirements that relate to the actual construction of buildings are reflected in the bodies of the International Building Code and International Residential Code. Requirements related to building utilities are contained in the International Plumbing Code, International Mechanical Code, International Fuel Gas Code, and the International Private Sewage Disposal Code. The other NFIP requirements, such as administrative provisions, and requirements that apply to floodways, subdivisions and manufactured homes are contained in Appendix G of the International Building Code. Communities that adopt the I-codes have the option of either adopting Appendix G or addressing these other NFIP requirements through other codes and regulations.

FEMA supported incorporation of NFIP flood resistant construction requirements into the I-Codes because it felt these requirements could be more effectively administered as part of a building code with full involvement of the community's building department. However, there will be challenges in adopting the I-Codes that your community will need to address.

- Make sure that all applicable NFIP requirements are met in either the I-Codes or your other codes and ordinances.
- Make sure that your State or community has not amended the I-Codes in a way that makes them inconsistent with NFIP minimum requirements.
- Designate which community agencies are responsible for meeting various NFIP



Handbook for New Mexico Floodplain Managers

requirements and establish administrative procedures to assure that coordination occurs between these agencies on individual development proposals.

- If a State agency directly enforces the I-Codes for certain categories of buildings, make sure you work out similar procedures with that State agency.

FEMA and the International Code Council have jointly developed a publication that provides a comprehensive explanation of how the International Code Series can be used to meet the requirements of the NFIP. The publication is entitled *Reducing Flood Losses Through the International Code Series* and is available from FEMA's media library at the following address:

https://www.fema.gov/media-library-data/20130726-1503-20490-3482/nfip_i-codes2005.pdf

The 2015 IBC, IRC, IEBC, and IFC have all been adopted statewide by New Construction Industries Division (CID) as minimum state codes. Few local jurisdictions adopt codes under home rule. The 2015 IFC has been adopted statewide by the State Fire Marshal's Office and the New Mexico Public Regulation Commission.

Subdivision Regulations

Subdivision regulations govern how land will be divided into single lots. They set construction and location standards for the infrastructure the developer will provide, including roads, sidewalks, utility lines, storm sewers and drainageways.

As noted in Section 14, subdivision regulations offer an opportunity to keep buildings out of the floodplain entirely with cluster developments.

They can also require that every lot have a buildable area above the base flood elevation, include dry land access and meet other standards that provide more flood protection than a building code can.

Subdivision regulations can specify what appears on the recorded plat of the subdivision, something that is checked whenever a property is purchased. This offers the community a chance to clearly designate the hazard.

However, since development can occur on existing lots (lots created before a subdivision regulation was passed, or lots in a subdivision that was approved before floodplain management criteria were included in the subdivision ordinance), a subdivision ordinance alone is generally not acceptable as a floodplain management ordinance. All new development and redevelopment in your floodplains must be regulated in order to comply with the requirements of the NFIP and §3-18-7 NMSA, 1978 as amended (NMSA §3-18-7).

“Stand alone” Ordinance

NMFMA has created a model “stand alone” ordinance that includes all the NFIP and State regulatory requirements (see Appendix A). The advantage of adopting a stand alone ordinance is that one ordinance contains all floodplain development standards. Developers can easily see what is required of them, and FEMA and the state can easily see if your community has adopted the latest requirements.



Handbook for New Mexico Floodplain Managers

The disadvantage to a separate ordinance is that it may not be coordinated with other building, zoning or subdivision regulations. Some communities have found that by adopting a stand alone model, they adopt standards that are inconsistent or even contrary to the standards in the other regulations. For example, your building code may require crawlspace vents to be high, near the floor joists, while the floodplain ordinance requires them to be no more than one foot above grade.

If you have a “stand alone” ordinance, you should review its provisions with all other offices and ordinances that regulate land development and building construction. Make sure that others know the floodplain regulations and that there are no internal inconsistencies. For example, a floodplain ordinance administered by the city engineer may not be coordinated with the permit process conducted by the building department.

8.1.2. Contents

Whether your floodplain regulations are in one ordinance or several, they should have these provisions:

- **Statutory authorization:** This shows that the state has authorized your community to regulate floodplain development, and places requirements and limitations on that regulation (see Article I, Section A in Appendix A). Statutory authorization is discussed further in Section 8.2.1.
- **Findings of fact:** This shows that there is a reason for your community to regulate development to protect it from flooding (see Article I, Section B in Appendix A). Findings of fact are discussed further in Section 8.2.2
- **Purpose:** The purpose of the ordinance is to protect public and private development from flood damage and to reduce the danger posed by flooding (see Article 1, Section C in Appendix A). The purpose of the ordinance is discussed further in Section 8.2.3.
- **Methods:** The methods in the ordinance include guiding development and changes in the form of your floodplains (see Article I, Section D in Appendix A). The methods used for floodplain management are discussed further in Section 8.2.4.
- **Definitions:** Definitions are an important part of your ordinance. Most of the definitions in the NMFMA model ordinance are from 44 CFR 60.3 (see Article II in Appendix A). The definitions in the NMFMA model ordinance are discussed throughout this Handbook.
- **Applicability of the ordinance:** This section describes the land area subject to regulation and how it is determined (see Article III, Sections A and B in Appendix A). Although most New Mexico communities only regulate floodplains identified by the Federal Emergency Management Agency on the community’s Flood Insurance Rate Map (FIRM), NMSA §3.18.7 requires that communities “designate and regulate floodplain areas having special flood or mudslide hazards.” The NMFMA model ordinance makes provisions for community adoption of floodplain maps not shown on the FIRM.

Floodplain mapping is discussed in Section 9 of this Handbook.



Handbook for New Mexico Floodplain Managers

- Development of a Floodplain Use Permit (see Article III, Section C in Appendix A): The Federal Emergency Management Agency (FEMA) requires that a community develop a permit process for floodplain development as a requirement for participation in the NFIP. Section 10 of this Handbook discusses the types of floodplain development that requires permits.
- Compliance and penalties for noncompliance: Article III, Section D and E in the NMFMA model ordinance (Appendix A) state that the ordinance must be complied with, and that there are penalties for violation of the ordinance.
- Legal protection for the ordinance and the community: An ordinance should include legal provisions that specify that the ordinance take precedence over less restrictive requirements in other ordinances, and that compliance with the ordinance is not a guarantee against flood damage (see Article III, Sections F, G and H in Appendix A).
- Administration of the ordinance: Someone in the community (the building official, the planning director, the engineer, the clerk, or someone else who is generally responsible for regulation of development in the community) is named in the ordinance as the Floodplain Administrator. In a small community, the Floodplain Administrator may wear many hats. In a large community, the Floodplain Administrator may supervise a staff of floodplain managers.
- Article IV, Sections A and B of the NMFMA model ordinance (see Appendix A) state that the community shall designate a Floodplain Administrator and describes his/her duties. This is discussed further in Section 8.3. Sections C and D describe the requirements of the Floodplain Use Permit and the requirement for the community to maintain FEMA Elevation Certificates and FEMA Floodproofing Certificates.
- NMSA §3-18-7 requires that floodplain development permits be reviewed by a Certified Floodplain Manager (CFM). Either the Floodplain Administrator must be a CFM, he/she must have a CFM of his/her staff, or the community must have floodplain developments reviewed by a CFM outside the community staff (a county or regional agency with a CFM may do these reviews, or the community may use a private consultant).
- Variances: An ordinance should have a variance procedure. There may come a time when there is a valid reason for the community to grant a variance from its ordinance. Article IV, Section E includes a procedure for variances, including a discussion of valid reasons for appeals (see Appendix A).
- Provisions for flood hazard reduction: This is the meat of the ordinance. It should cover all of the NFIP and State standards and additional regulatory standards that the community deems appropriate. The standards should include provisions for:
 - Building protection standards (elevation, floodproofing, anchoring)
 - Standards for manufactured homes and mobile home parks
 - Construction standards peculiar to the flood zones in your community, such as AO and AH

Handbook for New Mexico Floodplain Managers

- Construction in the floodway and standards for encroachments where floodways are not mapped
 - Standards for subdivisions
 - Standards for water and sewer service
 - Rules on water course alterations
- Severability: This is a statement that the individual provisions are separable and if anyone is ruled invalid, it does not affect the rest of the ordinance.

8.1.3. CRS Credit

If your community chooses to exceed the requirements of the National Flood Insurance Program you may wish to join the Community Rating System (CRS) program. This program encourages communities to enact regulatory standards that exceed these minimums and that are more appropriate for local conditions. Participating communities are rated and insurance policies in their community are discounted based on the quality of the community's floodplain management programs and ordinance restrictions.



The CRS is explained in more detail in Section 21. Where provisions that can receive CRS credit are mentioned in this reference, they are highlighted with the CRS logo.

8.2. The Legal Basis

Designing and administering a floodplain management program is essentially a job of writing and enforcing the law. In some communities, legal challenges have prevented implementation of well-planned programs. Therefore, we must know some basics about the law of regulating what people can do on their property.

8.2.1. Statutory Authority

“Statutory authority” means the powers given to a community by state law. In New Mexico, this authority is given in NMSA §3-18-7. These amendments require cities, towns, villages and counties with identified flood hazards to adopt floodplain management ordinances such that they meet the minimum requirements of the National Flood Insurance Program (NFIP). An ordinance can exceed state statutes but cannot prohibit an act specifically permitted by state statute or permit an act specifically prohibited by the state.

To show that a regulation has a sound legal basis, the statutory authority for the regulations should be included at the beginning of the ordinance.

8.2.2. Findings of Fact

The primary facts are that floods have caused damage in your community in the past, and that your community has identified flood hazards. Under NMSA §3.18.7, that fact requires that your community adopt an ordinance.



Handbook for New Mexico Floodplain Managers

8.2.3. Statement of Purpose

It is important that the statement of purpose be broad enough to do the things you need to do under your ordinance. The statement in the NMFMA model ordinance includes general purposes, like “protect human life and health” and more specific purposes like “ensure that potential buyers are notified that property is in a flood area.”

8.2.4. Methods of Reducing Flood Losses

These methods should include protection of new development from flooding and preventing new development from causing flood damage to existing development.

8.2.5. Other Local Governments

Local governments such as school districts, sanitary districts, park districts, cities, towns, villages and counties were created by the Legislature to perform specific duties. A city, town, village or county does not have the authority to regulate where the regulation would conflict with or “frustrate” the functions of a public division specifically granted by law.

If a local government or other organization undertakes a development project that would violate the flood protection standards of your ordinance, it should be required to show how its statutory authority exempts the project. Each situation will be different, but let the developer have the burden of proof that your ordinance “frustrates” its statutory responsibilities or privileges. You may also want to write a letter for the record to the agency, advising them that their project may be exposed to flooding or cause increased flooding elsewhere.

8.2.6. Taking

Why not simply tell people that they can’t build in the floodplain? If we did, we wouldn’t have to worry about new buildings getting flooded and the regulations would be simple to administer: Just say “No.”

While this regulatory standard appears desirable, it has one fatal legal problem: It could be a “taking.”

The Fifth Amendment to the U.S. Constitution states, “Nor shall property be taken for public use without just compensation.” The Constitution contains this provision because in England, the king could take property and use it for his own purpose — such as quartering troops or hunting— without compensation.

The term “taking” has come to mean any action by a government division that relieves a person of his or her property without payment.

Government agencies possess the authority to condemn and acquire privately owned land. Under the power of eminent domain, they can acquire land without the owner’s agreement provided the acquisition clearly is for a demonstrably public purpose, official condemnation proceedings are followed, and the owner is paid for the value of the land. Some common examples of eminent domain actions are:



Handbook for New Mexico Floodplain Managers

- Purchase of land for roads and public works projects
- The development of public park land
- Utility acquisition of rights of way for transmission lines, etc.

Courts have ruled that a taking may occur when the government enacts a law, standard or regulation that limits the use of the land to the extent that the owner has been deprived of all of his or her economic interest in using the property. Thus, the government has “taken” the property under a legal provision known as inverse condemnation. In cases where a court has found a taking, the governmental body has been required to pay the property owner for the value of the loss. Often, though, the regulations are retracted as applied to that property.

Usually, courts undertake a complicated balancing of public and private interests in deciding a taking issue. The courts will consider such factors as:

- Regulatory objectives
- The harm posed by uncontrollable development
- Reasonableness of the regulations
- Severity of the economic impact upon the private property owner

Very restrictive floodplain regulations and the State and NFIP regulatory standards have been challenged as a taking in a number of cases. Figure 8-1 summarizes important cases challenging the legality or constitutionality of NFIP regulations.

Most NFIP criteria are performance standards that do not prohibit development of a floodplain site provided the performance standards are met. For example, development in the floodway is prohibited only if it increases flood heights.

These performance-oriented standards of the NFIP have never been ruled as a taking. This is highly significant, given that more than 19,000 communities nationally administer floodplain management ordinances.

One reason for this success rate is that property owners must prove that they have lost all economic return on their parcels. It is hard to prove that nothing can be done on a piece of land, especially since the NFIP and State rules do allow many types of activities.

Although it may be more costly to build according to the floodplain management standards and, in some instances, it may not be economical to develop a property, the performance standard is a valid exercise of the police power because it is based on a legitimate public purpose: preventing flood damage. Floodway requirements in particular are defensible because they prevent the actions of one property owner from increasing flood damage to his or her neighbors.

The NFIP regulatory criteria have not lost a taking case because they allow most floodprone sites to be built on as long as precautions are taken to protect new structures and neighboring property from flood damage. The owners are not denied all economic uses of their properties as long as their construction accounts for the level of hazard.

Courts have supported regulatory standards that are more restrictive than NFIP regulations,



Handbook for New Mexico Floodplain Managers

such as complete prohibitions of new buildings or new residences in the floodway. These cases tied the prohibition to the hazard and the need to protect the public from hazards created by the development.

Things need to be reasonable. For example, a complete prohibition of development in a shallow flooding area where there is no velocity may not be considered as “reasonable” by a court.

The rationale does not always have to be tied to property damage. For example, in Illinois, upholding the State’s prohibition of new buildings in the northeastern Illinois floodways, the Illinois Supreme Court noted that while buildings could be protected, the residents would be surrounded by moving water during floods, preventing access by emergency vehicles.

The prohibition takes into consideration not only the concern about preventing further flooding, but also the concern about the need to provide disaster relief services and the need for the expenditure of state funds on shelters and rescue services for victims of flooding. (Beverly Bank v. Illinois Department of Transportation, September 19, 1991).

Handbook for New Mexico Floodplain Managers

Case	Issue	Decision/Impact
Village of Euclid v. Ambler Realty Company (1926)	The use of police power to regulate land use	The court upheld the basic concept of zoning.
Turnpike Realty Co. v. Town of Dedham (1972)	Challenge to the constitutionality of the NFIP	The court upheld the floodplain management regulations.
Just v. Marienette (1972)	A wetland regulatory case	The court decided that a landowner does not have the unlimited right to use the land for a purpose which is unsuited to its natural state or that will injure the rights of others.
Texas Landowners Association v. Harris (1978)	Challenge to the validity of the NFIP and its mitigation requirements	The courts held that the NFIP was reasonable. A community could not claim a taking if insurance or disaster relief was denied for failure to comply with NFIP standards, because they are benefits, not rights.
First Evangelical Lutheran Church of Glendale v. Los Angeles County, LA (1987)	Whether a temporary building moratorium that was deemed a taking would require compensation	The U.S. Supreme Court held that temporary regulatory takings could require compensation. This case was sent back to the state to decide if a taking had occurred. The state endorsed the floodplain regulations and held that the regulations were not a taking.
Adolph v. FEMA (1988)	Whether the parish floodplain management regulations adopted constituted a taking	The court upheld that the NFIP as a whole is not a taking, nor are the parish regulations.
April v. City of Broken Arrow (1989)	Whether two Oklahoma floodplain ordinances constituted a taking (requirement for elevation of new homes to 1 foot above the 100-year flood elevation)	The courts accepted the general proposition that local public officials must be afforded reasonable <i>elasticity</i> in planning and implementing legitimate state interests and held that regulations were valid.
Lucas v. South Carolina Coastal Council (1992)	South Carolina Supreme Court—whether the South Carolina Beachfront Management Act constituted a taking. U.S. Supreme Court—whether the property owner was entitled to compensation for his alleged “total loss of value” attributed to the Beachfront Management Act	The South Carolina Supreme Court ruled that the Act did not constitute a taking and reversed the trial court’s award of \$1.2 million to Lucas. The U.S. Supreme Court ruled that where the value of a property is essentially “destroyed” by regulation, compensation should be paid.
Dolan v. Tigard (1994)	Imposition of a floodplain bike path as a condition of a permit to expand commercial structures	The U.S. Supreme Court found that the business owners should not be required to construct a bike path to obtain the permit.

Figure 8-2. Selected cases of challenges to land use regulations. Note: These are brief summaries of the court cases. They should not be quoted without reading the full text of the ruling.

The lesson is that before your community enacts a regulatory provision that severely restricts the use of property, your community’s attorney should review the provision to be sure it will not be overturned as a taking. Regulatory standards that are reasonable, tied to the hazard and support public objectives should be upheld.



Handbook for New Mexico Floodplain Managers

8.2.7. Liability

Ordinance administrators naturally fear they could be sued if a person gets flooded or a building is damaged by a flood. Debated nationally for some time, this issue has been studied extensively by Dr. Jon Kusler, a nationally known attorney in floodplain management law.

Dr. Kusler summarized his most recent findings in *Floodplain Management in the United States: An Assessment Report*, Volume 2, prepared for the Federal Interagency Floodplain Management Task Force, 1992.

Excerpts from that report are quoted here. However, your community's legal department should provide more specific guidance.

- Government agencies are generally not liable for flood damage unless the flood was caused by a government action. "Except in a few instances, governments are not liable for naturally occurring flood damages. Government has, in general, no duty to construct dams, adopt regulations, or carry out other hazard reduction activities unless required to do so by a statute. It is only where a government unit causes flood damages or increases natural flood damages that liability may arise." (*Floodplain Management in the United States: An Assessment Report*, Volume 2, Page 1012)
- Liability is based on negligence; a community is well defended by a properly administered program. "In general, government units are not 'strictly or absolutely' responsible for increased flood damages. Liability usually results only where there is a lack of reasonable care. Where the standard of reasonable care is judicially applied to an activity, the seriousness of foreseeable threat to life or economic damage is an important factor in determining reasonableness of conduct. In general, the more serious the anticipated threat, the greater the care the government entity must exercise." (*Floodplain Management in the United States: An Assessment Report*, Volume 2, Page 1013)
- Policy or discretionary actions are more defensible than nondiscretionary, ministerial actions. It is better to have clear standards spelled out in the ordinance adopted by your governing board than to leave a lot of interpretation up to the administrator. "As a general rule, courts do not hold legislative bodies or administrative agencies liable for policy decisions or errors in judgment where the Legislature or [agency] exercises policymaking or discretionary powers. But they often hold agencies responsible for failure to carry out nondiscretionary duties or for negligence in carrying out ministerial actions." (*Floodplain Management in the United States: An Assessment Report*, Volume 2, Page 1013)
- "... from a legal perspective it may be desirable to submit proposed standards to a community's legislative body (e.g., community council) for debate and approval. Due to the special way legislative decisions are treated by the courts, legislative judgments, particularly those of a discretionary nature, are less likely to result in a successful liability suit than are division decisions. Courts generally defer to legislative judgment." (*Floodplain Management in the United States: An Assessment Report*, Volume 2, Page 1017)



Handbook for New Mexico Floodplain Managers

- Government employees are usually protected from liability suits. “Although governments may be liable for increased flood or drainage losses in a broad range of contexts, government employees are usually not personally liable for planning, permit issuance, operation of dams, adoption of regulations or other activities. No personal liability results where a government employee acts in good faith, within the scope of his or her job, and without malice. Successful lawsuits for hazard-related damages against government employees under common law theories or pursuant to Section 1983 of the Civil Rights Act are apparently nonexistent.” (*Floodplain Management in the United States: An Assessment Report*, Volume 2, Pages 1013 - 1014)

Based on these findings, you can protect yourself from lawsuits by:

- Adopting sound and appropriate flood protection standards: Remember, NFIP standards are minimums. Buildings should not be allowed in a mountainous floodplain with no warning time and very high velocities, even though the NFIP minimums would allow it. If you know flooding could be or has been higher than the base flood shown on the FIRM, you are not doing your residents any favors by allowing them to build buildings exposed to a known hazard.
- Becoming technically competent in the field: You won’t be sued if you have ensured that the project was properly constructed. There is no grounds for a suit if no one is damaged by flooding: “... ‘liability can be avoided if flood damages are avoided.’ From a legal perspective, this is a sound philosophy.” (*Floodplain Management in the United States: An Assessment Report*, Volume 2, Page 1017)
- Insuring the community: Your community may want to purchase liability insurance or establish a self-insurance pool or plan to protect itself.
- Encouraging property owners to buy flood insurance coverage. If people are compensated for any flood losses, they are less likely to file a lawsuit.
- Adopting an ordinance provision that exempts the community from liability. NMFMA’s model ordinances has a section entitled “Warning and Disclaimer of Liability” that may be similar to language that is already in your ordinance. It reads as follows:

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. On rare occasions greater floods can and will occur and flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of the community or any official or employee thereof for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made thereunder.

8.3. The Administrator

The state grants communities the police powers to adopt, administer and enforce local codes



Handbook for New Mexico Floodplain Managers

and regulations, including floodplain regulations. Generally, elected officials delegate authority for ordinance administration and enforcement to a subordinate officer.

A local floodplain administrator might be an existing local staff person, such as the building inspector, community zoning official, engineer or planner. The community also might contract to have the job done by the county, regional planning division, another jurisdiction or authority, or a private firm.

Throughout this reference, the person designated as responsible for administering the floodplain management ordinance is called “the administrator.” This reference also assumes that you are the administrator, so the terms “you” and “the administrator” are used interchangeably.

8.3.1. Duties

In general, the administrator is responsible for ensuring that development activities comply with the floodplain management regulations and other applicable codes and ordinances. Duties of the administrator vary depending on the kind, size and characteristics of the community. However, certain responsibilities are common to all ordinance administrators. Here is a list of such duties:

Understand the regulations: This is the most important of all of your duties and is the main subject of this reference. A sound working knowledge of the general and technical provisions of various federal, state and local regulations is essential. You must be able to explain them to others, to review permit applications for compliance, and to provide adequate interpretations.

Ensure that permits are applied for: Often people do not realize that they need to apply for a permit for a project in the floodplain. You need to ensure that the public is informed as to when permits are needed and how they are obtained. Anyone engaged in a development project without a permit must be told to stop and apply for one.

Correct violations: You must evaluate complaints, conduct investigations and use legal recourse when necessary to correct violations.

Process permit applications: Your primary role is to review permit applications for compliance with applicable local regulations. This involves:

- Collecting permit fees, where applicable.
- Assessing the accuracy and completeness of the application.
- Evaluating site plans, topographic data, building design plans and other technical data.
- Identifying deficiencies and devising ways to correct them.
- Issuing or denying the permit.
- Helping applicants pursue appeals or requests for variances.

Ensure that the community has a CFM on staff: NMSA §3-17-8 requires that floodplain development be reviewed by a Certified Floodplain Manager (CFM).

Coordinate with other programs: Responsibility for permit review may reside in or be shared with other offices, such as public works, planning and zoning, code enforcement or housing



Handbook for New Mexico Floodplain Managers

departments. Depending on your duties, you may be involved in coordinating permit reviews.

You must advise the applicant of any need for additional local, state or federal permits for the proposed development. Your office could have copies of the permit application forms or advise applicants whom to contact.

One of your NFIP responsibilities is to notify adjacent communities and the DPS prior to any alteration or relocation of a watercourse. You must submit evidence of such notification to the FEMA Regional Office and the US Army Corps of Engineers (USACE).

You should also notify adjacent communities of plans for a substantial commercial development or large subdivision that could affect their flood hazard areas.

Ensure projects are built according to approved permits: You or your staff must perform periodic and timely on-site inspections to confirm visually that development is following the approved plans. The best way to do this is with a series of inspections at appropriate stages in the construction process, as discussed in Section 16. A certificate of use or occupancy is a final permit that allows the owner to use the building. It should not be given until a final inspection confirms that everything was done according to the approved plans.

Take enforcement actions: When noncompliant activities are uncovered, you must act to resolve the situation. This may involve issuing stop-work orders or other violation notices, coordinating enforcement procedures with the community's attorney, or appearing in court.

Keep records: You should have on hand a sufficient supply of current permit applications, variance requests and other administrative forms. A project file should be kept for each development permit application. Records are covered in more depth in Section 19.

Maintain and update flood data and maps: As noted in Section 7.4, your community should maintain an adequate supply of maps showing the regulatory floodplain for your office and the public to use. All map corrections and notices of map revisions should be recorded and denoted on administrative maps, with the details kept in an indexed file.

You should also cooperate with federal, state and local agencies, and private firms, undertaking flood studies. You must submit any new floodplain data to the FEMA Regional Office within six months of their development. Community staff should review revisions to maps (including Conditional Letters of Map Revision and Letters of Map Revision) to ensure they meet your regulations.

You must notify the FEMA Regional Office within one year of an annexation or when your community has assumed or relinquished authority to adopt or enforce floodplain management regulations for a particular area. The NFIP has special procedures that need to be followed to ensure that these areas are properly mapped and regulated and remain eligible for flood insurance.



Handbook for New Mexico Floodplain Managers

44 CFR 59.22(a)(9)(v) Upon occurrence, [the community must] notify the Administrator in writing whenever the boundaries of the community have been modified by annexation or the community has otherwise assumed or no longer has authority to adopt and enforce flood plain management regulations for a particular area. In order that all FHBMs and FIRMs accurately represent the community's boundaries, include within such notification a copy of a map of the community suitable for reproduction, clearly delineating the new corporate limits or new area for which the community has assumed or relinquished flood plain management regulatory authority.

You must notify the FEMA Regional Office and the state within six months of physical changes that can affect flooding conditions, such as channel modifications or upstream detention.

44 CFR 65.3. A community's base flood elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information becomes available, a community shall notify the Administrator of the changes by submitting technical or scientific data in accordance with this part. Such a submission is necessary so that upon confirmation of those physical changes affecting flooding conditions, risk premium rates and flood plain management requirements will be based upon current data.

Update the ordinance: If your community is notified of changes in federal or state laws and/or regulations that would require changing your floodplain management ordinance, you must revise your ordinance within six months.

44 CFR 60.7. From time to time Part 60 may be revised as experience is acquired under the Program and new information becomes available. Communities will be given six months from the effective date of any new regulation to revise their flood plain management regulations to comply with any such changes.

Similarly, if you are given new flood data by FEMA, you have six months to update your ordinance to adopt the data and the regulatory requirements appropriate for that level of data (see Section 9).

44 CFR 60.2(a) A flood-prone community ... will be given a period of six months from the date the Administrator provides the data set forth in § 60.3(b), (c), (d), (e) or (f), in which to meet the requirements of the applicable paragraph.

A certified copy of any ordinance revision should be submitted to the FEMA Regional Office and to DPS/OEM promptly after adoption.

8.3.2. Dealing with the Public

As you administer your ordinance, you will be interacting with the residents, builders, developers and public officials. It is important that you convey the need to abide by the

Handbook for New Mexico Floodplain Managers

floodplain regulations for their safety and others in the community. This will encourage voluntary compliance and reduce the number of problems you may face.

You are, in effect, the public relations manager for floodplain management in your community. If you explain the rules showing the positive side (flood damage prevented, lives saved), you will be more successful than if people think you are grudgingly enforcing some unwelcome federal mandate.

You can use brochures, newsletters and newspaper articles to help educate the general public and permit applicants. You can also order a number of pamphlets from FEMA that explain the threat of flooding or the reasons to buy flood insurance. As shown in Figures 8-3a and 8-3b, some communities develop their own pamphlets or mailings to explain the reasons for their floodplain ordinances and the importance of the protecting the floodplain and the drainage system from improper development.

You may also want to consider educating your city council, county board or other public officials. It is important that the citizenry, your elected officials and members of a board of appeals understand and support your regulatory program. They are the ones that decide whether variances will be issued or whether the ordinance will be amended. One place to start is to get them a copy of *Addressing Your Community's Flood Problems: A Guide for Elected Officials* from the Association of State Floodplain Managers (see Appendix C).



Figure 8-3a. Example of a local public information Brochure (Southern Sandoval County Arroyo Flood Control Authority).

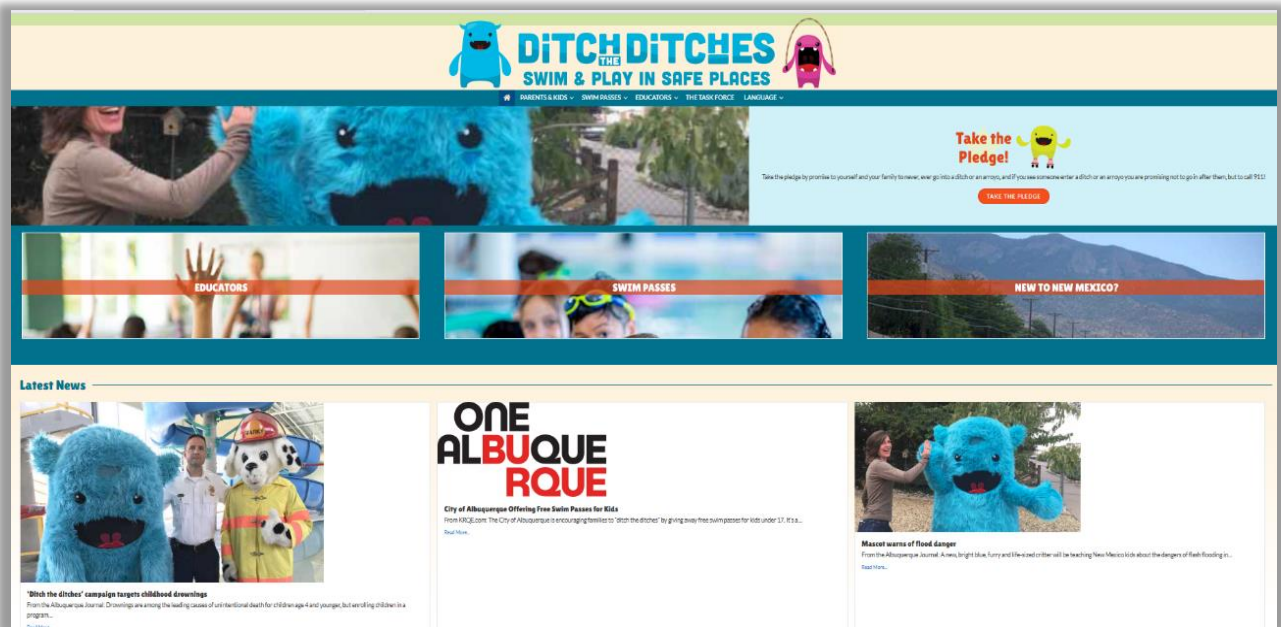


Figure 8-3b. Example of Public Outreach via the “Ditches are Deadly” website.

8.3.3. Qualifications

New Mexico statutes (NMSA 3-18-7) require that all floodplain permits be reviewed by a Certified Floodplain Manager (CFM). The NMFMA maintains the New Mexico CFM Program. See Section 2 for more information on that program.

This does not mean just any CFM can do any part of the job of administering the ordinance. One of the jobs of the community’s CFM is to make sure that the person with the right qualifications helps. They will probably need help from three other professions:

- Some tasks should be conducted by a licensed professional engineer (P.E.) experienced in hydrologic and hydraulic studies, such as reviewing a developer’s flood study before you accept new flood elevations. Some ordinances call for an engineer to review certain permits. Check your ordinance for this.
- Once a building has been constructed in the floodplain, you will need an elevation certificate which must be completed by a professional land surveyor.
- You should always consult your community’s attorney before you initiate an enforcement action.

8.3.4. Training

In many cases, only you will have the expertise needed to administer your ordinance. As the administrator, you will probably be your community’s primary source of information on:

- The basic NFIP requirements.
- Statutory requirements.
- Additional requirements of your ordinance.



Handbook for New Mexico Floodplain Managers

- How to use the NFIP maps and regulatory flood data.
- How maps are reviewed and revised.
- When permits are needed.
- Whether a proposed project meets the ordinance's standards.
- Whether a completed project complies with the approved plans.
- What records are needed.
- How to deal with citizens and builders.
- How to deal with violations.
- How floodplain development regulations and flood insurance rating are related.
- Where citizens and builders can get more information or help.

These topics are not taught at any high school or college. To learn these things you will need additional training. Here are some ways to get it:

- Attend NMFMA conferences. They are held in the spring each year.
- Visit NMFMA's web site periodically.
- Attend a workshop put on by NMFMA or FEMA.
- Complete FEMA's NFIP home study course. (see "EMI," below)
- Attend the refresher course offered at each NMFMA conference before taking the CFM exam. This course by itself will not prepare you for the exam, but it will help you with details if you are already familiar with the material.
- Spend time with the floodplain administrator in a neighboring community.
- Check with the FEMA Regional Office before you issue your first few permits or certificates of occupancy.
- Request a Community Assistance Visit whereby a FEMA or state person will visit you and review your procedures.
- Attend the Emergency Management Institute.
- Visit FEMA's web site periodically.
- Order and review the publications listed in Appendix C.

8.3.5. The Emergency Management Institute

The Emergency Management Institute (EMI) in Emmitsburg, Maryland, provides several courses related to the administrator's job, both as resident courses and home study.

The introductory course is "Managing Floodplain Development Through the National Flood Insurance Program." However, it covers the same information as this reference book (without the additional information on New Mexico state programs). Therefore, if you feel comfortable with the subject matter after reading this reference (and especially if you become a certified floodplain manager), you should not need to attend "Managing Floodplain Development."

EMI offers three other courses that would be helpful:

- National Flood Insurance Program/Community Rating System.
- Digital Hazard Data (how to use digital FIRMs and other data).
- Retrofitting Floodprone Residential Buildings.



Handbook for New Mexico Floodplain Managers

These courses are designed to give you step-by-step practical knowledge and experience. In addition, by attending an EMI course you meet other local administrators from around the country from whom you also can learn the ins and outs of floodplain management administration.

EMI courses run Monday through Thursday, one to four times a year. They are free for state and local officials. Generally, FEMA will pay transportation to Emmitsburg and will house you in dormitories on campus. For more information, upcoming course dates, etc. contact EMI (see Appendix B - Contacts).

To register for a resident course, all applications must be submitted [online](#) or through The National Emergency Training Center Office of Admissions and the FEMA Regional Office (see Appendix B).

“Managing Floodplain Development Through the National Flood Insurance Program” has been offered by the NMFMA and NMDHSEM in New Mexico on several occasions. If you are interested in taking this course without traveling to Maryland, contact the NMFMA or NMDHSEM to see if it will be offered in the near future.

There are also home study courses, called Independent Study. IS-9 is the home study version of “Managing Floodplain Development Through the National Flood Insurance Program.”



9. Regulatory Requirements: Maps and Data

CONTENTS

9.1. NFIP Maps and Data	9-3
9.1.1. Basic Rule #1.....	9-3
9.1.2. Where there's No Map.....	9-3
9.1.3. Unincorporated Areas	9-4
9.2. Exceptions.....	9-5
9.2.1. When FIRM and Ground Data Disagree	9-5
9.2.2. Draft Revised NFIP Data	9-6
9.2.3. Advisory Flood Hazard Data	9-7
9.3. Approximate A Zones	9-7
9.3.1. Existing Data	9-8
9.3.2. New Flood Studies	9-8
9.3.3. Large Developments.....	9-9
9.3.4. Small Developments.....	9-10
9.3.5. Submittal to FEMA.....	9-11
9.3.6. CRS Credit	9-11



Handbook for New Mexico Floodplain Managers

9.1. NFIP Maps and Data

Flood maps and flood data were discussed in Sections 5 and 6. This section builds on that information, covering the NFIP requirements as to when and how a community must use those maps and data.

9.1.1. Basic Rule #1

Basic rule #1: Check to make sure you have the latest flood maps and data published by FEMA. You must use the latest maps and flood data to administer your floodplain ordinance.

A community must adopt and enforce floodplain management regulations based on data provided by FEMA (44 CFR 60.2(h)). This includes the floodplain boundaries, base flood elevations, FIRM zones and floodway boundaries shown on your current Flood Insurance Rate Map, Flood Boundary Floodway Map and/or Flood Insurance Study.

44 CFR 60.2(h): The community shall adopt and enforce floodplain management regulations based on data provided by the [Federal Insurance] Administrator. Without prior approval of the Administrator, the community shall not adopt and enforce floodplain management regulations based upon modified data reflecting natural or man-made physical changes.

This requirement does not prevent a community from adopting and enforcing regulations based on data more restrictive than that provided by FEMA. For example, a community may want to regulate to an historical flood that was higher than the base flood elevations shown on the FIRM. However, such data must be approved by the FEMA Regional Office before it is used.

This requirement also does not prevent a community from using other technical data to identify and regulate floodprone areas not shown on FEMA maps. For example, many cities and urban counties map and regulate areas on small tributary streams that are not shown on the FIRM.

The community always has a say in what the latest maps and data should be. FEMA will send you proposed revisions to the official FIRM and you will have time to review them and submit your comments to FEMA before they are published. You also have a formal 90-day appeals period during which to submit your appeals before BFEs are made final. If you disagree with the FEMA data at any time and have scientific or technical data to support your position, then you should submit a request for a map revision as noted in Section 7, Maintaining and Revising NFIP Maps.

9.1.2. Where There's No Map

There are communities interested in floodplain management and flood insurance where FEMA has not done any mapping. In fact, there are three New Mexico communities in the NFIP with

Handbook for New Mexico Floodplain Managers

no FIRM. FEMA has determined that their flood or drainage problems are relatively minor and do not warrant an expensive flood insurance study.

These communities still have an obligation to the NFIP. They must comply with the requirements of 44 CFR 60.3(a) (see Section 3.5.2). Section (1) of the Federal Regulations states that the community shall “Require permits for all proposed construction or other development in the community, including the placement of manufactured homes, so that it may determine whether such construction or other development is proposed within floodprone areas.”

The rest of 60.3(a) lists specific requirements to make sure that new buildings, factory built homes, subdivisions and utilities are “reasonably safe from flooding.” The easiest way to do this is to map the flood problem area and adopt the map under your ordinance. If it is likely that new buildings will be built in the mapped floodplain, the community should determine base flood elevations.

In other words, even though FEMA did not give the community a map, the best way to meet its obligation to the National Flood Insurance Program, is to prepare its own map. This approach will eliminate confusion and claims of arbitrary treatment when you have to decide if a building is “reasonably safe from flooding.”

9.1.3. Unincorporated Areas

Some cities exercise “extraterritorial jurisdiction,” i.e., they enforce zoning and/or subdivision regulations in areas beyond their corporate limits.

Cities not exercising extraterritorial jurisdiction still must enforce the floodplain management regulations on new subdivisions that petition for annexation and need the city’s approval.

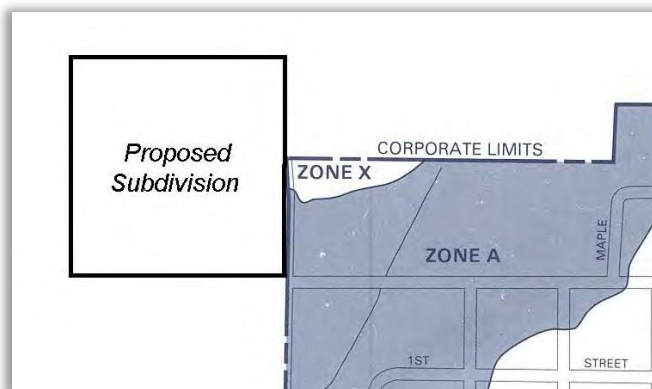


Figure 9-1. Communities are obligated to regulate new floodprone subdivisions that want to be annexed.

If you have a countywide FIRM, you have already adopted the map that sets floodplain and floodway boundaries and flood elevations over unincorporated areas.

If you don’t have a countywide FIRM, and a property is proposed for annexation or is in a recently annexed area that does not show up on your community’s map, use the county’s map and base flood elevations to determine the flood protection requirements. In fact, you should formally adopt the county’s FIRM in your ordinance to strengthen your basis for regulating areas not currently shown on your FIRM.



9.2. Exceptions

The basic rule does not cover every situation. Four occasions where a community may vary from the data provided by FEMA are:

1. When the FEMA data disagree with ground elevations.
2. When FEMA has provided draft revised data.
3. When FEMA provides “advisory” flood hazard data.
4. When the FEMA data are insufficient. This occurs in approximate A Zones where base flood elevations and floodway boundaries are not provided with the FIRM or Flood Insurance Study.

Exceptions 1 – 3 are covered in Section 9.2. The fourth exception is a bigger topic and is reviewed in Section 9.3.

Note: these situations only apply to the use of flood data for floodplain management purposes. Insurance agents and lenders must use the current FIRM when setting insurance rates and determining whether flood insurance is required. If a person wants to vary from the current FIRM to obtain different premium rates or to not have to purchase a flood insurance policy, the FIRM must be officially revised or amended.

9.2.1. When FIRM and Ground Data Disagree

The base flood elevations published in the Flood Insurance Study set the level for flood protection purposes. The maps are a graphic portrayal of that information.

As explained in Section 4 on floodplain mapping, in the past FEMA did not have detailed topographic mapping to use in preparing the flood maps, the flood boundaries are interpolated between cross sections using whatever topographical information is available. This resulted in inaccuracies in drawing the boundaries on the map.

Flood Map Modernization (Map Mod), a multiyear Presidential initiative funded by congress from fiscal year 2003 to 2008, improved and updated the nation’s flood maps and provided 92 percent of the nation’s population with digital Flood Insurance Rate Maps. Map Mod introduced a new way of doing business and laid the foundation for FEMA’s Risk Mapping, Assessment and Planning (Risk MAP) program. Map Mod used state-of-the-art technology and advanced engineering to increase the quality, reliability, and availability of flood hazard maps and data. In situations where detailed topographic data is lacking, the following applies.

The base flood elevation in relation to the actual ground elevation sets the floodplain limits for regulatory purposes.

Ground higher than the flood level. When ground surveys show that a development site is above the base flood elevation, you should record the data and issue the permit. Then, if the developer or owner wants the property removed from the Special Flood Hazard Area designation (e.g., in order to remove the Federal mandate to purchase flood insurance), he or she can request a Letter of Map Amendment (LOMA).



Handbook for New Mexico Floodplain Managers

It is recommended that you advise the applicant of the benefits of a LOMA before you issue the permit. Many New Mexico local officials require the LOMA first and many developers prefer the clear-cut exemption from the floodplain rules that a LOMA provides. However, a LOMA is not mandatory before you issue a permit.

It is up to the developer or property owner to apply for a map change, not community officials. The procedure is discussed in Section 7.

Ground lower than the flood level. Conversely, if site surveys show that areas considered outside the base floodplain on published maps are in fact below the base flood elevation, you should advise the applicant of the hazard and encourage protection of new buildings to the base flood elevation.

Even though a site may be technically outside the mapped SFHA, you are not doing future occupants any favors by ignoring the known flood hazard. However, the NFIP regulations do not require you to apply the floodplain management regulations on a property clearly outside the SFHA.

Your community's ordinance may define the regulated floodplain as "the area designated on a FIRM and adjacent areas that are below the base flood elevation." Then you have clear authority to regulate those areas even though it is not otherwise required by the NFIP regulations. *Either way, if the area is known to be below the base flood elevation, it is considered floodplain and a floodplain permit will be needed for new development.*

9.2.2. Draft Revised NFIP Data

The second situation where a community may vary from the official FEMA data is when FEMA has sent some preliminary data to the community for review. Communities are required to "reasonably utilize" the data from a draft or preliminary FIRM or flood insurance study.

Four scenarios are possible:

1. Where the original FIRM shows an SFHA with *no* base flood elevations and the draft FIRM has flood elevations: Use the draft information. In the absence of other elevation or floodway data, the draft information is presumed to be the best available.
2. Where the original FIRM shows an AE or AH Zone *with* a base flood elevation (or an AO Zone with a flood depth) or floodway and the revision *INCREASES* the base flood elevation or *WIDENS* the floodway: The draft revised data should be used. However, if the community disagrees with the data and intends to appeal, the existing data can be presumed to be valid and may still be used until the appeal is resolved.
3. Where the original FIRM shows an AE or AH Zone *WITH* a base flood elevation (or an AO Zone with a flood depth) or floodway and the revision *DECREASES* the base flood elevation or *SHRINKS* the floodway: The *EXISTING* data should be used. Because appeals may change the draft data, the final base flood elevation may be higher than the draft. If you were to allow new construction at the lower level as shown in the draft, the owners will have to pay higher flood insurance premiums.



4. Where the original FIRM shows a B, C or X Zone and the draft FIRM shows an SFHA: NFIP regulations do not require that the draft revised data be used. However, you are encouraged to use the draft data to regulate development, since these areas are subject to a flood hazard.

If the community intends to appeal preliminary data, it must be done during the official appeals period. Otherwise, you will have to wait for the new map to become official and submit a request for a map amendment or revision.

For more information on this issue, see *Use of Flood Insurance Study (FIS) Data As Available Data*, FEMA Floodplain Management Bulletin 1-98.

CLOMRs: The above four scenarios are also relevant for a Conditional Letter of Map Revision or CLOMR. Note the *conditional* part of a CLOMR. A CLOMR provides that *if* a project is constructed as designed, the base flood elevations can be revised or modified (or the property in question can be removed from the SFHA) after the as-built specifications are submitted and the final LOMR is issued.

A permit should not be based on a lower base flood elevation proposed by a CLOMR until the final LOMR is issued. However, you can issue a permit for that part of the work not dependent on the changes that will result from the LOMR and condition the full permit upon receipt of the final LOMR.

9.2.3. Advisory Flood Hazard Data

Sometimes FEMA issues advisory data after a major flood where it was found that the FIRM and/or flood insurance study underestimated the hazard. This information is provided so communities can ensure that reconstructed buildings are protected from the true hazard, not the one shown on the FIRM.

When you receive such advisory information, you should “reasonably utilize” it. If your community agrees with the information, the ordinance should be revised to adopt it. If it disagrees with the data, you should be ready to explain why the community is not requiring construction and reconstruction to be protected. You and your community are not helping residents if you allow them to rebuild without protection from a known hazard.

For more information on this issue, see *Use of Flood Insurance Study (FIS) Data As Available Data*, FEMA Floodplain Management Bulletin 1-98.

9.3. Approximate A Zones

The fourth occasion where you may vary from the data provided by FEMA is in approximate A Zones. Approximate A Zones are those areas not studied by the detailed hydrologic and hydraulic methods. These areas are shown as “unnumbered A zones” on the FIRM and “approximate 100-year or 1% flood zones” on the Flood Boundary Floodway Map.



Handbook for New Mexico Floodplain Managers

The FIS will not contain specific base flood elevations for approximate study areas nor will there be a floodway/fringe designation on the Floodway Map.

9.3.1. Existing Data

Where do you get the flood data you need when FEMA did not provide it on the FIRM? The best place to start is to find out whether the data has already been prepared by a state or federal agency or from another project. Possible sources of existing floodplain data include:

- County engineer
- Corps of Engineers studies or projects
- Natural Resource Conservation Service
- US Geological Survey

Data obtained from one of these other sources should be used, provided the data

- Reasonably reflect flooding conditions expected during the base flood,
- Are known to be technically correct, and
- Represent the best data available.

Best Available Data – From 44 CFR § 60.3: If the Federal Insurance Administrator has not provided sufficient data to furnish a basis for these regulations in a particular community, the community shall obtain, review and reasonably utilize data available from other Federal, State or other sources...

An additional resource now becoming available to New Mexico communities is Base Level Engineering (BLE) analysis. The BLE production approach combines high-resolution ground elevation data, and modeling technology advancements to create engineering models and flood hazard data. These analyses are produced at a large scale, like a watershed, as opposed to targeting stream reaches. The flood hazard information prepared is based off engineering models that determine flood elevations along each stream reach studies. The data prepared provides flood hazard information to community officials and allows them to interact with analysis results and review areas identified as prone to flooding. Communities can access and use data prior to updates to their regulatory FIRMs. Once a BLE assessment is completed, FEMA releases the flood risk information on the [Estimated Base Flood Elevation Viewer](#). In most cases, the data made available through the Estimated BFE Viewer can be used to inform local community identification of the Base Flood Elevations. FEMA's [HOW2 Determine BFE Outside a Floodplain](#) document provides instructions on how to use BLE data and FEMA's estBFE tool to determine BFE's for sites outside the designated floodplain extent. The data on the viewer can be used if the stream is shown as a Zone A flood zone and the floodplains are similar in shape and width OR if the stream is not shown on the current effective FIRM.

9.3.2. New Flood Studies

If there are no data available, then a new study must be conducted. Usually the developer picks up the cost of the study since he or she is the one wanting to build in the floodplain.

Some good guidance is found in the FEMA publication *Managing Floodplain Development in Approximate Zone A Areas: A Guide for Obtaining and Developing Base (100-Year or 1%) Flood Elevations*. This provides information on a number of methodologies for developing base flood elevations in approximate A zones. These methodologies range from detailed methods that



Handbook for New Mexico Floodplain Managers

produce base flood elevations and perform floodway analyses similar to those developed for a Flood Insurance Study to simplified methods that can be used in isolated areas where more costly studies cannot be justified.

- If your community has approximate A Zones that are likely to be developed, you should get a copy of this document and have your engineer review it. (The guide includes the Quick-2 software for computing flood elevations)
- In some cases, the developer will not need to finance an expensive detailed study. These cases are discussed in the next two sections on large and small developments.
- Whatever method you use, be sure to record on the permit records where the flood elevation came from. This will help you be consistent with future development in the same area.

9.3.3. Large Developments

You are encouraged to discuss the flood hazard as early as possible in discussions with subdividers and developers of large areas. If a subdivision or planned unit development will be partially in the floodplain, there may be ways to avoid building in the flood hazard area, which can save the developer the cost of a flood study.

44 CFR 60.3(b)(3): [Communities must] Require that all new subdivision proposals and other proposed development (including proposals for manufactured home parks and subdivisions) greater than 50 lots or 5 acres, whichever is the lesser, include within such proposals base flood elevation data.

If a subdivision in the SFHA meets this threshold and base flood elevations are required, the developer must conduct the needed study (the community may provide assistance). The study must provide base flood elevations and a floodway delineation. Some examples are given below.

The Benefits of Obtaining Detailed Data

The FIRM for the Town of Severn, North Carolina was an approximate Flood Hazard Boundary Map which was converted to a FIRM by letter in 1987. Kirby Creek is delineated as an unnumbered A zone on that map. In 1995, Kirby Creek flooded.

Town officials recognized that rebuilding should not take place until flood risks were better delineated. Since the FIRM did not identify 100-year flood elevations, the Town asked the state to prepare a detailed study with flood elevations to be used in their construction regulations. At the same time the Town adopted a moratorium on the repair of damaged buildings.

The State NFIP Coordinator, the North Carolina Department of Transportation and the U.S. Army Corps of Engineers organized a joint study effort. Each division sent team members to Severn. The NCDOT provided a survey crew to survey cross sections of Kirby Creek and its tributary. The Corps produced flood profiles for the streams.

As a result of the study the Corps estimated the elevation of the 100-year (1%) flood at 95' msl. They estimated the 1995 flood level of 97' msl. as being a 500-year (0.2%) flood. Using this information the Town of Severn adopted a revised floodplain management ordinance, adopted the Corps floodplain map and adopted a requirement that all new construction and substantially damaged buildings be elevated two feet above the 100-year flood elevation.

During Hurricanes Fran in 1997 and Floyd in 1999, the water in Kirby Creek reached an elevation near 97' msl. The detailed flood data and the two feet of freeboard limited flood damage to wetting the insulation under the floors of new structures. Each of these homes would have been flooded about two feet deep had they not been elevated using the new flood data.

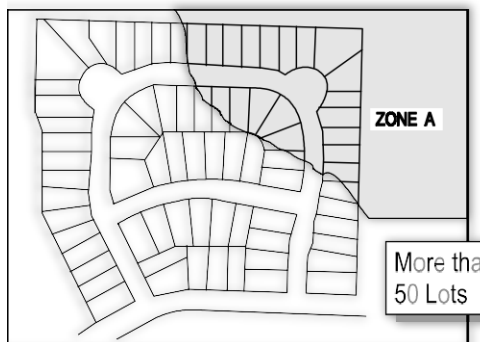


Figure 9-2. Proposed 75-lot subdivision.

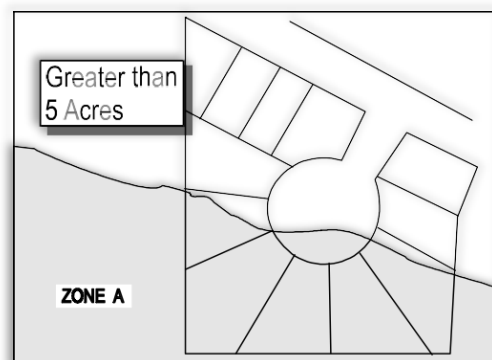


Figure 9-3. Proposed 6.7-acre subdivision.

The detailed flood study is required for the affected lots in the subdivisions shown in Figures 9-2 and 9-3. Figure 9-2 shows a 76-lot subdivision with several lots clearly affected by an

Handbook for New Mexico Floodplain Managers

approximate Zone A area. The subdivision depicted in Figure 9-3 is only 12 lots, but base flood elevations are required because the subdivision covers more than five acres. It also clearly shows buildable sites affected by an approximate Zone A area.

In Figure 9-4, the entire approximate Zone A area is to be left as open space. If the planned subdivision shows the floodplain is contained entirely within an open space lot, it may not be necessary to conduct a detailed engineering analysis to develop base flood elevation data.

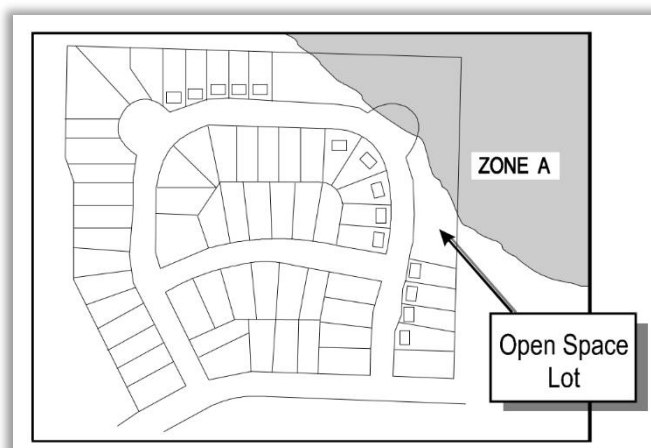


Figure 9-4. Proposed 76 Lot Subdivision

9.3.4. Small Developments

If the project is an isolated building (e.g., a cabin), it may not make economic sense to conduct a detailed hydrologic and hydraulic study to determine the base flood elevation. In these cases, you may want to use one of these less expensive alternatives (listed in priority order):

- Check with other agencies for an available study.
- Check the [Estimated BFE Viewer](#). The Estimated Base Flood Elevation Viewer provides users immediate access to the geospatial datasets and underlying engineering models for existing BLE studies through a point-click and download feature.
- Use historical records or the flood of record (the highest known flood level for the area) prepared by a government division. It may be that a recent flood was close to the base flood. If records of the recent flood can be used, base your regulatory flood elevations on them (or add a foot or two to the historical flood levels to provide a margin of error). Before you do this, get a second opinion from your state NFIP Coordinator, FEMA Regional Office or other agency that is familiar with flood data you want to use.
- Require protection to at least five feet above grade. This will result in lower flood insurance rates than if the building had no protection, but the rates are not as favorable as they would be if a base flood elevation were calculated. Only use this approach if you feel confident that the five feet of elevation will provide adequate flood protection to the building.
- Require the permit applicant to develop a base flood elevation or develop one yourself using one of the methods in the FEMA publication *Managing Floodplain Development in Approximate Zone A Areas: A Guide for Obtaining and Developing Base (100-Year or 1%) Flood Elevations*. This will usually require the services of an engineer, but will be worth the additional expense if it is the only way to make sure the building is protected from flood damage. There are several methods of determining BFEs at varying costs and levels of detail.

Handbook for New Mexico Floodplain Managers

9.3.5. Submittal to FEMA

When a detailed flood study provides new data in an approximate A Zone, it must be submitted to FEMA within six months. The community can pass that cost on to the developer by requiring that he or she submit of a Letter of Map Revision as a condition of approving the development. LOMRs are discussed in Section 7. If the developer doesn't do it, many individual property owners will have to do it later.

44 CFR 65.3: As soon as practicable, but not later than six months after the date such information becomes available, a community shall notify the Administrator of [map] changes by submitting technical or scientific data in accordance with this part.

9.3.6. CRS credit



Community Rating System credit is provided if base flood elevations, floodways and related regulatory data are provided in areas not mapped by the NFIP. It does not matter who prepared the study. It can be the developer, the community, or a state or federal division (other than FEMA). The size of the watershed or the FIRM zone designation do not matter, either. For more on the CRS, see Section 21.



10. Regulatory Requirements: What needs a permit?

CONTENTS

10.1.	Development permit	10-2
10.1.1.	Basic rule #2.....	10-2
10.1.2.	“Development”	10-2
10.1.3.	Where required	10-3
10.1.4.	Building Permits.....	10-3
10.1.5.	Public Projects	10-4
10.1.6.	Highways.....	10-4
10.1.7.	Small Projects	10-4
10.2.	Non-Building Requirements	10-5
10.2.1.	Subdivisions	10-5
10.2.2.	Water and Sewer Systems.....	10-6
10.2.3.	Hazardous Materials.....	10-7
10.3.	Permits from Other Agencies	10-8
10.3.1.	Local Agencies.....	10-8
10.3.2.	Soil and Water Conservation Districts.....	10-9
10.4.	State Agencies	10-9
10.4.1.	Department of Public Safety.....	10-9
10.4.2.	Licensing and Regulation Department (Construction Industries and Manufactured Housing Divisions)	10-9
10.4.3.	Department of Transportation	10-10
10.5.	Federal Agencies	10-10
10.5.1.	FEMA	10-10
10.5.2.	U.S. Army Corps of Engineers.....	10-10
10.5.3.	Other Federal Agencies.....	10-11



Handbook for New Mexico Floodplain Managers

10.1. Development Permit

10.1.1. Basic Rule #2

Permits are required to ensure that proposed development projects meet the requirements of the NFIP and your ordinance. Once a person applies for a permit, you can review the plans and make sure the project complies. The first step, therefore, is to get people to apply for a permit.

Basic rule #2: A permit is required for all development in the SFHA shown on your FIRM.

The key words here are “permit,” “development” and “SFHA.” Communities without an SFHA still have requirements for permitting development. See the discussion in Sections 9.1.2 and 10.1.3 on these requirements. Communities that regulate flood problem areas outside the mapped Special Flood Hazard Area should be consistent in their permit requirements for new development.

10.1.2. “Development”

The NFIP requirements are keyed to “development” in the floodplain. “Development” means “any man-made change to improved or unimproved real estate.” This includes, but is not limited to:

- Construction of new structures
- Modifications or improvements to existing structures
- Fencing
- Excavation
- Filling
- Paving
- Clearing and grubbing
- Drilling
- Driving of piles
- Mining
- Dredging
- Land clearing
- Grading
- Permanent storage of materials and/or equipment

All “development” needs a permit from the community. This is a minimum requirement of the NFIP.

44 CFR 59. Definitions: “Development” means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.



Handbook for New Mexico Floodplain Managers

10.1.3. Where Required

Development permits are required for all development projects in the SFHA shown on the FIRM. Communities are encouraged to require them outside the SFHA where there is a known flood hazard or where the ground elevation is lower than the base flood elevation.

44 CFR 60.3(a)(1) [“60.3(a) communities” that do not have a FIRM must] Require permits for all proposed construction or other development in the community, including the placement of manufactured homes, so that it may determine whether such construction or other development is proposed within flood-prone areas;

If you are a 60.3(a) community, you do not have a FIRM. Consequently, you must require a permit for all development projects *throughout* your community.

You must review each project’s location to determine if it has a flood risk. If it does, the best way to protect a new building from flood damage is to obtain a base flood elevation for the site and require that the building be elevated or protected to or above that base flood elevation.

10.1.4. Building Permits

Most communities have long had a system for issuing building permits, but few have a permit system for “development.” Regulating all development in floodplains is essential because fill or other material can obstruct flood flows just as structures can.

Because a “building permit” often covers only construction or modifications of buildings, this reference uses the term “development permit.” You should check your permit system to ensure that in the floodplain, permits are being required for all projects that meet the definition of development, not just “building” projects. Make sure you regulate the following in addition to the traditional building projects:

- Filling and grading
- Excavation, mining and drilling
- Storage of materials
- Erection of fences and walls
- Repairs to a damaged building (even those that do not affect structural members)
- Temporary stream crossings
- Activities by other government agencies, such as roads, bridges and school buildings

If your building permit system does not require permits for these activities, you need to revise your system, enact a new type of “development permit” or otherwise ensure that people apply for a permit for these non-building projects.

If building and/or mobile home permits are issued in your community by the Construction Industries Division or the Mobile Home Division of the New Mexico State Regulation and Licensing Department, please see Section 10.4.2 below.



Handbook for New Mexico Floodplain Managers

10.1.5. Public Projects

It is important to note that your community is responsible for enforcing the floodplain management regulations on all development within its jurisdiction. This includes projects implemented by other public offices, even though they may not be in the habit of applying for permits from you.

Section 8 discusses the limitations of your statutory authority to regulate other local units of government. However, you have no such limitation on other offices in your unit of government. While the streets or sewers departments do not have to actually apply for a permit from the building department, your community needs some system to ensure that their activities meet your ordinance's regulatory standards.

One way to do this is to follow the regular permit process. This will provide the documentation that is needed to show that the community is meeting all of its obligations to the NFIP.

10.1.6. Highways

Highways often have to cross rivers and floodplains. They are one kind of development that can't be avoided. Complications arise when a state agency has to develop in a community's floodplain.

Many of New Mexico's floodplains are areas of shallow flooding (AO zones, broad areas of unnumbered A zones and urbanized areas where no floodway has been delineated). In these areas, construction of a road one to two feet above grade is a serious obstruction of flood waters. Such construction may raise the water surface elevation on the uphill side of the road, divert water a long distance from its natural flow path and may concentrate flows on the downstream side of the road where dips or culverts are provided, increasing the depth of flooding and the velocity of the flood water. Where a street or road goes generally down the slope, the road may be either a barrier to flow or a channel for flow. If the road's effect on the floodplain is not considered at the time it is designed, it will probably cause flood problems somewhere in the community or in an adjacent community. Even normal maintenance of unpaved roads may change their effect on the floodplain.

It is recommended that community floodplain managers discuss your floodplain management ordinance with your public works department, community engineer and others responsible for planning, building and maintaining streets and roads in your community. If your county highway department has responsibilities for streets and roads in your community, you should also discuss your ordinance with them. Your community has a responsibility to ensure that ALL floodplain development is in compliance with your ordinance, including development by your community and other public entities.

10.1.7. Small Projects

You have some discretion to exempt obviously insignificant activities from the permit requirement, such as planting a garden, farming, putting up a mailbox or erecting a flagpole.



Handbook for New Mexico Floodplain Managers

The key is whether the project will present a new obstruction to flood flows, alter drainage or have the potential to be a substantial improvement. These determinations can only be made by the permit official, not the builder, so make sure your exemptions are clear.

There should be no possibility of a misunderstanding resulting in construction of a flood flow obstruction or a substantial improvement without a permit. For example, such exemptions should not be allowed in drainage easements, floodways, or within 5 or 10 feet of a lot line.

Some communities specifically exempt small projects in their ordinances. This is the recommended approach, as it avoids challenges that the permit official arbitrarily decides what projects need permits. You may consider adding the following language to your ordinance:

Development does not include maintenance of existing buildings and facilities such as re-roofing or re-surfacing of roads when there is no increase in elevation and no regrading or altering of existing land surfaces.

10.2. Non-Building Requirements

The primary thrust of the NFIP regulations is to protect insurable buildings and reduce future exposure to flood hazards. Sections 12 and 13 are devoted to the rules for ensuring that new and existing buildings comply with the NFIP requirements.

There are some additional requirements that help ensure that the buildings stay habitable and additional flood problems are not created. This section reviews the requirements for these “non-building” development projects.

10.2.1. Subdivisions

As noted in Section 9, larger subdivisions must provide base flood elevations and floodways if they are not already provided with the FIRM and Flood Insurance Study. With these data, new buildings must be properly elevated or floodproofed.

Subdivisions must also be reviewed to ensure that their infrastructure is reasonably safe from flood damage.

44 CFR 60.3(a)(4) [The community must] Review subdivision proposals and other proposed new development including manufactured home parks or subdivisions, to determine whether such proposals will be reasonably safe from flooding. If a subdivision proposal or other proposed new development is in a flood-prone area, any such proposals shall be reviewed to assure that (i) all such proposals are consistent with the need to minimize flood damage within the flood-prone area, (ii) all public utilities and facilities, such as sewer, gas, electrical, and water systems are located and constructed to minimize or eliminate flood damage, and (iii) adequate drainage is provided to reduce exposure to flood hazards;

Handbook for New Mexico Floodplain Managers

This review applies to subdivisions and other large developments, such as apartments, parks, shopping centers, schools, factory-built home parks and planned unit developments. If one is floodprone, the builder should:

- Minimize flood damage by locating structures on the highest ground.
- Have public utilities and facilities located and constructed so as to minimize flood damage.
- Provide adequate drainage for each building site.

The site plans for new developments and proposed plats for subdivisions can usually be designed to minimize the potential for flood damage while still achieving the economic goals of the project.

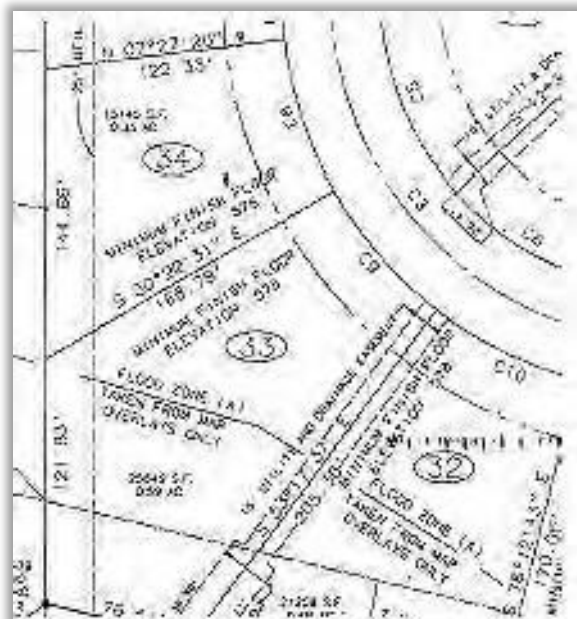


Figure 10-1. Subdivision plat showing flood hazard data

Developers should be encouraged to view the floodplain as an amenity to be kept open to provide habitat and recreation and aesthetic benefits for the future occupants. For example, lot size could be reduced and the lots clustered on high ground, with home sites having views of the floodplain (see also the discussion in Section 14 and Figure 14-1).

Many communities require subdividers to show the flood hazard on their final plats. These are the documents that are filed with the official property records. When title searches or other property reviews are conducted, the hazard is disclosed. This is especially helpful for potential buyers. In the example in Figure 10-1, the community requires both the floodplain boundary and the minimum finished floor elevation to be posted on new subdivision plats.

Note: It is a good idea to reference the source of the flood hazard data on the plat so the designations can be superseded by later map revisions and amendments.

10.2.2. Water and Sewer Systems

44 CFR 60.3(a)(5) [The community must] Require within flood-prone areas new and replacement water supply systems to be designed to minimize or eliminate infiltration of flood waters into the systems; and

44 CFR 60.3(a)(6) [The community must] Require within flood-prone areas (i) new and replacement sanitary sewage systems to be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters and (ii) onsite waste disposal systems to be located to avoid impairment to them or contamination from them during flooding.



Handbook for New Mexico Floodplain Managers

The objective of these requirements is to ensure that a building that is protected from flood damage can still be used after the flood recedes.

In most instances, these criteria can be met through careful system design. Manholes should be raised above the base flood level or equipped with seals to prevent leakage. Pumping stations should have electrical panels elevated above the regulatory flood elevation.

Septic tanks and on-site waste disposal systems should be located to ensure they are accessible during a flood, and that they will not release contamination in a flood. The first objective should be to locate the system outside the flood hazard area, if that is feasible. The septic tank should be sealed to avoid contamination of flood water, and if there is a danger that groundwater levels will rise to the level of the septic tank, it should be anchored to prevent flotation. An automatic backflow valve should be installed to prevent sewage from backing up into the building during flooding.

Wells in floodplains should be floodproofed. Regardless of the height of the well casing, they should be capped with a watertight seal. If flood water enters a well, it may contaminate the aquifer, making that well and others nearby unusable for their intended purposes. All electrical components outside the well itself should be elevated above the regulatory flood elevation.

10.2.3. Hazardous Materials

Most floodplain management ordinances have a section that reads:

Storage of materials and equipment that are flammable, explosive or injurious to human, animal or plant life is prohibited unless elevated a minimum of one foot above the base flood level. Other material and equipment must either be similarly elevated or (i) not be subject to major flood damage and be anchored to prevent movement due to flood waters or (ii) be readily removable from the area within the time available after flood warning.

This provision is not a state or federal mandate. However, it is good practice and if it is in your ordinance, it needs to be enforced. It would be wise to have specific standards in your ordinance.

The following lists were taken from the Corps of Engineers' *Flood Proofing Regulations*. The first is of items that are extremely hazardous or vulnerable to flood conditions so they should be prohibited from the SFHA or even the 500-year (0.2%) floodplain:

- | | |
|---------------------|----------------------|
| • Acetone | • Prussic acid |
| • Ammonia | • Magnesium |
| • Benzene | • Nitric acid |
| • Calcium carbide | • Oxides of nitrogen |
| • Carbon disulfide | • Phosphorus |
| • Celluloid | • Potassium |
| • Chlorine | • Sodium |
| • Hydrochloric acid | • Sulfur |

The following items are sufficiently hazardous that larger quantities should be prohibited in



Handbook for New Mexico Floodplain Managers

any space below the base flood level:

- Acetylene gas containers
- Storage tanks
- Lumber /buoyant items
- Gasoline
- Charcoal/coal dust
- Petroleum products

Larger quantities of the following items should be prohibited in any space below the base flood level:

- Drugs
- Tires
- Soaps/detergents
- Flood products
- Matches/sulfur products

10.3. Permits from Other Agencies

44 CFR 60.3(a)(2) requires all NFIP communities to ensure that other federal and state permits have been obtained. You should not issue your local permit until you are certain that the other agencies' requirements are met.

The purpose of this requirement is to help assure that coordination occurs between various levels of government on projects impacting floodplains. The requirement has the added benefit of protecting permit applicants by making sure they are aware of and obtain all of the permits necessary for a floodplain development prior to making irreversible financial investments. Permit applicants are not well served if they are allowed to proceed with a project only to have work stopped later by a Federal or State agency because they have not obtained proper permits.

Some communities allow their permit officials to issue the local permit on the condition that other required permits are obtained. However, this is not as effective as holding the local permit until the applicant can show that the other agencies have issued or will issue their permits.

Otherwise, the project may get under way before you are sure that it meets all legal requirements.

To implement this requirement, you are encouraged to develop a list of what permits are required in your jurisdiction.

10.3.1. Local Agencies

First, check with other local offices. Here is who you should coordinate with within your community government. Each office may have some permit review authority or interest so you need to decide which projects, if any, should be run by them before you issue a floodplain development permit.

- Building department



Handbook for New Mexico Floodplain Managers

- Planning department
- Zoning department
- Sanitation department
- Fire marshal
- Engineer
- Public works, streets or highways

Then check with other local governments. The following local authorities that may have jurisdiction over some aspects of floodplain development:

- The County
- Adjacent municipalities (pursuant to intergovernmental agreements)
- Drainage districts
- Levee district
- County health or sanitation department

10.3.2. Soil and Water Conservation Districts

The last office, the soil and water conservation district, can be especially helpful. Many communities have entered into intergovernmental agreements with their local district to review the impact of a development on natural resources. The district's staff can provide an expert technical review of how the project will affect other concerns as well as flooding.

Generally, each county has its own soil and water conservation district. Check in the county seat's telephone book under the county's name, e.g., "Cibola County Soil and Water Conservation District." The districts are separate from county government and are co-located with the local office of the U.S. Department of Agriculture's Natural Resources Conservation Service.

10.4. State Agencies

10.4.1. Department of Homeland Security and Emergency Management

The New Mexico Department of Homeland Security and Emergency Management is the State Coordinating Agency for the National Flood Insurance (NFIP). This is the state office that is designated by the Governor to provide technical assistance to communities in the NFIP. NMDHSEM also administers a variety of grant programs for mitigation and other related activities. See Appendix B for NMDHSEM contacts.

10.4.2. Licensing and Regulation Department (Construction Industries and Manufactured Housing Divisions)

In some New Mexico communities, building permits are issued by the Construction Industries Division (CID). This does not relieve the community of its obligations under its floodplain management ordinance to ensure that all development in floodplains is protected from flooding. Your floodplain management ordinance states that your ordinance will be enforced, and your community's participation in the NFIP depends on it.



Handbook for New Mexico Floodplain Managers

The community must ensure that all new development in its floodplains are elevated above the base flood elevation, that all components below the base flood elevation are made of flood resistant materials, and that development in its floodways do not increase the flood elevation. Many types of development that must be regulated (see Section 10.1.4) are not permitted by CID. The community must review and approve these developments and keep permit files on these uses.

It is essential that where CID issues building permits, the community work with CID to establish a review procedure so that the community's CFM reviews permit applications prior to their issuance.

In most New Mexico communities, manufactured home permitting is done by the Manufactured Housing Division (MHD). The discussion about CID immediately above applies equally to manufactured housing placements in your community's floodplains. In addition, it is your community's responsibility to ensure that such manufactured housing is anchored to prevent flotation or lateral movement.

It is essential that where MHD issues placement permits, the community work with MHD to establish a review procedure so that the community's CFM reviews permit applications prior to their issuance.

10.4.3. Department of Transportation

The NMFMA will be working with the New Mexico Department of Transportation (NMDOT) to ensure that state highways are designed to prevent obstruction of floods. Community floodplain managers may wish to work directly with their NMDOT district offices if they have concerns. See Appendix B for contact information.

10.5. Federal Agencies

10.5.1. FEMA

The Federal Emergency Management Agency does not directly permit development projects. The agency's role is to set minimum standards for local regulations and to provide assistance to local officials.

FEMA is involved in map revisions and often requests for map changes go hand in hand with development proposals, especially larger ones. Map revision procedures are explained in Section 7.

10.5.2. U.S. Army Corps of Engineers

The primary federal agency with permit authority over floodplain activities is the U.S. Army Corps of Engineers. The Corps has two major programs:

- Regulation of the discharge of dredged or fill materials into rivers, lakes, streams, and adjacent wetlands. (Section 404 of the Clean Water Act, 33 USC 1334)



Handbook for New Mexico Floodplain Managers

- Regulation of all construction activities on navigable waterways. (Section 10 of the River and Harbor Act of 1889, 33 USC 403)

How did the Army get into floodplain management? During the 19th century, the U.S. Army Corps of Engineers was the nation's main public works agency. It had primary responsibility for facilitating water transportation. The Section 10 authority was given to the Corps in 1899 when Congress passed the Rivers and Harbors Act. Until 1968, the Rivers and Harbors Act was administered to protect only navigation and the navigable capacity of this nation's waters.

In 1968, in response to a growing national concern for environmental values, the policy for review of Section 10 permit applications was revised to include additional factors besides navigation: fish and wildlife, conservation, pollution, aesthetics, ecology and general welfare. This new type of review was identified as a "public interest review."

The Corps of Engineers' regulatory function was expanded again when Congress passed the Federal Water Pollution Control Act Amendments of 1972 and then the Clean Water Act Amendments in 1977. The purpose of the Clean Water Act was to restore and maintain the chemical, physical, and biological integrity of this nation's waters.

See Appendix B for the address and phone number of the Albuquerque District Corps office.

The Corps is responsible for determining the jurisdictional limits of wetlands and other "waters of the United States." The "waters of the United States" regulated by the Corps of Engineers under Section 404 of the Clean Water Act includes most wetland areas.

10.5.3. Other Federal Agencies

Other federal agencies may have permit or notification requirements in different parts of New Mexico, or they may be able to assist communities with some aspects of floodplain management. As your community goes through the process of drafting or revising and adopting a floodplain management ordinance, you should contact any agencies that are active in or near your community and see if they have input. These agencies include:

- Bureau of Land Management
- US Forest Service
- Bureau of Indian Affairs
- Natural Resource Conservation Service
- Environmental Protection Agency
- Military base



11. Regulatory Requirements: Floodways

CONTENTS

11.1.	The Floodway Concept	11-2
11.1.1.	Basic Rule #3	11-2
11.1.2.	Floodway Map	11-2
11.1.3.	Changing the Floodway	11-3
11.2.	Floodway Rules.....	11-3
11.2.1.	Section 60.3(b) and 60.3(c) Communities	11-3
11.2.2.	Section 60.3(d) Communities	11-4
11.2.3.	Exemptions	11-5
11.3.	Community Responsibility.....	11-5
11.3.1.	No Rise Certification	11-5
11.3.2.	Permitted Uses	11-6
11.3.3.	Conditional Uses	11-7
11.3.4.	Watercourse Alterations	11-7
11.3.5.	Conveyance Shadow	11-8



11.1. The Floodway Concept

During the 1800's, there were many occasions when railroads and other development blocked drainage ways and floodplains. After the floods and resulting damage, the builders were sued. Since then, courts have consistently ruled that it is illegal to block the flow of surface waters so as to cause damage to others.

One of the key purposes of floodplain management is to prevent construction projects similar to those that created problems in the past. This is done by withholding the development permit until the project plans are reviewed to ensure that no obstruction to flood flows or increases in flood damages will be created.

11.1.1. Basic Rule #3

Once a permit application is received and the proposed project is ready for review, the next job is to ensure that the project will not impose flood problems on other properties.

Basic rule #3: Development must not increase the flood hazard on other properties.

This is more of a concern in riverine situations where a project may dam or divert flowing water onto other properties or increase flood flows downstream. To prevent this, communities adopt floodways to designate those areas where flood flows are most sensitive to changes brought by development.

Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations. For streams and other watercourses where FEMA has provided BFEs, but no floodway has been designated, the community must review developments on a case-by-case basis to ensure that these increases do not occur.

11.1.2. Floodway Map

Trying to determine a proposed project's effect on flood heights can be difficult and expensive, particularly when future developments are considered. To reduce this regulatory burden on communities and property owners, detailed Flood Insurance Studies have been completed for some communities in New Mexico. The FIS defines the floodway and the floodway fringe, which is then included on the community's floodplain map.

44 CFR 59.1 Definitions: "Regulatory floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

As explained in Section 4, the floodway is the central portion of a riverine floodplain needed to carry the deeper, faster moving water. Buildings, structures and other development activities — such as fill — placed within the floodway are more likely to obstruct flood flows,

Handbook for New Mexico Floodplain Managers

causing the water to slow down and back up, resulting in higher flood elevations.

The designation of a regulatory floodway and the resulting map are based on the following legal concepts:

- Property owners should be allowed to develop their land provided they do not obstruct flood flows and cause damage to others. The base flood level may be allowed to increase but not if significant damage would result.
- Properties on both sides of a stream must be treated equitably. The degree of obstruction permitted for one must also be permitted for the other.

Floodway maps are adopted to designate those areas where flood flows are most sensitive to changes brought by development.

11.1.3. Changing the Floodway

In some situations, it may be in the public interest to allow an increase in flood heights greater than allowed under the NFIP regulations. For example, it would be hard to build a flood control reservoir without affecting flood heights. Because a dam would have a major impact on flood heights, there needs to be a way to permit such projects.

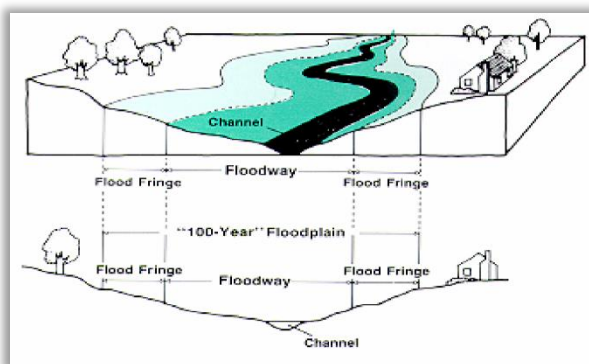


Figure 11-1. Floodway Cross-Section and Map.

However, when the project will change the flood level, the floodway maps must be changed to reflect the new hazard. Floodway maps can also be revised to reflect changed conditions and/or better ground information. The process for doing this is explained under the part on map revisions in Section 7.

11.2. Floodway Rules

11.2.1. Section 60.3(b) and 60.3(c) Communities

In some areas, floodways have not been designated because of high costs and historically low development pressure. As a local floodplain ordinance administrator you will be responsible for reviewing the project with respect to your ordinance and issuing a local floodplain development permit.

If your community has a FIRM with base flood elevations but no mapped floodway, you are subject to the requirements of 44 CFR Section 60.3(c). The following applies to you.



Handbook for New Mexico Floodplain Managers

44 CFR 60.3(c)(10): [Communities must] Require until a regulatory floodway is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.

For the purposes of administering your ordinance, you should treat the entire riverine floodplain as a floodway. You should require the encroachment certification to ensure that a development project will not obstruct flood flows and cause increased flooding on other property. This approach is recommended for all other riverine floodplains without a mapped floodway.

In riverine floodplains where no floodway has been designated, the review must demonstrate that the cumulative effect of the proposed development, when combined with all other existing and anticipated development:

- Will not increase the water surface of the base flood more than one foot at any point within the community, and
- Is consistent with the technical criteria contained in FEMA's Guidance for Flood Risk Analysis and Mapping – General Hydraulics Considerations (2016).

This review must be required for all development projects, although you may make the same judgments on minor projects as for floodways. You should pay particular attention to developments that may create a greater than one-foot increase in flood stages, such as bridges, road embankments, buildings and large fills.

11.2.2. Section 60.3(d) Communities

Once a floodway is established, your job as a local administrator is greatly simplified. When a permit application is submitted, you check the site location in relation to the floodway boundaries. If the site is in an identified fringe (in other words, outside of the floodway), you know the development will not cause flood damage to others by blocking flood flows: the floodway study already calculated that fringe obstructions will not cause a significant increase in flood heights. (NOTE: this does not mean that the development will not create a localized drainage problem, only that it will not block the flow of waters from flooding of the stream that was studied).

44 CFR 60.3(d)(3): [In the regulatory floodway, communities must] Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.

11.2.3. Exemptions

Some projects are too small to warrant an engineering study. For example, a sign post should not block flood flows. A driveway, road or parking lot at grade (without any filling) should not cause a problem, either.

11.3. Community Responsibility

In some cases, it is the community's responsibility to ensure that the NFIP floodway rules are met. This section applies to the following situations:

- Communities that have detailed studied floodplains. The community is responsible for permitting development in the mapped floodways.
- Communities that have approximate floodplain maps. If a floodway is mapped, the community is responsible for issuing the floodplain development permit.

11.3.1. No Rise Certification

All projects in the floodway must undergo an encroachment review to determine their effect on flood flows and ensure that they do not cause problems. Development projects in the flood fringe by definition do not increase flood heights above the allowable level, so encroachment reviews are not needed.

Your ordinance probably has language like, "No use shall be permitted in the floodway that would result in any increase in the base flood level. Consideration of the effects of any development on flood levels shall be based upon the assumption that an equal degree of development would be allowed for similarly situated lands."

The objective of this requirement and the floodplain management ordinance is to ensure that the floodway is reserved to do its natural job: carrying floodwater. The preferred approach is to avoid all development there.

Note that the regulations call for preventing ANY increase in flood heights. This doesn't mean you can allow a foot or a tenth of a foot – it means zero increase. If you do not limit the

"NO-RISE" CERTIFICATION

This is to certify that I am a duly qualified registered professional engineer licensed to practice in the State of _____

It is further to certify that the attached technical data supports the fact that proposed _____ (Name of Development) will not impact the 100-year flood elevations, floodway elevations, or floodway widths on _____ (Name of Stream) at published sections in the Flood Insurance Study for _____ (Name of Community) dated _____ (Study Date) and will not impact the 100-year flood elevations, floodway elevations, or floodway widths at unpublished cross-sections in the vicinity of the proposed development.

Attached are the following documents that support my findings:

Date: _____

Signature: _____

Title: _____ {SEAL}

Figure 11-2. Example of a "No-Rise" Certification



Handbook for New Mexico Floodplain Managers

increase to zero, small increases in flood heights from individual developments will cumulatively have significant impacts on flood stages and flood damages. Under NFIP minimum requirements, it is assumed that there will be no cumulative effects since the permissible rise for any single encroachment is zero. Projects, such as filling, grading or construction of a new building, must be reviewed to determine whether they will obstruct flood flows and cause an increase in flood heights on similarly situated land upstream or adjacent to the project site. The review must also consider what would happen if other properties in the same situation were to be allowed the same type of project.

Projects, such as grading, large excavations, channel improvements, and bridge and culvert replacements, should also be reviewed to determine whether they will remove an existing obstruction, resulting in increases in flood flows downstream.

Your community may conduct the encroachment review, or you may require the developer to conduct it. Most local permit officials are not qualified to make an encroachment review, so most require that this be done by an engineer at the developer's expense.

To ensure that the encroachment review is done right, you may want to require the developer to provide an encroachment certification. This is often called a "no-rise" certification because it certifies that the development project will not affect flood heights. An example of a format is in Figure 11-2. The certification must be supported by technical data, which should be based on the same computer model used to develop the floodway shown on the community's map.

Although your community is required to review and approve the encroachment review, you may request technical assistance and review from the FEMA Regional Office. If this alternative is chosen, you should review the technical submittal package and verify that all supporting data are included in the package before sending it to FEMA.

11.3.2. Permitted Uses

If the site is in the floodway, the NFIP requirement applies as does your own ordinance. NMFMA has established model ordinance language for communities with detailed studies, which recommends defining limited permitted and conditional uses of the floodway. Permitted Uses do **NOT** include:

- placement of structures
- placement of factory-built homes
- fill, levees or other obstructions
- storage of materials or equipment
- excavation or alteration of a watercourse

A list of permitted uses below is probably in your ordinance. Remember: these are uses that do not involve filling, grading or altering the surface of the ground so as to affect flood flows.

- Agricultural uses, such as general farming, pasture, grazing, outdoor plant nurseries, horticulture, viticulture, truck farming, forestry, sod farming and wild crop



Handbook for New Mexico Floodplain Managers

harvesting.

- Industrial-commercial uses such as loading areas, parking areas and airport landing strips.
- Private and public recreational uses such as golf courses, tennis courts, driving ranges, archery ranges, picnic grounds, boat launching ramps, etc.
- Residential uses such as lawns, gardens, parking areas and play areas.
- Such other open-space uses similar in nature to the above.

11.3.3. Conditional Uses

Unlike the permitted uses above, the following uses may involve structures (temporary or permanent), fill, storage of materials or equipment, excavation or alteration of a watercourse upon issuance of a conditional use permit by the applicable board or public agency. The uses must also meet the performance standards required by your ordinance (e.g., they do not involve filling, grading or altering the surface of the ground so as to affect flood flows or increase the base flood elevation).

- Uses or structures accessory to open space uses.
- Circuses, carnivals, and similar transient amusement enterprises.
- Drive-in theaters, new and used car lots, roadside stands, signs and billboards.
- Extraction of sands, gravel and other materials.
- Marinas, boat rentals, docks, piers and wharves.
- Utility transmission lines and underground pipelines.
- Other uses similar to those described above and those listed as Permitted Uses which meet the performance standards for floodway construction specified in your ordinance.

11.3.4. Watercourse Alterations

44 CFR 60.3(b)(6) [The community must] Notify, in riverine situations, adjacent communities and the State Coordinating Office prior to any alteration or relocation of a watercourse, and submit copies of such notifications to the [Federal Insurance] Administrator;

A community must notify adjacent communities and NMDHSEM prior to altering or relocating any river or stream within its jurisdiction. Copies of such notifications must be submitted to the FEMA Regional Office.

44 CFR 60.3(b)(7) [The community must] Assure that the flood carrying capacity within the altered or relocated portion of any watercourse is maintained;

Handbook for New Mexico Floodplain Managers

Any alteration or relocation of a water- course should not increase the community's flood risks or those of any adjacent community. This could happen if the watercourse's capacity to carry flood flow is reduced because a smaller or less-efficient channel is created, or by modifications to the floodway as a result of the project.

After altering a watercourse, the developer has created an artificial situation and must assume responsibility for maintaining the capacity of the modified channel. Otherwise, flooding is likely to increase as the channel silts in, meanders or tries to go back to its old location.



Figure 11-3. Channel alterations have special permit requirements

For any significant alteration or relocation, you should consider requiring the applicant to have an engineer certify that the flood-flow carrying capacity is maintained and that there will be no increase in flood flows downstream. It is recommended that you require the submittal and approval of a CLOMR from FEMA for large-scale proposals (see CLOMR procedures discussion in Section 7).

11.3.5. Conveyance Shadow

Building additions, swimming pools, garages, accessory buildings, and similar small projects can be located in the conveyance shadow. This is the area upstream and downstream of an existing building or other obstruction to flood flows. Flood water is already flowing around the larger obstruction, so the addition of a new structure will not change existing flood flow.

Determining the limits of the conveyance shadow is illustrated in Figure 11-4. Small structures located completely within the shadow may be permitted without an extensive hydraulic analysis needed for a no-rise certification.

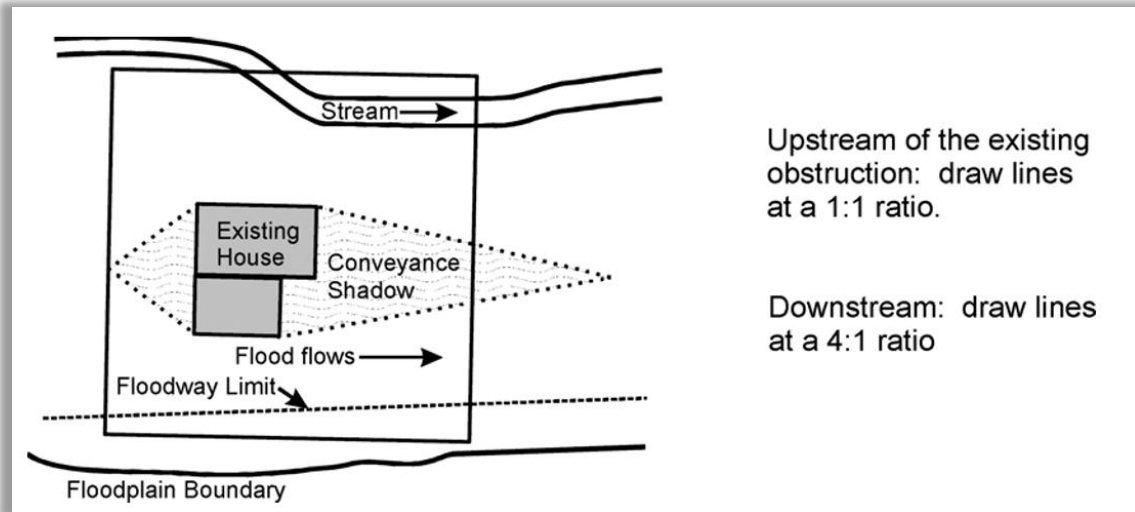


Figure 11-4. Determining the conveyance shadow.

Note: Although a small structure can be located in the conveyance shadow, it is still preferable to keep all development out of the floodway. Don't forget: that all buildings must be elevated or otherwise protected from the base flood and other requirements still apply.



12. Regulatory Requirements: New Buildings

CONTENTS

12.1.	Terminology	12-2
12.1.1.	Basic Rule #4	12-2
12.1.2.	Building	12-2
12.1.3.	Freeboard	12-2
12.1.4.	Flood Protection Elevation	12-3
12.2.	Elevation	12-3
12.2.1.	Fill	12-4
12.2.2.	Piles, Posts, Piers or Columns	12-4
12.2.3.	Walls or Crawlspace	12-4
12.2.4.	How High?	12-5
12.2.5.	Elevation Certificate	12-5
12.3.	Enclosures	12-6
12.3.1.	NFIP Requirement	12-6
12.3.2.	Openings	12-7
12.3.3.	Use	12-9
12.4.	Floodproofing	12-10
12.4.1.	NFIP Requirements	12-10
12.4.2.	Human Intervention	12-11
12.4.3.	How High?	12-11
12.4.4.	National Floodproofing Committee	12-11
12.5.	Other Provisions	12-12
12.5.1.	AO Zones	12-12
12.5.2.	Basements	12-13
12.5.3.	Anchoring	12-13
12.5.4.	Flood-Resistant Material	12-14
12.6.	Accessory Structures	12-15
12.6.1.	Residential Accessory Structures	12-15
12.6.2.	Wet Floodproofing Specifications for Accessory Structures	12-16
12.7.	Manufactured Homes	12-17
12.7.1.	Elevation	12-17
12.7.2.	Anchoring	12-18
12.7.3.	Evacuation	12-19
12.7.4.	Recreational Vehicles	12-19



12.1. Terminology

12.1.1. Basic Rule #4

Basic rule #4: New buildings, substantially improved or substantially damaged buildings must be protected from damage by the base flood.

12.1.2. Building

One objective of your ordinance is to protect new buildings. In this reference, the term “building” is the same as the term “structure” in the NFIP regulations. Your ordinance may use either term.

44 CFR 59.1 Definitions: “Structure” means, for flood plain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured [factory-built] home.

The term “building” or “structure” does not include open pavilions, bleachers, carports and similar structures that do not have at least two rigid walls and a roof.

How to determine if a building is substantially improved or substantially damaged is discussed in Section 13. In this section, consider the term “building” as an all-encompassing term that includes substantial improvements and repairs of substantial damage to a building.

Residential and nonresidential buildings are treated differently. If it is to be built in the floodplain, a residential building must be elevated above the base flood elevation. Nonresidential buildings, on the other hand, may be elevated or floodproofed.

Exemptions: Small additions and inexpensive buildings may be exempted from the building protection standards. See Section 12.5.1 on accessory structures.

12.1.3. Freeboard

Freeboard is an additional height requirement above the base flood elevation that provides a margin of safety against extraordinary or unknown risks. This reduces the risk of flooding and makes the building eligible for a lower flood insurance rate.

While not required by the NFIP, the NMFMA model ordinance recommends a minimum freeboard of one (1) foot. Freeboard is beneficial for the following reasons:

- Accounts for future increases in flood stages if additional development occurs in the floodplain.
- Accounts for future flood increases due to upstream watershed development.
- Acts as a hedge against backwater conditions caused by ice jams and debris dams.
- Reflects uncertainties inherent in flood hazard modeling, topography, mapping limitations and floodplain encroachments.

Handbook for New Mexico Floodplain Managers

- Provides an added measure of safety against flooding.
- Results in significantly lower flood insurance rates due to lower flood risk.

When constructing a new elevated building, the additional cost of going up another foot or two is usually negligible. Elevating buildings above the flood level also reduces flood insurance costs for current and future owners. Note that the higher the building is above the BFE, the lower the rate.



The Community Rating System credits freeboard under Activity 430, Section 432.b in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Higher Regulatory Standards* for example regulatory language. See Section 21 for a more complete discussion of the CRS

12.1.4. Flood Protection Elevation

The flood protection elevation (also referred to as the Design Flood Elevation) is a term used in this reference for the base flood elevation or the base flood elevation plus one foot of freeboard. Although the base flood elevation is the minimum required protection level your community may use, the NMFMA model ordinance includes recommended language for one foot of freeboard. This means that if you adopt the optional language, all new development and redevelopment must be protected to a level one foot above the base flood elevation.

12.2. Elevation

Elevating a building above the flood protection elevation is the most common and secure way to protect a building from flood damage. It is the only way allowed for residential buildings.

44 CFR 60.3(c)(2) [Communities must] Require that all new construction and substantial improvements of residential structures within Zones A1-30, AE and AH zones on the community's FIRM have the lowest floor (including basement) elevated to or above the base flood level...

In Zones A1-A30, AE, AO and AH, all new construction and substantial improvements of residential structures must be elevated so that the lowest floor (including the basement) is elevated to or above the flood protection elevation. This can be done in one of three ways:

- Elevation on fill.
- Elevation on piles, posts or columns.
- Elevation on walls or a crawlspace.

The NMFMA model ordinance has recommended language for freeboard (see Appendix A). Buildings built with one foot of freeboard will save up to 43% of NFIP insurance premiums.

12.2.1. Fill

NFIP regulations allow fill to be used by itself or in conjunction with other types of foundations to raise the lowest floor of a building above the BFE, but restrictions apply in floodways where fill would cause an increase in flood heights. The NMFMA model ordinance recommends that all residential buildings and most manufactured houses be placed on compacted fill.

Where fill is used to elevate buildings or manufactured homes, it must be properly designed, installed in layers and compacted. Simply adding dirt to the building site may result in differential settling over time.

The fill should also be properly sloped and protected from erosion and scour during flooding. To provide a factor of safety for the building and its residents, the NMFMA model ordinance recommends that the fill extend 10 feet beyond the walls of a structure before it drops below the flood protection elevation. The fill should not adversely affect the flow of drainage from or onto neighboring properties.

12.2.2. Piles, Posts, Piers or Columns

Piles, piers, posts or columns are appropriate for buildings where there is deeper flooding. Where flooding is likely to have high velocities or to create waves, elevation with no lower area enclosure is preferred.

12.2.3. Walls or Crawlspaces

The third elevation technique possible for structures in the floodplain is to build on solid walls. In shallower flooding areas, this elevation technique is the same as creating a crawlspace — a foundation of solid walls that puts the lowest floor at least one foot above the flood level.

When solid walls are used, care must be taken to ensure that hydrostatic or hydrodynamic pressure does not damage the walls. As discussed in Section 1.7.3, these water pressures can break a solid wall or concrete floor (Figure 1-18).

There are two ways to prevent this:

- Stem walls can be used on two sides parallel to the flow of water. The other two sides



Figure 12-1. These two new buildings elevated on fill plus freeboard were not damaged by this 100-year flood.



Figure 12-2. Building elevated on parallel stem walls.

Handbook for New Mexico Floodplain Managers

are kept open (Figure 12-2). This minimizes the obstruction to floodwaters and lessens pressure on the foundation.

- The walls can have openings large enough to allow floodwaters to flow in and out, preventing differential pressures on the walls. Openings are required any time there is a fully enclosed area below the BFE. This is discussed in more detail in the later section on enclosures.



Figure 12-3. Building elevated on crawlspace with openings.

12.2.4. How High?

NFIP regulations require that the lowest floor of a building must be elevated above the flood protection elevation. Note three things about this minimum requirement:

44 CFR 59.1. Definitions: “Lowest Floor” means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building’s lowest floor; provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of Section 60.3.

1. The term “lowest floor” includes a basement because all usable portions of a building must be protected from flood damage.
2. The minimum requirement is to elevate to the flood protection elevation. Earlier in this section, freeboard was covered. This is an extra margin of protection that requires the lowest floors to be at least one foot above the base flood elevation. (i.e., to the flood protection elevation).

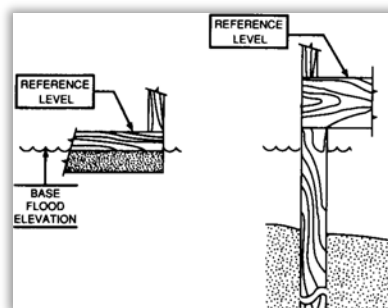


Figure 12-4. In A Zones: the top of the floor is the reference level.

3. In A Zones, under the minimum NFIP requirement, the lowest floor is measured from the top of the floor (Figure 12-4). However, it is recommended that buildings on elevated foundations, such as piles or a crawlspace, have supporting beams or floor joists above the flood protection elevation to protect them from flood damage.

12.2.5. Elevation Certificate

Because most new buildings built in the floodplain are residences, elevating them is one of the most important requirements of the NFIP. To ensure that a building is elevated above the flood protection elevation, the lowest floor is surveyed and an elevation certificate is completed by



Handbook for New Mexico Floodplain Managers

a licensed surveyor or engineer. A copy is kept by the local permit office. This is discussed in more detail in Section 19.

The NMFMA model ordinance requires that elevation certificates be provided for all new buildings, and that the Floodplain Administrator maintain these certificates and make them available upon request.

Over time, these elevation certificates will become a valuable asset to the community. When a building is required to have flood insurance, the owner must provide an elevation certificate. If a house is built, say, in 2003, the Floodplain Administrator will get a copy of the elevation certificate. In, say 2008, the building is sold and the new owner needs to purchase flood insurance. If the seller did not provide the buyer with a copy of the elevation certificate, the buyer must pay a surveyor to produce a new one. If he can obtain a copy of the original elevation certificate from his community, he will save several hundred dollars.

Completing and maintaining the FEMA Elevation Certificate is an important element of a floodplain management program. A copy of the FEMA Elevation Certificate is included in Appendix D.

12.3. Enclosures

Enclosures are areas created by a crawlspace or solid walls below the flood protection elevation. Enclosures deserve special attention for two reasons:

- The walls of enclosed areas are subject to flood damage from hydrostatic and hydrodynamic forces.
- People are tempted to convert floodable enclosures into areas that can sustain damage in a flood.

Does an enclosure under an elevated floor just go to waste? It need not.

12.3.1. NFIP Requirement

NFIP regulations allow certain uses in enclosures below the flood protection elevation because they are subject to minimal flood damage. Note that any level in a building that is below grade on all four sides is considered a basement, which is not allowed in the floodplain. This section addresses crawlspaces and other levels that are not below grade.

Three uses are allowed in the area below the elevated floor:

- Building access,
- Vehicle parking, and
- Storage of materials incidental and accessory to the principal use of the structure that have low damage potential.

The floodplain regulation requirements can be easier to accept if owners and builders are encouraged to think about the enclosed lower areas as usable space. If a building has to be elevated, say, five feet above grade, the owner should be encouraged to go up eight feet. This allows the lower area to be used for parking and provides three extra feet of flood protection.



Handbook for New Mexico Floodplain Managers

However, if the lower area is enclosed, there is a tendency for the owner to forget about the flood hazard and convert the enclosure to a finished room. This must be prevented.

The lower area on an elevated building must be floodable — it must be built of flood-resistant materials (see Section 12.4.4 on what materials are acceptable). Not allowed are finishings such as carpeting, paneling, insulation (both cellulose and fiberglass) and gypsum wallboard (also known as drywall and sheet rock).

Utilities that serve the upper level also must be protected from flood damage. Consequently, a furnace cannot be put in such an enclosure unless it is above the flood protection elevation. Air conditioning units should be suspended from the first floor's floor joists or on a pedestal, above the flood protection elevation. It is especially important to make sure that any ductwork in a crawlspace be above the flood protection elevation, too.

If the lower area is used for access to the upper level, a stairway can easily be designed that is resistant to flood damage. Installing an elevator is tricky, but there are ways to design and install an elevator that will face minimal flood damage, as explained in *Elevator Installation for Buildings Located in Special Flood Hazard Areas*, FEMA, NFIP-TB-4 (2019).

12.3.2. Openings

As noted in Section 1, solid walls can collapse if floodwaters get too deep. To prevent this, the enclosure must have openings to allow floodwaters to enter and leave, thus automatically equalizing hydrostatic flood forces on the walls.

44 CFR 60.3(c)(5) [Communities must] Require, for all new construction and substantial improvements, that fully enclosed areas below the lowest floor that are usable solely for parking of vehicles, building access or storage in an area other than a basement and which are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria: A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

You can be sure the openings are adequate by using one of two methods. The first method is to require the builder to have the design certified by a licensed professional engineer or architect.

The second method is to have the design meet or exceed the following three criteria:

1. The bottom of the openings must be no higher than one foot above grade. (see Figure 12-5)

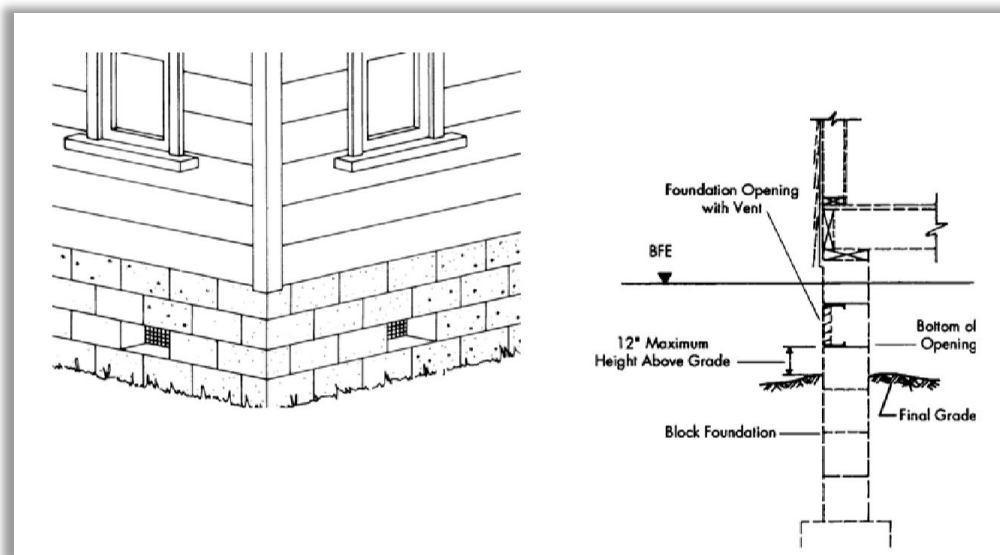


Figure 12-5. Opening location in solid foundation wall.

2. The openings should be installed on at least two walls of the enclosure to ensure that at least one will work if others get blocked or plugged.
3. Provide a minimum of two openings having a net area of not less than one square inch for every square foot of enclosed area that is subject to flooding. If the area of the enclosure is 1,000 square feet, the area of the openings combined must total at least 1,000 square inches.

A standard crawlspace vent for block walls is 8" x 16" or 128 square inches (see Figure 12-5). To determine how many would be needed, divide the square footage of the floor area by 128.

Example 1: $\frac{1,280 \text{ square foot building}}{128 \text{ square inches/vent}} = 10$ 10 vents will be needed

Example 2: $\frac{2,000 \text{ square foot building}}{128 \text{ square inches/vent}} = 15.62$ 16 vents will be needed

If the opening is covered by a standard crawlspace vent cover or grate, the net area of the opening must be used and the number of openings increased accordingly. New areas can be found on the manufacturers specifications or estimated if specifications are not available.

Openings may be equipped with screens, louvers, valves or other coverings or devices to keep animals out of the enclosure. However, any covering must permit the automatic flow of floodwater in both directions.

The opening sizes in the previous examples and in Figure 12-5 are based on standard crawlspace vents, which most building codes require to be installed in a crawlspace for ventilation purposes. Often these are located close to the floor joists in order to circulate air

Handbook for New Mexico Floodplain Managers

around the wooden members.

Such vents are well above the ground in an elevated building and would not meet the NFIP requirement that the bottom of the opening be within one foot of grade. However, NFIP requirements and building codes can be satisfied by the same vents if they meet the three criteria listed above.

Garage doors cannot be used to satisfy this requirement because they do not permit the automatic flow of floodwaters. However, garage doors may have vents in them that meet the above criteria.

Openings are not required for stem wall foundations that have been backfilled for pouring of a concrete floor slab. For further guidance, refer to *Requirements for Flood Openings in Foundation Walls and Walls of Enclosures*, NFIP-TB-1 (FEMA 2020).



Figure 12-6. The house on the left has compliant crawlspace openings. the openings in the foundation on the right are too high.

12.3.3. Use

Enclosed areas must be floodable and used only for parking vehicles, storage or entry to an area above the flood level - uses that are subject to little flood damage.

Materials to be stored should be of low flood damage potential. The type of storage permitted in an enclosed lower area should be limited to that which is incidental and accessory to the principal use of the structure. For instance, if the structure is a commercial building, the enclosure should be limited to storage of advertising materials, lawn and garden equipment, and other low damage items that can be easily moved to the elevated part of the building.

It would be good to advise the builder and owner that a flood insurance policy will not cover items stored below an elevated floor. The NFIP now covers items in enclosures below the first floor in the same way as items in a basement. This limited coverage is explained more in Figure 20-1. The interior portion of an enclosed area should not be partitioned or finished into separate rooms, except to enclose storage areas.



Handbook for New Mexico Floodplain Managers

If a building is elevated eight feet or more, regulating the use of the enclosure presents special problems. Over time, the owner may forget the flood hazard and want to convert the floodable area into a finished room. Such an action would increase the flood damage potential for the building, violate the conditions of the building permit, and violate the NFIP regulations. However, because the room is hidden behind walls, it can be very hard for the permit office to catch such a conversion. You should carefully check new building plans for signs, such as roughed in plumbing and sliding glass doors, that indicate that the owner may expect to finish the area in the future. You should also clearly state on your permit what the limitations are on construction and use of the enclosed area.

12.4. Floodproofing

Nonresidential buildings must be elevated or floodproofed. If they are elevated, they must meet the same standards as for residential buildings that were just reviewed. Elevation is the preferred method because it is more dependable. Elevated commercial and industrial buildings can often be designed so that they can continue to operate during a flood, reducing or eliminating business disruptions. Also, it will generally prove to be less expensive to elevate a non-residential building than to floodproof it. However, there will be situations where floodproofing may be the only alternative for protecting a nonresidential building.

12.4.1. NFIP Requirements

44 CFR 59.1. Definitions: “Flood proofing” means any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

44 CFR 60.3(c)(3) [Communities must] Require that all new construction and substantial improvements of non-residential structures within Zones A1-30, AE and AH zones on the community’s firm (i) have the lowest floor (including basement) elevated to or above the base flood level or, (ii) together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;

44 CFR 60.3(c)(4) [Communities must] Provide that where a non-residential structure is intended to be made watertight below the base flood level, (i) a registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and shall certify that the design and methods of construction are in accordance with accepted standards of practice for meeting the applicable provisions of paragraph (c)(3)(ii) or (c)(8)(ii) of this section, and (ii) a record of such certificates which includes the specific elevation (in relation to mean sea level) to which such structures are floodproofed shall be maintained with the official designated by the community under §59.22(a)(9)(iii);

For the purposes of regulating new construction, floodproofing is defined as measures



Handbook for New Mexico Floodplain Managers

incorporated in the design of the building so that below the flood protection elevation:

- Walls are watertight (substantially impermeable to the passage of water).
- Structural components can resist hydrostatic and hydrodynamic loads and effects of buoyancy.
- Utilities are protected from flood damage.

Most floodproofing is appropriate only where floodwaters are less than three feet deep, since walls and floors may collapse under higher water levels.

A licensed professional engineer or architect must prepare the building plans and certify the floodproofing measures using the FEMA Floodproofing Certificate form. This is discussed in more detail in Section 19.

12.4.2. Human Intervention

Floodproofing techniques that require human intervention are allowed but should be discouraged. Human intervention means that for a floodproofing measure to work, a person has to take some action before the floodwater arrives, such as turn a valve, close an opening or switch on a pump.

There are many potential causes of failure for these techniques, including inadequate warning time, no person on duty when the warning is issued, the responsible person can't find the right parts or tools, the person is too excited or too weak to install things correctly, and/or the electricity fails.

Before you approve plans for a building that relies on human intervention to be floodproofed, you should make sure that there are plans and precautions to keep problems from occurring. Techniques that rely on human intervention should only be allowed in areas with adequate warning time and in situations where there will be someone present who is capable of implementing or installing the required measures.

More information on floodproofing can be found in FEMA's Technical Bulletin 3-93, *Non-Residential Floodproofing Requirements and Certification for Buildings Located in Special Flood Hazard Areas* (FIA-TB-3. 1993)

12.4.3. How High?

The NMFMA model regulation recommends floodproofing to one foot above the base flood elevation. However, it should be noted that when a building is rated for flood insurance, one foot is subtracted from the floodproofed elevation. Therefore, a building floodproofed *to one foot above the base elevation* receives the same insurance rates as a building *elevated to the base flood elevation*.

12.4.4. National Floodproofing Committee

The National Nonstructural Flood Proofing Committee (NFPC) was established by the Corps of Engineers under Section 206 of the 1960 Flood Control Act, as amended. The NFPC was chartered to promote the use of nonstructural flood proofing methods, including dry and wet



Handbook for New Mexico Floodplain Managers

floodproofing, for reducing life loss and minimizing property damages.

The NFPC is a standing committee of current employees of the Corps of Engineers and is generally comprised of eight members and up to five advisors.

The Committee responsibilities include:

- Provide expertise directly to HQUSACE on the development, implementation, and execution of the Flood Plain Management Services Program and on the Flood Risk Management Program.
- Provide a source of technical expertise on all aspects of non-structural flood risk reduction and associated opportunities.
- Disseminate nonstructural flood risk reduction information through the web site, paper reports and personal communication.
- Serve as the Corps Center of Expertise for all Nonstructural Flood Risk Reduction, and partner with the Planning Centers of Expertise in all aspects of non-structural flood risk reduction and associated opportunities.
- Serve as a virtual community of non-structural flood risk reduction expertise.
- Develop and improve non-structural flood risk reduction methods and procedures, including research and testing as necessary.
- Support the application of nonstructural flood risk reduction methodology in the Corps planning process as required by planning guidance.
- Develop guides, pamphlets, and other publications on nonstructural flood risk reduction. Develop and display digital and physical models to demonstrate flood risk reduction measures.
- Disseminate nonstructural flood risk reduction information and expertise through presentations at Prospect Courses, Planning Core Curriculum, seminars, workshops, and other venues.
- In conjunction with, and at the request of, the associated Planning Center of Expertise, provide independent technical review of Corps projects which contain nonstructural flood risk /flood damage reduction measures.

Provide technical and planning assistance on non-structural flood damage reduction and associated opportunities.

12.5. Other Provisions

12.5.1. AO Zones

AO Zones are shallow flooding areas where FEMA provides a base flood depth. Since there is no base flood elevation, the rules read a little differently.

In AO Zones, all new construction and substantial improvements of residential structures shall



Handbook for New Mexico Floodplain Managers

have the lowest floor (including basement) elevated above the highest adjacent grade:

- At least one foot above the depth number specified in feet on the community's FIRM.
- At least three feet if no depth number is specified.

All new construction or substantial improvements of nonresidential structures shall meet the above requirements or, together with attendant utility and sanitary facilities, be floodproofed to the same elevation.

12.5.2. Basements

The definition of the "lowest floor" includes basements and the definition of "basement" includes any floor level below grade. For the purposes of the NFIP, a basement is defined as any area that is subgrade on all sides. The "lowest floor" of a building is the top of the floor of the basement if there is a basement. Since the "lowest floor" of a residential building must be at or above the BFE, it will be highly unusual to construct a basement in a floodplain that met these requirements.

44 CFR 59.1 Definitions: "Basement" means any area of the building having its floor sub grade (below ground level) on all sides.

Note that "walkout basements," "daylight basements" or "terrace levels" are usually sub grade on only three sides, with the downhill side at or above grade. Thus, they are not considered basements for either floodplain management or flood insurance rating purposes (but they are still the lowest floor of a building for floodplain management and insurance rating purposes).

If these areas are used only for parking, access, or storage and they meet other ordinance requirements, they can be regulated as enclosures below an elevated building and not be considered the lowest floor of the building.

On the other hand, cellars, the lower level of a split-level or bi-level house, garden apartments and other floors below grade (finished or unfinished) are considered basements under NFIP regulations. *This interpretation also applies to crawlspace floors that are below grade on all sides, too.*

Since the lowest floor of a residential building must be above the flood protection elevation, the only way to build a residential basement in the floodplain is if it is elevated above the flood protection elevation and surrounded by fill. Floodproofed non-residential basements are allowed, provided they meet the requirements discussed in Section 12.4.

12.5.3. Anchoring

44 CFR 60.3(a)(3) ...If a proposed building site is in a flood-prone area, all new construction and substantial improvements shall (i) be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy...



Handbook for New Mexico Floodplain Managers

Both elevated and floodproofed buildings must be properly anchored to stabilize them against flood forces. This means anchoring the building to its foundation and ensuring that the foundation won't move. Therefore, you need to make sure there is adequate protection against hydrostatic and hydrodynamic forces and erosion and scour that can undercut the foundation.

In areas of shallow flooding and low flood velocities, normal construction practices suffice. Additional anchoring measures, such as using extra bolts to connect the sill to the foundation or installing rods to connect the cap to the sill, should be required in two situations:

- Where the flood flows are faster than five feet per second.
- In factory-built homes.

In some areas it may be necessary to use foundations such as piles or piers which provide less resistance to floodwaters.

If your community has either of these conditions, it is recommended that the builder's architect or engineer sign a statement saying the design of the building includes "anchoring adequate to prevent flotation, collapse and lateral movement" during the base flood.

12.5.4. Flood-Resistant Material

44 CFR 60.3(a) (3) ...If a proposed building site is in a flood-prone area, all new construction and substantial improvements shall (ii) be constructed with materials resistant to flood damage...

Whether a building is elevated or floodproofed, it is important that all parts exposed to floodwaters be made of flood-resistant materials (see Figure 12-7). This includes all portions of the building below the BFE including foundation elements such as floor beams and joists and any below BFE enclosures.

"Flood-resistant materials" include any building product capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage. "Prolonged contact" means at least 72 hours, and "significant damage" is any damage requiring more than low-cost cosmetic repair (such as painting).

For further details on flood-resistant material requirements, refer to FEMA Technical Bulletin 2 (2008), *Flood Damage-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas in accordance with the National Flood Insurance Program*.

Handbook for New Mexico Floodplain Managers

- Concrete, concrete block or glazed brick.
- Clay, concrete or ceramic tile.
- Galvanized or stainless steel nails, hurricane clips and connectors. (in areas subject to saltwater flooding)
- Indoor-outdoor carpeting with synthetic backing. (do not fasten down)
- Vinyl, terrazzo, rubber or vinyl floor covering with waterproof adhesives.
- Metal doors and window frames.
- Polyester-epoxy paint. (do not use mildew-resistant paint indoors because it contains an ingredient that is toxic)
- Stone, slate or cast stone. (with waterproof mortar)
- Mastic, silicone or polyurethane formed-in-place flooring. Styrofoam insulation.
- Water-resistant glue.
- Pressure treated (.40 CCA minimum) or naturally decay resistant lumber, marine grade plywood.

Figure 12-7. Flood-resistant materials.

12.6. Accessory Structures

Certain accessory structures may not qualify as “buildings.” For example, open structures, such as gazebos and picnic pavilions that do not have at least two rigid walls, are not “buildings” and do not have to be elevated or floodproofed.

In certain cases, agricultural buildings can be granted waivers to the full requirements for flood protection. However, a variance would be needed. This is discussed in Section 17, Appeals and Variances. The building should still meet the wet floodproofing requirements spelled out in Section 12.5.2. An alternative to issuing a variance every time (which is not a good practice) is to adopt the appropriate specifications in your ordinance. Run the draft language by FEMA before the ordinance is amended, to make sure it meets their requirements.

12.6.1. Residential Accessory Structures

Accessory structures proposed in the floodway fringe for residential uses only may be exempted from the building protection standards. These would normally be limited to detached garages and sheds on a residential lot. Per the NMFMA model ordinance, if exempted they must meet the following criteria:

- The structure shall not be used for human habitation.
- The structure shall be designed to have low flood damage potential. For example, the building materials should be water resistant such as metal or treated lumber.
- The structure shall be constructed and placed on the building site so as to offer minimum resistance to the flow of floodwaters. For example the building could be placed immediately downstream of an existing building to reduce the effects of velocity of the flowing floodwater on the structure.



Handbook for New Mexico Floodplain Managers

- The structure shall be firmly anchored to prevent flotation, which may result in damage to other structures.
- The structure's service facilities such as electrical and heating equipment shall be elevated or floodproofed to at least one foot above the base flood level. (flood protection elevation)

12.6.2. Wet Floodproofing Specifications for Accessory Structures

Wet floodproofing involves using flood-resistant materials below the flood protection elevation and elevating things subject to flood damage above the flood protection elevation. Items that must be installed above the flood protection elevation include electrical boxes, switches and outlets. Only the minimum amount of electrical equipment required by code may be located below the flood protection elevation, and that equipment must be flood damage resistant.

The following specifications can be used when approving a wet floodproofed accessory building. They are limited to small detached garages, sheds and other accessory buildings. [Note: a community can adopt these specifications in its ordinance. If it does, permit applicants would not have to go through the variance procedure.]

There are two precautions to note:

- The community's action does not affect flood insurance rates. A separate policy on a wet floodproofed building can be very expensive.
- Larger or more expensive buildings, attached garages, room additions and similar modifications to a larger building must meet the regular flood protection requirements (e.g., additions to a residential building must be elevated above the flood protection elevation plus any required freeboard).

Here is FEMA's guidance on allowing wet floodproofed accessory structures:

1. The site must be in the flood fringe. No variances may be issued for accessory structures within any designated floodway if any increase in flood levels would result during the base flood.
2. Use of the structure must be limited to parking or limited storage and not used for human habitation.
3. The accessory structure must be built with flood-resistant materials for the exterior and interior building components and elements (i.e., foundation, wall framing, exterior and interior finishes, flooring, etc.) below the flood protection elevation. See Section 12.4.4.
4. The accessory structure must be adequately anchored to prevent flotation, collapse, or lateral movement of the structure. See Section 12.6.2. All of the building's structural components must be capable of resisting specific flood-related forces including hydrostatic, buoyancy, hydrodynamic and debris impact forces.



Handbook for New Mexico Floodplain Managers

5. The accessory structure must meet the NFIP openings requirement spelled out in Section 12.2.7.
6. Any mechanical, electrical, or other utility equipment must be located above the flood protection elevation or floodproofed so that they are contained within a watertight, floodproofed enclosure that is capable of resisting damage during flood conditions.
7. Major equipment, machinery, or other contents must be protected, The rate-of-rise of flood waters or the flood-warning time available through an existing, reliable (community-based or regionally-based) flood warning system must be adequate to provide sufficient lead time to remove and relocate contents to land above the flood protection elevation. A community must make a finding that rate-of-rise of flood waters and/or flood warning is adequate. Protection techniques must be specified:
 - Protection techniques for contents that cannot be relocated in the event of a flood include constructing protective watertight floodproofed areas within the building, the use of equipment hoists for readily elevating contents, or permanently elevating certain contents on pedestals or shelves above the flood protection elevation.
 - For contents that can be relocated, a determination must be made that property owners can safely remove contents at any time, 365 days a year, without risk to lives and that the contents will be relocated to a site out of the floodplain. The site for storing relocated contents should be specified.

For additional guidance, see *Wet Floodproofing Requirements*, FIA-TB-7, FEMA 1993.

12.7. Manufactured Homes

A manufactured home includes a building that is transportable, a mobile home or a “double wide” under the NFIP regulations. The term does not include a “recreational vehicle,” which is defined in Section 12.6.4. The NFIP regulations use the term “manufactured home” to include both mobile homes and prefabricated buildings.

44 CFR 59.1 Definitions: “Manufactured [factory-built] home” means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term “manufactured [factory-built] home” does not include a “recreational vehicle.”

12.7.1. Elevation

Manufactured homes present special problems in flood hazard areas. In the early 1980’s, Pima County, AZ determined that most manufactured homes were economically unrepairable if their floors were flooded for even a few hours. In the late 1990’s it was observed in North Carolina that double-wide manufactured homes that had the insulation below the lowest floor soaked by flood water cost about \$10,000 to repair, even if water never reached the floor level.

Handbook for New Mexico Floodplain Managers

Therefore, the NMFMA model floodplain ordinance requires that manufactured homes placed in floodplains must be elevated so that the *lowest structural member* is elevated at least one foot above the base flood elevation. Since the NMFMA model ordinance provides optional language that all residential buildings must be elevated on fill that is at the base flood elevation, manufactured homes must be elevated at least one foot above that fill.

44 CFR Section 60.3(c)(12) allows for a limited exemption to elevating to the flood protection elevation in pre-FIRM factory-built home parks.



Communities that adopt the provisions of the NMFMA model ordinance will receive CRS credit for freeboard, foundation protection and “Other Higher Standards” (CRS Activity 430)

12.7.2. Anchoring

44 CFR 60.3(c)(6) ...[Manufactured [factory-built] homes must] be elevated on a permanent foundation ... and be securely anchored to an adequately anchored foundation system to resist floatation collapse and lateral movement.

A “permanent foundation” means more than a stack of concrete blocks. It should include the following factors:

- a below-grade footing capable of resisting overturning,
- the depth needs to account for frost depth and expected scour,
- the footing must be sized appropriately for the site’s soil bearing capacity, and
- the design needs to account for seismic and other hazards.

The following types of permanent foundations should be used:

- Reinforced piers
- Posts
- Piles
- Poured concrete walls
- Reinforced block walls

“Adequately anchored” means a system of ties, anchors and anchoring equipment that will withstand flood and wind forces. The system must work in saturated soil conditions. Usually this means over-the-top or frame tie-downs in addition to standard connections to the foundation.

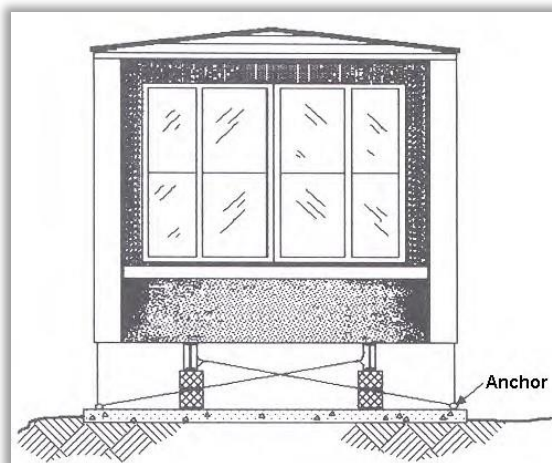


Figure 12-8. Factory-built home tie-downs

See also FEMA’s *Protecting Manufactured Homes from Floods and Other Hazards*, FEMA P-85,



Handbook for New Mexico Floodplain Managers

Second Edition (2009) for additional guidance on anchoring.

12.7.3. Evacuation

In some areas, there is adequate warning time to remove a factory-built home from harm's way. Protecting such property should not be discouraged, so FEMA allows an evacuated factory-built home to be put back on the original site without having to meet the requirements for siting a new building (assuming it was on the site legally). A legally placed existing factory-built home can be returned after an evacuation without being elevated provided it is not enlarged or altered.

12.7.4. Recreational Vehicles

44 CFR 59.1 Definitions: "Recreational vehicle" means a vehicle which is:

- (a) built on a single chassis;**
- (b) 400 square feet or less when measured at the largest horizontal projection;**
- (c) designed to be self-propelled or permanently towable by a light duty truck; and**
- (d) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.**

A recreational vehicle placed on a site in an SFHA must:

- Be on the site for fewer than 180 consecutive days and
- Be fully licensed and ready for highway use. "Ready for highway use" means that it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and has no permanently attached additions.

Otherwise, it must meet the elevation and anchoring requirements for manufactured homes. The purpose of this requirement is to prevent recreational vehicles from being permanently placed in the floodplain unless they are as well protected from flooding as a manufactured home.

The NFIP does not have minimum requirements for recreational vehicle parks or campgrounds other than the limitations on the placement of recreational vehicles. Recreational vehicle parks and campgrounds are often good uses for floodplains, particularly when flooding usually occurs during seasons when these facilities are not in use or where there is plenty of warning time prior to a flood. These facilities should not be permitted in flash flood areas since there may be loss of life if flooding occurs as well as loss of the recreational vehicles.



13. Regulatory Requirements: Existing Buildings

CONTENTS

13.1.	Basic Rule #5.....	13-2
13.2.	Substantial Improvement.....	13-2
13.2.1.	Projects Affected	13-2
13.2.2.	Multiple Projects	13-3
13.2.3.	Post-FIRM Buildings.....	13-3
13.2.4.	The Formula.....	13-4
13.2.5.	Project Cost.....	13-4
13.2.6.	Market Value	13-5
13.3.	Substantial Improvement Examples	13-7
13.3.1.	Example 1. Minor Rehabilitation	13-7
13.3.2.	Example 2. Substantial Rehabilitation.....	13-8
13.3.3.	Example 3. Lateral Addition — Residential	13-9
13.3.4.	Example 4. Lateral Addition — Nonresidential	13-9
13.3.5.	Example 5. Vertical Addition — Residential	13-10
13.3.6.	Example 6. Vertical Addition — Nonresidential	13-11
13.3.7.	Example 7. Post-FIRM Building — Minor Addition.....	13-11
13.3.8.	Example 8. Post-FIRM Building — Substantial Improvement	13-12
13.4.	Substantial Damage.....	13-13
13.4.1.	Cost to Repair	13-13
13.4.2.	Substantial Damage Software	13-14
13.4.3.	Increased Cost of Compliance	13-15
13.5.	Substantial Damage Examples	13-17
13.5.1.	Example 1. Reconstruction of a Destroyed Building	13-17
13.5.2.	Example 2. Substantially Damaged Structure	13-18
13.6.	Exceptions	13-20
13.6.1.	Exempt Expenses	13-20
13.6.2.	Historic Structures	13-20
13.6.3.	Code Violations.....	13-22



13.1. Basic Rule #5

Section 12 focused on the rules and regulations that prevent or reduce damage from floods to new buildings. But what happens when the owner wishes to make an improvement, such as an addition, to an existing building? What if a building is damaged by a fire, flood or other cause?

Basic Rule #5: If the cost of improvements or the cost to repair the damage equals or exceeds 50 percent of the market value of the building, it must be brought up to current floodplain management standards.

Under these conditions, an existing building must meet the requirements for new construction.

People who own existing buildings that are being substantially improved will be required to make a major investment in them in order to bring them into compliance with the law. They often are not happy. If the buildings have just been damaged, they will be financially strapped, and your elected officials will want to find ways to make repairing and rebuilding easier.

For these reasons, it is easy to see that this basic rule can be difficult to administer. It is also the one time when your regulatory program can reduce flood damage to existing buildings.

In this reference, the term “building” is the same as the term “structure” in the NFIP regulations. Your ordinance may use either term. The terms are reviewed in more detail in Section 12.

13.2. Substantial Improvement

44 CFR 59.1. Definitions: “Substantial improvement” means any reconstruction, rehabilitation, addition or other improvement to a structure, the total cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement.

13.2.1. Projects Affected

All building improvement projects worthy of a permit must be considered. These include:

- Remodeling projects
- Rehabilitation projects
- Building additions
- Repair and reconstruction projects (these are addressed in more detail in Section 13.4 on substantial damage)

Note that if part of a building is in the SFHA, the entire building is subject to these provisions.

Handbook for New Mexico Floodplain Managers

If your community does not require permits for minor maintenance, such as reroofing, or projects under a certain dollar amount, then such projects are not subject to the substantial improvement requirements. HOWEVER, if you have a larger project that includes reroofing, etc., then you must include the cost of ALL of the improvements in the cost of the project.

13.2.2. Multiple Projects

One problem you may face is a permit applicant trying to sneak through a loophole by applying for a permit for only part of the job and then later applying for another permit to finish the work. If both applications are together worth more than 50% of the value of the building (and the second permit is applied for less than one year after the first), the combined project should be considered a substantial improvement and subject to the rules. FEMA requires that the entire improvement project be counted as one.

In order to help you enforce this, you may want to count all applications submitted over, say, one year as one project. Check with your attorney on whether your ordinance clearly gives you the authority to do this and be sure to spell it out in the permit papers given to the applicant.

Some communities require that improvements be calculated cumulatively over several years. All improvement and repair projects undertaken over a period of five years, 10 years, or the life of the structure are added up. When they total 50 percent, the building must be brought into compliance as if it were new construction.



The Community Rating System credits keeping track of improvements to enforce a cumulative substantial improvement requirement. It also credits using a lower threshold than 50 percent. These credits are found under Activity 430, Section 431.d and e in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Higher Regulatory Standards* for example regulatory language.

The NFIP's Increased Cost of Compliance benefits are explained in section 13.4.3. One way to receive this benefit is if a building has been repetitively flooded. To make this provision available, the community needs to keep track of multiple repair projects (and have the ordinance language shown in Figure 13-10).

13.2.3. Post-FIRM Buildings

The rules do not address only pre-FIRM buildings — they cover *all* buildings, post-FIRM ones included.

In most cases, a post-FIRM building will be properly elevated or otherwise compliant with regulations for new construction. However, sometimes a map change results in a higher base flood elevation or change in FIRM zone. A substantial improvement to a post-FIRM building may require that the building be elevated to protect it from the new, higher, regulatory flood protection elevation.

It should be remembered that all additions to a post-FIRM building must be elevated at least as high as the flood protection elevation in effect when the building was built. (You cannot



Handbook for New Mexico Floodplain Managers

allow a compliant building to become noncompliant by allowing additions at grade). If a new, higher flood protection elevation has been adopted since the building was built, additions that are substantial improvements must be elevated to the new flood protection elevation.

13.2.4. The Formula

A project is a substantial improvement if:

$$\frac{\text{Cost of improvement project}}{\text{Market value of the building}} > 50 \text{ percent}$$

For example, if a proposed improvement project will cost \$30,000 and the value of the building is \$50,000:

$$\frac{\$30,000}{\$50,000} = 0.6 \text{ (60 percent)}$$

The cost of the project exceeds 50 percent of the building's value, so it is a substantial improvement. The floodplain regulations for new construction apply and the building must meet the post- FIRM construction requirements. If the project is an addition that meets the criteria discussed in sections 13.3.3 and 13.3.4, only the addition has to be elevated.

The formula is based on the cost of the project and the value of the building. These two numbers must be reviewed in detail. Keep good records of the applicant's estimates and your calculations.

13.2.5. Project Cost

The cost of the project means all structural costs, including

- all materials
- built-in appliances
- overhead
- profit
- repairs made to damaged parts of the building worked on at the same time
- labor

A more detailed list is included in Figure 13-1. You must count all work that is done as part of the project, even things that may not normally require a permit, such as the cost of painting.

Labor is the "true" cost of hiring someone to do the job, e.g., the prevailing rates contractors charge. If the owner does it himself or has free help, the "true" cost of that labor must be included.

To determine substantial improvement, you need a detailed cost estimate for the project, prepared by a licensed general contractor, professional construction estimator or your office.

Your office must review the estimate submitted by the permit applicant. To verify it, you can use your professional judgment and knowledge of local and regional construction costs, or you can use building code valuation tables published by the major building code groups. These



Handbook for New Mexico Floodplain Managers

tables can be used for determining estimates for particular replacement items if the type of structure in question is listed in the tables.

There are two exemptions to calculating the cost of an improvement or repair project: 1) improvements to correct pre-identified code violations and 2) historic buildings. These are explained in more detail in Section 13.6.

13.2.6. Market Value

In common parlance, market value is the price a willing buyer and seller agree upon. The market value of a structure reflects its original quality, subsequent improvements, physical age of building components and current condition.

However, market value for property can be different than that of the building itself. Market value of developed property varies widely due to the desirability of its location. For example, two houses of similar size, quality and condition will have far different prices if one is on the coast, or in the best school district, or closer to town than the other — but the value of the building materials and labor that went into both houses will be nearly the same.

For the purposes of determining substantial improvement, market value pertains only to the structure in question. It does not pertain to the land, landscaping or detached accessory structures on the property. Any value resulting from the location of the property should be attributed to the value of the land, not the building.

Acceptable estimates of market value can be obtained from these sources:

- Itemized costs of materials and labor, or estimates of materials and labor that are prepared by licensed contractors or professional construction cost estimators.
- Building valuation tables published by building code organizations and cost-estimating manuals and tools available from professional building cost-estimating services. These sources can be used as long as some limitations are recognized, notably that there are local variations in costs and the sources do not list all types and qualities of structures. These sources should not be used for structures that are architecturally unique, exceptionally large, or significantly different from the classes of structures that are listed.
- “Qualified Estimate” of costs that are prepared by the local official using professional judgment and knowledge of local and regional construction costs. This approach is most often used post-disaster when there are large numbers of damaged buildings and when permits must be quickly processed.

Building owners may submit cost estimates that they prepare themselves. If the community is willing to consider such estimates, owners should be required to provide as much supporting documentation as possible (such as pricing information from lumber companies and hardware stores). In addition, the estimate must include the value of labor, including the value of the owner’s labor.

Some market value estimates are often used only as screening tools (i.e., NFIP claims data and property appraisals for tax assessment purposes) to identify those structures where the

Handbook for New Mexico Floodplain Managers

substantial improvement ratios are obviously less than or greater than 50 percent (i.e., less than 40 percent or greater than 60 percent). For structures that fall in the 40 percent to 60 percent range, more precise market value estimates are sometimes necessary.

Items to be included:

- Labor and other costs associated with demolishing, moving, or altering building components to accommodate improvements, additions, and making repairs
- Costs associated with complying with any other regulations or code requirement that is triggered by the work, including costs to comply with the requirements of the Americans with Disabilities Act (ADA)
- Costs associated with elevating a structure when the proposed elevation is lower than the BFE
- Construction management and supervision
- Contractor's overhead and profit
- Sales taxes on materials
- Structural elements and exterior finishes, including
 - Foundations (e.g., spread or continuous foundation footings, perimeter walls, chain walls, pilings, columns, posts, etc.)
 - Monolithic or other types of concrete slabs
 - Bearing walls, tie beams, trusses
 - Joists, beams, subflooring, framing, ceilings
 - Interior non-bearing walls
 - Exterior finishes (e.g., brick, stucco, siding, painting, and trim)
 - Windows and exterior doors
 - Roofing, gutters, and downspouts
 - Hardware
 - Attached decks and porches
- Interior finish elements, including:
 - Floor finishes (e.g., hardwood, ceramic, vinyl, linoleum, stone, and wall-to-wall carpet over subflooring)
 - Bathroom tiling and fixtures
 - Wall finishes (e.g., drywall, paint, stucco, plaster, paneling, and marble)
 - Built-in cabinets (e.g., kitchen, utility, entertainment, storage, and bathroom)
 - Interior doors
 - Interior finish carpentry
 - Built-in bookcases and furniture
 - Hardware
 - Insulation
- Utility and Service equipment, including:
 - Heating, ventilation, and air conditioning (HVAC) equipment
 - Plumbing fixtures and piping
 - Electrical wiring, outlets, and switches
 - Light fixtures and ceiling fans
 - Security systems
 - Built-in appliances
 - Central vacuum systems
 - Water filtration, conditioning, and recirculation systems

Figure 13- 1a. Items included in calculating cost of the project.

Items to be excluded:

- Clean-up and trash removal (Section 4.4.)
- Costs to temporarily stabilize a building so that it is safe to enter to evaluate and identify required repairs
- Costs to obtain or prepare plans and specifications
- Land survey costs
- Permit fees and inspection fees
- Carpeting and recarpeting installed over finished flooring such as wood or tiling
- Outside improvements, including landscaping, irrigation, sidewalks, driveways, fences, yard lights, swimming pools, pool enclosures, and detached accessory structures (e.g., garages, sheds, and gazebos)
- Costs required for the minimum necessary work to correct existing violations of health, safety, and sanitary codes (Section 4.4.8)
- Plug-in appliances such as washing machines, dryers, and stoves

Figure 13- 1b. Items excluded in calculating cost of the project.

13.3. Substantial Improvement Examples

13.3.1. Example 1. Minor Rehabilitation

A rehabilitation is defined as an improvement made to an existing structure which does not affect the external dimensions of the structure.

If the cost of the rehabilitation is less than 50 percent of the structure's market value, the building does not have to be elevated or otherwise protected. However, it is advisable to incorporate methods to reduce flood damage, such as use of flood-resistant materials and installation of electrical, heating and air conditioning units above the flood protection elevation.

Figure 13-2 shows a building that had a small rehabilitation project. Central air conditioning was installed and the electrical system was upgraded. The value of the building before the project was

\$60,000. The value of the project was \$12,000:

$\frac{\$12,000}{\$60,000} = 0.2$ (20 percent)

The project costs less than 50 percent of the building, so this is not a substantial improvement.

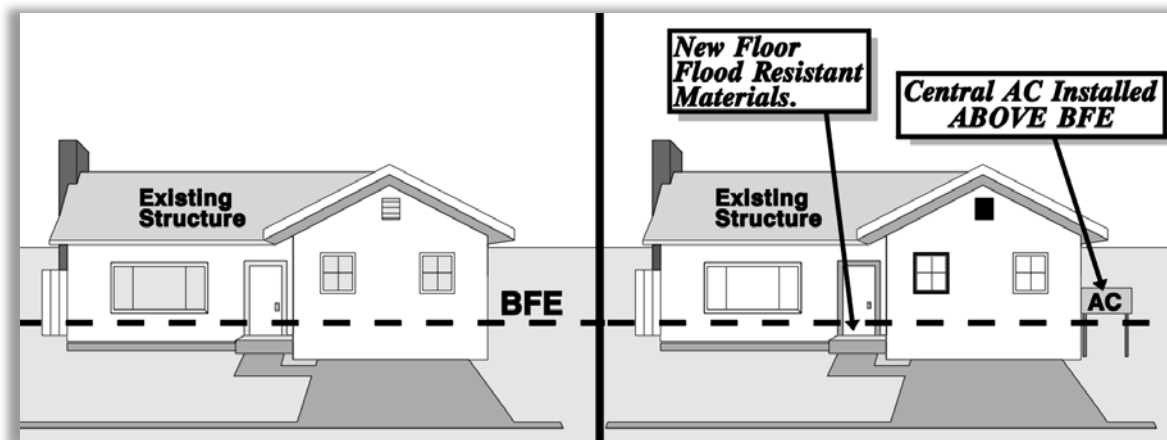


Figure 13-2. Minor rehabilitation using flood-resistant methods and materials. Neither structure would benefit from post-FIRM flood insurance rates because they are not elevated.

13.3.2. Example 2. Substantial Rehabilitation

If the rehab costs more than 50 percent of the value of the building, your ordinance requires that an existing structure be elevated and/or the basement filled to meet the elevation standard.

Figure 13-3 shows a building that has been allowed to run down. Its market value is \$35,000. To rehabilitate it will require gutting the interior and replacing all wallboard, built-in cabinets, bathroom fixtures and furnace. The interior doors and flooring will be repaired. The house will get new siding and a new roof. The cost of this rehab will be \$25,000:

$$\frac{\$25,000}{\$35,000} = 71.4 \text{ percent}$$

Because total cost of the project is greater than 50 %, the rehab is a substantial improvement

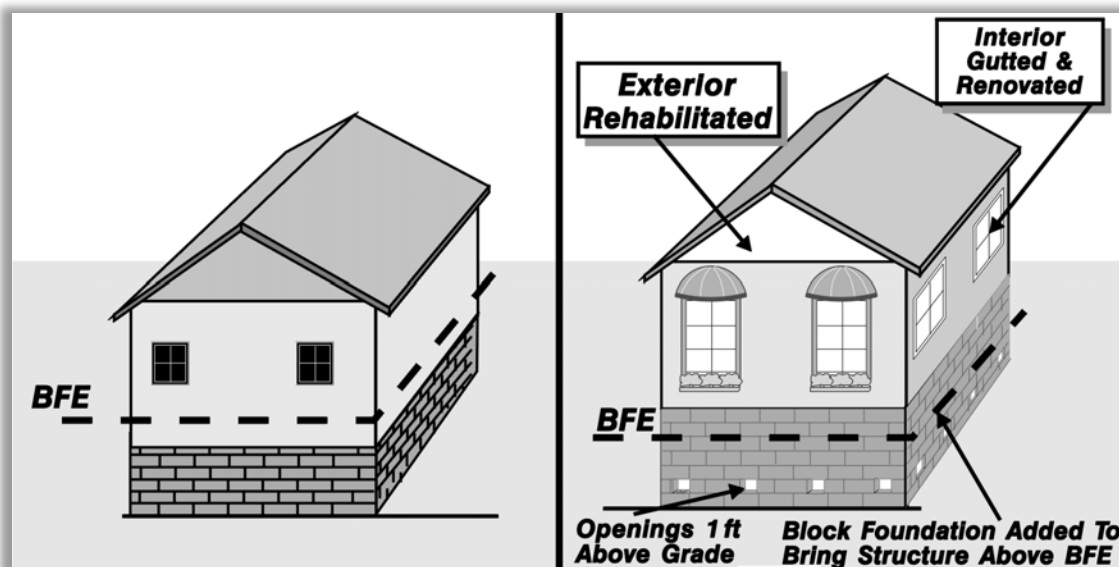


Figure 13-3. Substantially rehabilitated building elevated above the base flood elevation. The new structure would not benefit from post-FIRM flood elevation rates.

Handbook for New Mexico Floodplain Managers

13.3.3. Example 3. Lateral Addition — Residential

Additions are improvements that increase the square footage of a structure. Commonly, this includes the structural attachment of a bedroom, den, recreational room garage or other type of addition to an existing structure.

When an *ADDITION* is a substantial improvement (i.e., either worth more than 50% of the original building or it increases the original floor area by 25%), the addition must be elevated or flood-proofed, providing that improvements to the *existing* structure are minimal. Figures 13-4 and 13- 5 illustrate lateral additions that are compliant.

Depending on the flood zone and details of the project, the existing building may not have to be elevated. The determining factors are the common wall and what improvements are made to the existing structure. If the common wall is demolished as part of the project, then the entire structure must be elevated. If only a doorway is knocked through it and only minimal finishing is done, then only the addition has to be elevated.

In A Zones only, if significant improvements are made to the existing structure (such as a kitchen makeover), both it and the addition must be elevated and otherwise brought into compliance. Some communities require that both the existing structure and lateral additions be elevated in all cases.

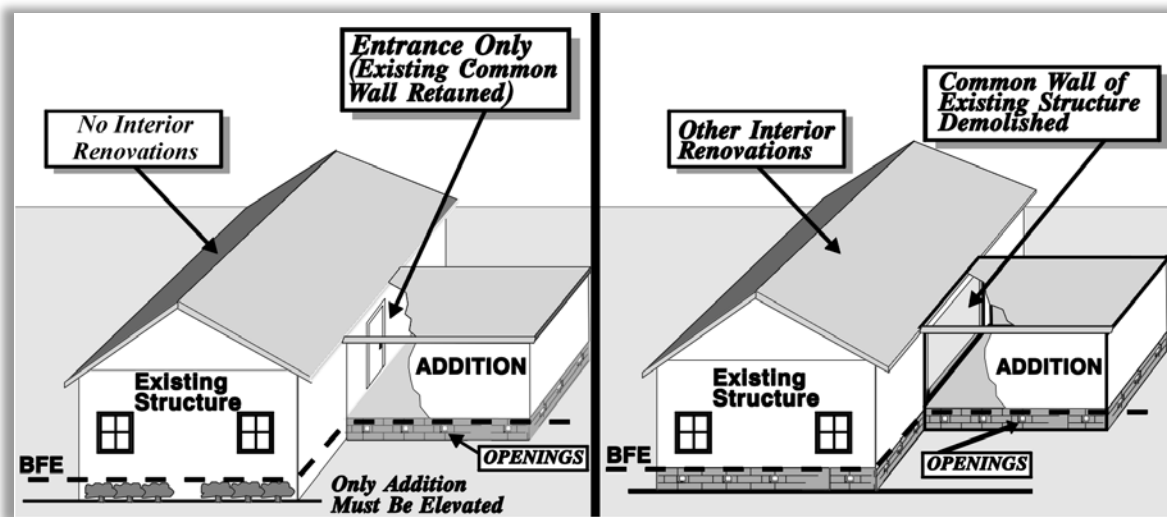


Figure 13-4. Lateral additions to a residential building in an A Zone. The structure on the left would not benefit from the post-FIRM flood insurance rates because it was not elevated.

13.3.4. Example 4. Lateral Addition — Nonresidential

A substantial improvement addition to a nonresidential building may be either elevated or floodproofed. See Section 12.4 for the requirements for floodproofing. Otherwise, all the criteria for residential buildings reviewed in Example 3 must be met.

Handbook for New Mexico Floodplain Managers

If floodproofing is used, the builder must ensure that the wall between the addition and the original building is floodproofed.

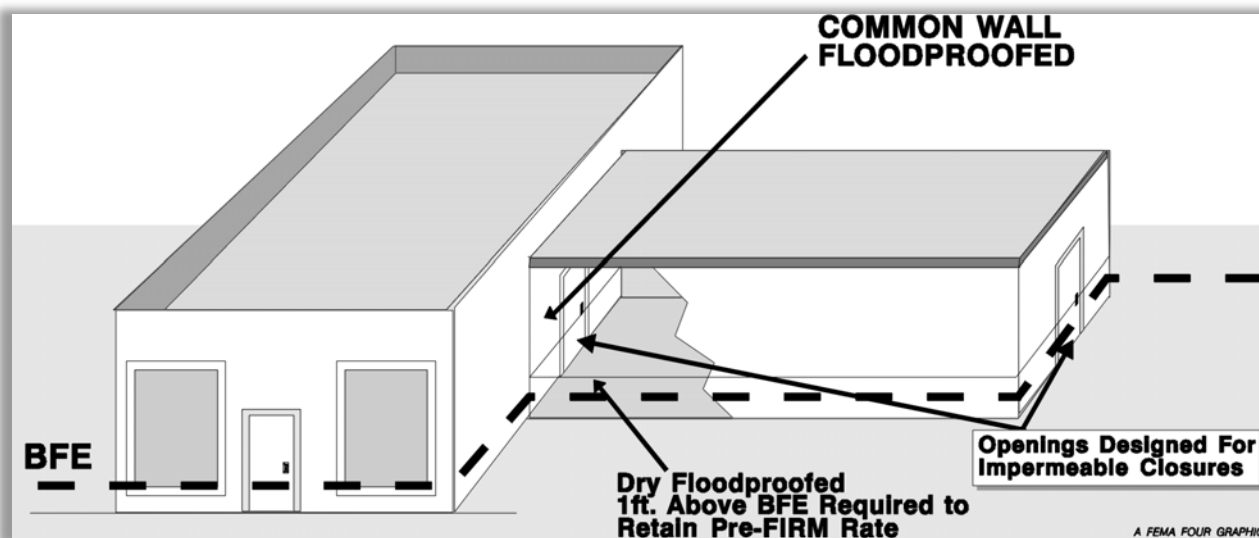


Figure 13-5. Lateral addition to a nonresidential building in an A Zone. The structure would not benefit from post-FIRM flood insurance rates because the original building was not elevated or floodproofed.

13.3.5. Example 5. Vertical Addition — Residential

When the proposed substantial improvement is a full or partial second floor, the entire structure must be elevated (Figure 13-6). In this instance, the existing building provides the foundation for the addition. Failure of the existing building would result in failure of the addition, too.

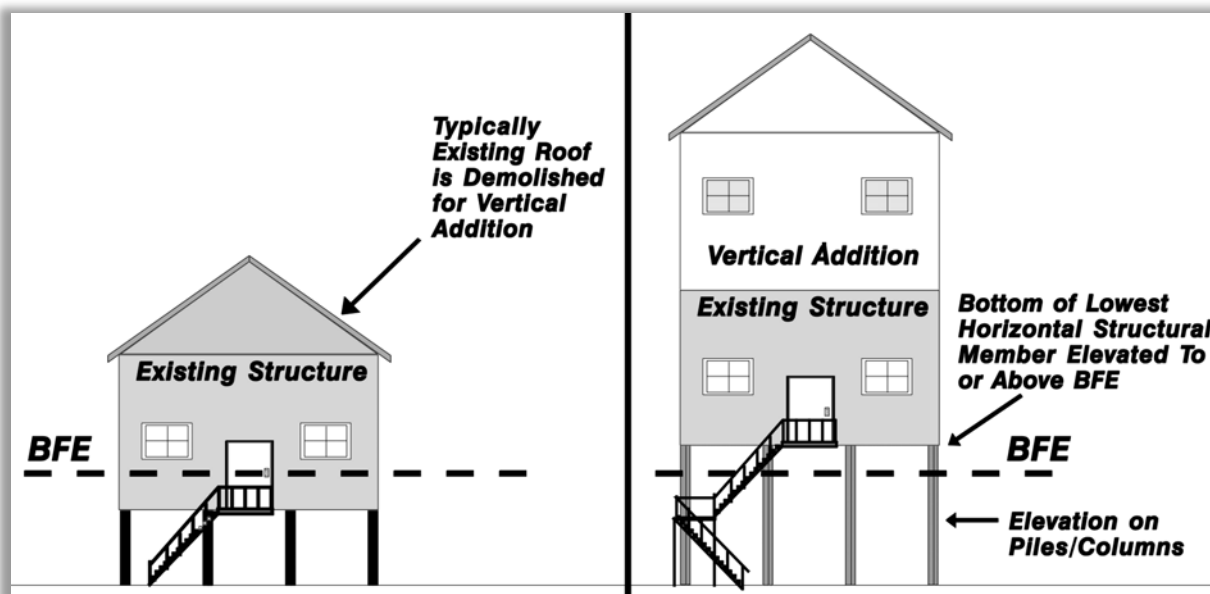


Figure 13-6. Vertical addition to a residential building. The new structure would benefit from post-FIRM flood insurance rates.

Handbook for New Mexico Floodplain Managers

13.3.6. Example 6. Vertical Addition — Nonresidential

When the proposed substantial improvement is a full or partial second floor, the entire structure must be elevated or floodproofed (Figure 13-7).

The owner could obtain post-FIRM rates on the building if it is floodproofed to one foot above the base flood elevation and he/she has a floodproofing certificate signed by a licensed professional engineer. An optional approach is to elevate the entire building and obtain an elevation certificate.

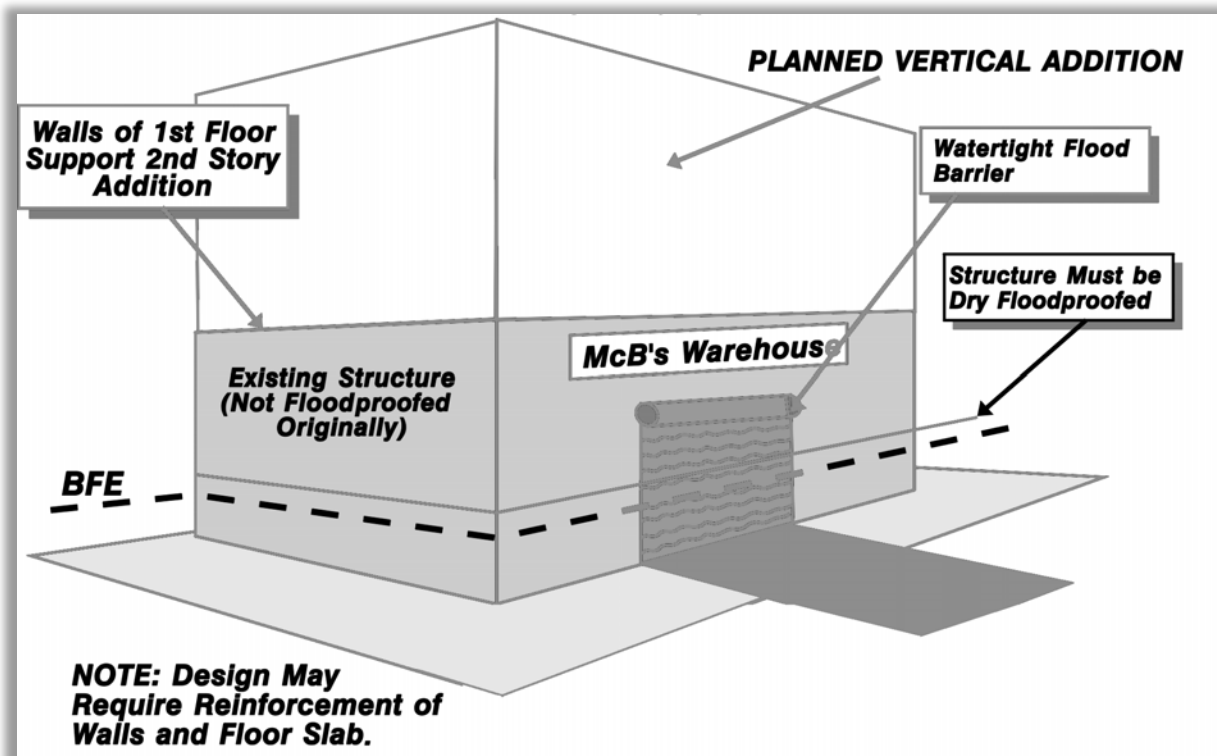


Figure 13-7. Vertical addition to a nonresidential building. The new floodproofed structure would benefit from post-FIRM flood insurance rates.

13.3.7. Example 7. Post-FIRM Building — Minor Addition

ALL additions to post-FIRM buildings are defined as new construction and must meet the requirements of your floodplain management ordinance regardless of the size or cost of the addition (Figure 13-8). A small addition to a residential structure must be elevated at least as high as the flood protection elevation in effect when the building was built.

If a map revision has taken place and the base flood elevation has increased, only additions that are substantial improvements have to be elevated to the new flood protection elevation.

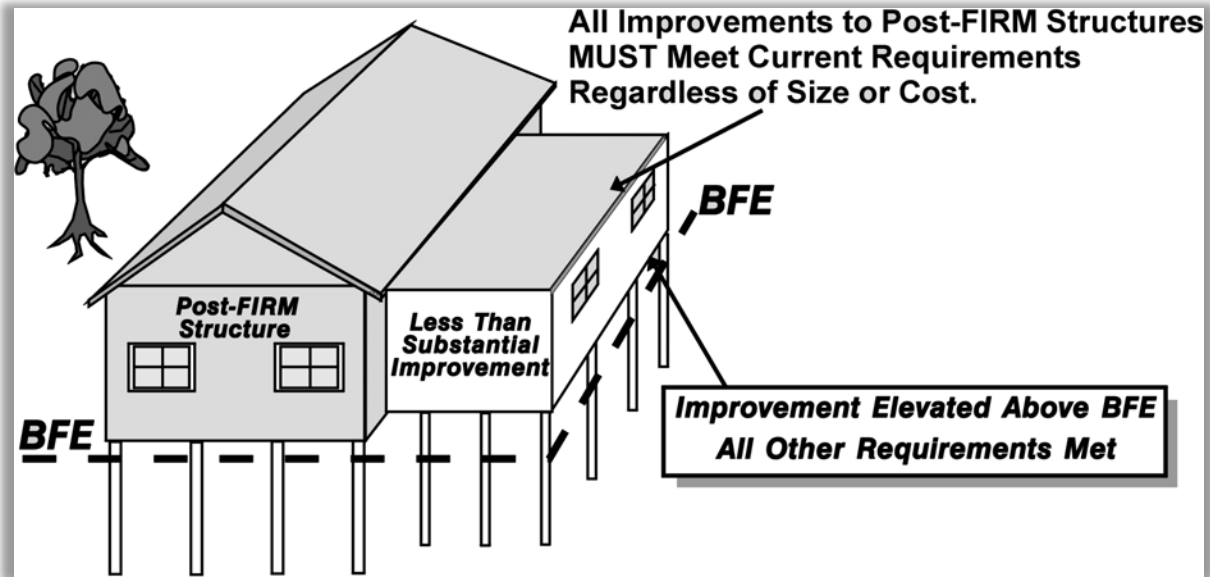


Figure 13-8. Small additions to post-FIRM buildings must be elevated.

13.3.8. Example 8. Post-FIRM Building — Substantial Improvement

Substantial improvements made to a post-FIRM structure must meet the requirements of the current ordinance. Figure 13-9 shows a lateral addition made after a map revision took place and the base flood elevation (BFE) was increased.

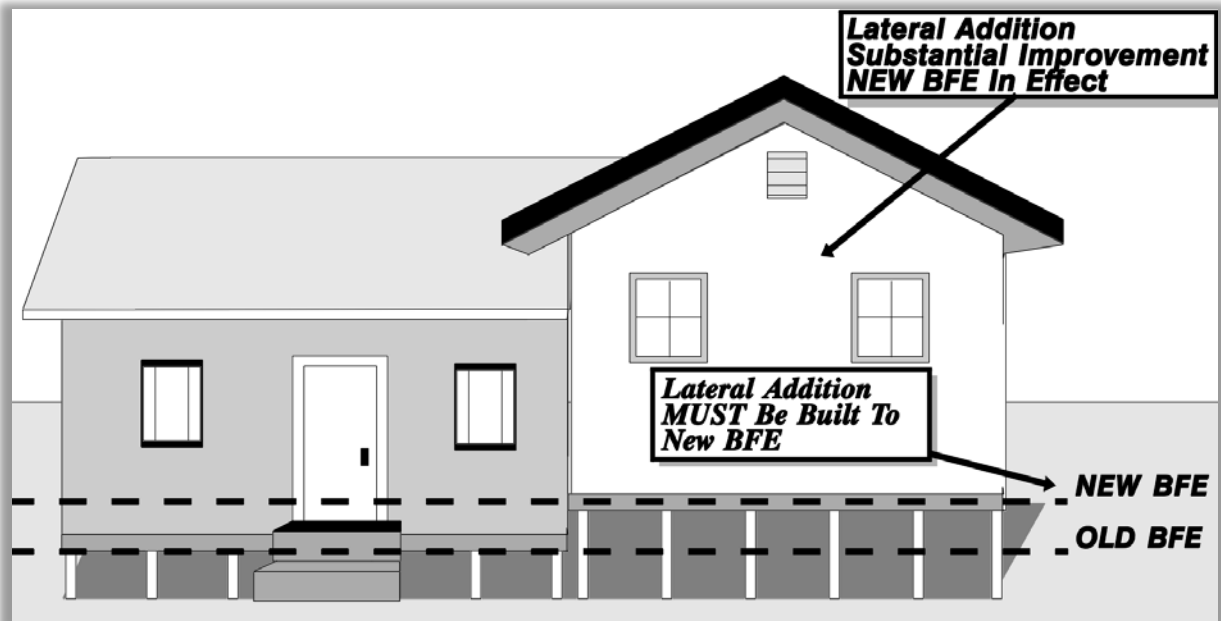


Figure 13-9. Substantial improvements to post-FIRM buildings must be elevated above the new base flood elevation.
Nonresidential buildings may be floodproofed.

13.4. Substantial Damage

44 CFR 59.1. Definitions: “Substantial damage” means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

Two key points:

- The damage can be from any cause — flood, fire, earthquake, wind, rain, or other natural or human-induced hazard.
- The substantial damage rule applies to all buildings in a flood hazard area, regardless of whether the building was covered by flood insurance.

The formula is essentially the same as for substantial improvements:

$$\frac{\text{Cost to repair}}{\text{Market value of the building}} > 50 \text{ percent}$$

Market value is calculated in the same way as for substantial improvements. Use the pre-damage market value.

13.4.1. Cost to Repair

Notice that the formula uses “cost *to* repair,” not “cost *of* repairs.” The cost to repair the structure must be calculated for full repair to the building’s *BEFORE-DAMAGE* condition, even if the owner elects to do less. It must also include the cost of any improvements that the owner has opted to include during the repair project.

The total cost to repair includes the same items listed in Figure 13-1.a. As shown in Example 2 in Section 13.5.2, properly repairing a flooded building can be more expensive than people realize. The owner may opt not to pay for all of the items needed. Even if the owner does some of the work himself, obtains some of the materials free, has a volunteer organization do some of the work or decides not to do some repairs, you must calculate the cost to repair based on the going market costs of the work.

In short, substantial damage is determined regardless of the actual cost to the owner. You must figure the true cost of bringing the building back to its pre-damage condition using qualified labor and materials obtained at market prices.

The permit office and the owner may have serious disagreements over the total list of needed repairs and their cost, as the owner has a great incentive to show less damage than actually occurred in order to avoid the cost of bringing the building into compliance. Here are four things that can help you:

- Get the cost to repair from an objective third-party or undebatable source, such as:
 - A licensed general contractor.
 - A professional construction estimator.



Handbook for New Mexico Floodplain Managers

- Insurance adjustment papers. (exclude damage to contents)
- Damage assessment field surveys conducted by building inspection, emergency management or tax assessment agencies after a disaster.
- Your office.
- Even if your office does not prepare the cost estimate, it needs to review the estimate submitted by the permit applicant. You can use your professional judgment and knowledge of local and regional construction costs. Or, you can use building code valuation tables published by the major building code groups.
- Use an objective system that does not rely on varying estimates of market value or different opinions of what needs to be repaired. The Residential Substantial Damage Estimator Program discussed later in this section will do this.
- Publicize the need for the regulations and the benefits of protecting buildings from future flooding. A well-educated public won't argue as much as one that sees no need for the requirement.
- Help the owner find financial assistance to meet the extra cost of complying with the code. If there was a disaster declaration, there may be sources of financial assistance as discussed in Section 23. If the owner had flood insurance and the building was substantially damaged by a flood, the new Increased Cost of Compliance coverage will help. (see Section 13.4.3)

13.4.2. Substantial Damage Software

FEMA developed the Substantial Damage Estimator (SDE) to provide estimates of building values and costs to repair. In general, this method is most often used in the post-disaster period when local officials need to inspect large numbers of damaged structures and make many substantial damage determinations.

FEMA's SDE software offers a formalized approach to develop reasonable estimates of building values and reasonable estimates of the cost to repair or reconstruct buildings. The SDE enables local officials to calculate a reasonable and defensible estimate of whether a building has been substantially damaged. Local officials can use these results from the software to make substantial damage determinations.

The SDE is described in the FEMA Substantial Damage Estimator (FEMA P-784 CD). This publication includes a User's Manual and a Field Workbook. Together they focus on using the SDE tool to perform field evaluations and post-event data collection, as well as pre-planning before an event.

Originally developed for single-family homes and manufactured homes, the 3.0 version of SDE now includes a component that will allow it to be used for common non-residential structures (e.g., office buildings, strip malls, restaurants, grocery stores, convenience stores, department stores, schools, etc.). However, SDE is not designed for estimating damage to unique buildings and buildings designated by State or Federal entities as "historic structures." The SDE also is an effective tool to use even if only one or a few buildings are damaged. The SDE Field



Handbook for New Mexico Floodplain Managers

Workbook includes worksheets that are useful even if the software is not used. SDE includes worksheets for single/multi-family buildings, manufactured homes, and certain non-residential buildings.

The SDE tool can be downloaded from FEMA's website.

13.4.3. Increased Cost of Compliance (ICC)

NFIP flood insurance policies on buildings include ICC coverage. This coverage was authorized by Congress to help pay the added costs of bringing buildings that are repetitively or substantially damaged by flooding into compliance with the community's floodplain management requirements for new construction.

ICC claims are paid after direct physical loss caused by flooding and:

- The building is determined by the community to be substantially damaged, or
- If the community has adopted a "repetitive loss" or cumulative substantial improvement provision that requires compliance based on flood damage that occurs two times in a 10-year period ending on the second event, where the cost to repair the damage equals or exceeds 50 percent of the building's pre-damage market value on each occurrence.

ICC payments are made to help pay for the following mitigation options that bring buildings into compliance:

- Elevation (including freeboard if required by the community)
- Relocation
- Demolition
- Dry floodproofing (non-residential buildings only)

Guidance on ICC is available in FEMA 301, Increased Cost of Compliance Coverage: Guidance for State and Local Officials. This publication describes the coverage, conditions of eligibility, and the claims process. The roles of the insurance agent, claims adjuster, and policyholder are described. The community's role is described in detail, including the following:

- Requiring compliance with all NFIP and local requirements.
- Collecting information and making substantial damage determinations.
- Informing property owners about the requirement to bring buildings into compliance and working with them to determine the appropriate options to achieve compliance.

An ICC claim can be made regardless of whether a flood results in a Presidential disaster declaration.

In 2010, the ICC coverage could provide up to \$30,000 towards the cost of bringing certain flood-damaged buildings into compliance.

In order for an ICC claim to be paid:

- Local officials must make SD determinations and work with owners to develop measures to bring buildings into compliance.
- Owners must file an ICC claim.
- Adjusters must verify key information and process claims.
- The community issues permits for the work.

Handbook for New Mexico Floodplain Managers

- Providing the property owner/policyholder a letter with the substantial damage determination; the owner then provides a copy to the claims adjuster to process the ICC claim.
- Issuing permits and inspecting construction.
- Performing final inspections and issuing certificates of occupancy or letters that state the building has been brought into compliance and that no variance was granted; this evidence is required before policyholders can receive the final installment of their ICC claim payments.



The Community Rating System credits keeping track of improvements to enforce a cumulative substantial improvement requirement. The 2017 *CRS Coordinator's Manual* credits the ordinance language in Figure 13-10. These credits are found under Activity 430, Section 432.d in the *CRS Coordinator's Manual* and the *CRS Application*.

Sample Repetitive Loss Definitions

There are two ways to meet the NFIP floodplain management criteria for repetitive loss:

- Adopt a repetitive loss provision in the existing floodplain management ordinance, then modify the existing substantial improvement definition currently in the floodplain management ordinance.
- Modify the existing substantial damage definition.

Adopt the following definition:

"Repetitive loss" means flood-related damages sustained by a structure on two separate occasions during a 10-year period for which the cost of repairs at the time of each such flood event, on the average, equals or exceeds 25 percent of the market value of the structure before the damage occurred.

THEN . . .

Modify the "substantial improvement" definition as defined in the NFIP Floodplain Management Regulations at 44 CFR 59.1 in a State or community floodplain management ordinance as follows:

"Substantial improvement" means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement. This term includes structures which have incurred repetitive loss or substantial damage, regardless of the actual repair work performed.

OR . . .

Modify the "substantial damage" definition as defined in the NFIP Floodplain Management Regulations at 44 CFR 59.1 in a State or community floodplain management ordinance as follows:

"Substantial damage" means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. "Substantial damage" also means flood-related damages sustained by a structure on two separate occasions during a 10-year period for which the cost of repairs at the time of each such flood event, on the average, equals or exceeds 25 percent of the market value of the structure before the damaged occurred.

Source: *Guidance for State and Local Officials -- Increased Cost of Compliance Coverage*, FEMA, 2003. This language is only needed to trigger an ICC payment for a repetitive loss. No ordinance changes are needed for the ICC coverage for substantial damage incurred by a single flood.

Figure 13-10. Sample ordinance language for ICC repetitive loss definition.

13.5. Substantial Damage Examples

13.5.1. Example 1. Reconstruction of a Destroyed Building

Reconstructions are cases where an entire structure is destroyed, damaged, purposefully demolished or razed, and a new structure is built on the old foundation or slab. The term also applies when an existing structure is moved to a new site. Reconstructions are, quite simply, "new construction." They must be treated as new buildings.

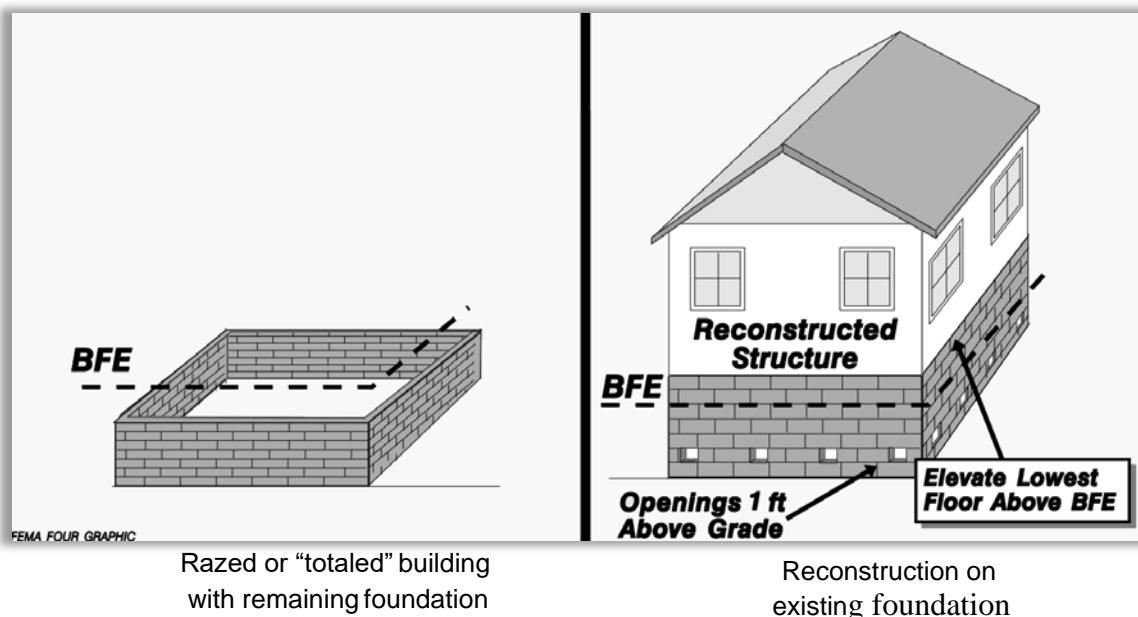


Figure 13-11. A reconstructed house is new construction.

The Plainfield Tornado

In 1990, Plainfield, Illinois was hit by a tornado. Twenty buildings in the Village's floodway were destroyed. The village used the substantial damage requirements and funding assistance from FEMA disaster assistance and State programs to encourage residents to not rebuild. Eventually all 20 properties were acquired and the floodway development was converted to public open space.

13.5.2. Example 2. Substantially Damaged Structure

To determine if a damaged structure meets the threshold for substantial damage, the cost of repairing the structure to its before-damaged condition is compared to the market value of the structure prior to the damage. The estimated cost of the repairs must include all costs necessary to fully repair the structure to its before-damaged condition.

If equal to or greater than 50 percent of that structure's market value before damage, then the structure must be elevated (or floodproofed if it is nonresidential) to or above the level of the base flood, and meet other applicable local ordinance requirements. This is the basic requirement for substantial damage.

Handbook for New Mexico Floodplain Managers

Figure 13-12 graphically illustrates the amount of damage that can occur to a building flooded only four feet deep. Even though the structure appears sound and there are no cracks or breaks in the foundation, the total cost of repair can be significant.



Figure 13-12. Even slow moving floodwater can cause substantial damage.

The cost of repair after a flood that simply soaked the building will typically include the following structural items:

- Remove all wallboard and insulation.
- Install new wallboard and insulation.
- Tape and paint.
- Remove carpeting and vinyl flooring.
- Dry floor, replace warped flooring.
- Replace cabinets in the kitchen and bathroom.
- Replace built-in appliances.
- Replace hollow-core interior doors.
- Replace furnace and water heater.
- Clean and disinfect duct work.
- Repair porch flooring and front steps.
- Clean and test plumbing. (licensed plumber may be required)
- Replace outlets and switches, clean and test wiring. (licensed electrician may be required)

The longer the water is in the building, the more damage it will cause. It can “wick” up the



Handbook for New Mexico Floodplain Managers

walls and damage a wallboard ceiling that is several feet above the high water line (see Figure 1-19). Standing water (or the moisture it brings) causes warping, mold, and mildew that add to the cost of repair.

Note: See also Figures 17-2 through 17-7 for what happens to flood insurance premiums if a substantially damaged building is granted a variance and is not brought up to post-FIRM standards.

13.6. Exceptions

As explained in previous sections, the substantial improvement and substantial damage requirements affect all buildings regardless of the reason for the improvement or the cause of the damage. There are three exceptions to this: exempt expenses, historic buildings and projects required by code.

13.6.1. Exempt Expenses

Certain activities related to making improvements or repairing damaged buildings do not have to be counted toward the cost of the improvement or repairs. These include:

- Clean-up and trash removal
- Costs to temporarily stabilize a building so that it is safe to enter to evaluate and identify required repairs
- Costs to obtain or prepare plans and specifications
- Land survey costs
- Permit fees and inspection fees
- Carpeting and recarpeting installed over finished flooring such as wood or tiling
- Outside improvements, including landscaping, irrigation, sidewalks, driveways, fences, yard lights, swimming pools, pool enclosures, and detached accessory structures (e.g., garages, sheds, and gazebos)
- Costs required for the minimum necessary work to correct existing violations of health, safety, and sanitary codes
- Plug-in appliances such as washing machines, dryers, and stoves

13.6.2. Historic Structures

The NFIP gives special consideration to the unique value of designated historic buildings and structures. Provided such structures retain their designations, communities do not have to require them to be brought into compliance if they will be substantially improved or have been substantially damaged. Figure 13-13 includes the NFIP's definition for "historic structures." The term includes structures that are: (1) listed or preliminarily determined to be eligible for listing in the National Register of Historic Places; (2) certified or preliminarily determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as a registered



Handbook for New Mexico Floodplain Managers

historic district; or (3) designated as historic site under a State or local historic preservation program that is approved by the Secretary of the U.S. Department of Interior. The definition does not include structures that are merely old, those that residents refer to as historic, or those that happen to be located in historic districts.

The NFIP floodplain management requirements contain two provisions that are intended to provide relief for historic structures located in SFHAs:

1. The NFIP definition of “substantial improvement” includes the following exclusion for historic structures: “Any alteration of a ‘historic structure,’ provided that the alteration will not preclude the structure’s continued designation as an ‘historic structure.’” The exclusion also applies to historic structures that have been substantially damaged. This provision allows communities to exempt historic structures from the SI/SD requirements of the NFIP.
2. The other provision of the NFIP floodplain management regulations that provides relief for historic structures” is the variance criteria at 44 CFR § 60.6(a). This provision states: “Variances may be issued for the repair or rehabilitation of historic structures upon a determination that the proposed repair or rehabilitation will not preclude the structure’s continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.” This provision allows communities to handle applications for work on historic structures by issuing variances.

To address the unique needs of preserving historic structures, communities may elect to use one of the two approaches, either granting variances or exempting historic structures from the SI/ SD requirements. Whichever approach is selected, it must be used in all cases when improvements or repairs are proposed for historic structures.

Using the variance option allows communities to evaluate individual requests and place conditions on the variance to make historic buildings more flood damage-resistant and to minimize flood damage. However, such conditions should not affect the historic character and design of the building.

It is important to note that additions to historic structures that are located in floodways require additional attention. While additions may not have to meet the substantial improvement requirements, they must still satisfy the NFIP requirements related to floodway encroachments. A floodway encroachment analysis must be provided to demonstrate that an addition will not cause any increase in the BFE.

Applications for improvements to historic structures should be accompanied by two pieces of evidence: (1) documentation that confirms the building is designated a historic structure; and (2) documentation that confirms the proposed work will not preclude the structure’s continued designation. Applicants can ask the appropriate qualified entity that makes such designations to review their construction plans. A copy of the findings should be kept in the community’s permanent records.

Although compliance is not required for substantial improvement of historic structures,



Handbook for New Mexico Floodplain Managers

owners should carefully consider the benefits of implementing measures to minimize flood damage. State historic preservation agencies may have resources to help owners evaluate feasible measures. Historic buildings can be elevated on raised foundations, relocated to sites outside of SFHAs, or retrofitted with measures that reduce risk from flooding. FEMA's Floodplain Management Bulletin: Historic Structures (FEMA P-467-2) provides guidance for communities and owners of historic structures.

13.6.3. Code Violations

44 CFR 59.1 Definitions: "Substantial improvement" means The term does not, however, include ... Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions.

The definition of substantial improvement provides an exclusion for "[a]ny project for improvement of a structure to correct existing violations of State or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions" (emphasis added).

When deciding whether to exclude the costs to correct existing cited health, safety, and sanitary code violations, local officials must consider the following:

- Correct existing cited violations. The work must be:
 - Limited to that necessary to correct an existing violation. This means that only work that is directly required for correction can be excluded from the costs of the proposed improvement or repair. All other work must be counted in the estimation of costs.
 - Required to correct an existing violation. This means the condition considered in violation pre-dates the application for a permit (or the date of a damage event) and, importantly, an official who has the authority to enforce the community's health, safety, and sanitary codes must have prior knowledge of the condition and must have verified that it constitutes a violation.
 - Required to correct an existing violation. Violations of a community's health, safety, and sanitary represent threats to public health and safety. Such conditions are considered violations only if they have been identified as violations. The mere presence of a condition that does not conform to current codes does not qualify as a violation.
- Identified by the local code enforcement official. To exclude certain costs from the SI/SD determination, an official who has the authority to enforce the community's health and sanitary codes must have knowledge of and have identified the condition, and must have verified or determined that the condition constitutes a violation (normally, this involves issuing a citation or other official notice). Communities might not make a routine practice of inspecting structures in order to document and issue citations for violations. If likely violations of health and sanitary codes are identified by



Handbook for New Mexico Floodplain Managers

the property owner or contractor during the course of deciding what work to perform and before any improvements or repairs are made, the costs to address those code violations may be excluded, but only if the local official has made the determination that they can be excluded.

- Minimum necessary to ensure safe living conditions. To qualify as excludable, the cost of correcting existing violations must be only those costs for the work that is the minimum necessary to address and resolve the violation. Costs of work in excess of the minimum necessary must be included in the SI/SD determination.

For proper treatment of this substantial improvement exclusionary provision, a clear distinction must be made between violations and elements that simply do not meet the present-day design or building code standards. The following examples describe situations where the work performed to meet code requirements must be included in SI/SD determinations and some situations where costs may be excluded:

- Work on a building, or work associated with a change in use or occupancy, may trigger requirements for compliance with the current code. When this occurs, the costs associated with compliance do not qualify for exclusion because the work is not a code violation but is necessary to meet current code. For example, consider an applicant who applies for a permit to perform work necessary for a change of occupancy from retail space to a restaurant. This will trigger certain code requirements and those costs must be included in the SI/SD determination. Costs that are related to compliance with current code requirements but are not related to correcting existing violations must be included.
- The owner of a poorly insulated building proposes to rehabilitate it for a new occupant. Although the building does not conform to the current code for energy efficiency, the costs of adding insulation and other energy efficiency work must be included because the lack of adequate insulation is not a health and safety violation.
- An owner proposes to improve a building and has applied for a permit. The owner presents the building official with evidence of termite damage. Termite damage is discovered in the floor joints and the joists are unable to safely support loads required by current code. The building official verifies that it constitutes a violation and cites it as a safety code violation. The minimum cost to correct this violation may be excluded if the violation was cited. If other building components have sustained termite damage that is not a safety code violation, such as damage to non-bearing wall studs and wall trim, the cost to address the damage must be included.
- A restaurant's plumbing system is failing and bathroom fixtures are inoperable. The condition is cited as a violation of the sanitary code. The owner proposes not only to correct the violation but make other improvements, including adding a second bathroom. The costs to correct the failing plumbing system and replace its fixtures may be excluded. The costs of the other improvements, including the second bathroom, must be included.
- In the course of inspecting an abandoned building, the code official cites several



Handbook for New Mexico Floodplain Managers

conditions as violations that must be corrected before the building can be reoccupied. The building is subsequently purchased and the new owner applies for a permit to not only address the violations, but also to rehabilitate the building. Only the costs to correct the cited violations that are explicitly related to health, sanitary, and safety code requirements may be excluded. All other costs associated with the rehabilitation must be included in the cost of improvements.

- The owner of a home has been notified that the home is not safe to occupy because of violations of the electrical code provisions. Rather than perform only the required repairs, the owner decides to completely renovate the home and submits an application that shows all renovation costs, while excluding the costs associated with all of the electrical work (including replacing all wiring and fixtures, installing more outlets, upgrading the panel board, etc.). The plan reviewer should catch this discrepancy. The only costs that may be excluded are those that are necessary to correct the violation – which means the costs associated with the code violation must be determined before they can be excluded from the SI/SD determination. All other costs associated with the upgrade of the electrical work must be included.

Example: A small business in a 40-year old building was damaged by a fire. The building's pre-fire market value was \$100,000. The insurance adjuster and the permit office concluded that the total cost to repair would be \$45,000.

The business is in an urban renewal area. The City had inspected it and cited the following violations:

- Replace unsafe electrical wiring.
- Install missing fire exit signs, smoke detectors and emergency lighting.
- Inadequate bathrooms.

The total cost of these code requirements would be \$8,000. However, since the citation was issued before the fire occurred, they would not have to be counted toward the cost to repair. Based on the basic formula:

$$\frac{\$45,000}{\$100,000} = 0.45 \text{ or } 45\% \quad \text{The building is not declared substantially damaged}$$

In this example, the building can be repaired without elevating or floodproofing. However, the permit office should strongly recommend incorporating flood protection measures and flood resistant materials in the repair project (as in the example in Figure 13-2).



14. Additional Regulatory Standards

CONTENTS

14.1.	NFIP Planning Considerations	14-2
14.2.	Location Restrictions	14-3
14.2.1.	Highly Hazardous Areas	14-3
14.2.2.	Subdivision Design	14-3
14.2.3.	Setbacks	14-6
14.2.4.	Factory Built Homes	14-6
14.2.5.	Natural Areas	14-7
14.2.6.	Low-Density Zoning	14-7
14.3.	Building Requirements	14-7
14.3.1.	Freeboard	14-7
14.3.2.	Foundation Standards	14-8
14.4.	Safety Requirements	14-9
14.4.1.	Critical Facilities	14-9
14.4.2.	Dry Land Access	14-10
14.4.3.	Dam Breaks	14-11
14.4.4.	Uncertain Flow Path Hazards	14-11
14.5.	Flood Conveyance and Storage	14-12
14.5.1.	Encroachment Standards	14-12
14.5.2.	Compensatory Storage	14-13
14.5.3.	Stormwater Management	14-14
14.6.	Environmental Protection Measures	14-15
14.6.1.	Strategies	14-15
14.6.2.	Federal Regulations	14-15
14.6.3.	Wetland Protection	14-16
14.6.4.	Rare and Endangered Species	14-16
14.6.5.	On-Site Sewage Disposal	14-16
14.6.6.	Water Quality Regulations	14-17
14.6.7.	Special Designations	14-17



14.1. NFIP Planning Considerations

FEMA has established minimum floodplain management requirements for communities participating in the NFIP. Communities must also enforce more restrictive State requirements. However, communities should seriously consider enacting regulations that exceed the minimum state and federal criteria.

In fact, the NFIP requires communities to at least consider additional measures which are found in 44 CFR 60.22, Planning Considerations for Floodprone Areas. They are summarized in Figure 14.1.

- (a)** The floodplain management regulations adopted by a community for floodprone areas should:
 - (1) Permit only that development of floodprone areas which
 - (i) is appropriate in light of the probability of flood damage
 - (ii) is an acceptable social and economic use of the land in relation to the hazards involved
 - (iii) does not increase the danger to human life
 - (2) Prohibit nonessential or improper installation of public utilities and public facilities.
- (b)** In formulating community development goals after a flood, each community shall consider:
 - (1) Preservation of the floodprone areas for open space purposes
 - (2) Relocation of occupants away from floodprone areas
 - (3) Acquisition of land or land development rights for public purposes
 - (4) Acquisition of frequently flood-damaged structures.
- (c)** In formulating community development goals and in adopting floodplain management regulations, each community shall consider at least the following factors:
 - (1) Human safety
 - (2) Diversion of development to areas safe from flooding
 - (3) Full disclosure to all prospective and interested parties
 - (4) Adverse effects of floodplain development on existing development
 - (5) Encouragement of floodproofing to reduce flood damage
 - (6) Flood warning and emergency preparedness plans
 - (7) Provision for alternative vehicular access and escape routes
 - (8) Minimum retrofitting requirements for critical facilities
 - (9) Improvement of local drainage to control increased runoff
 - (10) Coordination of plans with neighboring community's floodplain management programs
 - (11) Requirements for new construction in areas subject to subsidence
 - (12) Requiring subdividers to furnish delineations for floodways
 - (13) Prohibition of any alteration or relocation of a watercourse
 - (14) Requirement of setbacks for new construction within V Zones
 - (15) Freeboard requirements
 - (16) Requirement of consistency between state, regional and local comprehensive plans
 - (17) Requirement of pilings or columns rather than fill to maintain storage capacity
 - (18) Prohibition of manufacturing plants or facilities with hazardous substances
 - (19) Requirements for evacuation plans

Figure 14-1. NFIP planning considerations (44 CFR 60.22).



14.2. Location Restrictions

Where the hazard is so severe that certain types of development should be prohibited, a location restriction provision may be appropriate. Some communities prohibit some or all development in all or parts of their floodplains. A common approach is to prohibit particular structures in the floodway or areas exceeding certain flood depths or velocities.

Because this is the most restrictive higher regulatory provision, location restriction language has to be drafted carefully to avoid a taking challenge. Sometimes, a community can tie transfers of development rights or other benefits to a development that avoids the flood hazard area. These types of “win – win” situations benefit everyone and reduce the potential for challenging the ordinance.

14.2.1. Highly Hazardous Areas

Prohibiting development makes sense in high hazard areas, where people are exposed to a life-threatening situation even though buildings could be protected from flood damage. For example, it would be appropriate to prohibit development in the active portion of an alluvial fan or along a narrow floodplain in a stream valley that is susceptible to flash flooding.

14.2.2. Subdivision Design

Undeveloped land, still in large tracts, offers the best opportunity to limit where certain types of development will be located. When a developer wants to subdivide the land, communities have many tools to arrange the development so that buildings are kept out of the floodplain. This has two advantages over simply requiring the buildings to be protected from flooding:

- Buildings are not isolated by floodwaters, putting a strain on local emergency services to guard them or evacuate or rescue their occupants.
- The neighborhood will have waterfront open space and recreation areas – a valuable amenity in most communities.

Addressing flood risk for new subdivisions should start with the mindset that: (1) FEMA flood maps provide an initial identification of risk areas and (2) there may be additional flood hazard areas on the tract of land that need to be identified. Depending on the size of the subdivision, the stormwater created by the development itself can result in increased flood risk to the buildings and infrastructure on-site as well as offsite impacts. New development must not create conditions for future problems for those property owners, nor should it result in higher flood risks for existing residents of the community. There are a number of approaches to subdivision layout and design that can aid in minimizing the creation of new flood risks for new and existing residents.

A cluster subdivision, also known as an open space subdivision, is a technique allowing for the modification of dimensional requirements of the zoning law to group or “cluster” structures or lots at a higher density on the most suitable portion of land. This clustering leaves other areas open to preserve the natural and scenic quality of open lands. A conservation subdivision is a type of cluster subdivision that focuses on protecting large portions of a site with important

Handbook for New Mexico Floodplain Managers

environmental value. Usually, half or more of the site is preserved as open space. From a flood risk perspective, there is no other approach that has as much ability to reduce flood damages while simultaneously protecting the integrity of the floodplain ecosystem. Indeed, PAS Report 473 recommends conservation subdivisions with no lots in the floodplain as the best policy for communities (Figure 14-2).

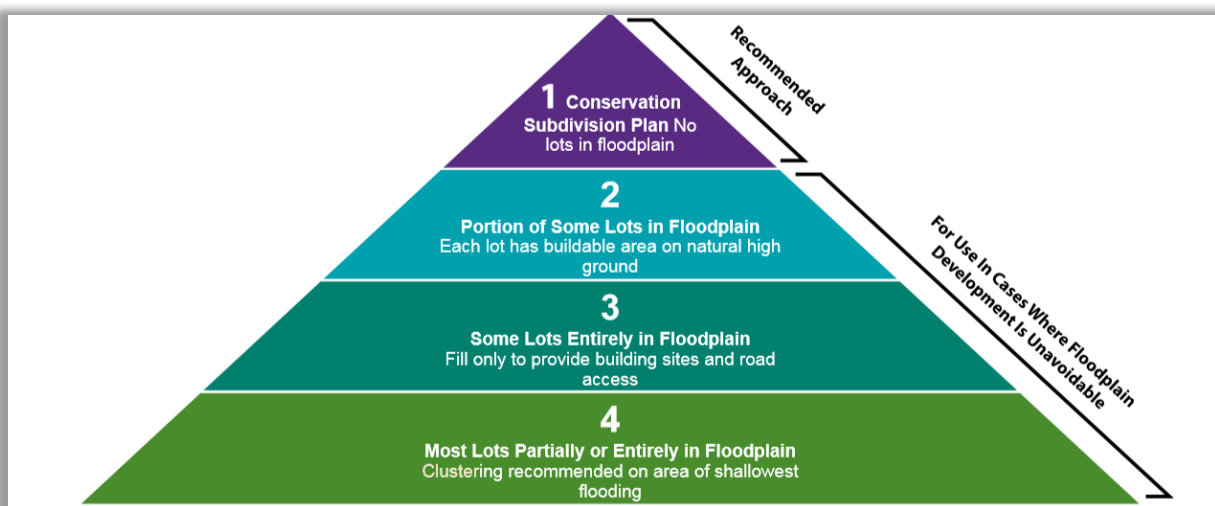


Figure 14-2. Subdivision design hierarchy (Morris 1197)

Nothing has changed in the past 19 years to alter that view. However, it is recognized that some communities may have more difficulty implementing such an approach due to their geography or the fact that any remaining developable land is at higher risk from flooding. The basic principles of conservation subdivision design that also apply in reducing flood risk and enhancing natural floodplain functions include the following:

- Ensure that floodplain areas are non-buildable, either laid out as areas that are non-buildable on lots or set aside reserve areas entirely (i.e., not contained within lots).
- Preserve riparian areas in perpetuity by making them reserve areas protected through easements. This, in turn, protects or enhances the conservation of wildlife and aquatic resources.
- Develop smaller lots.
- Allow for increasing density in developable areas to ensure a roughly equivalent lot yield that would otherwise be allowed if a more conventional subdivision design was applied to the site.
- Promote flexibility in reducing setbacks from roads and increasing setbacks from floodplains or water bodies.

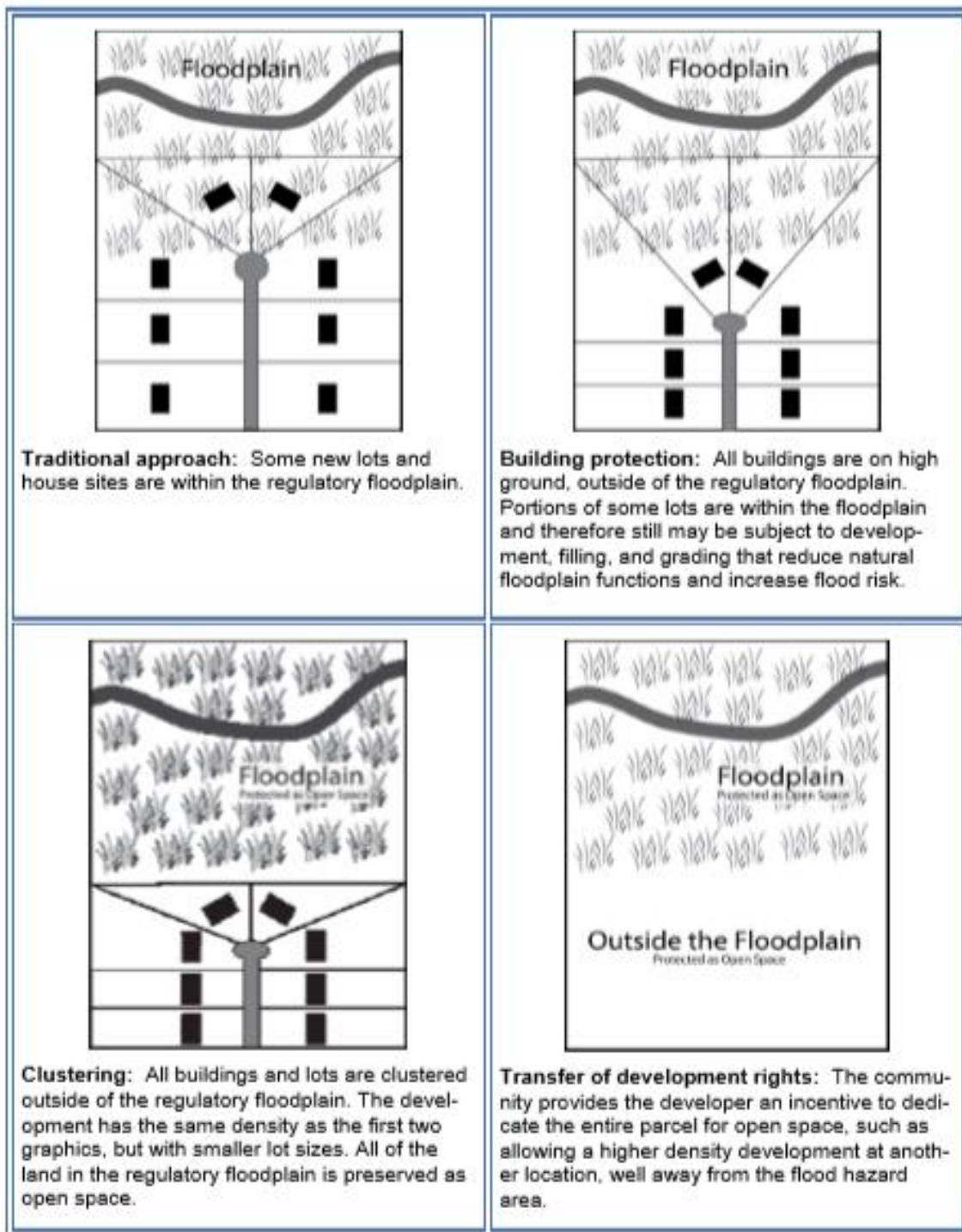


Figure 14-3. Alternative ways to develop a property that is partially flood-prone.

Handbook for New Mexico Floodplain Managers

The planned unit development (PUD) approach offers developers flexibility in planning the entire area. For example, a PUD may have a cluster development with houses closer together than allowed under normal zoning lot line setbacks.

Subdivision and planning regulations also can mandate that a certain portion of a development be set aside as open space for recreation or stormwater management purposes. Developers find that it is cheaper to put the open space in the floodplain than to put buildings there that have to incorporate the more expensive floodplain construction requirements. Linear parks and greenways that connect the open space areas through a community are becoming more and more popular and help sell new developments.



Figure 14-4. Riversides offer excellent opportunities for linear parks and greenways.

14.2.3. Setbacks

Setbacks may be used to keep development out of harm's way. Setback standards establish minimum distances that structures must be positioned—set back—from river channels. Setbacks can be defined by vertical heights or horizontal distances.

While floodplain boundaries are defined by vertical measures, horizontal setbacks also provide protection from flood damage, especially along lakes and wide rivers where the effects of waves decrease further inland. Note the photo in Figure 14-6 – setbacks can protect new construction from riverine erosion, too.

Setbacks prevent disruption to the channel banks and protect riparian habitat. Such setbacks are frequently created to serve as isolation distances to protect water quality, and stream and wetland resources.

Setbacks from watercourses have been used to minimize the effect of non-point sources of pollution caused by land development activities, timber harvesting and agricultural activities. Solid waste landfills and on-site sewage disposal systems often are restricted within certain distances of a body of water.



The Community Rating System credits setbacks that prevent disruption to shorelines, stream channels and their banks under Activity 430, Section 432.1.6.b in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Higher Regulatory Standards* for example regulatory language.

14.2.4. Factory Built Homes

Many communities have adopted provisions prohibiting the placement of factory built or manufactured homes in the floodway. Check your ordinance. This used to be a minimum requirement of the NFIP and may still be on your books.

14.2.5. Natural Areas

The natural functions and values of floodplains coupled with their hazardous nature have led communities to promote and guide the less intensive use and development of floodplains. More and more municipalities are requiring that important natural attributes such as wetlands, drainage ways and floodplain areas be set aside as open space as a condition to approving subdivision proposals.



The Community Rating System provides substantial credit for preserving floodplain areas as open space. If buildings and filling are prohibited, credit is found under Activity 420 Open Space Preservation, Section 422.a in the *CRS Coordinator's Manual* and the *CRS Application*. If the area has been kept in or restored to its natural state, more credit is provided under

Section 422.c.

14.2.6. Low-Density Zoning

When a community prepares its land use plan and zoning ordinance, it should consider what uses and densities are appropriate for floodplains. If buildings are not prohibited entirely, the community should zone its floodplains for agricultural or other low-density use to reduce the number of new structures.

For example, it's better to have a floodplain zoned for agricultural or conservation use with a minimum lot size of 20 or 40 acres than to allow four single-family homes to every acre. In some areas, "residential estate" zones with minimum lot sizes of two to five acres provide lots large enough that homes can be built out of the floodplain.



The Community Rating System provides substantial credit for zoning floodplains with low-density uses under Activity 422.g Low Density Zoning (LZ) in the *CRS Coordinator's Manual* and the *CRS Application*.

14.3. Building Requirements

Section 14.1 reviewed regulatory approaches to keeping buildings or certain uses out of all or parts of the floodplain. An ordinance can also set higher standards for those structures that are allowed to be built in the floodplain.

14.3.1. Freeboard

Freeboard is an additional height requirement above the base flood elevation that provides a margin of safety against extraordinary or unknown risks. This reduces the risk of flooding and makes the structure eligible for a lower flood insurance rate.

One foot of freeboard is recommended in the NMFMA model ordinance. This helps account for the one-foot rise built into the concept of designating a regulatory floodway and the encroachment requirements where floodways are not identified.

Handbook for New Mexico Floodplain Managers

There are reasons for considering a freeboard greater than one foot. Such a freeboard:

- Accounts for future increases in flood stages if additional development occurs in the floodplain.
- Accounts for future flood increases due to upstream watershed development.
- Acts as a hedge against backwater conditions caused by ice jams and debris dams.
- Reflects uncertainties inherent in flood hazard modeling, topography, mapping limitations and floodplain encroachments.
- Provides an added measure of safety against flooding.
- Results in significantly lower flood insurance rates due to lower flood risk.

Freeboard safety factors are common in the design of flood control projects and floodplain development. Many communities have incorporated freeboard requirements into the elevation and floodproofing requirements stipulated by the NFIP. Freeboard requirements adopted by communities range up to four feet.

When constructing a new elevated building, the additional cost of going up another foot or two is usually negligible. Elevating buildings above the flood level also reduces flood insurance costs for current and future owners.

Lowest floor vs. BFE	AE, A1 – A30 Zones	
	Building	Contents
+4	.28/.08	.38/.12
+3	.32/.08	.38/.12
+2	.47/.10	.38/.12
+1	.88/.14	.48/.12
0	2.02/.23	.95/.12
-1	5.05/.29	1.93.16
-2	7.35/.55	3.42/.12

Figure 14-5 Rates for post-FIRM single-family dwellings located in the SFHA.

Figure 14-4 shows the insurance rates for a post-FIRM single-family dwelling. Note that the higher the building is above the BFE, the lower the rate. These rates are based on the true or actuarial cost of insuring a building in the floodplain. By adding one foot of freeboard above the BFE, the cost for the first layer of coverage is reduced from 2.02 dollars per \$100 of coverage to 88 cents. This shows how the extra foot reduces the potential for damage.



The Community Rating System credits freeboard under Activity 430, Section 432.b in the *CRS Coordinator's Manual* and the *CRS Application*. Under Activity 450, Section 432.i, the CRS credits requiring all buildings to be elevated above the street level to prevent flood problems caused by local drainage. See also *CRS Credit for Higher Regulatory Standards* for example regulatory language.

14.3.2. Foundation Standards

Without a safe and sound foundation, an elevated building can suffer damage from a flood due to erosion, scour or settling. The NFIP regulations provide performance standards for anchoring new buildings and foundation and fill placement standards for floodproofed buildings.

However, the NFIP performance standards do not specify how a building's foundations are to be constructed. Especially in areas where an engineer's certificate is not required by the NFIP

Handbook for New Mexico Floodplain Managers

regulations, more specific foundation construction standards would help protect buildings from flood damage. One option is to require that a registered professional engineer or architect certify the adequacy of elevated building foundations and the proper placement, compaction and protection of fill when it is used in building elevation.

The NMFMA model ordinance recommends that you require that all residential buildings and manufactured homes be built or placed on compacted fill that is at least as high as the base flood and extends at least 10 feet in all directions from the building.



The Community Rating System credits foundation protection under Activity 430, Section 432.c in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Higher Regulatory Standards* for example regulatory language.

14.4. Safety Requirements

14.4.1. Critical Facilities

For some activities and facilities, even a slight chance of flooding poses too great a threat. These should be given special consideration when formulating regulatory alternatives and floodplain management plans.

FEMA defines four kinds of critical facilities:

- Structures or facilities that produce, use or store highly volatile, flammable, explosive, toxic and/or water-reactive materials.
- Hospitals, nursing homes and housing likely to have occupants who may not be sufficiently mobile to avoid injury or death during a flood.
- Police stations, fire stations, vehicle and equipment storage facilities, and emergency operations centers that are needed for flood response activities before, during and after a flood.
- Public and private utility facilities that are vital to maintaining or restoring normal services to flooded areas before, during and after a flood.



Figure 14-6. Critical facility in a floodplain.

A critical facility should not be located in a floodplain. Communities often prohibit critical or hazardous facilities or uses from the floodway or the entire floodplain. While a building may be considered protected from the base flood, a higher flood or an error on the builder's or operator's part could result in a greater risk than the community is willing to accept.

Handbook for New Mexico Floodplain Managers

If a critical facility must be located in a floodplain, then it should be designed to higher protection standards and have flood evacuation plans. The more common standards—freeboard, elevation above the 500-year floodplain and elevated access ramps—should be required.

According to Executive Order 11988, federal agencies must meet rigorous alternative site evaluations and design standards before funding, leasing or building critical facilities in the 500-year floodplain. Executive Order 11988 is discussed further in Section 24.



The Community Rating System credits prohibiting critical facilities or requiring them to be protected from damage by the 500-year, or 0.2%, flood in Activity 430, Section 432.f in the *CRS Coordinator's Manual* and the *CRS Application*. See *CRS Credit for Higher Regulatory Standards* for example regulatory language.

14.4.2. Dry Land Access

Fire prevention, evacuation and rescue operations are common emergency response activities associated with flooding. The effectiveness and success of these efforts greatly depend on readily available access. However, streets and roads are usually the first things to be inundated in the event of a flood.

To ensure access, some communities have enacted ordinance provisions requiring that all roads and other access facilities be elevated to or above the base flood elevation. Some require elevation to within one foot of the base flood elevation so at least fire and rescue equipment can travel on them during a flood.



Figure 14-7. Critical facility without dry land access.

Four people died in this nursing home during a 1978 flood in Rochester, Minnesota. It was isolated by high velocity floodwaters. Because there was no dry land access, firefighters could not rescue the occupants.

Handbook for New Mexico Floodplain Managers

While some local officials may feel that this approach is too restrictive, it is important to note that emergency response personnel die every year attempting to rescue flood-stranded citizens. Also, others may die or be seriously injured because they cannot be rescued in time.

Naturally, there are some areas with floodplains so extensive that a developer cannot be expected to connect his development to high ground. As with all regulatory standards, you must carefully weigh the local hazard, the regulation's objectives, and the costs and benefits of meeting the standard before you draft new ordinance language.



The Community Rating System has credited dry land access provisions under Activity 430, Section 432.o in the *CRS Coordinator's Manual* and the *CRS Application*.

14.4.3. Dam Breaks

The State Dam Safety Office in the Office of the State Engineer and the Corps of Engineers have identified high hazard dams. The designation is based on both the height of the dam and the amount of development at risk downstream.

Should a dam give way, the area covered by the resulting flood downstream is called the dam breach inundation area. Dam breach analyses may have been done for some of the dams upstream of your community, in which case you can obtain a map of the area subject to inundation. (Check with the State Engineer's state dam safety office to be sure that the map was prepared using an approved method.)

Close to the dam, the dam breach inundation area is likely to be larger than the base floodplain. A regulatory program should encompass such areas outside the base floodplain. It should also take into account the lack of warning time a dam break would pose. Typical measures include:

- Including dam failure preparedness in the community's emergency response plan.
- Prohibiting construction of buildings in the dam breach inundation area.
- Prohibiting siting of critical facilities in the dam breach inundation area.
- Requiring new buildings to be elevated above the base flood elevation or the dam breach elevation, whichever is higher.
- Requiring dam owners to maintain their facilities.
- Requiring dam owners to establish warning systems if their dams are in danger of failing.



The Community Rating System credits dam failure emergency action plans under Activity 630, Section 632.a in the *CRS Coordinator's Manual* and the *CRS Application*.

14.4.4. Uncertain Flow Path Hazards

Throughout the desert Southwest, and in many New Mexico communities, the flood hazards are compounded by high sediment loads in the flood water, which actually cause the floodplain

Handbook for New Mexico Floodplain Managers

to change from one flood to the next. A stream which carried a large amount of sediment during a flood is called a “fluvial” stream.

There are two primary types of hazards associated with fluvial systems:

- Alluvial fans develop where flood water with high sediment loads emerges from steep mountain canyons onto floodplains with relatively shallow slopes. As the slope of the streambed decreases, the velocity of the flood water decreases. When the velocity of the water decreases, sediment drops out and is deposited in the streambed. The result is that channels fill with sediment and new channels are formed. Over thousands of years, new channels are formed in a fan shape, or a shallow cone shape, with the point of the cone, the apex, at the mouth of the canyon. Some alluvial fans have no deep channels, and the course of flood water leaving the mouth of the canyon changes to some extent during each large storm. Other alluvial fans have entrenched channels that may remain relatively stable for hundreds or even thousands of years.
- Most other streams in New Mexico are affected in some way by the processes of erosion and sedimentation. In some stream reaches, there is ongoing erosion of the channel. The channel is becoming deeper or wider over time. In other stream reaches, there is deposition over time. In these reaches, the channel bed is gradually filling, raising the elevation of the base flood and increasing the width of the base floodplain. In some stream reaches, the channel migrates back and forth over a fairly well-defined floodplain. Such a migrating channel may meander outside the delineated floodway, causing damage to buildings that are elevated above the flood elevation.

It generally requires the expertise of a specialist, a geomorphologist, to evaluate the hazards and appropriate regulatory standards for alluvial fans and channels with erosion, sedimentation or meander problems. FEMA has developed a mapping technique for alluvial fans, and alluvial fans are shown on a few Flood Insurance Rate Maps in New Mexico communities. FEMA is working on a mapping methodology for riverine erosion.

Hazards associated with uncertain flow path floods are not just a floodplain management issue. These hazards are probably the single biggest cause of flood damage to state and local infrastructure. Most road failures in New Mexico are caused by erosion and sedimentation.



For more information, contact the Corps of Engineers, which has expertise alluvial fan and sedimentation and erosion hazards. See also *CRS Credit for Management of Areas Subject to Uncertain Flow Path Hazards*. The Community Rating System provides credit for mapping and managing these hazards.

14.5. Flood Conveyance and Storage

14.5.1. Encroachment Standards

Some communities are not comfortable with allowing development in the flood fringe to increase flood heights by up to a foot. A one-foot increase in flood heights will increase the

Handbook for New Mexico Floodplain Managers

potential for flood damage to floodprone buildings and affect properties that were otherwise not threatened by the base flood. This is especially true in flat areas where a one-foot increase can extend the floodplain boundary by blocks.

These communities require floodway mapping and encroachment studies to allow a smaller surcharge, usually 0.5 or 0.1 foot. Twelve states require that regulatory maps use a smaller floodway mapping surcharge than the NFIP's one-foot minimum standard. This results in a wider floodway, but less potential for increased flood losses due to future development.

In Minnesota, one watershed district took another regulatory approach, enacting regulations that restricted encroachments in the flood fringe to 20 percent of the total floodplain area. In Washington State, some communities treat higher velocity and deeper flood fringe areas as floodways and make development in those areas comply with the floodway construction standards.

Scottsdale, AZ allows no increase in flood elevation as a result of development in the floodplain. A developer must provide additional channel capacity in order to fill any part of the floodplain.



The Community Rating System credits more restrictive floodway mapping standards under Activity 410 Additional Flood Data, Section 412.e in the *CRS Coordinator's Manual* and the *CRS Application*.

14.5.2. Compensatory Storage

The NFIP floodway standard in 44 CFR 60.3(d) restricts new development from obstructing the flow of water and increasing flood heights. However, this provision does not address the need to maintain flood storage. Especially in flat areas, the floodplain provides a valuable function by storing floodwaters. When fill or buildings are placed in the flood fringe, the flood storage areas are lost and flood heights will go up because there is less room for the floodwaters. This is particularly important in smaller watersheds which respond sooner to changes in the topography.

For this reason, some communities adopt more restrictive standards that regulate the amount of fill or buildings that can displace floodwater in the flood fringe. One simple approach is to prohibit filling and buildings on fill—all new buildings must be

elevated on columns or flow-through crawlspaces. On the other hand communities prefer buildings on fill because it provides a safe spot above flood levels outside the building walls.

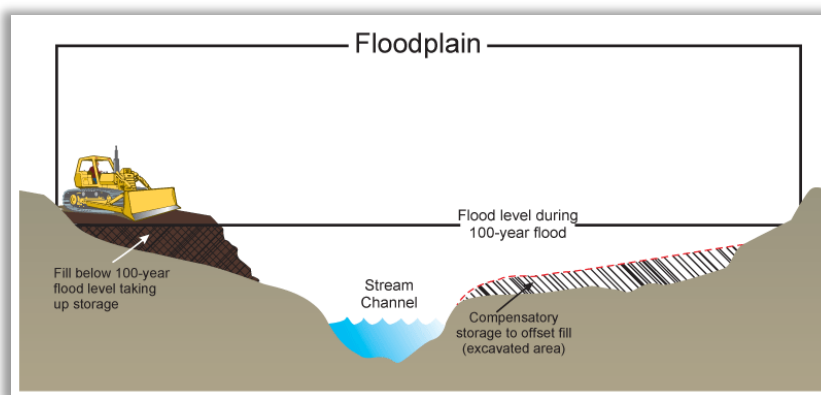


Figure 14-8. Compensatory storage.

Handbook for New Mexico Floodplain Managers

Another approach is to require compensatory storage to offset any loss of flood storage capacity. The developer is required to offset new fill put in the floodplain by excavating an additional floodable area to replace the lost flood storage area. This should be done at “hydraulically equivalent” sites— fill put in below the 10-year flood elevation should be compensated by removal of soil below that elevation elsewhere in the floodplain. Optional ordinance language that includes this provision is included in the NMFMA model ordinance.



The Community Rating System credits prohibition of fill and compensatory storage under Activity 430, Section 432.a in the *CRS Coordinator's Manual* and the *CRS Application*. See *CRS Credit for Higher Regulatory Standards* for example regulatory language.

14.5.3. Stormwater Management

A floodplain management program in an urbanizing area must confront the increase in flood flows caused by development within the watershed. As forests, fields and farms are covered by impermeable surfaces like streets, rooftops and parking lots, more rain runs off at a faster rate. In an urbanized area, the rate of runoff can increase fivefold or more.

Changes in the surface drainage system compound this problem. Stormwater runoff travels faster on streets and in storm drains than it did under pre-development conditions. As a result, flooding is more frequent and more severe (Figure 1-9). Efforts to reduce the impact of increased runoff that results from new development in a watershed are known as stormwater management.

One way to reduce the impact of stormwater from new development is to require the developer to restrict the rate at which the increased runoff leaves the property. The developer must build a facility to store stormwater runoff on the site.

Under stormwater detention, the stored water is held for release at a restricted rate after the storm subsides. Under stormwater retention, stormwater runoff is held for later use in irrigation or groundwater recharge, or to reduce pollution.

As an alternative to using a uniform standard for all areas, many communities regulate development according to a master plan that analyzes the combined effects of existing and expected development on stormwater and flood flows in the watershed. Such watershed-specific regulations may allow different amounts of runoff for different areas in order to control the timing of increased flows into the receiving streams.

Instead of requiring developers to build stormwater facilities on-site, a plan may require them to contribute funds for a regional facility. By planning the runoff from entire watersheds, this approach can be more effective in reducing increases in downstream flooding.

Stormwater management also has water quality aspects and includes efforts to reduce erosion and the entry of sediment and pollutants into receiving streams.



The Community Rating System credits both water quantity and water quality stormwater management regulations and plans under Activity 450 in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Stormwater Management* for example regulatory language.

14.6. Environmental Protection Measures

Flooding may not occur often enough in your area to be viewed as a problem in need of a solution, making it difficult to obtain the public and political support needed to carry out local floodplain management measures designed solely to reduce future flood losses.

Support often can be gained by associating flood loss reduction with broader community concerns and goals. A larger constituency for managing the community's floodplains can be built if other interests realize that their needs can be met through their involvement and support in flood protection. This, in turn, brings more resources and expertise into play.

Then, too, designing and packaging funding proposals to meet a number of community goals can boost your chances of obtaining outside resources. One approach is to tie the need to manage the floodplain to protect your community's economic well-being with the need to protect and maintain the natural resources and functions of the floodplain. These resources and functions can be of considerable benefit to the community, a benefit often unrealized or underestimated.

14.6.1. Strategies

Preservation and restoration are the two basic approaches to protecting a floodplain's natural resources. Preservation strategies focus on strict control or prohibition of development in sensitive or highly hazardous areas. Restoration strategies focus on actions to improve the quality or functioning of degraded floodplains. It is not always possible—or necessary—to make a distinction between the two strategies.

This section focuses on the development controls and regulatory standards you can use to protect natural resources or minimize harm to them. These measures, used by all levels of government, are among the most effective means available for protecting natural resources of floodplains and reducing flood damage.

14.6.2. Federal Regulations

Federal regulations and those in many states protect resources by limiting the ways, location and extent to which these resources may be modified. Two federal regulations can have far-reaching impact:

NEPA: When a federal agency proposes to fund a project located in a flood hazard area, the National Environmental Policy Act (NEPA) requires an evaluation of the project's environmental impact as part of the decision-making process. The evaluation should include the impact on flooding as well as water and air quality.



Handbook for New Mexico Floodplain Managers

EO 11988: Executive Order 11988 Floodplain Management requires federal agencies to check NFIP maps to see if a proposed project will be in a floodplain. If one is, the agency must follow an eight-step process to determine whether there is a feasible alternative to location in the floodplain. If not, the project must include flood damage reduction measures.

In short, Federal agencies must meet the same or more restrictive development standards as do private property owners under the community's NFIP regulations. See Section 24 for the full text of the executive order.

14.6.3. Wetland Protection

The federal regulation that local permit officials see most often is the program established by Section 404 of the Clean Water Act. Jointly administered by the Corps of Engineers and the U.S. Environmental Protection Agency, the Section 404 program regulates the discharge of dredged or fill material into U.S. waters, including adjacent wetlands.

The Section 404(b)(1) guidelines provide extensive environmental criteria for judging permit applications while emphasizing the need to prevent avoidable losses of aquatic resources, as well as the need to minimize adverse environmental impacts. The permit is discussed in more detail in Section 10.

The desire to reduce the cumulative impacts of wetland losses has led many jurisdictions to adopt a "no net loss of wetlands" policy. No net loss is addressed either in terms of acreage or the functional value of the wetlands. Despite these programs and other such efforts, as recent as 1989 it was estimated that the country was losing 300,000 – 450,000 acres of wetlands each year.

14.6.4. Rare and Endangered Species

Undeveloped floodplains may contain habitat for rare and endangered species of plants and animals. On the federal level, the Endangered Species Act of 1973 directs federal agencies not to undertake or assist projects that would adversely affect any endangered species.

The Act also requires an "incidental take permit" when it appears that the habitat of a rare or endangered species will be "taken" or impacted by a non-federal activity. Communities should coordinate their permit review with this program which is administered by the U.S. Fish and Wildlife Service. Some communities have sensitive areas regulations or a similar approach that protects such habitats.

14.6.5. On-Site Sewage Disposal

Most municipalities regulate the design, location and placement of on-site sewage systems. Because the objective of such programs is to prevent surface and subsurface contamination, there are many requirements to selecting a proper site and designing a system that will work in a flood.

Less than desirable locations for on-site systems include areas with high groundwater tables, impervious soils, certain types of porous soils, and the potential for flooding. These characteristics often coincide with floodplains.

Regulations that restrict where septic systems can go often mean that a property owner cannot build in or near the floodplain.

14.6.6. Water Quality Regulations

Since the enactment of the Clean Water Act in 1972 and related state legislation, more care is being given to the regulation of direct discharges of pollutants into waterways. Federal and state point source regulations focus on wastewater treatment plants and industrial sites where polluted water is piped to a stream or lake at a single point.

Non-point sources of pollutants are harder to regulate. If stormwater is not collected and sent to a wastewater treatment plant, it flows directly into a body of water. On its way, stormwater collects sediments from soil erosion as well as road oil, pesticides, lawn treatment chemicals and other pollutants. There is no treatment facility to clean this runoff water.

Regulatory approaches for non-point sources include buffer zones or stream setbacks where there are on-site disposal systems, timber harvesting, tilling of soil, mining, or development in general. These requirements are often part of, or complement, state or local stormwater management regulations.

14.6.7. Special Designations

Stream corridors often possess special value for an area, region or state. These corridors are given special designations—such as a wild or scenic river—and are afforded an extra level of recognition and protection.

While such programs are not necessarily regulatory in nature, they do encourage proper planning and land use control, discourage unwanted development, and guide federal and state actions.



The Community Rating System credits preserving areas for their natural functions under Activity 420 Open Space Preservation, Section 422.a. Credit for prohibiting critical facilities in floodplains and for prohibiting on-site sewage treatment, landfills and other hazardous use or threats to public health, is provided in Activity 430 Higher Regulatory Standards, Section 432.f. Water quality regulations are credited in Activity 450 Stormwater management, Section 452.d.



15. Permit Review

CONTENTS

15.1.	Development Permits	15-2
15.1.1.	When a Permit is Required	15-2
15.1.2.	Where a Permit is Required	15-4
15.1.3.	Permit Application Form	15-4
15.2.	Review for Completeness.....	15-7
15.2.1.	Check All Forms	15-7
15.2.2.	Check Site Plan for Completeness	15-7
15.2.3.	Check Building Plan for Completeness	15-8
15.2.4.	Check Certifications	15-8
15.2.5.	Check for Federal and State Permits	15-9
15.2.6.	Circulate for Others to Review.....	15-9
15.3.	Review for Compliance.....	15-10
15.3.1.	Examine Site Information	15-10
15.3.2.	Review Building Plans	15-11
15.3.3.	Review Engineering Documents.	15-11
15.4.	Application Approval or Denial	15-11
15.4.1.	Approval.....	15-11
15.4.2.	Denial	15-12



15.1. Development Permits

Once the ordinance is in force, any development or change in land use requires authorization, generally in the form of a permit from the local administrator or agency. “Development” and what needs a permit is discussed in Section 10.

This section reviews a standard process. It is not a mandatory process, but it does ensure that all of your State and NFIP requirements will be met. If your community has a permit process that has proven successful, you should review this section to see if there are things you would want to add to your process.

Figure 15-1 shows the permit process that forms the organization for this section. To facilitate your work, you may want to develop your own checklist.

15.1.1. When a Permit is Required

A permit is required for almost any development-related change to the floodplain, including but not limited to:

- Construction of new structures
- Modifications or improvements to existing structures
- Reconstruction of damaged structures
- Fencing
- Excavation
- Filling
- Paving
- Drilling
- Driving of piles
- Mining
- Dredging
- Land clearing (including grubbing, if there is significant change in the land surface)
- Grading
- Permanent storage of materials and/or equipment

While many communities have issued building permits for some time, most usually don’t have a permit system for such a wide range of activities as “development.” Regulation of all development in floodplains is essential because fill or other material can obstruct flood flows just as structures can. This is discussed more in Section 10.

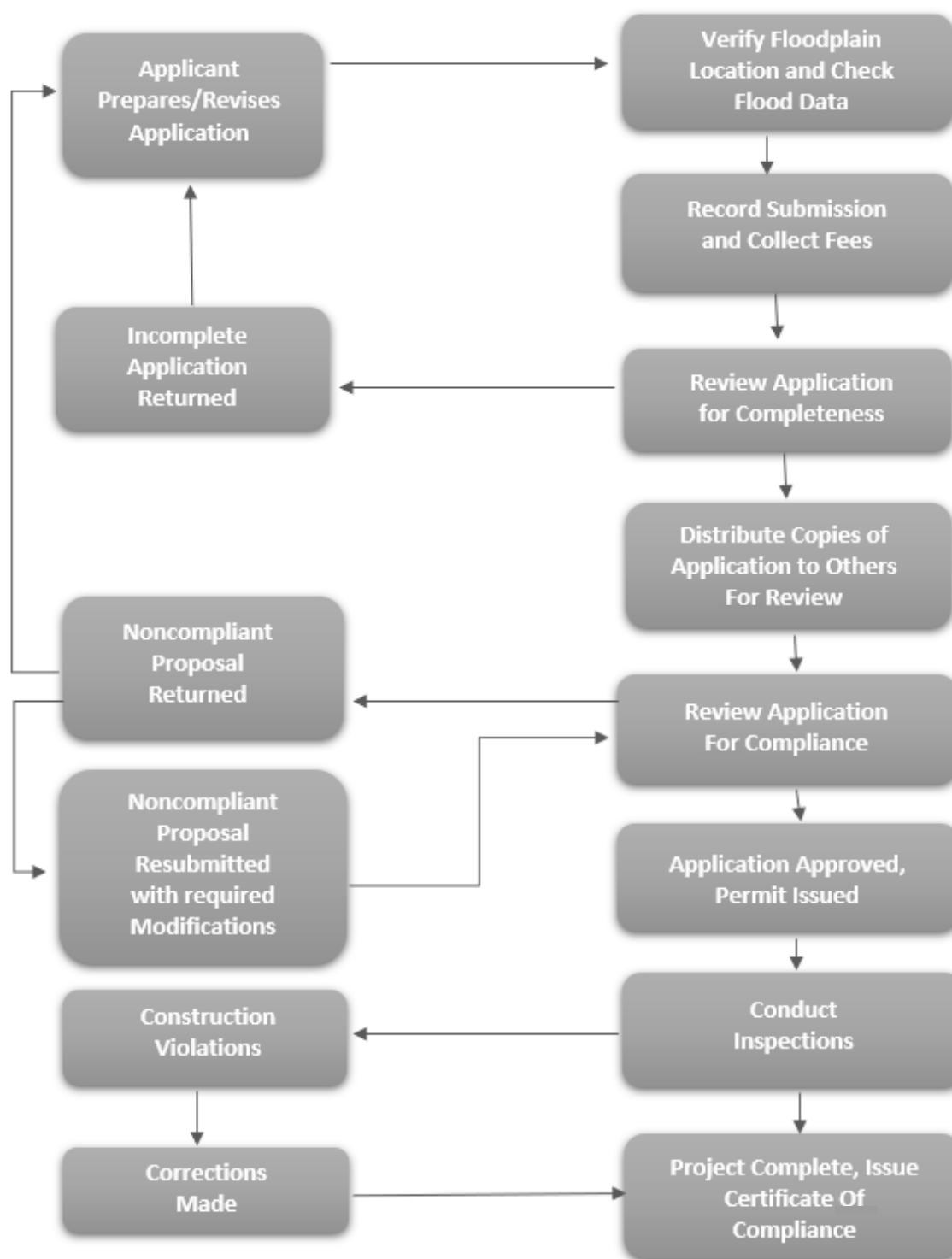


Figure 15-1. Permit review flow chart.



Handbook for New Mexico Floodplain Managers

15.1.2. Where a Permit is Required

Section 10 reviews the minimum NFIP requirements and Section 8.1.1 reviews your statutory limitations to regulate some development.

44 CFR 60.1(b) These regulations must be legally-enforceable, applied uniformly throughout the community to all privately and publicly owned land within flood-prone ... areas, and the community must provide that the regulations take precedence over any less restrictive conflicting local laws, ordinances or codes.

You cannot exempt activities by your own community government. Just because the public works department doesn't get a permit from the building department does not mean that it doesn't have to follow the NFIP rules that govern all development within your statutory authority. Your ordinance and your agreement with the NFIP says that your community will ensure that all development within its jurisdiction will be regulated.

You do have some discretion to exempt obviously insignificant activities from the permit requirement — such as planting a garden, putting up a mailbox or erecting a flagpole. Other projects, such as reroofing and replacing siding, will not affect flood flows or be labeled substantial improvements (see the discussion in Section 10).

15.1.3. Permit Application Form

Forms are a valuable and necessary tool in reviewing development proposals for regulatory compliance. When designed properly, they can be the most efficient way to get information that is essential to conducting an effective and thorough review.

A good administrative form can serve as a checklist for identifying the kinds of information that should accompany a permit application. The forms should be revised periodically to remain current with changes in the floodplain management ordinance and to include pertinent information. Your community should have its own permit application form. Check it to be sure it includes all state and NFIP requirements.

Figures 15-2 and 15-3 show a model Floodplain Use Permit. Each community should modify this model permit to meet their needs. For example, a community with no delineated floodways should delete the references to development in a floodway. Note that this model permit includes provisions consistent with regulatory language recommended by the NMFMA in its model ordinance (see Appendix A). If your ordinance does not include these provisions, change this permit form accordingly.

Make sure that the person who signs the form is either the property owner or someone who can speak for the owner. If in doubt, talk to the owner or get it in writing that the person signing the application is authorized to commit the owner to meeting the requirements.



Handbook for New Mexico Floodplain Managers

FLOODPLAIN USE PERMIT APPLICATION

Application # _____ -

Date _____

TO THE ADMINISTRATOR: The undersigned hereby makes application for a Floodplain Use Permit. The work to be performed, including flood protection works, is as described below and in attachments hereto. The undersigned agrees that all such work shall be done in accordance with the requirements of the (_____) (city/county) Flood Damage Prevention Ordinance and with all other applicable city/county ordinances and the laws and regulations of the State of New Mexico.

(Owner or Agent)

(Date)
(Date)

(Builder)

(Address)

(Address)

Telephone # _____

Telephone _____

1. Location: _____ $\frac{1}{4}$ _____ $\frac{1}{4}$, Section _____ , Township _____ , Range _____

Street Address: _____

2. Type of development

Filling _____ Grading _____ Excavation _____ Routine Maintenance _____

Minor Improvement _____ Substantial Improvement _____ New Construction _____

3. Description of Development: _____

4. Premises: Size of site: _____ ft. x _____ ft. Area of Site: _____ sq. ft. Estimated Cost: \$ _____

5. Principal Use: _____

6. Accessory Uses (Storage, parking, etc.): _____

7. Addition or modification to existing use? Yes _____ No _____ Assessed value of structure: \$ _____

8. Flood Zone: A _____ A1 – A30 _____ AE _____ AO _____ AH _____

9. Is development located within a delineated floodway? Yes _____ No _____

IF ANSWERED "YES," CERTIFICATION MUST BE PROVIDED PRIOR TO ISSUANCE OF A FLOODPLAIN USE PERMIT, THAT THE PROPOSED DEVELOPMENT WILL RESULT IN NO INCREASE IN THE BASE FLOOD ELEVATION.

10. Elevation/depth of the Base flood (Identify source if other than the FIRM): _____

11. Highest adjacent grade at the development site (natural ground): _____ MSL/NGVD

12. Lowest adjacent grade at the development site (natural ground): _____ MSL/NGVD

13. Required elevation/depth for lowest floor (including basement): _____ MSL/NGVD

14. Proposed elevation/height above grade for lowest floor (including basement): _____ MSL/NGVD

Figure 15-2. Page 1 of a model Floodplain Use Permit.



Handbook for New Mexico Floodplain Managers

15. Other floodplain information (Identify and describe source):

THIS PERMIT IS ISSUED WITH THE CONDITION THAT THE LOWEST FLOOD (INCLUDING BASEMENT) OF ANY NEW OR SUBSTANTIALLY IMPROVED BUILDING WILL BE ELEVATED TO AT LEAST ONE FOOT ABOVE THE BASE FLOOD ELEVATION (IF AVAILABLE) OR AT LEAST ONE FOOT HIGHER THAN DEPTH NUMBER ABOVE THE HIGHEST ADJACENT GRADE (IN AO ZONES), AND THAT IF THE DEVELOPMENT IS PROPOSED IN A DELINEATED FLOODWAY, THE DEVELOPMENT WILL CAUSE NO INCREASE IN THE BASE FLOOD ELEVATION. ALL UTILITIES, APPLIANCES AND DUCTWORK SHALL BE ELEVATED TO AT LEAST ONE FOOT ABOVE THE BASE FLOOD ELEVATION OR DEPTH NUMBER, OR BUILT OF WATER RESISTANT MATERIALS AND DESIGNED TO BE FLOODPROOF.

THIS PERMIT IS ISSUED WITH THE CONDITION THAT ANY NEW OR SUBSTANTIALLY IMPROVED BUILDING (INCLUDING ANY MANUFACTURED HOUSE) COVERED BY THIS PERMIT WILL BE BUILT ON COMPACTED FILL THAT IS AT LEAST AS HIGH AS THE BASE FLOOD ELEVATION, AND THAT SUCH FILL WILL EXTEND AT LEAST TEN FEET FROM ALL WALLS OF THE BUILDING BEFORE IT DROPS BELOW THE BASE FLOOD ELEVATION.

THIS PERMIT IS ISSUED WITH THE CONDITION THAT THE DEVELOPER/OWNER OF ANY NEW OR SUBSTANTIALLY IMPROVED BUILDING (INCLUDING ANY MANUFACTURED HOUSE) WILL PROVIDE A COMPLETED FEMA ELEVATION CERTIFICATE BY A REGISTERED ENGINEER, ARCHITECT OR LAND SURVEYOR BASED ON "ACTUAL CONSTRUCTION" PRIOR TO ISSUANCE OF AN OCCUPANCY PERMIT.

Plans and Specifications Approved this _____ Day of _____, 20__.

(Signature of Developer/Owner)

(

(Signature of Floodplain Administrator)

Figure 15-3. Page 2 of a model Floodplain Use Permit.



Handbook for New Mexico Floodplain Managers

Where a particular activity that is required by the NFIP regulations is mentioned in this reference, the reference to 44 CFR Part 60 is included in brackets (e.g. [44 CFR 60.3(c)(5)]). These activities must be included in the permit process in order for the community to remain in full compliance with the NFIP.

15.2. Review for Completeness

Submission of a development permit application starts the permit process. Before submitting an application, the prospective applicant often will contact you to obtain a copy of the regulations, locate the proposed site in relation to the NFIP maps, determine flood elevations, or gather procedural and technical information needed to complete the application.

This informal part of the permit process can be important in guiding the applicant to locate and design the development in compliance with your regulations. It also can help the applicant to prepare a complete application, avoiding unnecessary delays at the outset.

Some communities ensure that the permit process will go smoothly by having a formal pre-application meeting with a developer to review a preliminary plan.

The application package should contain all the administrative forms, plans, blueprints and technical documentation required for you to review the proposed project for regulatory compliance. If the application package is incomplete, the review should stop. The applicant should be advised (in writing) of missing documents and told (in writing) that the review will not start until the missing documents are submitted.

Some communities require that a permit be issued within so many days of receipt of the application. You should not officially “receive” the application or log it in until it has been reviewed and determined to be complete.

15.2.1. Check All Forms

Make sure all administrative forms are completed satisfactorily and properly signed. Scan the administrative forms to ensure that all questions have been answered. If important items are left blank or not addressed completely, bring them to the attention of the applicant for completion.

Inaccurate information also should be brought to the attention of the applicant. Your review should be halted until deficiencies are corrected.

15.2.2. Check Site Plan for Completeness

Depending on the specificity or detail of the administrative forms, the various plans that accompany the application will provide the technical data needed for a thorough review. At a minimum, there needs to be a site plan, drawn to scale. Such a plan should show:

- Location of property lines
- Required set back lines and easements
- Topographic information, such as contour lines or spot elevations



Handbook for New Mexico Floodplain Managers

- Streets
- Watercourses
- Location of existing and proposed structures
- All clearing, filling and other proposed changes to the ground
- Floodway and floodplain boundaries
- base flood elevations
- If there is more than one Zone on the lot, the base flood and boundary locations should be depicted on the plans

When a plan is prepared by a licensed professional architect, engineer or land surveyor, it should be stamped with the license seal to certify technical accuracy.

15.2.3. Check Building Plan for Completeness

If a building site is in the Special Flood Hazard Area (SFHA) shown on the Flood Insurance Rate Map, each building must be protected to the flood protection elevation. The application package must include building design plans that show:

- The kind and potential use of the structure
- Proposed lowest floor elevations of all new construction and the existing lowest floor for substantially improved or substantially damaged buildings
- Proposed elevations of adjacent grades
- The type of foundation system
- The existence of any enclosure below the lowest floor, along with electrical and plumbing plans for the area, location and dimensions of openings and materials proposed for use in an enclosure below the base flood elevation
- The height to which a nonresidential structure is to be floodproofed and the complete list of floodproofing techniques to be used, with detailed drawings.

In this reference, the term “building” is the same as the term “structure” in the NFIP regulations. Your ordinance may use either term. The terms are reviewed in more detail in Section 12.1.1.

15.2.4. Check Certifications

Ensure that all necessary certifications are included and properly signed. The applicant must provide all completed certifications needed for the permit review.

Based on the minimum NFIP requirements, two situations would require the filing of certified documents with the permit application:

- Floodway encroachment: If any part of the proposed project is to be located in a designated floodway, the applicant must submit an engineering certification and documentation demonstrating that the proposed encroachment would not result in any increase in base flood heights. If the project is in a riverine floodplain where no floodway has been adopted, the certification would show that there the project will not exceed



Handbook for New Mexico Floodplain Managers

the allow-able increase a flood heights. [44 CFR 60.3(c)(10) and (d)(3)]

- Floodproofed building: In the event a nonresidential structure is to be floodproofed, the applicant must submit a statement from a licensed professional engineer or architect certifying that the design and methods of construction meet these standards [44 CFR 60.3(c)(4)]. A second, as-built, certificate is also required to be submitted later.
- Enclosures below the lowest floor. Section 12 covers the requirements for openings in enclosures. If an applicant designs an enclosure below the lowest floor using an alternative to the NFIP standard, a licensed professional architect or engineer must certify the design [44 CFR 60.3(c)(5)].

15.2.5. Check for Federal and State Permits

Ensure that all necessary federal and state permits are being obtained. You must review the application package to determine whether federal and state permits are necessary [44 CFR 60.3(a)(2)]. To help you and the applicant, you might include the agency or program names as a checklist on your permit application form. See Section 8 for a list of other agencies that are likely to need to review the project.

When obtaining federal and state approval takes a long time, you may add a condition on permit issuance on the applicant's obtaining such permits later. The applicant should provide documentation to the administrator stating that the required federal and state permits have been applied for, and that portion of the project affected by needed permits will not proceed until the permits are issued.

For example, getting a Section 404 wetlands permit from the Corps of Engineers may take several months. Under such circumstances, you may issue a local permit with the stipulation that the applicant must have submitted all required permits before beginning construction. You can verify this at your first inspection.

15.2.6. Circulate for Others to Review

Submit copies of appropriate parts of the application package to other departments for review. Depending on the type and size of the proposed development and on the regulatory responsibilities of other departments or offices in your community, the applicant should submit a sufficient number of copies to allow for other's review.

Here are some departments and agencies that might need to review a portion of the application:

- Building department
- Zoning department
- Planning department
- Engineer's office
- Sanitation department (septic system approval)
- U.S. Army Corps of Engineers (Sections 404 or 10 permit)
- Soil and water conservation district (impact of subdivisions and other large



Handbook for New Mexico Floodplain Managers

- development on the natural resources of the area)
- Adjacent communities (alteration or relocation of a watercourse)
- New Mexico Department of Homeland Security and Emergency Management (alteration or relocation of a watercourse)
- If locally applicable:
 - US Forest Service
 - Bureau of Land Management
 - Tribes

If your office hasn't done this already, you should contact these agencies, determine what, if anything, they need to review, and prepare a checklist for permit applicants that advises them of the other approvals that will be needed.

15.3. Review for Compliance

Now that you have a complete application package, follow these recommended procedures to verify that the project will meet all of your ordinance requirements.

15.3.1. Examine Site Information

Check the site plan to ensure that the plotted floodplain and floodway boundaries appear accurately plotted. Look for possible obstructions in the floodway and other potential violations.

Inspect the plan carefully and compare it with the FIRM, floodway map and profile. Some project sites may be located close to the boundaries of the SFHA. Because the map scale is small, or it is difficult to pinpoint the project site, you may have trouble determining whether the project will be in or out of the SFHA. See Section 6 on reading maps and making floodplain and floodway boundary determinations.

Remember, a floodplain development permit is required only if the planned structure is located within the SFHA and other floodplains adopted by your community. For example, while the applicant's property may be located partially in the SFHA, the proposed structure could be built on land outside the SFHA. In this case, floodplain regulations would not apply and no special floodplain development permit is needed (unless regrading puts the structure in the floodplain).

However, if clearing, grading, filling, or road or bridge construction associated with erecting the structure is within the SFHA, a permit is necessary.

Note that while you can use better ground elevation data to determine that a building location is above the base flood elevation (and therefore outside the SFHA), the property will remain in the SFHA on the FIRM. That means that it is still subject to the flood insurance purchase requirement and the rates will be set at SFHA rates. It is the owner's responsibility to submit a request for a Letter of Map Amendment (LOMA) in order to have the FIRM reflect the better data (see Section 7 for more information on LOMAs).



Handbook for New Mexico Floodplain Managers

15.3.2. Review Building Plans

Any conflict or inconsistency with applicable regulations will require adjustments to the building plans. Check the proposed elevations against your flood protection elevation. Be sure to look at what's planned to be installed below the lowest floor, such as in a crawlspace. Items such as ductwork must be elevated above the flood protection elevation or otherwise protected from flood damage.

15.3.3. Review Engineering Documents.

Have the community's engineer review engineering documents. As listed previously, depending on the type and location of the structure being proposed, an engineering document or certification may be needed to show compliance with NFIP requirements concerning floodway encroachment, floodproofing and enclosures below the lowest floor.

All engineering documents should be examined by your community's staff engineer, or a consulting engineer available to perform reviews, to ensure that acceptable technical standards were used and that calculations are correct. If your community does not have a staff engineer, the FEMA Regional Office may be able to help review the data.

15.4. Application Approval or Denial

Once you complete your review of the permit application papers for completeness and technical compliance with the ordinance, a decision on the application is due.

15.4.1. Approval

If the proposed development is in compliance with regulations, issue a permit. (see example in Figure 15-4) The permit becomes the official authorization from the community allowing the applicant to proceed, based on the information submitted in the application package.

Somewhere in the permit record, such as the approved plans, the application form or the permit form itself, a record should be kept of the base flood elevation and the required floor elevation. There should also be a general statement that all construction will be in accordance with all codes and ordinances. The model application/permit forms shown in Figures 15-2 and 15-3 provide such a record.

The day a permit is issued is the date of the

The image shows a sample 'FLOODPLAIN DEVELOPMENT PERMIT' form. At the top right is a 'No.' field. The title 'FLOODPLAIN DEVELOPMENT PERMIT' is in large, bold, black letters. Below the title, it says 'Specify for what purpose the permit is issued—' followed by a line for 'New construction, alterations, fill, excavation, other'. There are three lines for 'ISSUED TO:', 'ADDRESS:', and 'PROJECT ADDRESS:'. Below 'PROJECT ADDRESS:' is a note '(if different from permittee's address)'. There are two lines for 'ISSUED BY:', with the first line having 'Floodplain Management Administrator' written on it. Below that is a line for 'DATE:' with a note '(This permit expires 180 days from this date)'. At the bottom, a small box contains the text 'THIS PERMIT MUST BE POSTED ON THE PREMISES IN A CONSPICUOUS PLACE SO AS TO BE CLEARLY VISIBLE FROM THE STREET.'

Figure 15-4. Sample permit form.



Handbook for New Mexico Floodplain Managers

“start of construction,” provided construction begins within 180 days. Used for insurance rating purposes, this date determines what FIRM was in effect when the building was built, regardless when ground was broken or construction was finished.

For regulatory purposes, a permit may be effective or valid for a certain period of time, according to the standard used in your other regulations. If at the end of this period the project is not complete, the permit technically expires. However, ordinances routinely provide for the permit officer to issue written extensions to allow completion of the development under the conditions of the original permit.

Another approach is to require that work continue to proceed over a given period. If work stops for a certain length of time, the permit is withdrawn.

15.4.2. Denial

If the application is not in compliance with local regulations, the permit should be denied. The applicant then can choose to:

- Withdraw the permit application.
- Redesign the project to bring it into compliance with regulations.
- Appeal to the Board of Adjustments or Board of Supervisors.
- Ask for a variance to the regulations.

While you may not be formally required to disclose the reasons for denying an application, it is good policy to do so in writing. This tells the applicant what areas are noncompliant so that if he or she wishes to resubmit the application, appropriate corrections can be made.

Appeals and variances are covered in Section 17. Clarifying the deficiencies for the applicant also can help reduce the number of appeals of administrative and regulatory decisions you make.



16. Inspections

CONTENTS

16.1.	Why Inspect?	16-2
16.2.	Pre-Construction Inspection	16-2
16.3.	Elevation Inspection	16-4
16.3.1.	Timing.....	16-4
16.3.2.	Checking Elevations	16-5
16.3.3.	Other Checks.....	16-5
16.4.	Final Inspection	16-5
16.4.1.	Purpose.....	16-5
16.4.2.	Certificate of Occupancy	16-6
16.5.	Future Inspections.....	16-6
16.5.1.	Compliance Inspection	16-6
16.5.2.	Post-Damage Inspection.....	16-6
16.6.	Checking Elevations in the Field.....	16-7
16.6.1.	Starting Elevation.....	16-7
16.6.2.	Running the Level	16-7
16.6.3.	Records	16-8
16.6.4.	Running a Turn.....	16-8
16.6.5.	Helpful Hints	16-9



16.1. Why Inspect?

Now that you have issued the permit, your job is still not done. Follow-up conversations and inspections are vital to ensure that the applicant adheres to the permit's requirements. Taking a hands-off approach to construction can create many problems for both the project's owners and your community.

The most effective way to ensure compliance is to inspect the site frequently during construction. This is particularly important in the early phases of work on a building because that is when errors in the location or elevation of the lowest floor can be found and corrected. An inspection program also puts builders, developers and property owners on notice that the community will insist that projects are completed in compliance with regulations.

A series of at least three inspections is recommended for every project, especially any project that involves construction of a building:

1. pre-construction inspection
2. elevation inspection
3. final inspection

The pre-construction inspection allows you to make sure the development is located correctly before construction begins, avoiding a floodway encroachment or unpermitted fill in the floodplain. The elevation inspection, if timed correctly, avoids a very expensive error if the lowest floor is placed below the flood protection level.

The final inspection, ensures that all your permit requirements have been met and that the necessary certificates are in your files before the development is approved for use or occupancy. A checklist for this recommended approach is included as Figure 16-1.

It is also recommended that you consider using some means of withholding approval if the permit conditions have not been met. A certificate of occupancy is an example of this. The certificate would be issued upon final approval. If a certificate has not been issued some communities withhold services such as water or power. Read this section and determine what would work best for your community.

16.2. Pre-Construction Inspection

Do this inspection before ground is broken. Ideally, this site visit should be after the site is staked out to allow you to check the plans in relation to the ground and lot boundaries. With plans in hand, you should determine that the site as identified on the proposed plans is consistent with actual ground conditions.



Handbook for New Mexico Floodplain Managers

FLOODPLAIN INSPECTION REPORT

Date: _____ Inspector: _____

Permit #: _____ Applicant: _____

Type of inspection: ☐ Pre-construction* ☐ Elevation ☐ Final

Pre-Construction Inspection*

Office Work

- ☐ Review permit file before going to the field
- ☐ Ask permit reviewer any questions, if necessary
- ☐ Check for any necessary state or federal permits

Field Work

- ☐ Check building or development location. Measure distances from waterway or landmarks. Locate floodplain and floodway boundaries.

Elevation Inspection

- ☐ Check elevation of the lowest floor. Is it at or higher than the permitted elevation?
- ☐ YES, development continues ☐ NO, TAKE IMMEDIATE ACTION
- ☐ If fill is used, check fill location, compaction and side slopes

Final Inspection

- ☐ Elevation or Floodproofing Certificate in files (if not required from owner prior to final acceptance)
- ☐ Check fill and grading for any floodplain or floodway encroachment
- ☐ Check that water resistant materials were used for all construction below the regulatory flood elevation. Include ducts and utilities.
- ☐ For enclosures below the BFE, check use, number and size of openings (at least 2 openings on different walls; openings size totals 1 sq. in./1 sq. ft. of enclosure; openings no more than 12 in. above grade.
- ☐ Check that the furnace, air conditioner, etc. are elevated at or above the lowest floor elevation
- ☐ For factory-built homes, check anchoring

INSPECTION APPROVED ☐ YES ☐ NO, SEE NOTES ON OTHER SIDE

* If no pre-construction inspection was done, inspect these items at the time of the elevation inspection.

Figure 16-1. Model Floodplain Inspection Report.



Handbook for New Mexico Floodplain Managers

Check the following:

- The location of the floodplain and floodway boundaries.
- Setbacks from lot lines, channel banks, etc.
- Floodway encroachments, if applicable.

If the building, filling, etc., as staked out are in violation of the approved plans or of the ordinance requirements, you must tell the developer to make revisions. The project must not be allowed to proceed until you have gone back and verified that it is in compliance.

It is recommended that you take photographs, document the problem in writing, and issue a stop work order to the builder until the problems have been corrected.

16.3. Elevation Inspection

Schedule your inspection of a project involving a new building or addition to a building just before installation of the lowest floor. You need to ensure that the lowest floor will be built at the height stipulated in the permit application, that the foundation is the type specified in the plans, and that all materials to be used below the regulatory flood elevation are water resistant.

16.3.1. Timing

The type of foundation dictates your schedule:

- If the building is on a slab foundation, the inspection is best done when the forms are placed. You can check the proposed floor elevation by checking the elevation of the top of the forms. If the forms are high enough, you can approve the pouring the slab.
- If the building is on an elevated foundation (crawl space, piles, etc.), the inspection is best done when the foundation is completed. If the top of the foundation is high enough, and if the ductwork and utilities that are to be below the regulatory flood elevation are constructed of water resistant materials, you can approve placement of the floor. Make sure the crawl space floor is higher than the lowest adjacent grade, or the area will be considered a basement under NFIP rules.
- If the building is to be floodproofed and the floodproofing technique is easy to identify - such as a reinforced concrete stem wall up to the flood protection elevation - this inspection should be conducted when that portion of the project is completed.

Making sure a structure is properly elevated is the key to the entire regulatory process. If this doesn't happen, the permit process is pretty much for naught. Therefore, an inspection at the point of initial construction, where changes to the height of the foundation can be made without major difficulty, is best. Once the foundation is poured or laid, it can be very expensive for the property owner to change the building location or the elevation of the lowest floor.



Handbook for New Mexico Floodplain Managers

16.3.2. Checking Elevations

You can confirm the floor elevation at this stage in one of two ways. First, you can have the builder certify the floor elevation. This must be done by a surveyor or engineer.

More information on checking elevations is provided in Section 16.6

The alternative approach is to check for yourself:

- Before construction or sometimes as part of the pre-construction inspection, the developer's surveyor or your engineer can shoot an elevation reference mark to a nearby stationary object such as a tree or telephone pole. The mark should be at the same elevation as the height to which the lowest floor should be elevated.
- During the elevation inspection, you can use a hand level to determine whether the lowest floor will be as high as the reference mark. This will give you a rough estimate that the building will be close to the correct elevation. A hand level will not give accurate elevations.

Note: Neither approach relieves the builder of having to provide an as-built elevation or floodproofing certificate when the project is done. This elevation check simply verifies that the building will be elevated or floodproofed to the proper elevation before it is too late to make changes.

16.3.3. Other Checks

During your elevation inspection, also check:

- Whether any fill meets the necessary compaction, slope and protection standards contained in your regulations.
- The building's location matches the permit application plans.
- The number and size of crawlspace or enclosure openings.
- Whether any part of the project encroaches into the floodway.

16.4. Final Inspection

16.4.1. Purpose

The final inspection is conducted as the project nears completion. The purpose of this inspection is to:

- Ensure that the foundation and floor elevations have not been altered since the second inspection.
- Obtain an as-built elevation or floodproofing certificate.
- Verify that enclosures below the lowest floors have adequate openings.
- Ensure that nothing subject to flood damage, such as a furnace or air conditioning unit, has been located below the lowest floor.
- Check for floodway encroachments.
- Check the anchoring system used in securing factory-built homes.



Handbook for New Mexico Floodplain Managers

16.4.2. Certificate of Occupancy

After the project passes final inspection, many communities issue a document called a certificate of occupancy, certificate of compliance or use permit.

This certificate allows the owner to move in to the newly constructed building or addition. Usually a new building cannot be sold until the seller has this certificate. Some utility companies will not start service until the certificate is presented. Therefore, if the project does not comply with the permit requirements, withholding the certificate of occupancy can prevent the owner from using or occupying the building.

Before a certificate is completed, you must make sure that all needed documents are received and checked. You must have an elevation certificate and the other forms noted in the later section on record keeping.

16.5. Future Inspections

16.5.1. Compliance Inspection

Certifying a structure for occupancy is the final step in the permit process. However, the property must remain in compliance with your ordinance and the conditions under which the permit was issued.

You should periodically drive through floodplain areas, checking to ensure that the property continues to remain in compliance. Often property owners are not aware of permitting requirements for additions and improvements. Later inspections are particularly important when a structure contains an enclosure below the lowest floor. Such areas can be easily modified and made into habitable spaces, in violation of your ordinance.

In some cases, you may want to condition issuance of a permit or certificate of occupancy on being allowed to make future inspections. Check with your community's attorney on appropriate language.

If you find an unpermitted activity, you need to take appropriate action to bring the structure back into compliance. This may mean requiring the homeowner to remove the unpermitted work or restoring an enclosure below the base flood elevation to its original condition.

16.5.2. Post-Damage Inspection

After a flood, fire, tornado or other natural or human cause of damage, you need to inspect floodplain buildings. You need to move quickly as most homeowners are quick to begin their repairs. During this inspection you can hand out flyers letting the property owners know what repair work will require a building permit. You need to determine if the structure has been "substantially damaged" (see section 13). In general, if the flood crested two feet above a buildings adjacent grade you should carefully check the building's damage.

Section 22 discusses in detail what you should do in the event of a flooding disaster. This information also applies for other disasters. A sample letter to the property owner and an inspection checklist is provided.

16.6. Checking Elevations in the Field

This section is provided to explain how elevations are shot and checked in the field. While a local permit official may not feel comfortable shooting elevations for regulatory purposes, this section shows what is involved and what a surveyor does.

Note: these are basic instructions for use with basic tools. Today's surveyors will likely use Global Positioning System (GPS) equipment that work differently but are based on the same techniques.

Three pieces of equipment are needed: a level, a rod, and a record book. The first two can usually be found in the local street or highway department. If not, the consulting engineer or a neighboring community may loan one. If one is needed all the time, new levels can be purchased for as little as \$400. (This can be recovered from permit fees)

16.6.1. Starting Elevation

Typically the hardest part of field checking elevations is finding a point of known elevation from which to start. U.S. Geological Survey benchmarks are the best place to start but they can be several miles apart. A flood insurance study will provide some reference marks.

Often the local engineer will keep elevation records from sewer or street projects. (Note: Make sure local records or benchmarks are based on the same datum as the flood elevation). A community with no known elevations should contact the Corps of Engineers for assistance.

16.6.2. Running the Level

A two-person team is needed. The second person could be the developer or someone else working at the site. This person places the rod on a point where the elevation is known such as a reference mark from a Flood Insurance Study (starting elevation). It is important that the person holding the rod hold it straight to get accurate readings. The permit official levels the instrument and reads the height where the cross hairs show on the rod. This is called the "back sight." Add it to the starting elevation to produce "HI" or the height of the instrument (Figure 16-2).

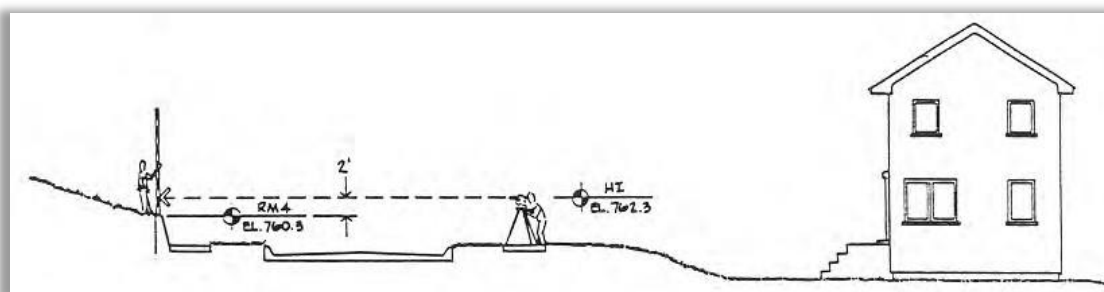


Figure 16-2. Starting elevation (760.3) + reading on rod (2') = Height of Instrument (HI) = 762.3.

Handbook for New Mexico Floodplain Managers

Next the person with the rod places the rod on the lowest floor. Keeping the instrument level, the permit official turns it to the rod and reads the height. This height is called the “fore sight.” This number is subtracted from HI and gives the elevation of the lowest floor (Figure 16-3).

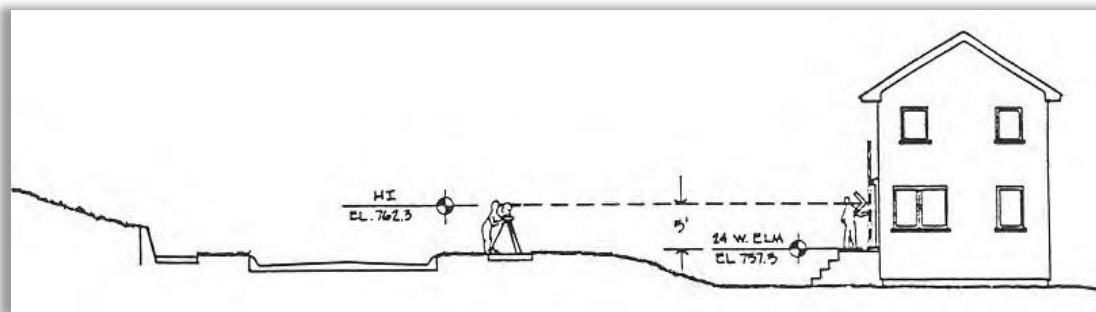


Figure 16-3. HI (762.3) minus fore sight (5') = lowest floor elevation (757.3).

16.6.3. Records

There is a standard way of recording the figures obtained. This method should be followed to assist engineers or other permit officials in understanding what was done. It is important that the records kept be as detailed as possible, especially the location of where the rod was placed as this will help later field checks to refer to the elevation records. This record should be kept with the permit records.

PERMIT NO. <u>85-12-03-11</u>		BUILDING OFFICIAL <u>Bill D. Best</u>			
SITE <u>24 West Elm</u>		FLOOD PROTECTION ELEVATION <u>756.0</u>			
Station	back-sight	HI	fore-sight	Elevation	Description
RM 4	2'	762.3		760.3	Flood Insurance Study Reference Mark
24 West Elm			5'	757.3	Top of Floor at Front Door

Figure 16-4. Standard surveying record format.

16.6.4. Running a Turn

When the starting elevation is too far to see from the site you want to measure, a “turn” must be run. This is simply shooting the foresight to a selected “turning point.” The level is then moved and a back sight is read with the turning point acting as the new starting elevation (Figure 16-5).

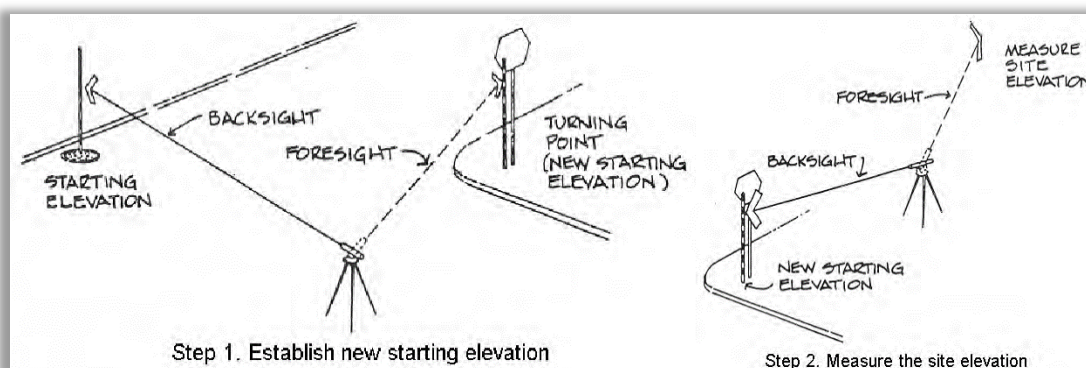


Figure 16-5. Running a turn.



Handbook for New Mexico Floodplain Managers

The permit official may want to help the developer (and future enforcement work) by running the level before the permit is approved. The flood protection elevation could be marked at the building site. This shows the developer how high the structure must be built and can be helpful if plans must be modified. It will also make checking the “as built” elevation much quicker.

A thorough record must be kept describing the mark to ensure that it won’t be moved (e.g., “nail with red tape 4 feet from ground in largest oak tree in northeast corner of lot = flood protection elevation = 465.2 feet NGVD.”)

16.6.5. Helpful Hints

- A level mounted on a tripod, although more expensive, is more accurate and easier to use.
- Use an “automatic level.” It levels itself, saving time, particularly when there are a lot of turning points.
- A light-weight fiberglass rod saves wear and tear on the person holding the rod. The ability to extend it up to 25 feet is a feature that is very useful in steep terrain and for long shots.
- Another thing to help on long shots is a level with high power magnification.
- Because there are never enough benchmarks, make an agreement with the highway department to be allowed to establish reference marks on pavements, bridges, etc.
- Maintain a reference file of area benchmarks with information from flood insurance studies; state or county highway departments; and utility companies. There is CRS credit for this.



17. Appeals and Variances

CONTENTS

17.1.	Appeals and Variances	17-2
17.1.1.	Appeals	17-2
17.1.2.	Conditional or Special Uses	17-2
17.1.3.	Variances	17-2
17.1.4.	Boards	17-2
17.2.	Variances	17-2
17.2.1.	National Flood Insurance Program Requirements	17-3
17.2.2.	Hardship.....	17-5
17.2.3.	Hardship Examples	17-6
17.2.4.	Other Concerns.....	17-7
17.2.5.	Flood Insurance Rates	17-8
17.2.6.	Historic Buildings	17-11
17.2.7.	Functionally Dependent Use	17-11
17.2.8.	Records	17-12



17.1. Appeals and Variances

Appeals, special uses and variances require judgment calls involving several people, as ordinances typically do not allow only one person to decide these issues. Here is when they can occur and how they are usually handled.

17.1.1. Appeals

Ambiguous language or differing interpretations can lead the applicant and permit office to disagree. Your ordinance should have a process for referring these disagreements to a board, such as a Board of Adjustment, County Commission or City Council, which will interpret the ordinance and settle the dispute.

17.1.2. Conditional or Special Uses

Some regulations use the conditional use, special use, or special exception process to allow some use of the floodplain. This process allows a community to review the project completely and place special conditions on the permit. An example of conditional uses in a floodway would be a carnival which could be limited in the number of days it is open or a marina which could be limited in the size and use of any structures. A zoning board or other governing board is responsible for reviewing such requests.

17.1.3. Variances

Zoning ordinances, building codes and floodplain management regulations cannot be written to anticipate every imaginable situation. A process for issuing variances gives a builder a way to seek permission to vary from the letter of the rules because of a special situation.

A variance can mean that the minimum standards of the NFIP may not be met by a project due to a special local circumstance. Because of this, most of this section is devoted to variances.

FEMA may review a community's findings justifying the granting of variances, and if that review indicates a pattern inconsistent with the objectives of sound floodplain management, FEMA may take appropriate action up to and including suspending the community from the National Flood Insurance Program (NFIP).

17.1.4. Boards

In all three cases, the applicant submits a request to a knowledgeable board of arbiters. These boards do not have authority to change the ordinance, just to apply or interpret the ordinance's provisions. They may or may not have authority to make a final decision. If not, they make recommendations to the governing board or a state agency, which makes the final decision.

17.2. Variances

A variance is a grant of relief by a community from the terms of a land use, zoning or building code regulation. Because a variance can create an increased risk to life and property, ***variances from elevating above the flood protection elevation or other requirements in the flood ordinance***



Handbook for New Mexico Floodplain Managers

should be rare.

Granting variances is a local decision. The variance must be based on state law, NFIP criteria, and other provisions the community may wish to require. Your community's review board must consider the fact that every newly constructed building adds to the local government's responsibilities and remains a part of the community for the indefinite future. Figure 17.1 is provided as a guidance checklist to help board members determine if a variance should be granted.

Variances are based on the general principal of zoning law that they pertain to a piece of property and are not personal in nature. In general, a variance is granted for a parcel with physical characteristics so unusual that complying with the ordinance would create an exceptional hardship to the applicant or surrounding property owners. Those characteristics must:

- Be unique to that property and not shared by adjacent parcels.
- Pertain to the land, not to any structure, its inhabitants or the property owners.

Characteristics that might justify a variance include an irregularly shaped lot, a parcel with unsuitable soils, or a parcel with an unusual geologic condition below ground level. It is difficult, however, to imagine any physical characteristic that would give rise to a hardship sufficient to justify issuing a variance to a flood elevation requirement for a new building. There are usually alternative ways to construct a compliant building even in these situations. If the property is not unique, then other similarly situated land would also be eligible for the same variance.

Your community should grant variances based only on a structure-by-structure review. Never grant variances for multiple lots, phases of subdivisions or entire subdivisions

17.2.1. National Flood Insurance Program Requirements

NFIP regulations do not address appeals, special uses or conditional permits. However, because variances may expose insurable property to a higher flood risk, NFIP regulations set guidelines for granting them. The guidelines, which are designed to screen out situations in which alternatives other than a variance are most appropriate, appear in 44 CFR 60.6(a). The guidelines should be incorporated into your ordinance.

A review board hearing a variance request must not only follow procedures given in the ordinance, it must consider the ordinance's criteria in making its decision. When the ordinance is followed, few situations qualify for a variance.

Note that your ordinance includes things that are not minimum NFIP requirements. An example is your flood protection elevation which requires new buildings to be protected to one foot higher than the NFIP standard base flood level. FEMA expects you to enforce your complete floodplain management ordinance. Issuing variances is not a good practice, even variances from your own higher local standard. FEMA considers a variance to your standards as a variance to the NFIP ordinance.

If your community makes a practice of varying from your ordinance's standards, you could be



Handbook for New Mexico Floodplain Managers

subject to the sanctions for non-compliance (see Section 3.6). If your community makes a practice of varying from your own higher standards (even though the projects meet the NFIP criteria), FEMA will advise you to revise your regulations rather than enforce them inconsistently.

Should you issue a floodplain variance?

A city or county is authorized to approve variances from the letter of your floodplain regulations “that will not be contrary to the public interest where, owing to special conditions, a literal enforcement of the provisions of this Ordinance will result in unnecessary hardship.” The issuing of variances is guided strictly by the requirements of your local ordinance and state and federal regulations. Variations to your flood protection regulations should be avoided and only issued because of special situations.

When considering a variance application, ask the following 10 questions:

1. Is the variance requested on land that is unique? Each variance request must be considered on a structure by structure and lot by lot basis. You must consider if the lot is unique. If it is not unique, then other similarly situated land would also be eligible for a variance for the same reasons.
2. Would failure to grant the variance result in exceptional hardship to the applicant? The key word is “exceptional.” For example, physical handicaps and financial hardship do not qualify. Here are some examples of what does **not** meet exceptional hardship:
 - The land value will drop.
 - The owner does not have enough money to comply.
 - The house will be elevated and will look different from the neighbors.
 - The homeowner cannot walk up steps into an elevated addition.
3. Is the property in a floodway? If it is, no variance can be issued if any increase in flood levels would occur during the base flood. The developer’s engineer needs to provide the data to your satisfaction.
4. Will granting the variance increase flood heights and velocities?
5. Will granting the variance increase the threat to public safety? Can people get to safety during a flood? Can emergency vehicles reach the property during flooding? Will there be loose materials that will be swept downstream onto other properties?
6. Will granting the variance result in extraordinary public expense? You should consider that every new floodplain building adds to your community’s responsibility during a flood. Consider the costs of maintenance and repair of public utilities, streets and bridges.
7. Will granting the variance create nuisances, or cause fraud on or victimization of the public?
8. Will the water supply and sanitation systems still be able to operate and prevent disease, contamination and unsanitary conditions?
9. Can the project be built in a flood-free location?
10. Is the project compatible with existing local plans, laws or ordinances? With existing and anticipated development?

Figure 17-1. Variance checklist.

Your work should conclude with written **findings of fact** that address each of these 10 questions. If you do find that a variance is deserved, then make sure you:

- Issue the minimum variation necessary. A variance is a request to vary from the rules, not to ignore them. Any variance should allow only minimum deviation from the local requirements.
- Notify the applicant (in writing) that granting the variance will result in:
 - increased risks to life and property and
 - increased flood insurance premium rates, up to \$25 per \$100 of coverage. In many instances, the variance-induced rates will be so high as to make the building essentially uninsurable because the owners cannot afford the premium.
- Record the findings and conditions with the county deed records so future owners or occupants will be told of the terms and conditions.

Figure 17-1. Variance checklist (Continued).

17.2.2. Hardship

The concept of unnecessary hardship is the cornerstone of all variance standards. Strict adherence to this concept across the country has limited the granting of variances.

The applicant has the burden of proving unnecessary hardship. Reasons for granting the variance must be substantial; the proof must be compelling. The claimed hardship must be exceptional, unusual and peculiar to the property involved. Financial hardship, inconvenience, aesthetic considerations, physical handicaps, personal preferences or the disapproval of one's neighbors do *NOT* qualify as exceptional hardships. Nor do problems caused by previous action of the applicant or property owner.

The local board must weigh the applicant's plea of hardship against the purpose of the ordinance. Given a request for a variance from floodplain elevation requirements, the board must decide whether the hardship the applicant claims outweighs the long-term risk to the owners and occupants of the building would face. Additionally, the board must consider the community's need for strictly enforced regulations that protect its citizens from flood danger and damage.

When considering variances to flood protection ordinances, local boards continually face the difficult task of frequently having to deny requests from applicants whose personal circumstances evoke compassion, but whose hardships are simply not sufficient to justify deviation from community-wide flood damage prevention requirements.

These problems can be resolved through other means, even if the alternatives to a variance are more expensive or complicated than building with a variance, or if they require the property owner to put the parcel to a different use than originally intended, or to build elsewhere.

The following are common claims of hardship, but they are **NOT** good and sufficient cause for a variance:



Handbook for New Mexico Floodplain Managers

- The value of the property will drop somewhat.
- It will be inconvenient for the property owner.
- The owner doesn't have enough money to comply.
- The property will look different from others in the neighborhood.
- The owner started building without a permit and now it will cost a lot to bring the building into compliance

17.2.3. Hardship Examples

Example 1: A small undeveloped lot is surrounded by lots on which buildings have been constructed at grade. The ordinance requires new buildings to be constructed several feet above grade.

If the owner were to build a new house, it would look different, potential buyers would ask questions and find out about the flood problem in the area. If it were built on fill, the lot might drain onto the neighbors' property.

This situation probably would not warrant a variance because the owner does not face an exceptional hardship. Appearance is not a hardship and no action should be taken to hide the hazard from others. There are ways to elevate a building without creating a drainage problem, such as elevating the building on pilings or a crawlspace or grading the fill to drain away from adjoining properties.

Example 2. A property owner seeks a variance because he or she would have to spend several thousand dollars to elevate a house to comply with the ordinance, and several thousand more to build a wheelchair ramp or an elevator to provide access for a handicapped member of the family.

While financial considerations are important to property owners and the needs of a handicapped person must be accommodated, these difficulties do not put this situation in the category of "exceptional hardships" because:

- The characteristics that result in the claimed hardship do not pertain to the property but are personal.
- A variance is not needed to provide day-to-day access to the building, which can be provided by building a ramp or elevator.
- Having a handicapped person occupy a floodprone dwelling raises a critical public safety concern to both the residents and the emergency responders.

If a variance is granted and the building is constructed at grade, the handicapped or infirm person must leave when floodwaters begin to rise, yet he or she may need help to do so. This poses an unnecessary danger to the handicapped person and places an extra demand on the community's emergency services personnel, who may be called upon to rescue the resident in the event of a flood.

On the other hand, if the building is properly elevated, the handicapped person either can be



Handbook for New Mexico Floodplain Managers

evacuated or can survive the flood simply by remaining at home safely above the floodwaters.

In effect, the variance would not relieve the property owner of his or her difficulty, but likely only postpone and perhaps ultimately increase it. It would not help the community, either, as the building will be susceptible to damage long after the current owners are gone.

It would be more prudent for both the owner and the community if the variance were denied and the home built at the proper elevation with handicapped access. This would ensure the safety of all family members when floodwaters rise, as well as protect the property owner's and the community's investment in the property.

17.2.4. Other Concerns

Local authority. A local government does not have the authority to vary from state requirements. A community cannot issue a variance to a state or Corp of Engineers permit or to any standards required by the state.

Findings of fact. The board reviewing the request for a variance should make a written record of all the facts, including the rationale for granting the request. A careful process should be followed that reviews all of the criteria for granting or denying a variance so the decision does not appear arbitrary.

Public safety and expense. Flood damage prevention ordinances are intended to help protect the health, safety, well-being and property of the local citizens. Variances must not create threats to public safety or nuisances.

Because it would increase damage to other property owners, no variance may be issued within a regulatory floodway that will result in any increase in base flood levels (44 CFR 60.6(a)(1)).

Fraud and victimization. Variances must not defraud or victimize the public. Any buildings permitted below the flood protection elevation face increased risk of damage from floods, and future owners of the property — and the community — are subject to all the costs, inconvenience, danger and suffering that those increased flood damages may bring. Future owners may purchase the property, unaware that because of a variance, it is subject to potential flood damages and can be insured only at high rates.

Minimum variation necessary. A variance is a request to vary from the rules, not to ignore them. Any variance should allow only minimum deviation from the local requirements. For example, even if an applicant can justify not elevating a building above the flood protection elevation, the review board should not automatically allow the building to be built at grade. The board should still require as much elevation as possible, to provide some flood protection without causing exceptional hardship.

In considering variances, the review board should use local technical staff expertise and recommendations from the building, planning, zoning or engineering departments. The local technical staff should consider varying other requirements in order to provide the needed flood protection. For example, it may be more appropriate to issue a variance to the front yard setback requirement in order to get the building out of the floodway.



Handbook for New Mexico Floodplain Managers

17.2.5. Flood Insurance Rates

While a variance may allow deviation from building standards specified in a local ordinance, flood insurance rates and the flood insurance purchase requirement — which must be enforced by lending institutions — cannot be waived.

This can create severe financial consequences for a property owner, as insurance rates for a building built below the flood protection elevation can be substantially higher than those for elevated buildings. A variance from elevation requirements — the most common kind of variance requested — increases the risk to a building, and that increased risk is reflected in higher annual insurance premiums.

If a variance is requested to construct a building below the flood protection elevation, you must notify the applicant (in writing) that granting the variance will result in increased flood insurance premium rates, up to \$25 per \$100 of coverage. In many instances, the variance-induced rates will be so high as to make the building essentially uninsurable because the owners cannot afford the premium.

The original owner who applied for a variance may not care, but if approved, the variance's impact may matter a great deal to subsequent potential owners who cannot afford the property's high insurance rates. The result may be owner abandonment; your community could be left with a vacant, flood-damaged and essentially uninsurable building.

Figures 17-2 through 17-7 show example premiums for a single-family home protected to different levels. They provide a clear picture of the cost of actuarial post-FIRM flood insurance rates and, therefore, the true risk to which the building is being exposed.

You should give these two pages of illustrations to anyone considering seeking a variance to save construction costs. A variance may save money in the short term, but over the long run, the owner will pay much more in insurance premiums or, if uninsured, in flood losses.

Note: These premiums are for the purposes of this example. Insurance rates vary, based on location, date of construction and lowest floor elevation, and must be computed case-by-case. The premiums shown for the next series of illustrations were computed based on \$100,000 in building coverage.

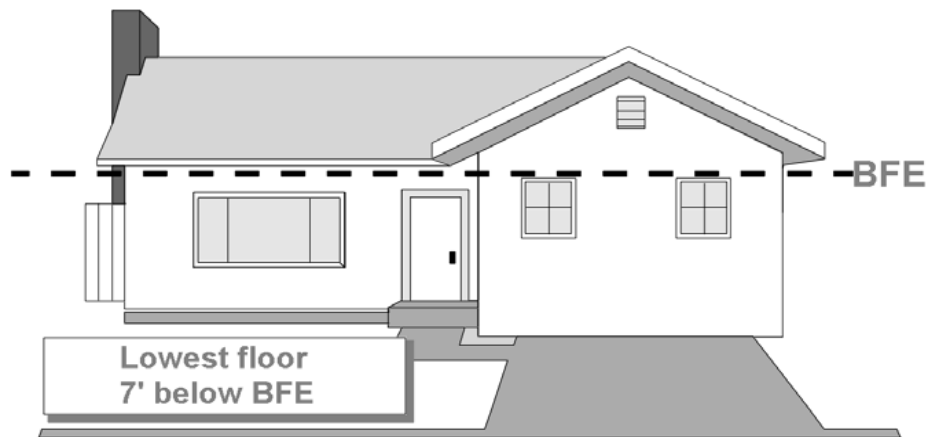


Figure 17-2. Pre-FIRM building — 1995 insurance rate: \$595.

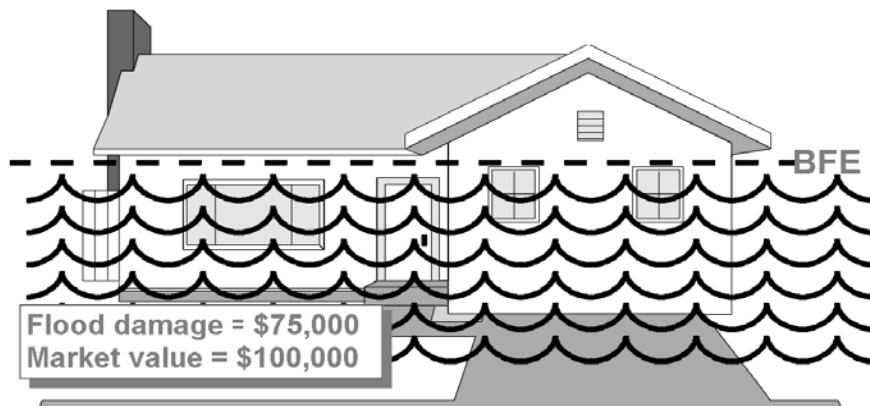


Figure 17-3. Pre-FIRM building — substantially damaged by 1997 flood.

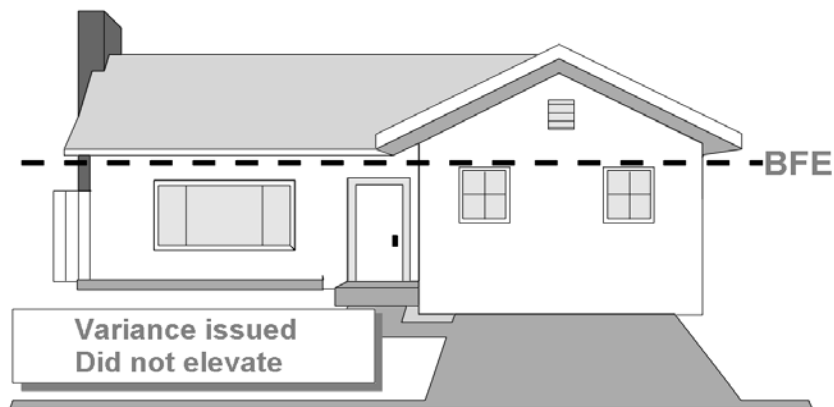


Figure 17-4. Repaired — variance allowed with no elevation (7 feet below base flood elevation); actuarial rate for NFIP insurance: \$3,090.

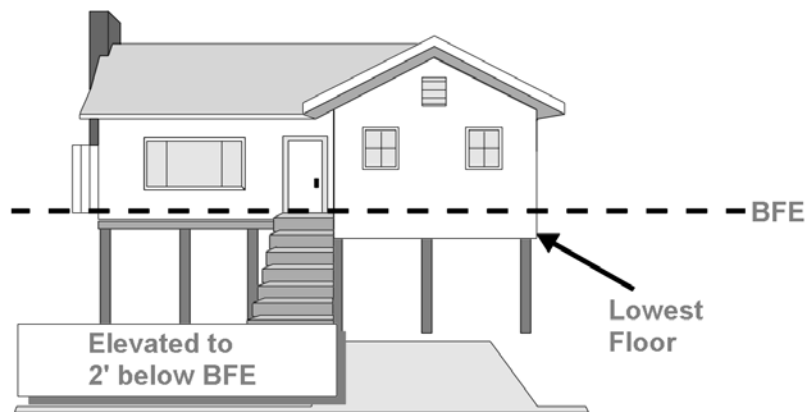


Figure 17-5. Repaired — variance allowed. Elevated to 2' below base flood elevation; actuarial rate for NFIP insurance: \$1,140.

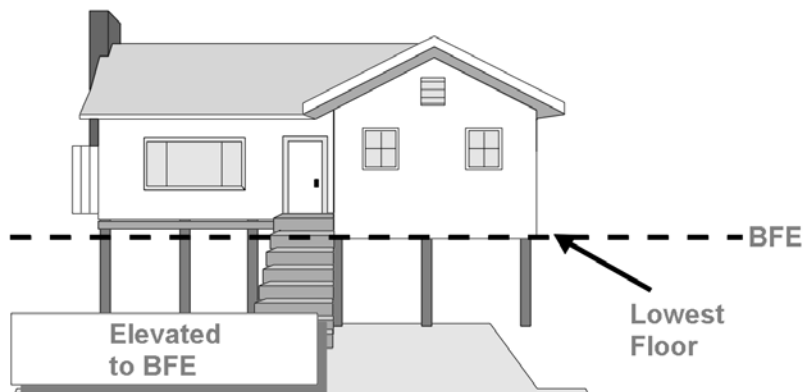


Figure 17-6. Repaired — elevated to base flood elevation; actuarial rate for NFIP insurance: \$351.

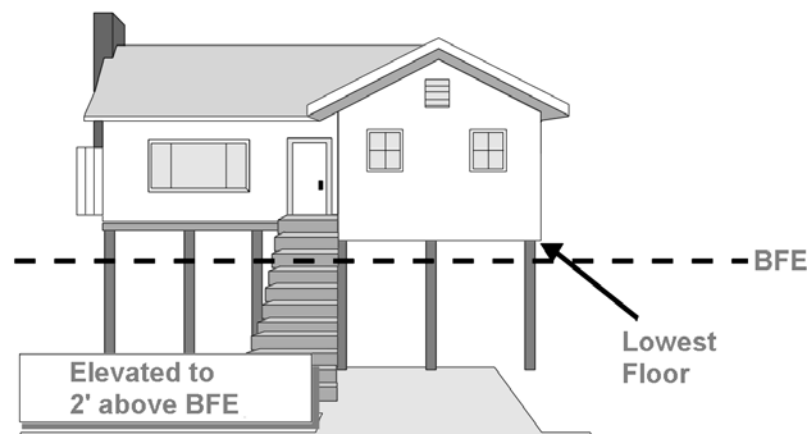


Figure 17-7. Repaired — elevated 2 feet above base flood elevation; actuarial rate for NFIP insurance: \$216.



Handbook for New Mexico Floodplain Managers

17.2.6. Historic Buildings

A variance may be issued for the reconstruction, rehabilitation or restoration of historic structures if the variance is the minimum necessary to preserve the historic character and design of the structure (see Figure 17-8 for the definition of an “historic structure”).

Changes to the structure must not destroy or alter the characteristics that made it a historic building. The state’s historic building code shall be applied solely or in conjunction with a local building code. The variance review process should ensure that whatever mitigation measures can be taken to reduce future flood damage must be required, such as elevating an air conditioner or using flood-resistant materials.

Historic structure means any structure that is:

- (a) Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
- (b) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
- (c) Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior (The New Mexico State Historic Preservation Division Site Inventory); or
- (d) Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:
 - (1) By an approved state program as determined by the Secretary of the Interior or
 - (2) Directly by the Secretary of the Interior in states without approved programs.

Structures are either listed or may be eligible to be listed. Only a federally-certified state or local historic preservation program can make such determinations. The State Historic Preservation Division of the New Mexico Office of Cultural Affairs (see Appendix B) or a federally-certified local historic preservation board should be consulted to determine if a structure proposed for the historic exemption is indeed historic.

Figure 17- 8. Definition of “historic building.”

17.2.7. Functionally Dependent Use

A variance may be issued for new construction, substantial improvements and other development necessary for the conduct of a functionally dependent use. A functionally dependent use is one that must be located or carried out close to water — such as a docking or port facility necessary for the unloading of cargo or passengers, shipbuilding and ship repair.

A functionally dependent use variance could be issued provided that:

- There is good and sufficient cause for providing the relief.
- An applicant will suffer exceptional hardship should a variance be denied.
- The variance will be the minimum necessary to provide relief.



Handbook for New Mexico Floodplain Managers

- The variance does not cause a rise in the base flood level within a regulatory flood- way.

The structure or other development must be protected by methods that minimize flood damage and create no additional threats to public safety. One way of accomplishing this is to use wet-floodproofing techniques such as using flood resistant materials, elevating mechanical equipment, locating offices above the flood protection elevation, using ground fault interrupt electrical circuits, or developing an emergency plan to remove contents before a flood.

17.2.8. Records

The community must keep a record of all variances and the rationale for granting them. These are usually prepared as a “findings of fact” document. The findings are subject to review by FEMA during a Community Assistance Visit.

The records must include a copy of the written notification to the applicant that the issuance of a variance to construct a building below the flood protection elevation will result in increased flood insurance premium rate as high as \$25 per \$100 of coverage, and such construction below the flood protection elevation increases risk to life and property.

It is recommended that the variance findings, conditions and authorization be recorded in the county deed records. This provides a means of permanently notifying future or prospective owners about the terms and conditions of the variance.



18. Enforcement

CONTENTS

18.1.	Enforcement Actions.....	18-2
18.1.1.	Voluntary Compliance	18-2
18.1.2.	Administrative Steps.....	18-2
18.2.	Legal Recourses	18-3
18.2.1.	Fine	18-3
18.2.2.	Recordation	18-3
18.3.	Section 1316.....	18-4
18.4.	Help	18-4
18.5.	Resolving Violations	18-5
18.5.1.	Example Violation #1 – Fill in the Floodway without a Permit.....	18-5
18.5.2.	Example Violation #2 – House Built too Low.....	18-5



18.1. Enforcement Actions

Adequate, uniform and fair enforcement means two things:

- All development in a floodplain must have a permit.
- All development with a permit must be built according to the approved plans.

In order to ensure that development is meeting these requirements, you must monitor the floodplain, and where necessary, conduct an inspection of a property. Be sure to review your authority to gain access onto private property with your attorney.

The New Mexico statutes allow cities and counties to appoint enforcement officers to enforce ordinances. If you are the local enforcement officer and you discover development activities without permits or contrary to the approved plans, you must enforce your ordinance. You have several methods for enforcing your ordinance. This section explores these methods.

18.1.1. Voluntary Compliance

The best approach is to convince the developer or property owner that complying with the ordinance is in his or her own best interest. This may take some explanation of the flood hazard and how the rules protect the property (or neighboring properties) from that hazard.

If the issue is protection of a building, the flood insurance rate table in Figure 20-4 shows how expensive insurance could be for a non-compliant structure. Even if the developer or current property owner is not interested in flood insurance, future owners may want it and probably will be required to purchase it as a condition of a mortgage or loan. Expensive flood insurance may make the building very difficult to sell.

Should voluntary efforts not work, you have other compliance tools.

18.1.2. Administrative Steps

Your first steps in enforcement involve what you can do as an ordinance administrator. Be sure to review these with your community's attorney before you start:

1. Contact the property owner or building contractor in person or by telephone to explain your concerns. Give them a deadline to respond to your concerns.
2. Follow up with a written notice.
3. Notify the property owner (in writing, preferably via certified mail) of the nature of the violations, what to do to correct them and a deadline. This is commonly called a "stop work order."
4. Post a violation notice on the property.

If a problem is found during construction of a permitted project, you have additional tools:

- If the violation is a serious one, or if the problem still exists after a follow-up inspection, you can issue a stop-work order or revoke the permit.
- You can withhold the certificate of occupancy until the problem is corrected. Usually utilities will not be turned on and a bank loan will not be closed until the certificate of



occupancy is issued.

18.2. Legal Recourses

If your administrative measures do not bring results, go back to your community's attorney and discuss the next steps. Generally, the attorney will write a letter, listing the violations and how the owner can comply.

You can help the attorney by having complete records of all correspondence and meetings with the person accused of the violation. Have dated photographs showing the violation. You should also identify what section of the ordinance was violated, when and how, and what was specifically allowed in the approved permit.

You should advise the attorney about what actions can be taken that would bring the project into compliance. Depending on the violation, these actions could include removing the building (or other project), retrofitting the building to protect it, applying for a variance, or revising the maps to remove the problem from the floodplain or floodway.

If the letter does not bring compliance, the attorney can take the case to court and request that additional enforcement measures be brought to bear.

18.2.1. Fine

A violation of the floodplain ordinance is classified as a misdemeanor. The NMFMA model ordinance provides for the use of fines as a means of enforcement. Your ordinance should then establish a maximum fine per offense. A simple misdemeanor is punishable by a fine of at least fifty dollars but not to exceed five hundred dollars. The NMFMA model ordinance provided that each day of violation may be considered a separate violation.

Usually, each day a violation continues is considered a separate offense. This approach encourages a quick remedy to the problem. Some communities double the fee for violating the ordinance if construction was begun without a permit. Check with your community's attorney for an acceptable fine for a misdemeanor.

An appeals process must also be defined. If your ordinance is based on zoning authority, a board of adjustments may be established to hear and decide appeals from and review any order, requirement, decision, or determination made by an administrative official charged with the enforcement. If your ordinance is not based on zoning authority, the County Commission or Council usually hears the appeal.

The appeal must specify the grounds for appeal. There is no set time period in which the board must hear the appeal, however, the Code requires that a reasonable time be fixed. Moreover, "due notice" must be given to the parties once the appeal is scheduled and a decision must be rendered within a reasonable time. Once the board has made a finding, it will constitute a final administrative decision, which is subject to judicial review.

18.2.2. Recordation

Depending on your ordinance's authority, you may be able to record the violation in the



Handbook for New Mexico Floodplain Managers

property's deed records. This will inform potential purchasers as well as "cloud the deed," making it hard for the owner to sell the property. This approach is more appropriate for new developments that are likely to be sold in the near future.

18.3. Section 1316

Section 1316 of the National Flood Insurance Act authorizes FEMA to deny flood insurance to a property declared in violation of the community's ordinance.

Section 1316 is used when all other legal means to remedy the violation have been exhausted and the structure is still noncompliant. Check with the FEMA Regional Office on how 1316 has been used.

If invoked under Section 1316, denying flood insurance means:

- The property may be difficult or impossible to sell.
- The market value of the property may fall.
- The cost of suffering flood damage without insurance may be too great a risk for the property owner.
- Lending institutions holding the property's mortgage may threaten to foreclose.
- Any permanent reconstruction will be denied disaster assistance.

In some cases, a Section 1316 insurance denial will be sufficient to convince the property owner to correct the violation. Section 1316 also has the advantage of limiting any taxpayer liability if the building is damaged by a flood, as the owner will be ineligible for an insurance claim or disaster assistance.

Section 1316 is designed to supplement your enforcement work, not replace it. You need to continue your enforcement work to bring the violation into compliance.

18.4. Help

You are not alone in wanting your ordinance enforced. Help in dealing with violations is often available from other sources. Your first point of contact can be NMDHSEM. The staff will work with you to determine the best way to deal with a particular violation and to provide expert advice.

If the project is in a wetlands area, development without a Corps of Engineers permit may be a violation of federal law. You should contact the Corps to ascertain whether the project is a violation. If so, discuss mutual enforcement actions.

It is important that you keep NMDHSEM and FEMA apprised of your problems and progress. NMDHSEM and FEMA staff can assist you in pursuing a violation.

If you are a member of the NMFMA and attend conferences and other training opportunities, you have met other community floodplain managers who have probably had to deal with the same problems you face. Call around to find someone to help.



18.5. Resolving Violations

If a pattern of a lack of enforcement is found during a Community Assistance Visit, FEMA may consider one of the compliance actions discussed in Section 3.6. You need to show that you are doing more than relying only on Section 1316.

What do you do when the owner of a property in violation of your regulations agrees (or is ordered by a court) to bring the project into compliance? Three scenarios are reviewed to show how problems could be resolved. Note: To be sure that the resolution is compliant with the NFIP and state law, discuss the situation with FEMA and NMDHSEM before reaching an agreement with the property owner.

18.5.1. Example Violation #1 – Fill in the Floodway without a Permit

The property owner placed fill into the floodway. Here are some ideas on how you could resolve this type of case.

Abatement Option 1: Remove the Fill. If removal of the fill is the option that is used, it may entail more than removing a pile of dirt. If the fill has been graded and the original “natural” elevation can no longer be discerned, you will have to determine (as near as possible) the original elevations and slope. Then, you must require that the violator remove the fill only to that elevation and slope.

Abatement Option 2: Leave the Fill and get a Permit. You could agree to leave the fill in place and have the violator apply for a permit, supply a “no rise certification,” and get a Letter Of Map Revision (LOMR). If so, give him/her copies of all pertinent application forms and establish a specific date by which you must receive all applications and data. You then need to coordinate your response with all other applicable agencies and inform NMDHSEM and FEMA in writing of your actions. You must monitor the situation and be ready to fall back to Option A if the violator fails to meet his/her part of the agreement.

If you do not receive the permit application and LOMR data as agreed, then the violation must be considered active and all violation notices should remain in effect until the LOMR and the permit application are received. You should inform the violator that the violation is still active, provide a second due date for the submission of the data and inform him/her that if the information is not received, the community will initiate litigation.

Abatement Option 3: Apply for a Variance. If the developer can supply proof that even though the project increases flood heights, it will have no adverse impact on others, he could apply for a variance. He will still need to submit application. If the increase in flood heights is significant enough, the developer needs to apply for a LOMR to reflect the new flooding conditions.

18.5.2. Example Violation #2 – House Built Too Low

A single-family dwelling was not constructed to the required elevation. The lowest floor is three feet below the flood protection elevation and is two feet below the base flood elevation (in violation of both the local ordinance and FEMA regulations).



Handbook for New Mexico Floodplain Managers

Abatement Option 1: Elevate. If the structure was built on a crawlspace, elevation would be the best option. If the structure has been built on slab, elevation may be an option but would probably be more expensive. Special care must be taken to ensure that the new elevation meets the elevation requirements of the ordinance.

If the structure is built over a basement, then the first floor may be at or above the ordinance elevation which may be more than the minimum FEMA requirement. If this is the case, you may wish to require that the basement be abandoned and filled. This option could be accomplished by moving all heating, plumbing and utilities and utility equipment to the first floor or higher and backfill the basement.

Abatement Option 2: Allow to Remain. If you agree that the structure should remain on the site as is, then several actions should be taken:

1. The violator must be required to floodproof the structure to the maximum extent possible and submit a certified elevation certificate, a floodproofing certificate and a copy of a letter requesting rating or re-rating of the structure for flood insurance purposes to the community.
2. The violator should file a notice with the County Recorder notifying any future purchasers that the property does not conform to the floodplain development requirements of the community. A copy of the notice should also be filed with the title abstract. This option should be considered only if all the requirements of the ordinance cannot be met.
3. The community should submit the appropriate information to FEMA so the building will be a "submit to rate," i.e., its flood insurance premiums will reflect the true hazard that it is exposed to.
4. The variance procedure should be used and records kept to document that the building is not a legal violation of your regulations.

Abatement Option 3: Demolish. Although demolition would not normally be required for a structure with the lowest floor (including basement) only one or two feet below the base flood elevation outside of a designated floodway, this is an option that must be considered. If the structure lies in a floodway or more than two feet below the base flood elevation, demolition becomes a more appropriate option.



19. Records

CONTENTS

- 19.1. Permit File 19-2
 - 19.1.1. Contents..... 19-2
 - 19.1.2. File Retention..... 19-3
- 19.2. Elevation Certificate 19-3
 - 19.2.1. FEMA’s Form..... 19-3
 - 19.2.2. Annexations 19-4
- 19.3. Floodproofing Certificate 19-4
- 19.4. Biennial Report..... 19-5



Handbook for New Mexico Floodplain Managers

Records show what you approved and what you told the developer, forming a “paper trail” needed for administrative or legal proceedings related to development projects. Such records are vital in case the project is built in violation of your ordinance or the conditions of a permit. They also give future owners information about the property. Records are also checked by FEMA to determine if your community is in full compliance with the NFIP.

This section reviews what records you must — or should — keep to meet your community’s obligation to the NFIP.

19.1. Permit File

Your community should have a permit record system that is keyed to a geographical identifier (not just a building permit number) such as: street address, subdivision, lot and block number, section, township and range, or county assessor’s property ID number.

You should have a file for each permit application. The files should have some indicator on the folder to show that it is a Floodplain Use Permit, such as a different color file folder or file label.

IF YOUR OFFICE IS IN A FLOODPLAIN, OR IF YOU KNOW THAT IT IS SUBJECT TO FLOODING, IT IS VITAL THAT YOUR PERMANENT FLOODPLAIN MANAGEMENT FILES BE KEPT IN ANOTHER LOCATION THAT IS NOT SUBJECT TO FLOODING. THIS IS TRUE FOR ALL IMPORTANT GOVERNMENT RECORDS, BUT IT IS ESPECIALLY IMPORTANT FOR YOUR FLOODPLAIN USE PERMITS, ETC., AFTER A FLOOD, WHEN YOU ARE CONCERNED ABOUT SUBSTANTIAL DAMAGE ISSUES, REPAIRS AND OTHER FLOOD-RELATED PROBLEMS.

19.1.1. Contents

Permit files should contain copies of these items, as appropriate:

- The permit application form and all attachments, including the site plan.
- All correspondence pertinent to the project.
- Flood and floodway data prepared by the developer.
- Engineering analyses of floodway encroachments and watercourse alterations.
- Special engineering designs for enclosures below the base flood.
- Any variances or appeals proceedings.
- Records of inspections of the project while under construction.
- An accurate and complete FEMA Elevation Certificate indicating “As-Built” conditions for all new and substantially improved buildings.
- Certificates of compliance or occupancy.

Keeping these records is a requirement to participate in the NFIP; there is no statute of limitations as to how long they should be kept. You may want to keep a separate log, record or file of floodplain permits so you can readily retrieve those floodplain projects to show NMDHSEM and FEMA staff.



Handbook for New Mexico Floodplain Managers

19.1.2. File Retention

It is not necessary to keep the entire building plans and other documents longer than is required for local code purposes. However, here are some reasons to keep floodplain permit related materials (in a retrievable format) for as long as you can:

- If you allow below-base flood enclosures, you will need the approved ground floor plan of each building in case future owners modify that area (see Section 12.3).
- You need to keep track of each building improvement so you can tell when the building has been substantially improved (see Sections 13.2 and 13.3.3).
- If a flood insurance “submit to rate” issue arises, you need to be able to show whether the building was originally built according to your regulations (see Section 20.3.2).

Any of these situations could arise years from now, but they would impact on your office’s obligation to the State and the NFIP.

19.2. Elevation Certificate

Your permit file needs an official record that shows how high new buildings and substantial improvements were elevated. This is needed both to show compliance with the ordinance and for the owner to obtain a flood insurance policy.

19.2.1. FEMA’s Form

There is no mandated form for keeping building elevation records, but the NMFMA model ordinance requires that you use FEMA’s Elevation Certificate Form (FEMA Form 81-31). A blank copy of the latest form is in Appendix D.

If your community is participating in the Community Rating System, the FEMA form must be used for new construction and substantial improvements to existing buildings. Insurance agents writing flood insurance policies also must use the form to properly rate all new and post-FIRM buildings in the floodplain. FEMA encourages communities to use the form to help their residents obtain flood insurance.

The FEMA form is an 18-page packet. It includes the six-page FEMA Form 086-0-33, Elevation Certificate, and instructions on how to complete it. Additional copies of the packet are available at no cost from FEMA. (see Appendix C)

It can also be downloaded from FEMA’s web site, in both fillable PDF form.

Note: If you use the software version, or keep elevation records on a computer database, you also need to keep the original signed “hard copy” of the surveyor’s certification.

The responsibility for obtaining and filing an elevation certificate rests on the local permit official. Part or all of the form may be completed by a land surveyor, engineer, architect, or local official authorized by ordinance to provide floodplain management information.

You may give property owners or surveyors blank forms and expect them to complete the entire



Handbook for New Mexico Floodplain Managers

form. The permit official should at least double-check the form to ensure that it is complete and that Sections A and B (on property and map information) are correct. Local officials in CRS communities are obligated to ensure that the entire forms are complete and accurate.

The local permit official is also responsible for Section G. Although it is optional, it contains some good information that helps determine if a building is compliant. Item G8 is particularly important. You should make a habit of completing this section for every new building in the SFHA.

19.2.2. Annexations

The FEMA Elevation Certificate form is self-explanatory. One problem arises when a city annexes Special Flood Hazard Areas in the unincorporated areas of the county. This situation can lead to considerable confusion as to flood zone determination, as well as knowing which community number and panel numbers should be used on Elevation Certificates and other NFIP documents.

Flood zone determination: If the subject property is located within areas annexed from the county, use the county flood maps to determine the appropriate flood zone.

Community Identification Number: In item B1 of Section B of the FEMA form (“NFIP Community Name & Number”), use the municipality’s NFIP ID number once a property is annexed.

Flood Map Panel Number: For property located in an annexed area, for item B4 of Section B (“Map and Panel Number”), use the entire county ID and panel number— “370087 0005,” not just “0005.” For sites within the “area not included,” state “No NFIP Map.” For items B5 – B7, refer to the county’s map.

19.3. Floodproofing Certificate

Floodproofing means making a building watertight, or substantially impermeable to floodwaters. It is an option only allowed for nonresidential buildings.

Designs for a floodproofed building must account for flood warning time, rate of rise of floodwaters, uses of the building, mode of entry to and exit from the building and the site, floodwater velocities, flood depths, debris impact potential and flood frequency. FEMA’s Technical Bulletin 3-93, *Non-Residential Floodproofing Requirements and Certification for Buildings Located in Special Flood Hazard Areas*, has a detailed discussion on each of these considerations.

For insurance rating purposes, the building’s floodproofed design elevation must be at least one foot above the base flood elevation to receive rating credit. If floodproofed only to the base flood elevation, the floodproofing credit cannot be used, resulting in higher flood insurance rates.

44 CFR Sections 60.3(B)(5) and (c)(4) require the community to obtain and maintain a licensed professional engineer’s certification that a nonresidential building was properly floodproofed. You are encouraged to use the one-page FEMA certification form shown in Appendix D because



Handbook for New Mexico Floodplain Managers

it fulfills NFIP insurance rating needs as well as floodplain management requirements. It can also be downloaded from FEMA's web site (see Appendix D).

19.4. Biennial Report

Every two years, participating communities must complete a form describing the community's progress in the previous two years in implementing floodplain management measures (44 CFR 59.22). A copy of a biennial report appears in Figure 19-1.

FEMA sends the one-page form to your chief elected official. It must be completed and returned to FEMA within 30 days.

The only way you can complete the biennial report is to have complete and accessible permit records. You need to keep track of:

- Changes in community boundaries.
- Physical or topographical changes that affect flood hazard areas.
- Amendments to your floodplain ordinance.
- The number of building permits issued in the floodplain.
- The number of variances issued. You also need to be able to tell FEMA:
- The number of people and number of buildings in the floodplain. While these numbers can be approximate, accurate figures will greatly help FEMA and its programs. The NMFMA has adopted a resolution that all New Mexico communities should accurately count the buildings in their floodplains.
- Whether you would like any floodplain management assistance.



Handbook for New Mexico Floodplain Managers

DEPARTMENT OF HOMELAND SECURITY EMERGENCY PREPAREDNESS AND RESPONSE DIRECTORATE NATIONAL FLOOD INSURANCE PROGRAM

O.M.B. No. 1660-0003
Expires June 30, 2007
See reverse side for
Paperwork Burden Notice

Biennial Report for
Calendar Year 2005 and 2006

REGULAR PROGRAM
(With Base Flood Elevations)

RETURN TO:
Federal Emergency Management Agency
Biennial Report Coordinator
3601 Eisenhower Avenue
Alexandria, VA 22304

INSTRUCTIONS

1. This report should be completed by the locally designated Floodplain Manager (e.g., your City Manager, City Planner, Building Inspector, etc.).
2. Please return this report within 45 days of receipt to the address above, or fax it to 1-877-NFIP-BR1. If you would like to respond via the Internet, go to www.floodmaps.fema.gov/br2007 and use the following PIN number _____. For more information, contact the FEMA Biennial Report Coordinator toll free at 1-877-FEMA-114 (1-877-336-2114).

SECTION I – Changes in your community that may have affected flood hazard areas:

If you answer "yes" to any question in this section, please be prepared to provide explanatory information and/or technical data including, when appropriate, your own community map or a copy of the Flood Insurance Rate Map showing the areas affected. Do not send this information at this time. FEMA may contact you by phone in the near future for this information.

- | | Yes | No |
|---|--------------------------|--------------------------|
| A. Does your community have any changes to the base data on your Flood Insurance Rate Maps?
(e.g., adding/correcting street, adding Letters of Map Revision, or annexations/corporate limit changes) | <input type="checkbox"/> | <input type="checkbox"/> |
| B. Have the characteristics of watersheds in your community changed to the extent that your floodplain needs to be restudied?
(e.g., major landuse changes due to urbanization, deforestation, wildfires, or stream relocation due to erosion/siltation) | <input type="checkbox"/> | <input type="checkbox"/> |
| C. Does your community have information that may be incorporated into a Flood Insurance Rate Map?
(e.g., watershed studies or Base Flood Elevations established by developers) | <input type="checkbox"/> | <input type="checkbox"/> |
| D. Has there been a significant man-made change affecting your designated flood hazard areas?
(e.g., levees, bridges, culverts, extensive filling, excavation, or stream channelization) | <input type="checkbox"/> | <input type="checkbox"/> |

SECTION II – Community Floodplain Management Data during the last 2 years (calendar years 2005-2006 only):

- | | | |
|---|------------------------------|-----------------------------|
| A. Has your community updated its floodplain management ordinance during the reporting period? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| B. How many building permits were granted within the last <u>2 calendar years</u> for new structures (including substantial improvements to existing structures) in the designated flood hazard areas shown on your community's Flood Insurance Rate Map? | <input type="text"/> | |
| C. How many variances to your local floodplain management ordinance were granted within the last <u>2 calendar years</u> for new structures or substantial improvement to existing structures in designated flood hazard areas shown on your community's Flood Insurance Rate Map? Please provide ONLY the number of variances granted for structures with the lowest floor below the Base Flood Elevation. | <input type="text"/> | |
| D. Is your community in need of technical assistance in improving local floodplain management, such as regulation interpretation, planning, enforcement procedures, floodproofing, or a community visit? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| E. Please update the demographic information for your community that was provided to FEMA when your community last reported to the National Flood Insurance Program. If any numbers are NOT correct or a "0" appears, please provide the revised number in the space below. If precise data are not available, please give us your best estimate. | | |

	Permanent Year-Round Population	1-4 Family Structures	All other Structures
1. In your <u>entire</u> community (including flood hazard areas)			
2a. In your flood hazard areas <u>only</u> .			
2b. How did you determine the number of structures in the flood hazard areas? <input type="checkbox"/> GIS data <input type="checkbox"/> best estimate <input type="checkbox"/> tax map overlays <input type="checkbox"/> other (explain) _____			
NAME, TITLE, SIGNATURE, AND E-MAIL ADDRESS	PHONE NO. (including area code)	Date Month Year	

FEMA Form 81-29, MAR 07

REPLACES ALL PREVIOUS EDITIONS

Retain a copy of this report for your records

R

Figure 19-1. Sample Biennial Report.



20. Flood Insurance

CONTENTS

20.1.	Introduction.....	20-2
20.1.1.	Insurance Companies	20-2
20.2.	Coverage.....	20-2
20.2.1.	Building Coverage	20-2
20.2.2.	“Building” Defined	20-3
20.2.3.	Contents Coverage	20-4
20.2.4.	Enclosures.....	20-4
20.2.5.	Basements	20-4
20.2.6.	Amount of Coverage.....	20-6
20.2.7.	Waiting Period	20-6
20.3.	Rating Buildings	20-6
20.3.1.	Rating Pre-FIRM Buildings	20-7
20.3.2.	Rating New Buildings.....	20-8
20.3.3.	Rating in Approximate A Zones	20-9
20.3.4.	Premiums.....	20-10
20.4.	The Mandatory Purchase Requirement	20-10
20.4.1.	Where it Applies	20-10
20.4.2.	How it Works	20-11
20.4.3.	Flood Insurance for Your Community	20-12



20.1. Introduction

One of the main reasons for your floodplain management program is to make insurance available for people who want to protect themselves financially from flood hazards. This section reviews how the insurance aspect of the NFIP works and how rates and coverage are dependent on how well buildings comply with your ordinance.

This section is devoted to flood insurance policies: what's covered, what's not covered, when must a policy be bought, and other rules. This is important information for the local permit administrator to know because some construction decisions affect what is eligible for insurance coverage.

If you have additional questions:

- *Answers to Questions about the National Flood Insurance Program*, questions 25 – 71 covers the topics in this section or see FEMA's NFIP web site (see Appendix C, References and Appendix B, Contacts).
- Local insurance agents should have additional references, including FEMA's *Flood Insurance Manual* or see it on FEMA's NFIP web site (see Appendix B Contacts)

20.1.1. Insurance Companies

Flood insurance policies are obtained through local property insurance agents. The agents may sell a policy through one of the Write Your Own insurance companies or a "direct" policy through FEMA. Both approaches will result in the issuance of a "Standard Flood Insurance Policy" that meets all the requirements and rates set by FEMA.

If an insured property is flooded, the property owner contacts his or her insurance agent. The agent arranges for an adjuster to review the damage and work with the insured to settle a claim.

Property owners always work through their insurance agents – they do not need to deal with FEMA.

20.2. Coverage

Flood insurance coverage is provided for insurable buildings and their contents to property owners in NFIP communities.

20.2.1. Building Coverage

Building coverage is for the structure. This includes all things that typically stay with the building when it changes ownership, including:

- Utility equipment, such as a furnace or water heater
- Wall-to-wall carpeting
- Built-in appliances
- Wallpaper and paneling



Handbook for New Mexico Floodplain Managers

Ten percent of a residence's building coverage may apply to a detached garage or carport. Other appurtenant structures must be insured under a separate policy.

20.2.2. "Building" Defined

A "building" is defined as a walled and roofed structure, including a manufactured home, that is principally above ground and affixed to a permanent site. This definition has three parts:

- "Walled and roofed" means it has in place two or more exterior rigid walls and the roof fully secured so that the building will resist flotation, collapse and lateral movement.
- "Manufactured (mobile) home" is a building transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities.
- "Principally above ground" means at least 51 percent of the actual cash value of the structure, including machinery and equipment (but not land value), is above ground.

This definition is similar to, but not quite the same as, the definition for "building" or "structure" used for floodplain management and defined in Section 12. The term includes a building in the course of construction, alteration or repair. Buildings in the course of construction that have yet to be walled and roofed are eligible for coverage except when construction has been halted for more than 90 days and/or if the lowest floor used for rating purposes is below the BFE.

Materials or supplies intended for use in such construction, alteration, or repair are not insurable unless they are contained within the enclosed building on the premises or adjacent to the premises.

Examples of things that are not considered insurable buildings include:

- Gas or liquid storage tanks
- A structure with more than 50 percent of its value underground, such as an underground pumping station, well or septic tank
- Tents
- Tennis and swimming pool bubbles
- Swimming pools
- Fences, docks, driveways
- Open pavilions for picnic tables and bleachers
- Carports with open sides
- Sheds on skids that are moved to different construction sites
- Licensed vehicles, campers and travel trailers (unless permanently attached to the site)
- A building declared in violation of a state or local law (see Section 18.3 on Section 1316)
- Buildings over water which were built after October 1, 1982
- Landscaping, crops, and other items outside of a building



Handbook for New Mexico Floodplain Managers

20.2.3. Contents Coverage

Contents coverage is for the removable items inside an insurable building. A renter can take out a policy with contents coverage, even if there is no structural coverage.

Certain contents are not insurable. These include:

- Animals and livestock
- Licensed vehicles
- Jewelry, artwork, furs and similar items valued at more than \$2500
- Money or valuable papers
- Personal property that is not secured to prevent flotation located in a building that is not fully enclosed (such as an open carport).

20.2.4. Enclosures

There is limited coverage in enclosures below the lowest floor of an elevated post-FIRM building (including a manufactured home):

- There is no contents coverage in these enclosures.
- The only structural coverage is for the required utility connections and the foundation and anchoring system required to support the building.

It therefore behooves the permit official to ensure that furnaces and other items that can be damaged by floodwater are not allowed in a crawlspace or other enclosure below an elevated lowest floor.

20.2.5. Basements

A basement is a floor that is below grade on all sides. There is limited coverage for basements as listed in Figure 20-1.

The National Flood Insurance Program has limited coverage for basements and the below grade floors of tri levels. The NFIP defines “basement” as “Any area of the building, including any sunken room or sunken portion of a room, having its floor below ground level (subgrade) on all sides.” (Article II of the Standard Flood Insurance Policy, December 31,2000).

Coverage under building or structural coverage is limited to:

a. Any of the following items, if installed in their functioning locations and, if necessary for operation, connected to a power source:

- (1) Central air conditioners;
- (2) Cisterns and the water in them;
- (3) Drywall for walls and ceilings in a basement and the cost of labor to nail it, unfinished and unfloated and not taped, to the framing;
- (4) Electrical junction and circuit breaker boxes;
- (5) Electrical outlets and switches;
- (6) Elevators, dumbwaiters, and related equipment, except for related equipment installed below the 100-year flood elevation after September 30, 1987;
- (7) Fuel tanks and the fuel in them;
- (8) Furnaces and hot water heaters;
- (9) Heat pumps;
- (10) Nonflammable insulation in a basement;
- (11) Pumps and tanks used in solar energy systems;
- (12) Stairways and staircases attached to the building, not separated from it by elevated walkways;
- (13) Sump pumps;
- (14) Water softeners and the chemicals in them, water filters, and faucets installed as an integral part of the plumbing system;
- (15) Well water tanks and pumps;
- (16) Required utility connections for any item in this list; and
- (17) Footings, foundations, posts, pilings, piers, or other foundation walls and anchorage systems required to support a building.

b. Clean-up. (Article III. Section A.8).

Coverage under personal property coverage “is limited to the following items, if installed in their functioning locations and, if necessary for operation, connected to a power source:

- a. Air conditioning units, portable or window type;
- b. Clothes washers and dryers; and
- c. Food freezers, other than walk-in, and food in any freezer. (Article III. Section B.3.)

Figure 20-1. Flood Insurance Coverage for Basements.



Handbook for New Mexico Floodplain Managers

20.2.6. Amount of Coverage

Insurance rates for all buildings are based on a two-tiered system: a first or basic layer of coverage and a second or additional layer. The maximum amounts available under each layer are shown in Figure 20-2.

Building Coverage	Basic Insurance Limits	Additional Insurance Limits	Total Insurance Limits
Single-family dwelling	\$60,000	\$190,000	\$250,000
2-4 family dwelling	\$60,000	\$190,000	\$250,000
Other residential	\$175,000	\$325,000	\$500,000
Nonresidential	\$175,000	\$325,000	\$500,000
Contents coverage			
Residential	\$250,000	\$75,000	\$100,000
Nonresidential	\$150,000	\$350,000	\$500,000

Figure 20-2. Amount of available

Note: This table is for communities in the Regular Phase of the NFIP. If your community has a Flood Insurance Rate Map and is participating in the NFIP, it is in the Regular Phase. Coverage amounts are as of October 2017.

20.2.7. Waiting Period

In most cases, a 30-day waiting period follows the purchase of a flood insurance policy before it goes into effect. There are some exceptions when a policy goes into effect immediately: e.g., when a policy is purchased at the time of a new mortgage or title transfer and when a new FIRM puts a property into the SFHA.

The objective of the 30-day waiting period is to encourage people to keep a policy at all times. FEMA does not want folks to wait for the river to rise before they buy their coverage. Also, to be on a sound financial basis, the NFIP needs everyone at risk to pay their share of the premiums.

Many people have found out about the waiting period the hard way. Your community would be wise to publicize availability of flood insurance so residents can be protected when a flood comes.

20.3. Rating Buildings

The insurance agent calculates the premium for a flood insurance policy on a property. The premiums on new buildings are based on the risk of flooding and flood damage. If a building is built incorrectly, the owner may be faced with very high premiums or insufficient coverage. On the other hand, if a building is built properly, the owner will pay less than what it costs to insure a pre-FIRM building under the “subsidized” rates.

The two aspects of the NFIP – insurance and regulations – reinforce each other. How well local floodplain management regulations are enforced affects the flood insurance rates paid by the citizens of your community. Consequently, it is important for you to know how flood insurance rates are set for new buildings.

20.3.1. Rating Pre-FIRM Buildings

Pre-FIRM buildings are those built before the effective date of your first Flood Insurance Rate Map (FIRM). This means they were built before detailed flood hazard data and flood elevations were provided to the community and usually before your community enacted comprehensive regulations on floodplain construction.

Pre-FIRM buildings can be insured using “subsidized” rates that, for most pre-FIRM buildings are significantly less than actuarial rates that fully reflect their risk of flooding. They are designed to help people afford flood insurance even though their buildings were not built with flood protection in mind.

The “subsidy” in the subsidized rate is not funded by taxpayers. It is, in fact, an insurance mechanism called cross-subsidization. The NFIP insurance costs are supported from flood insurance premiums, so post-FIRM and X Zone policy holders are, in effect, helping their pre-FIRM counterparts obtain affordable flood insurance coverage. The NFIP also has statutory authority to borrow a specified amount of money from the U.S. Treasury and exercises this authority to even out good years and bad. However, this borrowing must be paid back with interest. If catastrophic flooding occurred over several years and the NFIP exceeded its statutory borrowing authority, the program may have to obtain an appropriation from Congress to pay back this “subsidy”

The pre-FIRM building rates for a single-family house are shown in Figure 20-3. They are based on the building type and FIRM zone. The elevation of the building is not counted because most people do not have elevation data on pre-FIRM buildings. If there is an elevation certificate or similar record, then the building can be rated at the post-FIRM rate, if it is lower.

If a pre-FIRM building is substantially damaged or substantially improved, it will be rerated as a post-FIRM building when the policy is renewed (see Section 13 on determining substantial damage and substantial improvement).

A, AE, A1-A30, D zones			B,C,X zones	
Building types	Building	Contents	Building	Contents
No basement	1.04/.95	1.31/1.71	1.09/.30	1.67/.53
With basement	1.11/1.40	1.31/1.44	1.22/.42	1.87/.61
With enclosure	1.11/1.68	1.31/1.71	1.22/.46	1.87/.69
Mobile home	1.04/.95	1.31/1.71	1.09/.54	1.67/.53

Figure 20-3. Rates for pre-FIRM single-family dwellings.

Rates are per \$100 coverage as of May 2003. The two numbers under each category (Building or Contents) reflect the rates for the basic and additional layers of coverage explained in Figure 20-2. The FIRM zones designations are explained in Figure 5-7. In addition, there is a \$30 policy fee and a \$75 fee for ICC coverage.



Handbook for New Mexico Floodplain Managers

Example: The buyer of a pre-FIRM home with no basement or enclosed areas below the main floor is required by his/her lender to purchase flood insurance. The value of the home is \$80,000. The annual premium is \$0.76 per \$100 for the first \$50,000 (“basic coverage”) and \$0.28 for the remainder (\$30,000) (“additional coverage”). The annual premium is $(\$0.76 \times 500) + (\$0.28 \times 300) + \$30.00 + \$75.00 = \$569.00$.

20.3.2. Rating New Buildings

The premium rates for new or post-FIRM construction are actuarial, meaning they are based on the known risk the building is exposed to. Post-FIRM rates base the risk on the FIRM zone and the elevation of the lowest floor (including the basement) of the building in relation to the base flood elevation (“BFE”). These rates are shown for a single family residence in Figure 20-4.

Figure 20-4 shows how the rates are dependent on the elevation of the lowest floor in relation to the base flood elevation. The higher the floor, the lower the rate. A building with the lowest floor at the base flood elevation (“0” in Figure 20-4) benefits from a lower rate than a pre-FIRM building’s “subsidized” rate: \$1.04 per \$100 for the first layer compared to \$1.09 cents per \$100 for a building in the AE Zone. A post-FIRM building elevated one foot above the base flood elevation pays 88 cents, half of the pre-FIRM rate of 68 cents.

Lowest floor vs. BFE	AE, A1 – A30 Zones	
	Building	Contents
+4	.28/.08	.38/.12
+3	.32/.08	.38/.12
+2	.47/.10	.38/.12
+1	.88/.14	.48/.12
0	2.02/.23	.95/.12
-1	5.05/.29	1.93/.16
-2	Submit to rate	

Figure 20-4. Rates for post-FIRM single-family dwellings in the SFHA.

Notes: Rates are for one floor, no basement, as of May 2003. The two numbers reflect the rates for the basic and additional layers of coverage that are explained in Figure 20-2. In addition, there is a policy fee of \$30.00 and a variable fee for ICC coverage.

Examples: A community requires new buildings to be built so that the first floor is at or above the BFE. A builder builds a \$100,000 one-story residence at the BFE. The annual flood insurance premium is $(\$0.89 \times 500) + (\$0.08 \times 500) + \$30.00 + \$24.00 = \$539.00$. If the builder had built the home one foot above the BFE, the annual premium would have been $(0.55 \times 500) + (\$0.08 \times 500) + \$30.00 + \$24.00 = \369.00 . That foot of elevation would have saved the buyer \$170.00 every year for the life of the mortgage.

Submit for Rate:

Certain properties at high flood risk, because of peculiarities in their exposure to flooding, do



Handbook for New Mexico Floodplain Managers

no lend themselves to preprogrammed rates. Rates for these properties are not included in the Flood Insurance Manual. These risks require an in-depth underwriting analysis and must be submitted to the NFIP or WYO Insurance Company for an individual (specific) rate. Examples include buildings with their lowest floors two feet or more below BFE, buildings with below grade crawlspaces, certain buildings with enclosures 2 feet or more below BFE, some buildings in unnumbered A zones, and similar risks.

Since a submit-for-rate policy often is an indicator of the property owner's noncompliance with a community's regulations, the community's failure to enforce its regulations, or the result of a variance action, these cases are forwarded to the appropriate FEMA Regional Office for investigation.

Elevation Certificates: You can see how important it can be for the owner to have the building properly rated. One of the key tools that helps do this is the elevation certificate. This form tells the insurance agent how high the building is and how high the base flood elevation is. It is discussed in Section 19.

Floodproofing: A floodproofed nonresidential building is rated based on the elevation of its lowest floor, unless it is floodproofed to one foot above the base flood elevation. Then, one foot is subtracted from the flood protection level. Thus, a building must be floodproofed to one foot above the base flood elevation in order to get the same rates as a building elevated to the base flood elevation.

If a building is only floodproofed to the base flood elevation or lower, this floodproofing credit cannot be used and it will be rated based on the floor elevation. If the lowest floor is two or more feet below the base flood elevation, it will be a submit to rate.

Buildings that are floodproofed need floodproofing certificates, as explained in Section 20.

20.3.3. Rating in Approximate A Zones

Approximate A Zones are floodplains that are mapped on the FIRM without a base flood elevation. They are discussed in Section 6. A post-FIRM building in an approximate A Zone cannot be rated using tables like Figure 20-4.

A post-FIRM single-family home in an approximate A Zone will be subject to a rate of \$2.43/1.15 for building coverage and \$3.26/1.70 for contents coverage. This rate is much higher than the rates in Figures 20-3 and 20-4. This can be a real disincentive for people to buy flood insurance on post-FIRM buildings in approximate A Zones.

There are two ways to obtain lower rates in approximate A Zones. In either case, an elevation certificate is needed.

- If the community provides a locally developed base flood elevation and the building is elevated to or above that base flood elevation, the rates are comparable to those for buildings in AE Zones. Communities are encouraged to do this, as explained in Section 9.

Handbook for New Mexico Floodplain Managers

- If there is no base flood elevation from any source, rates can be set based on the height of the building above its highest adjacent grade. Rates are reduced for buildings 1 foot, 2 feet and 5 or more feet above grade (the higher the building, the lower the rate). Buildings built at or below grade can use the submit for rate approach.

20.3.4. Premiums

A policy holder's total payment is calculated by:

- Multiplying the amount of building coverage desired times the rate. (done once for the basic coverage and again for the additional limits)
- Multiplying the amount of contents coverage times the rate desired. (done once for the basic coverage and again for the additional limits)
- Factoring in the amount of deductible the policy holder wants.
- Adding the premium for Increased Cost of Construction coverage. (which varies from \$4 to \$75 per \$30,000 of coverage, depending on the type of building and FIRM zone. See Section 13 on ICC coverage)
- Adding the expense constant. (currently \$50 to help cover the cost of writing the policy)
- Adding the Federal policy fee. (currently \$30 to help pay for administrative costs, such as floodplain mapping)

The rates can vary based on the community's floodplain management program. If the community has not properly enforced its floodplain management ordinance, it could be put on probation. Under probation, all policies have an additional \$50 surcharge. If the community does not take remedial or corrective measures while on probation, it can be suspended.



Conversely, a community that has an exemplary program that includes floodplain management activities above and beyond the minimum NFIP criteria may apply for a Community Rating System (CRS) classification. This has reduced the flood insurance premiums in about 1,000 communities by up to 45%. The CRS is explained in more detail in Section 21.

20.4. The Mandatory Purchase Requirement

The Flood Disaster Protection Act of 1973 added a key requirement to the NFIP: if a community participates in the program, flood insurance is a prerequisite for receiving money from a federal agency or a federally-supported financial program.

20.4.1. Where it Applies

The mandatory purchase requirement applies to all forms of federal or federally related financial assistance for buildings located in Special Flood Hazard Areas (SFHAs). This requirement affects loans and grants for the purchase, construction, repair, or improvement



Handbook for New Mexico Floodplain Managers

of any publicly or privately owned building in the SFHA, including machinery, equipment, fixtures, and furnishings contained in such buildings.

Financial assistance programs affected include loans and grants from agencies such as the Department of Veterans Affairs, USDA Rural and Housing Services, Federal Housing Administration, Small Business Administration, and Federal Emergency Management Agency.

The requirement applies to secured mortgage loans from financial institutions, such as commercial lenders, savings and loan associations, savings banks, and credit unions that are regulated, supervised or insured by Federal agencies such as the Federal Deposit Insurance Corporation and the Office of Thrift Supervision.

The requirement comes into play if a loan is made, increased, renewed or extended – at any of those steps, the lender must check to see if the building is in an SFHA at that time. For example, a building in an X Zone when the original mortgage was taken out, would be affected if the area is remapped in the SFHA and the loan is later refinanced.

The requirement also applies to all mortgage loans purchased by Fannie Mae or Freddie Mac in the secondary mortgage market.

20.4.2. How it Works

Before a person can receive a loan or other financial assistance from one of the affected agencies or lenders, there must be a check to see if the building is in an SFHA on the Flood Insurance Rate Map (FIRM). It is the agency's or the lender's responsibility to check the FIRM to determine if the building is in an SFHA, although many communities provide assistance.

Usually, the lender will have the determination done by a third party flood hazard determination company that provides a guarantee that the determination is correct. The lender must document the determination and whether flood insurance is required on a Standard Flood Hazard Determination Form (FEMA Form 81-93). The lender will notify the borrower if flood insurance is required.

If the building is in an SFHA, the agency or lender is required by law to require the recipient to purchase a flood insurance policy on the building. The Federal law requires structural coverage equal to the amount of the loan (or other financial assistance) or the maximum amount available, whichever is less.

Note: Many people who were required to get building coverage do not realize that their contents are not covered unless they voluntarily purchase contents coverage. A local public information program would help residents by informing them of this and other basic facts, such as the 30-day waiting period and the availability of insurance for properties outside the floodplain.

The mandatory purchase requirement does not affect loans or financial assistance for items that are not covered by a flood insurance policy, such as vehicles, business expenses, landscaping, and vacant lots.

It does not affect loans for buildings that are not in the floodplain, even though a portion of



Handbook for New Mexico Floodplain Managers

the lot may be floodprone. While not mandated by law, a lender may require a flood insurance policy as a condition of a loan for a property in any zone on a FIRM and may require more coverage than the minimum required by Federal law.

20.4.3. Flood Insurance for Your Community

As a recipient of federal financial assistance, your community may have been subject to the mandatory purchase requirement. You should determine if there are any insurable publicly owned or leased buildings in your floodplain. If so, see if they received federal aid in the past. Likely prospects include:

- A wastewater treatment plant (always located near a body of water) which received a grant from the Environmental Protection Division.
- Public housing or neighborhood center funded with help from the Department of Housing and Urban Development or the Community Development Block Grant.
- Any facility that received disaster assistance after a flood or other disaster declaration.

Whether there was a requirement to buy insurance or not, you should advise your risk manager or other appropriate office about the buildings exposed to flooding. Many agencies find out too late that their “all risk” insurance policies don’t cover flooding.

Over the last few years, Congress has taken steps to encourage public agencies and private property owners to purchase flood insurance instead of relying on disaster assistance for help after a flood. Disaster assistance for a public building will be reduced by the amount of insurance coverage (structural and contents) a community should carry on the building (regardless whether the community is carrying a policy).

In effect, disaster assistance for public agencies now has a very large deductible equal to the insurance policy it should carry. Why wait for the disaster to be caught short? You should advise the appropriate people of the need to purchase flood insurance coverage on your community’s buildings.



21. The Community Rating System

CONTENTS

21.1.	Introduction to the Community Rating System	21-3
21.1.1.	Goals	21-3
21.1.2.	Operation.....	21-4
21.1.3.	Community Responsibilities	21-5
21.1.4.	Costs and Benefits	21-6
21.2.	CRS Activities	21-7
21.3.	Credit Points.....	21-8
21.3.1.	Application for Credit	21-8
21.3.2.	Activity Credit Points	21-8
21.3.3.	Quick Check of Potential CRS Credit.....	21-9
21.4.	The CRS in New Mexico.....	21-11
21.4.1.	CRS Communities.....	21-11
21.4.2.	Opportunities to Participate.....	21-11
21.5.	Publications	21-11



21.1. Introduction to the Community Rating System

The NFIP has been effective in requiring new buildings to be protected from damage by a 1% chance flood, also known as the base flood. However, flood damage still results from floods that exceed the base flood, from flooding in unmapped areas, and from flooding that affects buildings constructed before the community joined the NFIP.

Under the Community Rating System (CRS), communities can be rewarded for doing more than simply regulating construction of new buildings to the minimum national standards. Under the CRS, the flood insurance premiums of a community's residents and businesses are discounted to reflect that community's work to reduce flood damage to existing buildings, manage development in areas not mapped by the NFIP, protect new buildings beyond the minimum NFIP protection level, preserve and/or restore natural functions of floodplains, help insurance agents obtain flood data, and help people obtain flood insurance.

21.1.1. Goals

The goals of the NFIP are to provide flood insurance to property owners, to encourage flood loss reduction activities by communities, and to save taxpayers' money. As a part of the NFIP, the CRS provides both incentives and tools to further these goals.

The CRS recognizes, encourages, and rewards—by the use of flood insurance premium adjustments—community and state activities that go beyond the minimum required by the NFIP to:

- Reduce and avoid flood damage to insurable property,
- Strengthen and support the insurance aspects of the NFIP, and
- Foster comprehensive floodplain management.

The purpose of the CRS is to support the NFIP. To do this, the CRS provides flood insurance premium rate reductions to policyholders in recognition of the fact that their communities implement activities that exceed the minimum NFIP requirements and that work toward the three goals of the CRS. Included in this support are measures that credit protection to life and property during a flood. A closer look at how communities can implement these three goals follows.

Goal 1. Reduce and Avoid Flood Damage to Insurable Property.

The CRS supports the NFIP by working to minimize flood losses nationwide, both inside and outside of mapped floodplains. Communities are encouraged to reduce the exposure of existing buildings (and their contents) to flood damage, especially properties that are subject to repetitive flood losses. New buildings and their contents should be protected from known and future local flood hazards. Standards higher than those set out in the minimum criteria of the NFIP may be needed to accomplish these tasks. The CRS encourages communities to map and provide regulatory flood data for all their flood hazards. The data should be used in their regulatory programs and shared with all users and inquirers.



Handbook for New Mexico Floodplain Managers

Goal 2. Strengthen and Support the Insurance Aspects of the NFIP.

The CRS recognizes communities whose activities generate and contribute data that enable accurate actuarial rating of flood insurance. Communities are encouraged to implement mapping and information programs that help assess individual property risk and reduce repetitive flood losses. To help expand the policy base, communities should make their residents aware of their flood risk so that they purchase and maintain flood insurance policies.

Goal 3. Foster Comprehensive Floodplain Management.

The CRS encourages communities to use all available tools to implement comprehensive local floodplain management programs, which ordinarily have concerns beyond the protection of insurable property. The CRS recognizes local efforts that protect lives; further public health, safety, and welfare; minimize damage and disruption to infrastructure and critical facilities; preserve and restore the natural functions and resources of floodplains and coastal areas; and ensure that new development does not cause adverse impacts elsewhere in the watershed or on other properties.

A community's staff should understand the physical and biological processes that form and alter floodplains and watersheds and take steps to deal with flooding, erosion, habitat loss, water quality, and special flood-related hazards. A comprehensive approach includes planning, public information, regulations, financial support, open space protection, public works activities, emergency management, and other appropriate techniques. **Prerequisite:** Before it can apply to the CRS, a community must be in full compliance with the minimum requirements of the NFIP. This is determined by a Community Assistance Visit to the community by FEMA. This visit must have been completed no more than one year before the application to the CRS is submitted.

21.1.2. Operation

To be recognized in the insurance rating system, community floodplain management activities must be described, measured, and evaluated. The basic tool for this is the *CRS Coordinator's Manual*, which sets forth the application procedures, creditable activities, and the credit points assigned to each activity. A community receives a CRS classification based upon the total score for its activities. The *CRS Coordinator's Manual* gives examples of activities and how their credit is calculated.

There are 10 CRS classes: Class 1 requires the most credit points and gives the greatest premium reduction; Class 10 receives no premium reduction. A community that does not apply for the CRS, or does not obtain the minimum number of credit points, is a Class 10 community.

Community participation in the CRS is voluntary. Any community in full compliance with the rules and regulations of the NFIP may apply for a CRS classification better than Class 10.

The application procedures are simple: the community submits a letter of interest and shows that it is implementing activities that would receive at least 500 credit points. The documents



Handbook for New Mexico Floodplain Managers

go to the ISO/CRS Specialist for that state. The Regional Office of the Federal Emergency Management Agency (FEMA) must approve the submittal to ensure that the community is in full compliance with the minimum floodplain management criteria of the NFIP.

Upon receiving FEMA approval, a community verification visit is scheduled by the ISO/CRS Specialist. At this verification visit, the ISO/CRS Specialist reviews all of the community's activities that may deserve credit, even those not in the community's submittal. All CRS credit is verified according to the credit criteria in the Coordinator's Manual in effect at the time of the visit.

ISO: The Insurance Services Office, Inc. (ISO) has many years of experience collecting and processing data for more than 1,000 insurance companies. Among other services, ISO develops and provides advisory classifications for community fire protection and building code programs. ISO reviews CRS submittals, verifies communities' credit points, and performs program improvement tasks for FEMA.

ISO administers the CRS for FEMA. ISO staff review CRS applications, verify the community's credit points, and perform program improvement tasks. See Appendix B for the latest CRS contact information.

After the verification visit, ISO submits its findings to FEMA. FEMA sets the CRS credit to be granted and notifies the community, the state, insurance companies, and other appropriate parties. The classification is effective on either May 1 or October 1, whichever comes first, after the community's activities are verified.

Each year the community must recertify that it is continuing to perform the activities for which it is receiving CRS credit. Recertification is an annual activity that includes progress reports for certain activities. A "cycle verification visit" takes place every few years and is conducted in the form of another verification visit to the community.

If a community is not properly or fully implementing the credited activities, its credit points, and possibly its CRS classification, will be revised. A community may add credited activities in order to improve its CRS classification.

Communities are encouraged to call on their ISO/CRS Specialist for assistance at any time. This can be especially helpful when they are considering a change to a credited activity or implementing a new program.

A week-long CRS course for local officials is offered free at FEMA's Emergency Management Institute and has been field deployed to many states. The ISO/CRS Specialist, NFIP State Coordinator, and FEMA Regional Office have more information on this course, state workshops, and other CRS training opportunities.

21.1.3. Community Responsibilities

Once a community receives its initial classification in the CRS, it must continue to implement its credited activities to keep its classification. Specifically, a community is responsible for

- Designating a community CRS Coordinator—someone who is familiar with the community



Handbook for New Mexico Floodplain Managers

- offices that implement CRS activities;
- Cooperating with the ISO/CRS Specialist and the verification procedures (Section 230);
- Recertifying each year that it is continuing to implement its activities (Section 213);
- Advising FEMA and its ISO/CRS Specialist of modifications to its activities (Section 214);
- Keeping elevation certificates, old FIRMs, and old Flood Insurance Studies for as long as the community is in the CRS;
- Keeping the records iterated in the activities' documentation sections until they are reviewed at the verification visit;
- Ensuring that flood protection projects and drainage system maintenance activities are compliant with federal environmental and historic preservation requirements (Section 507); and
- Participating in the cycle verification process (Section 232).

Communities will receive periodic updates to the Coordinator's Manual and other CRS materials. They are encouraged to order the background publications (see Appendix C), attend CRS workshops, and ask their ISO/CRS Specialists for help understanding the CRS credit criteria for their current and planned activities.

21.1.4. Costs and Benefits

Communities should prepare and implement those activities which best deal with their local problems, whether or not they are creditable under the CRS. Few, if any, of the CRS activities will produce premium reductions equal to or in excess of their implementation costs. In considering whether to undertake a new floodplain management activity, a community must consider all of the benefits the activity will provide (not just insurance premium reductions) in order to determine whether it is worth implementing.

Costs: No fee is charged for a community to apply for participation in the CRS. The only costs the community incurs are those of implementing creditable floodplain management activities and the staff time needed to document those activities and prepare for and participate in the recertification process and verification visits.

Benefits:

There are many benefits to participating in the CRS. Most of them cannot be measured in direct dollar terms, so it is impossible to conduct a strict numerical comparison of the benefits with the costs of implementing the credited activities. Listed here are the benefits more commonly mentioned by community officials.

- (1) The benefit that attracts people to the CRS the most is the reduction in flood insurance premiums for their residents and businesses. The dollar savings varies according to the CRS class, the number of policies, and the amount of coverage. A community can obtain the current and potential dollar savings for all 10 classes from its ISO/CRS Specialist. These are known as the "what if" tables.
- (2) Although the premium reduction attracts interest in the CRS, the most important benefits are the enhanced public safety, reduction in damage to property and public infrastructure, avoidance of economic disruption and losses, reduction in human suffering, and



Handbook for New Mexico Floodplain Managers

protection of the environment provided by the credited activities. Community officials agree that these programs are improved when changes are made to meet the CRS credit criteria.

- (3) Through the CRS a community can evaluate the effectiveness of its flood program against state and nationally recognized benchmarks.
- (4) Training and technical assistance in designing and implementing credited flood protection activities are available through the CRS at no charge.
- (5) Many communities initiate new public information activities when they join the CRS. These build a knowledgeable constituency within the community—people who become more interested in protecting themselves from flooding and in supporting the community's floodplain management efforts.
- (6) Keeping its CRS credits has proven to be an effective motivator to continue implementing flood protection programs during the “dry years.” The fact that the community's CRS status could be affected by the elimination of a flood-related activity or a weakening of the regulatory requirements for new development has been taken into account by many governing boards when considering such actions.
- (7) There is mutual support among CRS participants. Communities that participate in the CRS are joining the ranks of localities that have demonstrated a serious commitment to the health, safety, and welfare of their residents—and their floodplain and coastal resources. Across the nation, “CRS users groups” of representatives of counties, communities, and regional entities have formed to share their experiences, support each other in advancing their floodplain management programs, and encourage other communities to participate in the program.

21.2. CRS Activities

There are 19 creditable activities, organized under four categories, which are presented in the 300–600 series of the Coordinator's Manual. The Coordinator's Manual assigns credit points based upon the extent to which an activity advances the three goals of the CRS.

Public Information Activities (300 Series)

This series credits programs that advise people about the flood hazard, encourage the purchase of flood insurance, and provide information about ways to reduce flood damage. These activities also generate data needed by insurance agents for accurate flood insurance rating. They generally serve all members of the community.

Mapping and Regulations (400 Series)

This series credits programs that provide increased protection to new development. These activities include mapping areas not shown on the FIRM, preserving open space, protecting natural floodplain functions, enforcing higher regulatory standards, and managing stormwater. The credit is increased for growing communities.

Flood Damage Reduction Activities (500 Series)

This series credits programs for areas in which existing development is at risk. Credit is provided for a comprehensive floodplain management plan, relocating or retrofitting



Handbook for New Mexico Floodplain Managers

floodprone structures, and maintaining drainage systems.

Warning and Response (600 Series)

This series provides credit for measures that protect life and property during a flood, through flood warning and response programs. There is credit for the maintenance of levees and for state regulatory programs for dams, as well as for programs that prepare for the potential failure of levees and dams.

21.3. Credit Points

Some CRS activities may be implemented by the state or a regional agency rather than by the community. For example, some states have hazard disclosure laws that are creditable under Activity 340 (Flood Hazard Disclosure). A community in those states will receive those credit points when it applies for CRS credit and demonstrates that the law is effectively implemented within its jurisdiction.

21.3.1. Application for Credit

The Community Rating System provides for 10 classes, with Class 1 having the most premium credit and communities in Class 10 receiving none. A community's CRS class is based on the number of credit points calculated for the activities that are undertaken to reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance.

A community is automatically a Class 10 community unless it applies for a CRS classification and shows that the activities it is implementing warrant a better classification. A community may apply for CRS credit by submitting a *CRS Application* with appropriate documentation to its ISO/CRS Specialist.

A community uses the *CRS Application* for its initial application for CRS classification. The community must have at least 500 points using the *CRS Application* to apply for CRS Classification. The final score will be calculated by the ISO/CRS Specialist after a review of the documentation and the community's implementation of its activities at the verification visit.

A community should apply only for those activities it is actively undertaking and those it knows it can implement in accordance with the *Schedule*. A community should not be overly ambitious and overestimate its first year credit points at the risk of losing credit later for activities it is unable to implement. For example, no credit is provided for draft ordinances. Communities can only receive credit for regulations that have been enacted and enforced.

21.3.2. Activity Credit Points

The 19 activities and their credit points are shown in Figure 21-1. Each activity has one or more elements. Elements are the basic credit level for the CRS. The element and activity scoring process is covered in Activity 220 (Credit Calculation).

The maximum credit points for each activity are shown in the second column. The maximum credit can be earned when all elements within an activity are being implemented and all credit criteria are met. In some activities, maximum credit cannot be provided unless credit has been



Handbook for New Mexico Floodplain Managers

earned in other activities. For example, additional credit is provided in some activities if the community has adopted a Program for Public Information under Activity 330 (Outreach Projects).

The third and fourth columns in Figure 21-1 show the estimated maximum credit and average credit points using a conservative model to convert the points received under the 2007 Coordinator's Manual to the new scoring in the 2013 and 2017 Coordinator's Manuals. The maximums and averages are based upon the number of applicants for each activity, not the total number of applicants for the CRS. The fifth column shows the percentage of all CRS communities that received credit for each activity as of May 2013.

Communities should note the average credits for these activities. They provide a better indication of what an applicant can expect for an activity than do the maximum points available.

A community must have at least 500 verified credit points to become a Class 9 or better. It must also meet the prerequisites for certain classes, as described in Section 21.1. As explained in Activity 230 (Verification), the final, or verified, credit is calculated by the ISO/CRS Specialist after a review of the documentation provided by the community and the community's implementation of its activities at the verification visit.

21.3.3. Quick Check of Potential CRS Credit

The CRS "Quick Check" is a tool that a community can use to assess its potential for receiving CRS credit for activities it is undertaking. The Quick Check can be found at www.CRSresources.org/200.

The Quick Check does not estimate credit for a community. However, by reviewing each element and going through the steps explained in Section 220, a community can assess its potentially creditable activities.

There are three important things to note when estimating credit:

1. Moving to a Class 6, 4, or 1 depends on both having adequate points AND meeting class prerequisites, as explained in Section 21.1.
2. Many CRS activities have an impact adjustment associated with them. An impact adjustment means that CRS credit is provided for the portion of the regulatory floodplain to which the creditable element is applied. For example, even though 1,450 maximum points are available for open space preservation (OSP), if a community has 20% of the regulatory floodplain as open space, then the credit will be 20% of the allowable credit, or 290 points. See Section 21.2.
3. Only the final, verified credit calculated by the ISO/CRS Specialist after the verification visit determines a community's total points. It is important that the community provide correct and complete materials to document its activities. Only through a review of the community's documentation can the ISO/CRS Specialist determine the credit points that should be provided.



Handbook for New Mexico Floodplain Managers

A community should apply only for those activities it is actively undertaking and those it knows it can implement in accordance with the Coordinator's Manual. For example, no credit is provided for draft ordinances—regulations must have been enacted and enforced. Also, a community should not be overly ambitious in undertaking new activities for CRS credit at the risk of losing the credit later (at annual recertification or cycle verification visits) for activities it is unable to implement or continue.

Table 110-2. Credit points awarded for CRS activities.*				
Activity	Maximum Possible Points	Maximum Points Earned	Average Points Earned	Percentage of Communities Credited
300 Public Information Activities				
310 Elevation Certificates	116	116	38	96%
320 Map Information Service	90	90	73	85%
330 Outreach Projects	350	350	87	93%
340 Hazard Disclosure	80	62	14	84%
350 Flood Protection Information	125	125	38	87%
360 Flood Protection Assistance	110	100	55	41%
370 Flood Insurance Promotion *	110	110	39	4%
400 Mapping and Regulations				
410 Flood Hazard Mapping	802	576	60	55%
420 Open Space Preservation	2,020	1,603	509	89%
430 Higher Regulatory Standards	2,042	1,335	270	100%
440 Flood Data Maintenance	222	249	115	95%
450 Stormwater Management	755	605	132	87%
500 Flood Damage Reduction Activities				
510 Floodplain Mgmt. Planning	622	514	175	64%
520 Acquisition and Relocation	2,250	1,999	195	28%
530 Flood Protection	1,600	541	73	13%
540 Drainage System Maintenance	570	454	218	43%
600 Warning and Response				
610 Flood Warning and Response	395	365	254	20%
620 Levees	235	207	157	0.5%
630 Dams	160	99	35	35%
* Figures are based on communities that have received verified credit under the 2013 CRS Coordinator's Manual (about 43% of CRS communities), as of October 2016. The maximum possible points are based on the 2013 Coordinator's Manual. Growth adjustments are not included.				

Figure 21-1. Credit Points awarded for CRS Activities



21.4. The CRS in New Mexico

21.4.1. CRS Communities

With about 1,444 communities in the CRS, and almost 22,000 communities in the National Flood Insurance program, any CRS community can say that they are among the top 5% of communities in the country. New Mexico has eleven CRS communities, and more are applying for participation. These communities are earning a CRS discount for property owners in their communities who have NFIP flood insurance:

- Alamogordo
- Albuquerque
- Bernalillo County
- Clovis
- Farmington
- Dona Ana County
- San Juan County
- Hobbs
- Las Cruces
- Portales
- Roswell

State-wide, 12,074 NFIP policy holders are paying \$10.4 million per year in flood insurance premiums and receiving no CRS discount.

21.4.2. Opportunities to Participate

The CRS is strongly supported by FEMA Region VI (it is not so strongly supported in some parts of the country), by NMDHSEM and by the NMFMA.

The CRS Specialist from Insurance Services Office, Inc. (ISO) usually attends NMFMA conferences. Contact him or the NMFMA if you are interested in learning more about the CRS.

21.5. Publications

Except as noted, the following documents are available at no cost. They can be downloaded from the CRS web site (see Appendix B).

General References on the Community Rating System (CRS)

CRS Coordinator's Manual, 2017. 600+ pages. Includes the current *Schedule* and *Commentary*. The *CRS Coordinator's Manual* is the primary document used by communities for the Community Rating System. It includes detailed discussion of credits provided for various floodplain management activities and instructions on the calculation of credit. The *CRS Coordinator's Manual* is used to verify CRS credit and for modifications of a community's CRS credit for a better classification.

CRS Application, April 2017, 14 pages. Instructions and worksheets for a community to apply for an initial CRS classification. The activities are summarized and the activity descriptions are combined with checklists which are submitted for application.

NFIP Community Rating System: The Local Official's Guide to Saving Lives, Preventing Property Damage and Reducing the Cost of Flood Insurance introduces the National Flood Insurance



Handbook for New Mexico Floodplain Managers

Program Community Rating System as a way of promoting the awareness of flood insurance.

CRS Record-Keeping Guidance, 2017. Guidance on keeping track of records and annual actions such as outreach projects for CRS credit. The guide includes sample forms.

References on Specific Activities

CRS Credit for Drainage System Maintenance, 2006. 66 pages. A discussion of the credit under Activity 540 (Drainage System Maintenance) in the *CRS Coordinator's Manual*, with examples.

CRS Credit for Flood Warning Programs, 2006. 62 pages. A discussion of the credit under Activity 610 (Flood Warning Program) in the *CRS Coordinator's Manual*, with examples.

CRS Credit for Outreach Projects, 2006. 112 pages. A discussion of the credit under Activity 330 (Outreach Projects) in the *CRS Coordinator's Manual*, with examples.

CRS Credit for Stormwater Management, 2006. 56 pages. A discussion of the credit under Activity 450 (Stormwater Management) in the *CRS Coordinator's Manual*, with examples.

Example Plans, 2007. 78 pages. A discussion of credit for Floodplain Management Planning (Section 510 in the *CRS Coordinator's Manual*), with examples.



22. Disaster Operations

CONTENTS

22.1.	Disaster Operations.....	22-2
22.1.1.	Emergency Operations	22-2
22.1.2.	Building Condition Survey.....	22-3
22.1.3.	Permit Requirements.....	22-4
22.1.4.	Clean Up and Emergency Repairs.....	22-5
22.2.	Enforcement.....	22-7
22.2.1.	Initial Inspection	22-7
22.2.2.	Posting	22-7
22.2.3.	Follow Up.....	22-10
22.2.4.	Flooded Buildings	22-10
22.2.5.	Contractor Quality Control	22-10
22.3.	Administration.....	22-11
22.3.1.	Permit Rorms	22-11
22.3.2.	Public Information	22-11
22.3.3.	Technical Assistance	22-12
22.3.4.	Staff Assistance.....	22-12



22.1. Disaster Operations

Floodplain managers agree: It's not *if* your community will be flooded. It's *when*.

Those who have been hit by a flood or other disaster usually regret they were unprepared. Whether it's your house or your community, you can take steps to be ready for the inevitable.

This section covers the steps and procedures that your permit office should follow after a disaster. The rules are the same for floods or any other kind of disaster. Remember: it does not matter what damaged the buildings in your floodplain. If they are damaged, you are responsible to see that they are repaired according to the standards in your floodplain management ordinance.

After a disaster you can expect everyone to want you to respond quickly and efficiently, without regard to other priorities. You will have to take on emergency post-disaster responsibilities, often at the expense of not performing your normal duties.

In addition, you may, yourself, have suffered damage or loss. So, while you are at work helping others, you may not be getting the help you need yourself. Add to this the need to be available at least 12 hours a day, with few trained helpers.

There may be pressure from the public and elected officials to waive normal procedures and regulations in order to help people return to normal as fast as possible. This, in spite of the fact that "back to normal" means people and buildings exposed to the type of flooding that may have caused the disaster in the first place.

In short, your residents and businesses are primarily concerned with getting back to normal. Your stress level is high, patience can be low, the environment is unfamiliar, and there is never enough time or money. To help you prepare for this scenario, it is strongly recommended that your permit office prepare procedures that will ensure full and fair enforcement of your regulations during this time of stress, confusion and controversy.

22.1.1. Emergency Operations

Remember, the emergency manager is responsible for disaster and emergency response activities, such as evacuation, rescue, sandbagging and coordination with the county, state and federal emergency management agencies. Once the disaster proves to be big enough, the emergency manager will open up the Emergency Operations Center (EOC).

You may have a role during the emergency. The permit office usually is expected to have a representative in the EOC during the disaster.

When reviewing this section, you should meet with the emergency manager to review what he or she expects you to do before, during and after the disaster. It's very important to clarify your role as soon as possible. The emergency manager may need you for damage assessment right when you think you can start inspecting individual buildings.

At some time you will move from the emergency phase to the recovery phase. That is where



Handbook for New Mexico Floodplain Managers

this section picks up. You also should review with the emergency manager what your office needs to be doing to help your community recover, and at what point you and your staff are free to pursue the activities covered in this section.

22.1.2. Building Condition Survey

A building condition survey is conducted to help the permit office manage time and resources most efficiently. The survey determines:

- If any building is so dangerous that it should not be reentered without a careful inspection.
- Which buildings will need a building permit before they can be repaired or reoccupied.

When possible, the building condition survey is done in conjunction with the emergency manager's initial damage assessment. If the area affected is relatively small, the survey may be skipped and the permit office can immediately begin inspecting damaged buildings.

High Water Marks: High water marks should be marked with spray paint or other highly visible method on telephone poles, trees, etc. They prove to be very valuable records. They will help residents relate the last flood to the regulatory protection level. For example, if the flood was estimated to be two feet below the base flood, people can be told that if they were substantially damaged, they will have to elevate their homes at least two feet above the high water marks.

High water marks are also important for recording the extent of the flood and adding to the hydro-logic record. Someone, usually the community's engineer, should be responsible for obtaining readings from stream gauges and other high water marks as they are reported. Using these high water marks, the engineer should prepare a flood boundary map and estimate a flood recurrence interval.

Work Maps: You should have work maps of the floodplain that show buildings, addresses and elevation contour lines. They should be sized for use during the survey. Made in advance of a disaster, they should be on letter or legal size paper for easy use in a vehicle.

Before the survey, you should review the work maps for the affected area(s) and, using the high water mark data, determine which areas are worst hit. This can be done by plotting known flood boundaries or matching high water marks to the elevation contour lines.

Any area where the flood crest was two feet or more above the building's adjacent grade should be outlined on the map and designated as the first priority for the building condition survey.

Conduct: The building condition survey is conducted from outside all buildings, usually from a vehicle. Depending on the severity and duration of flooding, the survey may be conducted concurrently with the emergency manager's initial damage assessment. A photo should be taken of each building, showing any damage that is visible from outside.

On your work maps, code each building with an "A" "B" or "C" for the three categories of



Handbook for New Mexico Floodplain Managers

building condition:

A - Apparently safe: No exterior signs of structural damage. People can be allowed back in, but they will need building permits for repairs.

B - Building obviously substantially damaged: The flood swept the building away, it has collapsed or it is missing one or more walls. The building cannot be reoccupied without major structural work.

C - Could be substantially damaged: The building may be substantially damaged, but such damage is not obvious. Any building with more than two feet of water over its first floor falls in this category.

When the field work is done, summarize the survey findings and plot them on a master mitigation map. Use color coding, so areas coded B and C — those that are or may be substantially damaged — will stand out.

Notice to Owners: Upon completing the survey, hand-deliver a letter to each property surveyed, including those assessed as apparently safe. Each letter should include the building's address and, where known, the owner's name. A sample letter is in Figure 22-1.

Keep copies in the permit office and start a file on each property designated as "B — Building obviously substantially damaged" or "C — Could be substantially damaged."

With the letter include a copy of the FEMA/Red Cross book, *Repairing Your Flooded Home*. You can get supplies of them from FEMA or the Red Cross. A PDF of the book can be downloaded in electronic format at https://nchh.org/resource/fema_repairing-your-flooded-home/.

If too few copies are available, you may reproduce your own and even include your community's name on the cover. FEMA and the Red Cross encourage this, as it will make the book more pertinent to local readers.

The requirements stated in the notice should also be publicized. Sometimes well-meaning friends and organizations help people clean up and repair so fast, that they don't realize when a permit is needed.

Insurance Adjustments

Flood insurance adjusters fill out a Preliminary Damage Assessment Form if they think a building may be substantially damaged (see Section 13.4). The form is faxed to a central NFIP adjustment office which makes it available to the FEMA Region.

The Regional staff can provide this information to the local building departments. This procedure will help flag potentially substantially damaged buildings. While this can be a useful tool for code enforcement, it must be remembered that it is preliminary data and subject to revision when a more thorough damage estimate and claims adjustment is conducted.

22.1.3. Permit Requirements

As soon as possible after the flood, you should contact NMDHSEM and the FEMA Regional Office to review reconstruction regulatory requirements and to see if there are any new



Handbook for New Mexico Floodplain Managers

guidance documents or data from claims adjusters. You must require permits to determine if any buildings are substantially damaged.

Permit Required: *A permit is needed for each building that will be repaired by removing, altering or replacing the roof, walls, siding, wallboard, plaster, insulation, paneling, cabinets, flooring, electrical system, plumbing, heating or air conditioning. These repair/reconstruction projects must meet your building code and flood protection ordinance.*

The requirement for a permit cannot be waived, although your governing board may opt to waive permit fees. The board may not reduce or ignore the NFIP substantial damage requirement. To do so will subject your community to NFIP sanctions (see Section 3.6).

22.1.4. Clean Up and Emergency Repairs

You may allow cleanup and temporary emergency repairs to proceed without a permit. These include:

- Removing and disposing of damaged contents, carpeting, wallboard, insulation, etc.
- Hosing, scrubbing or cleaning floors, walls, ductwork, etc.
- Covering holes in roofs or walls and covering windows to prevent weather from inflicting further damage.
- Making the building safe to enter by removing sagging ceilings, shoring up broken foundations, and other actions.

You may want to identify which buildings may need emergency work and review with the owner the benefits of having professional contractors do some of it.

Structural alterations — such as removing floors or studs or replacing a furnace — are not allowed without a permit.

Owners of potentially substantially damaged buildings should be advised against making major repairs unless the building presents a safety hazard, because their buildings may be purchased, modified and/or demolished later.



Handbook for New Mexico Floodplain Managers

Dear [Name]

The permit office conducted a windshield survey of flooded buildings in your neighborhood. A review of your building from the outside indicates that the structure was affected by the recent flood. Here are some things you should know:

1. Repairs to your building require a permit from the City's permit office. Before you remove, alter, or replace any of the following items, you **MUST** obtain a building permit: the roof, walls, siding, wallboard, plaster, insulation, paneling, cabinets, flooring, electrical system, plumbing, heating, or air conditioning.
2. The permit office will conduct a complimentary inspection of the damage to your building. This inspection will help you identify what needs to be repaired. It will also identify if a permit is needed and if your building could be substantially damaged. There is no cost for this inspection but it must be taken before you begin your repairs or reconstruction. We will contact you when we plan to do the inspection. If you have a preferred time, please call us to arrange an appointment.
3. You may proceed with clean up activities and temporary emergency repairs without a permit. These include:
 1. Removing and disposing of damaged contents, carpeting, wallboard, insulation, etc.
 2. Hosing, scrubbing, or cleaning floors, walls, ductwork, etc.
 3. Covering holes in roofs or walls and covering windows to prevent the weather from inflicting further damage.
 4. Removing sagging ceilings, shoring up broken foundations, and other actions to make the building safe to enter.
4. Some day in the future, your area will flood again. There are things you can do during repair and reconstruction to reduce damage from the next flood. Many of these are discussed in the attached book, *Repairing Your Flooded Home*. We'll be glad to talk to you about protecting your property from future flooding. If we receive a disaster declaration, there may be some financial assistance to help pay for making your property safer than it was before. In the meantime, read Step 8 in *Repairing Your Flooded Home* for some ideas.
5. In order to screen out possible opportunists from taking advantage of the current situation, any contracted work must be done by a firm licensed to work in the City. Furthermore, residents are cautioned and warned *not* to sign blank contracts, agree to have work performed without first seeing the contractor's registration card, or allow work or alterations not authorized by the City permit office.

For further information, please contact the permit office at_____.

Sincerely,

[Name], Director
Permit Office

Attachment: *Repairing Your Flooded Home*

Figure 22-1. Sample letter to flood damaged property owner.

(Reword for other types of disasters)

22.2. Enforcement

The previous section covers the first step in enforcing the repair permit requirement: deliver the notices to property owners after the building condition survey and start a file on each property.

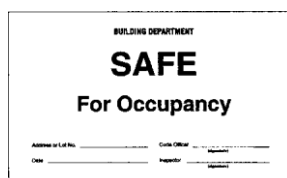
22.2.1. Initial Inspection

As soon as possible after the notice is delivered, your office should inspect each flooded property to review needed repairs and determine if a permit is needed.

Use a checklist to make the inspection quick and consistent. A sample checklist is shown in Figures 22-2 and 22-3. Give a copy of the completed inspection to the property owner, along with safety, health and repair information.

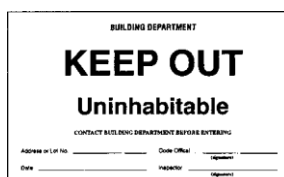
22.2.2. Posting

Upon completion of the inspection, you should post the appropriate sign on the front of the building so it is clearly visible from the street. Appropriate colored signs can be obtained in volume from the model code organizations. The ones shown here are from the Building Officials and Code Administrators (BOCA) and are color coded for easy viewing from the street.



If the building needs repairs that do not require a permit, post “Safe for Occupancy” and “Approved to Connect” (utilities) signs (green).

If a permit to make repairs is needed, post the “Habitable — Repairs Necessary” sign (yellow).



If it is not safe to clean up or work on the building without major structural repairs, post a “Keep Out — Uninhabitable” sign (red).

Only a representative of the permit office may remove or replace a sign after permits have been issued and repairs are made. The “safe for occupancy” signs may be removed by the owners in accordance with instructions issued by the community (for example, the permit office may want all signs posted until all inspections have been completed).



Handbook for New Mexico Floodplain Managers

Property address: _____ Date: _____

Owner: _____ Phone: _____

Check the appropriate column. Column 1 items note that the damage is minor, column 2 items can be expensive to repair, and column 3 items are indicators of substantial damage. Do not count clean up costs or damage to contents (including plug-in appliances) and other items not part of the building's structure (detached structures, fences, sidewalks, swimming pools, etc.).

1	2	3	
_____	_____	_____	General condition
			Building appears sound and safe to enter, needs minor work to make habitable
	_____		Apparently safe to enter, needs extensive cleaning/repairs
		_____	Foundation, floor, wall or ceiling damage such that building not safe to enter
			Depth of water
_____			In crawlspace, <2" in unfinished basement, not in building
_____			In unfinished basement, only affected contents and utilities
	_____		< 3' in finished basement or over first floor
		_____	≥ 3' over first floor or in finished basement
			Foundation
			Type of foundation: _____Slab _____Basement/split level _____Crawlspace
_____			No signs of cracks or settling.
	_____		Cracks in basement or crawlspace walls
		_____	Buckling of slab or basement floor, broken crawlspace or basement wall
			Exterior
			Type of exterior walls: _____Masonry _____Wood/aluminum/vinyl siding
_____			No signs of cracks or swelling, doors/windows stick but work
	_____		Some swelling or warping of walls, doors/windows may need to be replaced
		_____	Deck, porch, balcony damaged
		_____	Shifting of wall on foundation, wall broken
			Floors
_____			Concrete/tile/bare wooden floors: no signs of damage
_____			Tile//vinyl/linoleum coming loose, can be cleaned and reglued
	_____		Carpeting/vinyl/linoleum soaked, needs to be replaced
		_____	Wooden floor or subfloor warped, broken, or needs replacement
			Interior
_____			Water did not reach any wallboard, paneling or insulation, doors stick but work
	_____		First four feet of wallboard, paneling or insulation must be replaced
		_____	All wallboard, paneling or insulation in the lowest floor must be replaced
		_____	Doors/molding/built-in bookcases swollen, warped, need to be replaced
		_____	Studs/walls broken, shifted
		_____	Ceiling sagging/collapsing

Figure 22-2. First page of sample building inspection checklist.



Handbook for New Mexico Floodplain Managers

1	2	3	
			Heating & central air conditioning
			Type of system: _____ Forced air _____ Electric baseboard _____ Other: _____
_____			Water did not reach any electrical parts, gas jets, or ductwork
	_____		Ductwork needs to be disassembled and cleaned or replaced
	_____		Gas jets and/or electrical parts need to be cleaned or replaced
	_____		Propane/fuel tank needs to be reconnected and/or anchored
			Electrical
_____			Water did not reach any outlets, switches, meters, or fuse or breaker boxes
	_____		Outlets, switches, breakers, lights or other fixtures need to be replaced
	_____		Meter or service box need to be repaired or replaced by a professional
			Plumbing
_____			Drains and sewers need to be cleared
_____			Sump pump needs to be repaired or replaced
	_____		Water heater needs to be replaced
	_____		Water softener needs to be replaced
			Kitchen and bath
_____			Kitchen and bath(s) only need to be cleaned up
_____			Built-in appliances, ovens, etc. need cleaning by a professional
	_____		Built-in appliances, ovens, etc. need to be replaced
	_____		Cabinets/counters warped or otherwise need to be replaced
	_____		Plumbing fixtures cracked, broken or need to be replaced
_____	_____	_____	Number of checks in each column
Completed by: _____.			
<p>If all checks are in column 1, no building permit is needed. If there are any checks in columns 2 or 3, a building permit must be applied for and a repair/reconstruction estimate (prepared and signed by a licensed contractor) must be submitted.</p> <p>Except where professional cleaning is needed, any items checked in columns 1 or 2 can be performed by the owner.</p> <p>A licensed contractor may charge for the repair/reconstruction estimate, especially if the owner intends to do the work.</p> <p>Any item checked in column 3 and any alteration to the electrical or plumbing systems must be performed by a licensed contractor.</p> <p>The owner should read <i>Repairing Your Flooded Home</i>, page 15-29 for clean up and repair guidance and pages 39-41 for mitigation suggestions to incorporate into the repairs.</p> <p>For further information, please contact the Permit Office at _____.</p>			

Figure 22-3. Second page of sample building inspection checklist.



Handbook for New Mexico Floodplain Managers

22.2.3. Follow Up

Here are some things to help with enforcement:

- As you develop procedures, check with your utility companies and appropriate community utility departments. Advise them of your enforcement procedures.
- If not in place, establish a policy that utilities may not turn service back on unless there is an “Approved to Connect” sign posted on the building. This will help greatly in getting people to comply with the regulations after a disaster.
- Instruct police and other departments about the permit requirements and ask them to report to you any construction projects under way without posted permit signs.
- Within a week of issuing the notices to the owners, visit the notified properties to ensure that the owners are abiding by the requirements.
- Keep a master list or map to track your survey, inspection and permit application findings.

22.2.4. Flooded Buildings

Flooded buildings are harder to inspect than those damaged by other means. Much of the damage is hidden behind walls or under floors, so the owner may not recognize the long term effects of water, moisture and mold.

You should require that the wallboard/plaster and insulation be removed from a flooded building. Once the owner says the framing members are dry, conduct an inspection. Check the cleanliness and moisture content before allowing the walls to be recovered. If the studs are too wet, tell the owner to allow them to dry more before they are covered over.

The best way to measure the level of moisture in wood is with a moisture meter. You can get a moisture meter through woodworking specialty companies. It needs to have a probe that can be stuck into the wood.

If the wood's moisture content exceeds normal levels for your area of the country (usually 10% - 15%), it is too wet to be covered by paint or wallboard. Reinspect it later after it is allowed to dry some more. If the owner is anxious to rebuild, make sure he or she has a copy of *Repairing Your Flooded Home*. Step 4 of that book reviews how to speed up the drying process.

22.2.5. Contractor Quality Control

After a disaster, not-so-honest or unqualified contractors offer to help disaster victims, sometimes offering cut rates or special deals. Your community may want to control this by requiring that certain construction and reconstruction work be done by qualified and licensed people.

If you do license contractors, advise property owners of this requirement through the news media. You can also provide handouts on dealing with contractors and what to do in case of a



Handbook for New Mexico Floodplain Managers

dispute (for some good language, see Pages 38-39 in *Repairing Your Flooded Home*).

Your work does not have to be a series of confrontations with contractors. They can be your best ally when telling a property owner why things have to be done a certain way. They also can help encourage property owners to retrofit and take additional steps to protect themselves from the next flood.

You may want to conduct workshops for contractors on flood repairs, mitigation measures, funding opportunities, etc.

22.3. Administration

22.3.1. Permit Forms

If a permit is required, the property owner should be given the forms needed and told what repairs, if any, can proceed before the permit is issued. Keep these forms in the property's file:

- Notice to the owner. (Figure 22-1)
- Initial inspection checklist. (Figures 22-2 and 22-3)
- Permit application.
- Repair/reconstruction estimate.
- Substantial damage worksheets.
- Inspection records.
- FEMA Elevation or Floodproofing Certificate, if the building is required to be elevated or floodproofed.
- Certificate of occupancy.

22.3.2. Public Information

Your community should tell residents about the regulatory requirements and the need to carefully clean and rebuild. You should issue news releases and/or distribute materials to **advise property owners about:**

- Activities that need a permit.
- Activities that do not need a permit. (The language in Figure 22-1 could form the basis for a news release)
- The substantial damage rule.
- The benefits of Increased Cost of Compliance flood insurance coverage. (see Section 13.4.3)
- The need for licensed contractors, if required in your community.
- The information provided in steps 2, 3 and 4 in *Repairing Your Flooded Home*, such as taking pictures for insurance and disaster assistance claims before throwing things away, how to drain a basement without breaking the walls, and health and safety precautions.
- The need to include property protection measures as part of repairing homes or businesses. People need to recognize that "returning to normal" means returning to a



Handbook for New Mexico Floodplain Managers

building that will be damaged by another flood.

22.3.3. Technical Assistance

Many technical issues can arise during post-disaster permit operations, but you have many sources of assistance:

- Call NMDHSEM and the FEMA Regional Office first. If there was a disaster declaration, they may be able to provide technical assistance staff or workshops to clarify things.
- Ask your county health department or emergency manager for site-specific guidance on how to ensure that a building is fit for reoccupancy, well water is drinkable, etc.

Some communities require that a contractor certify that a building has been properly cleaned. This should be allowed only if the contractor is qualified to do so. Two organizations certify repair contractors. They can tell you who in your area are certified and what qualifications they have.

They are the International Institute for Cleaning and Restoration Certification (IICRC) and the Association of Specialists in Cleaning and Restoration (ASCR). See Appendix B for contact information.

22.3.4. Staff Assistance

If the disaster affected many properties, you likely will need more people to perform survey and inspection work. Staff assistance can come from:

- A mutual aid agreement with neighboring communities. There may already be some agreements with neighbors on sharing staff from other offices. If you don't have any, work with your emergency manager on procedures and agreement language.
- Your area building officials association, which may know of members available to help.

If there was a disaster declaration, check with your emergency manager. You may be able to get temporary hires, with part of the cost reimbursed through disaster assistance. Disaster assistance may also reimburse your community for inspectors to conduct habitability inspections and to determine if buildings are substantially damaged.



23. Hazard Mitigation

CONTENTS

23.1.	Mitigation Measures	23-2
23.1.1.	Flood Prevention	23-2
23.1.2.	Property Protection	23-3
23.1.3.	Natural Resource Protection	23-3
23.1.4.	Emergency Services	23-3
23.1.5.	Structural Projects	23-3
23.1.6.	Public Information	23-4
23.2.	Mitigation Planning	23-4
23.2.1.	Benefits of Planning.....	23-5
23.2.2.	The Planning Process.....	23-5
23.3.	Multi-Objective Management.....	23-6
23.3.1.	M-O-M Guidelines.....	23-7
23.3.2.	Benefits	23-8
23.4.	Mitigation Assistance Programs.....	23-9
23.4.1.	Technical Assistance	23-9
23.4.2.	Property Owners.....	23-10
23.4.3.	Flood Mitigation Assistance Program.....	23-10
23.4.4.	Disaster Assistance	23-11



23.1. Mitigation Measures

While this *Handbook* has focused on regulations directed toward new construction in the floodplain, most communities are more concerned about existing flood problems. This section tackles the bigger issue — reducing flood losses and making sure other activities don't make things worse.

Many communities deal with flooding with only one or two activities. Every community in the NFIP regulates new development to make sure things do not get worse. Many communities tackle their local drainage problems with storm sewer or drainage construction projects. Communities in high hazard areas usually have flood warning and evacuation programs.

However, many communities do not realize how many other flood protection activities they could implement. Nor do they know of all the other federal, state, local and private agencies or organizations that can help them with a flood problem.

While flooding cannot always be stopped — and in many cases, should not be prevented — flood hazards can be reduced. As their definitions attest, the words “hazard mitigation” mean taking measures that minimize or reduce the impacts of flooding on human development.

For the purposes of this reference, “flood hazard mitigation” is defined as “all actions that can be taken to reduce property damage and the threat to life and public health from flooding.”

“All” is the critical word. Each community should consider all possible measures for mitigating flood hazards, and each community should seek support from as many programs and agencies as possible.

Each mitigation measure is appropriate in different situations. Structural flood control projects can be the most efficient way to protect an existing critical facility or a concentration of damage-prone buildings. But in developing areas, regulations and acquisition make more sense, as they are inexpensive ways to prevent creation of flood problems.

“All actions” is an all-encompassing definition. To make “all actions” more manageable, flood hazard mitigation measures can be categorized under six basic strategies.

23.1.1. Flood Prevention

Preventive measures are designed to keep the problem from occurring or getting worse. They ensure that future development does not increase flood damage. Preventive measures are usually administered by building, zoning, planning and/or code enforcement offices. They include:

- Planning and zoning
- Open space preservation
- Building codes
- Floodplain development regulations
- Subdivision regulations
- Stormwater management in the watersheds above floodplains



Handbook for New Mexico Floodplain Managers

23.1.2. Property Protection

Property protection measures are used to modify buildings subject to flood damage rather than to keep floodwaters away. Your community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. These measures include:

- Acquisition
- Relocation
- Building elevation
- Floodproofing
- Sewer backup protection
- Insurance

23.1.3. Natural Resource Protection

Water quality and natural habitats may be improved, and flood losses reduced, by preserving or restoring natural areas or the natural functions of floodplain and watershed areas.

These activities usually are implemented by environmental or code enforcement agencies. In addition to these measures, zoning or preserving open space also can protect natural resources.

- Wetland protection
- Erosion and sediment control
- “Best management practices” for stormwater runoff

23.1.4. Emergency Services

Emergency services measures protect people during and after a flood. Most counties and many cities have emergency management offices to coordinate warning, response and recovery during a disaster. Emergency services measures include:

- Flood warning
- Flood response
- Critical facilities protection
- Health and safety maintenance

23.1.5. Structural Projects

Structural flood control projects are used to prevent floodwaters from reaching properties. These measures are “structural” because they involve construction of man-made structures to control water flows. There are six common types of projects:

- Reservoirs
- Levees/floodwalls/seawalls
- Channel modifications
- Enlarging culverts or bridge openings
- Diversions



Handbook for New Mexico Floodplain Managers

- Drainage system maintenance

Structural projects can be very expensive. Their other shortcomings include:

- Disturbing the land, disrupting natural water flows, destroying habitats.
- Requiring regular maintenance, which if neglected can have disastrous consequences.
- Being built to a flood protection level that larger floods can exceed, causing extensive damage.
- Creating a false sense of security, as people protected by a project often believe that no flood will ever reach them.

23.1.6. Public Information

Public information activities advise property owners, potential property owners and visitors about the hazards, ways to protect people and property from the hazards, and the natural and beneficial functions of floodplains. Usually implemented by a public information office, they can include:

- Map information
- Outreach projects
- Real estate disclosure
- Library
- Technical assistance
- Environmental education

23.2. Mitigation Planning

Different departments in a community may implement activities that are not coordinated or that may even conflict with one another. Some examples:

- The street department extends or improves streets into the floodplain — while the planning and zoning office is discouraging development there.
- The public works department straightens ditches and lines them with concrete to make them more efficient — while the parks department or neighborhood groups promote greenways and natural vegetative approaches to bank stabilization.
- The engineering office collects valuable data on rainfall and stream levels —but does not give the emergency manager information to predict the timing or crest of a flood.
- Property owners view a swamp as a place to be filled in so it can be farmed or built on — without realizing the wetland's role in absorbing floodwaters and providing habitat.
- The community recognizes that development of watersheds in the community is increasing flooding in its floodplains. It applies hydrologic modeling to its long-term land use plan to determine the ultimate results of this increased runoff. It plans structural measures that will be implemented as development proceeds. It also adopts regulations that require developers to control the increase in runoff from their developments.



Handbook for New Mexico Floodplain Managers

23.2.1. Benefits of Planning

Floodplain residents and property owners are not always aware of things that are being done to protect them from flooding, nor are they aware of things they can do to protect themselves, or how they can contribute to community efforts. Developing a flood hazard mitigation plan is one of the best ways to correct these shortcomings.

The objective of planning is to produce a program of activities that will best tackle the community's flood problem and meet other community needs. A well-prepared plan will:

- Ensure that all possible activities are reviewed and implemented so that the most appropriate solutions are used to address the flood problem.
- Link floodplain management policies to specific activities.
- Ensure that activities are coordinated with each other and with other community goals, objectives and activities, preventing conflicts and reducing the costs of implementing individual activities.
- Educate residents about the flood hazard, flood loss reduction measures, and the natural and beneficial functions of floodplains.
- Fulfill planning requirements for federal assistance.
- Guide development away from hazardous areas.
- Build public and political support for projects that prevent new flood problems, reduce flood losses and protect the natural and beneficial functions of floodplains.
- Facilitate implementation of floodplain management activities through an action plan that has specific tasks, staff assignments and deadlines.

Note: the Flood Mitigation Assistance Program and the new Disaster Mitigation Act of 2000 tie certain Federal mitigation funding to having a mitigation plan.

A well-prepared plan will guide your community's flood, stormwater and related activities so that they are implemented more economically and in ways more attuned to the needs and objectives of your community and its residents.

A well-prepared plan also will reduce flood losses and improve protection of the floodplain's natural and beneficial functions, to the benefit of both your community and the NFIP.

23.2.2. The Planning Process

The planning process includes getting input from everyone who has relevant information, everyone who is affected by flooding and everyone who will participate in implementing the plan. It works for all types of plans, such as those for land use plans, capital improvement, neighborhood redevelopment and hazard mitigation.

A hazard mitigation plan can take many forms, using a variety of formats and organizational styles. The format and organization of a plan are not what is important.



Handbook for New Mexico Floodplain Managers

Dwight D. Eisenhower said, “Plans are worthless. Planning is essential.” This simple phrase says it all:

The paper document is not as important as the *process* of planning. Because each community is different, each floodplain management plan will be different. However, the process they follow should be similar.

FEMA recommends a 10-step planning process, summarized in Figure 23-1. This process provides a framework with which local officials, residents, engineers, technical experts and others can work out the details and reach agreement on what should be done to mitigate the flood hazard.

1. Organize to prepare the plan.
2. Involve the public.
3. Coordinate with other agencies.
4. Assess the hazard.
5. Assess the problem.
6. Set goals.
7. Review possible activities.
8. Draft an action plan.
9. Adopt the plan.
10. Implement, evaluate and revise

Figure 23-1 The 10-step mitigation planning process

23.3. Multi-Objective Management

Because water does not respect property lines or city limits, solutions to your community’s flood problem will involve not just people who suffered damage most recently, but also the neighborhood, your community and even the rest of the watershed.

A single-minded approach will not lead to a solution to a flood problem. Other interests are out there, and if everyone focuses only on his or her own concerns, everyone will simply compete — and no one wins.

On the other hand, there is a proven approach to reduce flood losses and simultaneously address other community concerns. Called multi-objective management or M-O-M, it succeeds because using it builds alliances among interest groups.

Pre-Disaster Mitigation: Kampsville, Illinois

Kampsville, Illinois, is a town of 400 residents on the Illinois River. Its residents could have continued to endure floods, wait for a flood control project that would not be built, or look for alternative ways to reduce flood losses.

They chose the third option, and it paid off during the 1993 flood.

After Kampsville was flooded in 1979 and again in 1982, residents and local officials decided to do something. They knew they would not stop the Illinois River from flooding, and that to build a large enough levee would require removing many of the buildings they wanted to protect. So they began a systematic planning process to review alternative ways to reduce flood losses.

One of the first things they did was ask for help. The Illinois Department of Natural Resources provided staff support, and during a series of planning meetings, other agencies were invited to explain their ideas and tell how they could help.

It became apparent that the best solution was to purchase and relocate the worst-hit buildings. Because this would leave the town with a large open area, folks started talking about what they would do with it.

They also were concerned that they would lose some businesses when the floodprone properties were bought out. During this process, they realized that they had to think about more than just flooding; they had to consider the future of their town and its economic base. They expanded their planning process to encompass other goals, including redeveloping the acquired area, designing a park and building a base for tourism.



Handbook for New Mexico Floodplain Managers

Taking the plan to various funding sources, Kampsville eventually received more than \$1 million to buy 50 properties and convert flooded and dilapidated buildings to open space. The money was used also to elevate some buildings that were not flooded very deeply, to floodproof the water treatment plant and to relocate the fire station. A new ferry landing and all-weather access into town were also built.

Pursuing its other objectives, the village started sponsoring recreation activities, including an annual celebration that brings in hundreds of people. They now view the riverfront as a resource, not a problem area.

In all, financial assistance was provided by three state agencies, two federal agencies and the town's largest employer. Although it took almost 10 years to plan, fund and complete, Kampsville's approach paid off during the 1993 Midwest flood. The town suffered some damage because floodwaters exceeded the 100-year flood elevation, but Kampsville did not make the news because its damage was relatively minor compared to that of its neighbors.

M-O-M uses existing financial and other resources to look at the whole watershed affecting the flooding problem. In the end, your community will have coordinated flood loss reduction with reaching some of its other goals and needs. By using M-O-M, solutions to flooding will be more effective, more sensitive to the environment, have broader support, be part of a more comprehensive program and accomplish more than one objective.

23.3.1. M-O-M Guidelines

There is nothing magical about multi-objective management. The idea is to bring together everyone with a concern or problem that has the potential to affect or be affected by the flood problem. It requires communication among groups, and it capitalizes on the help government agencies and private organizations offer.

Multi-objective management has six guidelines:

1. **Keep the effort locally based.** Solutions must be acceptable to residents, their neighbors and others in the area. They must fit in with other local concerns and goals.
2. **Understand the flood problem and its relation to the watershed.** The problem is not isolated; neither is it limited to one stream or one neighborhood. If people think in terms of the whole watershed, they will come up with more possible solutions — and the solutions will not cause problems for someone else.
3. **Think broadly about possible solutions to reduce the flood problem.** There are more ways to do things than conventional wisdom may suggest. Don't get locked into wanting a floodwall or other single-purpose project without first checking out alternatives.
4. **Identify the other community concerns and goals that could have a bearing on the flood problem.** People who are interested in those other concerns should meet and brainstorm possible solutions that can reach more than one of their objectives.
5. **Obtain expert advice and assistance from government agencies and private organizations.** Planners should find out what financial assistance and advice are available. They should not put all their eggs in one basket and wait for that big "cure-all" project that may never be funded; there are literally hundreds of programs out there.
6. **Build a partnership among the private and public groups and individuals that can be**



Handbook for New Mexico Floodplain Managers

enlisted to work on the objectives. More minds and hands mean that better ideas will result, people will be more likely to follow through, and more people will be available to do the work.

Using the systematic 10-step process will help greatly in developing a mitigation plan that coordinates and includes the other community objectives and interests. Preparing a written plan helps people get organized, clarifies solutions and formalizes everyone's participation.

23.3.2. Benefits

If you have a flood problem, you may ask, "Why bother with this M-O-M stuff? Why not just stop the flooding?"

This is not as easy as it sounds, especially if you are on a large river.

Structures to "stop" or control floods can be expensive to build and maintain; take a long time to plan, fund, and build; and can cost more than the value of the property they would protect. They may adversely affect other properties, the environment and other people's plans for the area. As shown by large floods all over the country, they don't always work, especially if a flood is larger than anticipated.

If you have only one objective — "stop the flooding" — you may spend a lot of time and money on your one problem, in the process creating problems for other people. You will be competing with other communities that want funds for expensive structural projects. You will even be competing with others in your community who have different goals in mind.

The M-O-M approach helps you take charge of your future by looking at all the things your community needs and seeing how they can be combined with possible ways to reduce flood losses. Your eggs are not all in one basket, you are less dependent on outside agencies, and you have more sources of funding and technical advice.

With M-O-M, you join forces with other people who are just as devoted to their goals — be they parks and recreation, economic development, tourism or environmental education. You can all reach your objectives in a cheaper, faster and less disruptive manner by using M-O-M, and get more permanent, less expensive flood loss reduction than by trying to control the natural forces that cause floods.

One reason M-O-M gets such good results is that by using it, you treat the river's floodplain and its watershed as a resource. The floodplain need not be just a place with a flood hazard; it is also an area that is important to your community and to plant and animal life.

The M-O-M process makes sure that flood projects don't undermine other community objectives and the need to protect the natural environment.

For more information on M-O-M, see *Using Multi-Objective Management to Reduce Flood Losses in Your Watershed*.



The 10-step planning process is credited under the Community Rating System, Activity 510 Floodplain Management Planning, in the *CRS Coordinator's Manual* and the *CRS Application*. It is explained in more detail in *Example Plans*. Plans developed according to this process are a prerequisite for funding under other FEMA programs.

23.4. Mitigation Assistance Programs

A variety of federal, state, local and private sources offer assistance in mitigation activities. Help is limited only by your community's imagination and initiative. This section reviews the more common programs.

23.4.1. Technical Assistance

Help with mitigation planning may be available from a local, regional or state planning division or a private organization. For example, the National Park Service's Rivers, Trails and Conservation Assistance Program provides staff support for local planning under certain conditions. If they can't help with the whole thing, they may be able to help with some tricky parts, like providing a facilitator for an all-day community input workshop.

Another source of assistance is a private consultant. Planning and engineering firms usually have personnel skilled in the various flood loss reduction measures and the planning process.

These flood-related agencies and organizations may help in providing technical assistance or in implementing mitigation activities that benefit your community:

- The soil and water conservation district
- Agencies of the U.S. Department of Agriculture that work with watershed property owners, such as the Natural Resources Conservation and Cooperative Extension services.
- County stormwater management commissions.
- Regional or metropolitan water, sewer or sanitary districts.
- County emergency management division
- Department of Public Defense, Emergency Management Division
- FEMA Regional Office.
- The district office of the U.S. Army Corps of Engineers.

More references and contacts in floodplain management agencies and programs can be obtained through the Association of State Floodplain Managers and the Floodplain Management Resource Center. (see Appendix B, Contacts)

See also [*Federal Programs Offering Non-Structural Flood Recovery and Floodplain Management Alternatives*](#), Executive Office of the President, 1998, on FEMA's website.

Assistance on wetlands issues can be obtained by calling the USEPA Wetlands Information Hotline at. (800) 832-7828



Handbook for New Mexico Floodplain Managers

23.4.2. Property Owners

Many times, a community does not have to look beyond the beneficiaries of hazard mitigation to find help for a mitigation activity.

For an activity that directly affects a property, such as a retrofitting project, the owner should be asked to chip in. One example is using the owner's insurance claim to help pay for a project related to repairing a damaged building. The Increased Cost of Compliance coverage in the flood insurance policy was specifically created for mitigation purposes. It is discussed in more detail in Section 13.2 on Substantial Damage.

Mitigation Cost Sharing

The Village of South Holland, Illinois, found that residents are ready and willing to pay for mitigation measures to protect their homes. The Village uses a 25% rebate program as a catalyst to get property owners interested. The owners pay 75% of the cost and get the rebate after the project passes inspection.

Over the last five years, the program has funded over 350 projects, such as basement waterproofing, sump pump backup systems, overhead sewers, and drainage improvements. These are relatively low cost measures to protect against the local drainage and sewer backup problems residents face.

These projects have a total cost of \$728,000. However, the community's share has been only \$182,000.

Owners who recognize that they have a real flood problem are willing to pay a large part of the cost. In one project in Denham Springs, Louisiana, homeowners paid up to \$40,000 as the 50/50 match to elevate their homes above flood levels.

For more information on these and other local funding sources, see the Corps of Engineer's *Local Flood Proofing Programs*.

23.4.3. Flood Mitigation Assistance Program

The Flood Mitigation Assistance program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended with the goal of to reduce or eliminate flood risk of severe repetitive and repetitive flood damage to buildings insured by the National Flood Insurance Program (NFIP). The program provides funding to states, territories, federally-recognized tribes and local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP. Funding is also available for management costs.

FMA will pay 75 percent of the cost of these measures under its planning grants, project grants and technical assistance grants. Each state receives annual funding for planning and project grants. The State's Emergency Management Division administers the program. All funding applications must go through the state to be accepted by FEMA (see Appendix B, Contacts).

Planning grants: The purpose of a planning grant is to develop or update a Flood Mitigation Plan. To be eligible for an FMA project grant, an eligible applicant must develop, and have approved by the FEMA Regional Director, a Flood Mitigation Plan which "will articulate a comprehensive strategy for implementing technically feasible flood mitigation activities for the area affected by the plan."



Handbook for New Mexico Floodplain Managers

The regulations note that “existing plans, such as those credited through the Community Rating System ... may meet the requirements of FMA with few or no modifications.”

Project grants: The following types of projects are eligible for funding through FMA, providing they meet all other eligibility criteria:

- Acquisition of insured structures and underlying real property in fee simple and easements restricting real property to open space uses.
- Relocation of insured structures from acquired or restricted real property to non-hazard prone sites.
- Demolition and removal of insured structures from acquired or restricted real property.
- Elevation of insured residential structures in accordance with NFIP standards.
- Elevation or dry floodproofing of insured nonresidential structures in accordance with NFIP standards.
- Other activities that bring an insured structure into compliance with the NFIP’s flood- plain management requirements.
- Minor physical flood mitigation projects that reduce localized flooding problems and do not duplicate the flood prevention activities of other Federal agencies.

To be eligible a project grant, a project must be:

- In conformance with the Flood Mitigation Plan. The type of project being proposed must be identified in the plan.
- Cost-effective, not costing more than the anticipated value of the reduction in both direct damages and subsequent negative impacts to the area if future floods were to occur. Both costs and benefits are computed using net-present value.
- In conformance with federal regulations on floodplain management, protection of wetlands, seismic safety and applicable environmental laws and regulations.
- Technically feasible.
- In conformance with the minimum standards of the NFIP.
- Located physically in a participating NFIP community that is not on probation or must benefit such community directly by reducing future flood damage.

23.4.4. Disaster Assistance

If your community is hit by a disaster and the area subsequently receives a presidential disaster declaration, a variety of programs can provide mitigation assistance. Most of them are authorized by the Robert T. Stafford Disaster Relief and Emergency Act, known as the Stafford Act.



Handbook for New Mexico Floodplain Managers

First, a disaster field office will be established under the guidance of a state coordinating officer and a federal coordinating officer. They will be supported by mitigation staff, directed by a deputy federal coordinating officer for mitigation and a state hazard mitigation officer.

Two types of help will be provided: technical assistance and financial assistance. The federal-state team will distribute up-to-date materials about these programs; this section provides a brief overview of them. Note that they may be slightly different when implemented in your area in the future.

Technical assistance: The disaster assistance staff should be able to spend time with your community's mitigation planners. They can review mitigation measures, techniques and funding sources. One of their prime concerns will be proper regulation during reconstruction (see Section 22). They can help analyze damage to identify areas prime for acquisition and clearance and help develop mitigation plans.

The disaster team may also provide technical assistance to property owners. Information on repairing and retrofitting is given through public meetings, handouts and news releases. Sometimes mitigation tables are set up in disaster recovery centers, or separate Reconstruction Information Centers are opened. They house architects, engineers and other specialists who can work closely with owners to help design appropriate flood protection measures.

Financial assistance: FEMA will widely publicize the assistance programs that are made available after a disaster declaration. Three main types of assistance are available, each of which can fund mitigation measures:

1. Public/Infrastructure Assistance, formerly known as the Public Assistance Program, it can provide 75 percent of the cost of repairing or restoring facilities owned by public agencies and certain private nonprofit organizations. If an applicant prefers to relocate a facility out of the floodplain rather than replace it, FEMA will still provide funds, but at a reduced share.

FEMA takes the first step in obtaining Public/Infrastructure Assistance funding by completing a Damage Survey Report (DSR) for each facility. The community should have a representative on each DSR team to provide local input into the repair or replacement design for damaged facilities.

The local DSR representative should be aware that this program provides an opportunity to incorporate hazard mitigation features while replacing some damaged property. FEMA can provide funding above and beyond the cost of repairing or replacing a public facility, if it can be demonstrated that the proposed mitigation measure is technically feasible, cost-effective and required by a state or local regulation.

Mitigation Example: A flood washes out a culvert that used to back up every time there was a 2-inch rain. FEMA and the state will estimate the cost to repair or replace it as it was. If someone points out that (1) a larger culvert can save more money than it costs by reducing flood damage to other properties, (2) the larger culvert will not create a new flood problem, and (3) floodplain regulations prohibit obstructions in the floodway, then FEMA may share the expense of replacing the lost culvert with a larger one.



Handbook for New Mexico Floodplain Managers

Similarly, funds from this program can be used to protect or relocate damaged water and sewer lines, floodproof pumping stations or replace bridges with clear spans.

Insurance note: Public/Infrastructure Assistance grants for public buildings are subject to a “deductible.” Under the Stafford Act, Federal disaster assistance for a flooded public building will be reduced by the amount of flood insurance coverage the community should have on that building.

It does not matter whether the building is insured; FEMA will still only provide assistance for damage that exceeded the level of available insurance (structural and contents).

Example: The maximum amount of structural flood insurance available for a non-residential building is \$500,000. Floodville’s \$2 million city hall is flooded and receives \$600,000 in damage. If the city hall is in an SFHA, the disaster assistance program will assume it’s insured for \$500,000. Federal aid to repair or rebuild the city hall will be 75% of \$100,000 (\$600,000 - \$500,000). Floodville will receive \$75,000 in disaster assistance for a building that suffered \$600,000 in damage. If the city hall was not insured, Floodville’s taxpayers are going to have to come up with the balance. If it was insured, the city will have \$575,000 (\$500,000 in insurance claim and \$75,000 from disaster assistance) toward repairs and reconstruction.

Flood insurance is also a good idea because not every flood warrants a Federal disaster declaration. The moral of the story is to make sure that all publicly owned buildings subject to flooding have flood insurance.

2. Human services programs provide resources to assist residents and business owners, such as temporary housing, unemployment aid, food stamps, grants and loans. Many of these were formerly called the Individual Assistance Program.

Temporary housing can be particularly helpful in providing homes for people waiting to find out if their homes can be reoccupied or if they will be acquired and cleared.

The Individual and Family Grants (IFG) program is designed to help disaster victims pay for “unmet needs,” such as those that are not funded by other programs. It is a grant to individuals, usually people who cannot qualify for a loan or cannot get a loan to cover all of their expenses.

Sometimes IFG can be used to fund minor property protection projects, such as elevating a furnace, water heater, washer or electrical service box above the flood level. These grants can be especially useful in areas with lower income or fixed income families that are subject to shallow or basement flooding.

3. Hazard mitigation programs provide financial resources to help reduce susceptibility to damage from a future disaster. Section 404 of the Stafford Act makes money available to assist eligible applicants after a Presidential disaster declaration. Section 404’s Hazard Mitigation Grant Program will pay up to 75 percent of the cost of such mitigation projects.

To be eligible, the projects should be consistent with the recommendations of the State’s mitigation plans and strategies. Projects must be shown to be cost-effective, and they may



Handbook for New Mexico Floodplain Managers

mitigate hazards other than the one that caused the disaster.

Eligible projects include acquisition of floodprone properties and reversion to open space, elevation of floodprone buildings and minor drainage improvements.

Traditionally, the program has most often been used to acquire floodplain properties. In some communities, the property owners volunteered to help pay the non-federal share of the cost.

Even if your community did not receive a disaster declaration, you may be able to receive a Hazard Mitigation Grant. In 1997, FEMA ruled that the funds could be spent on appropriate projects throughout a state that received a disaster declaration. However, priority funding is usually given to communities in the declared counties.

24. Executive Order 11988

CONTENTS

24.1.	Executive Order 11988.....	24-2
24.2.	Executive Order 11988 -- Floodplain Management.....	24-2
24.3.	8 Step Decision Making Process.....	24-5
24.3.1.	§ 9.6 Decision-Making process.....	24-5



24.1. Executive Order 11988

Executive Order 11988 sets minimum requirements for Federal agencies to follow when they build in the floodplain, fund projects in the floodplain or are otherwise responsible for floodplain development. The Order does not prohibit floodplain development. It requires agencies to “consider alternatives to avoid adverse effects and incompatible development in the floodplains.”

Most agencies follow guidelines published by the U.S. Water Resources Council (which has since been disbanded). Those guidelines recommend an 8 step decision making process, which is included in Section 24.3.

24.2. Executive Order 11988 -- Floodplain Management

SOURCE: The provisions of Executive Order 11988 of May 24, 1977, appear at 42 FR 26971, 3 CFR, 1977 Comp, p. 117, unless otherwise noted.

By virtue of the authority vested in me by the Constitution and statutes of the United States of America, and as President of the United States of America, in furtherance of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.), the National Flood Insurance Act of 1968, as amended (42 U.S.C. 40011 et seq.), and the Flood Disaster Protection Act of 1973 (Public Law 93-234, 87 Stat. 975), in order to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplain development wherever there is a practicable alternative, it is hereby ordered as follows:

SEC. 1. Each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands, and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

SEC. 2. In carrying out the activities described in Section 1 of this Order, each agency has a responsibility to evaluate the potential effects of any actions it may take in a floodplain; to ensure that its planning programs and budget request reflect consideration of flood hazards and floodplain management; and to prescribe procedures to implement the policies and requirements of this Order, as follows:

- (a) (1) Before taking an action, each agency shall determine whether the proposed action will occur in a floodplain--for major Federal actions significantly affecting the quality of the human environment, the evaluation required below will be included in any statement prepared under Section 102(2)(C) of the National Environmental Policy Act. This Determination shall be made according to a Department of Housing and Urban Development (HUD) floodplain map or a more detailed map of an area, if available. If such maps are not available, the agency shall make a determination of the



Handbook for New Mexico Floodplain Managers

location of the floodplain based on the best available information. The Water Resources Council shall issue guidance on this information not later than October 1, 1977.

- (2) If an agency has determined to, or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains. If the head of the agency finds that the only practicable alternative consistent with the law and with the policy set forth in this Order requires sitting in a floodplain, the agency shall, prior to taking action, (i) design or modify its action in order to minimize potential harm to or within the floodplain, consistent with regulations issued in accord with Section 2(d) of this Order, and (ii) prepare and circulate a notice containing an explanation of why the action is proposed to be located in the floodplain.
- (3) For programs subject to the Office of Management and Budget Circular A-95, the agency shall send the notice, not to exceed three pages in length including a location map, to the state and areawide A-95 clearinghouses for the geographic areas affected. The notice shall include (i) the reasons why the action is proposed to be located in a floodplain; (ii) a statement indicating whether the action conforms to applicable state or local floodplain protection standards and (iii) a list of the alternatives considered. Agencies shall endeavor to allow a brief comment period prior to taking any action.
- (4) Each agency shall also provide opportunity for early public review of any plans or proposals for actions in floodplains, in accordance with Section 2(b) of Executive Order No. 11514, as amended, including the development of procedures to accomplish this objective for Federal actions whose impact is not significant enough to require the preparation of an environmental impact statement under section 102(2)(C) of the National Environmental Policy Act of 1969, as amended.
 - (b) Any requests for new authorization or appropriations transmitted to the Office of Management and Budget shall indicate, if an action to be proposed will be located in a floodplain, whether the proposed action is in accord with this Order.
 - (c) Each agency shall take floodplain management into account when formulating or evaluating any water and land use plans and shall require land and water resources use appropriate to the degree of hazard involved. Agencies shall include adequate provision for the evaluation and consideration of flood hazards in the regulations and operating procedures for the licenses, permits, loan or grants-in-aid programs that they administer. Agencies shall also encourage and provide appropriate guidance to applicants to evaluate the effects of their proposals in floodplains prior to submitting applications for Federal licenses, permits, loans or grants.
 - (d) As allowed by law, each agency shall issue or amend existing regulation and procedures within one year to comply with this Order. These procedures shall incorporate the Unified National Program for Floodplain Management of the



Handbook for New Mexico Floodplain Managers

Water Resources Council, and shall explain the means that the agency will employ to pursue the nonhazardous use of riverine, coastal and other floodplains in connection with the activities under its authority. To the extent possible, existing processes, such as those of the Council on Environmental Quality and the Water Resources Council, shall be utilized to fulfill the requirements of this Order. Agencies shall prepare their procedures in consultation with the Water Resources Council, the Director of the Federal Emergency Management Agency, and the Council on Environmental Quality, and shall update such procedures as necessary.

[Sec. 2 amended by EO 12148 of July 20, 1979, 44 FR 43239, 3 CFR, 1979 Comp., p. 412]

SEC. 3. In addition to the requirements of Section 2, agencies with responsibilities for Federal real property and facilities shall take the following measures:

- (a) The regulations and procedures established under Section 2(d) of this Order shall, at a minimum, require the construction of Federal structures and facilities to be in accordance with the standards and criteria and to be consistent with the intent of those promulgated under the National Flood Insurance Program. They shall deviate only to the extent that the standards of the Flood Insurance Program are demonstrably inappropriate for a given type of structure or facility.
- (b) If, after compliance with the requirements of this Order, new construction of structures or facilities are to be located in a floodplain, accepted floodproofing and other flood protection measures shall be applied to new construction or rehabilitation. To achieve flood protection, agencies shall, wherever practicable, elevate structures above the base flood level rather than filling in land.
- (c) If property used by the general public has suffered flood damage or is located in an identified flood hazard area, the responsible agency shall provide on structures, and other places where appropriate, conspicuous delineation of past and probable flood height in order to enhance public awareness of a knowledge about flood hazards.
- (d) When property in floodplains is proposed for lease, easement, right-of-way, or disposal to non-Federal public or private parties, the Federal agency shall (1) reference in the conveyance those uses that are restricted under identified Federal, State or local floodplain regulations; and (2) attach other appropriate restrictions to the uses of properties by the grantee or purchaser and any successors, except where prohibited by law; or (3) withhold such properties from conveyance.

SEC. 4. In addition to any responsibilities under this Order and Sections 202 and 205 of the Flood Disaster Protection Act of 1973, as amended (42 U.S.C. 4106 and 4128), agencies which guarantee, approve, regulate, or insure any financial transaction which is related to an area located in a floodplain shall, prior to completing action on such transaction, inform any private parties participating in the transaction of the hazards of locating structures in the floodplain.



Handbook for New Mexico Floodplain Managers

SEC. 5. The head of each agency shall submit a report to the Council on Environmental Quality and to the Water Resources Council on June 30, 1978, regarding the status of their procedures and the impact of this Order on the agency's operations. Thereafter, the Water Resources Council shall periodically evaluate agency procedures and their effectiveness.

SEC. 6. As used in this Order:

- (a) The term "agency" shall have the same meaning as the term "Executive agency" in Section 105 of Title 5 of the United States Code and shall include the military departments; the directives contained in this Order, however, are meant to apply only to those agencies which perform the activities described in Section 1 which are located in or affecting floodplains.
- (b) The term "base flood" shall mean that flood which has a one percent or greater chance of occurrence in any given year.
- (c) The term "floodplain" shall mean the lowland and relatively flat areas adjoining inland and coastal waters including floodprone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year.

SEC. 7. Executive Order No. 11296 of August 10, 1966, is hereby revoked. All actions, procedures, and issuances taken under that Order and still in effect shall remain in effect until modified by appropriate authority under the terms of this Order.

SEC. 8. Nothing in this Order shall apply to assistance provided for emergency work essential to save lives and protect property and public health and safety, performed pursuant to section 305 and 306 of the Disaster Relief Act of 1974 (88 Stat. 148, 42 U.S.C. 5145 and 5146).

SEC. 9. To the extent the provisions of section 2(a) of this Order are applicable to projects covered by Section 104(h) of the Housing and Community Development Act of 1974, as amended (88 Stat. 640), 42 U.S.C. 5304(h)), the responsibilities under those provisions may be assumed by the appropriate applicant, if the applicant has also assumed, with respect to such projects, all of the responsibilities for environmental review, decision making, and action pursuant to the National Environmental Policy Act of 1969, as amended.

24.3. 8 Step Decision Making Process

Each agency publishes its own regulations on how it administers the requirements of Executive Order 11988. Most agencies follow guidelines published by the U.S. Water Resources Council. Those guidelines recommend an 8 step decision making process. This section has been taken from FEMA's regulations, 44 CFR Part 9, section 9.6.

24.3.1. § 9.6 Decision-Making Process.

- (a) Purpose. The purpose of this section is to set out the floodplain management and wetlands protection decision-making process to be followed by the Agency in applying the Orders to its actions. While the decision-making process was initially designed to



Handbook for New Mexico Floodplain Managers

address the flood-plain Order's requirements, the process will also satisfy the wetlands Order's provisions due to the close similarity of the two directives. The numbering of Steps 1 through 8 does not firmly require that the steps be followed sequentially. As information is gathered throughout the decision-making process and as additional information is needed, reevaluation of lower numbered steps may be necessary.

- (b) Except as otherwise provided in §9.5 (c), (d), (f), and (g) regarding categories of partial or total exclusion when proposing an action, the Agency shall apply the 8-step decision-making process. FEMA shall:

Step 1. Determine whether the proposed action is located in a wetland and/or the base floodplain (500-year floodplain for critical actions); and whether it has the potential to affect or be affected by a floodplain or wetland (see §9.7);

Step 2. Notify the public at the earliest possible time of the intent to carry out an action in a floodplain or wetland, and involve the affected and interested public in the decision-making process (see § 9.8):

Step 3. Identify and evaluate practicable alternatives to locating the proposed action in a floodplain or wetland (including alternative sites, actions and the "no action" option) (see §9.9). If a practicable alternative exists outside the floodplain or wetland, FEMA must locate the action at the alternative site.

Step 4. Identify the potential direct and indirect impacts associated with the occupancy or modification of floodplains and wetlands and the potential direct and indirect support of floodplain and wetland development that could result from the proposed action (see § 9. 10);

Step 5. Minimize the potential adverse impacts and support to or within floodplains and wetlands to be identified under Step 4, restore and preserve the natural and beneficial values served by floodplains, and preserve and enhance the natural and beneficial values served by wetlands (see § 9. 1 1);

Step 6. Reevaluate the proposed action to determine first, if it is still practicable in light of its exposure to flood hazards, the extent to which it will aggravate the hazards to others, and its potential to disrupt floodplain and wetland values and second, if alternatives preliminarily rejected at Step 3 are practicable in light of the information gained in Steps 4 and 5. FEMA shall not act in a floodplain or wetland unless it is the only practicable location (see § 9.9);

Step 7. Prepare and provide the public with a finding and public explanation of any final decision that the floodplain or wetland is the only practicable alternative (see § 9.12); and

Step 8. Review the implementation and post-implementation phases of the proposed action to ensure that the requirements stated in § 9.11 are fully implemented. Oversight responsibility shall be integrated into existing processes.

[45 FR 59526, Sept. 9, 1980, as amended at 49 FR 35583, Sept. 10, 1984; 50 FR 40006, Oct.1, 1985]



25. Flood Warning

CONTENTS

25.1.	How a Flood Warning System Works.....	2
25.1.1.	Flood Threat Recognition	25-4
25.1.2.	Emergency Warning Dissemination	25-5
25.1.3.	Flood Response Operations.....	25-5
25.1.4.	Critical Facilities Planning	25-6
25.1.5.	StormReady Communities	25-6
25.2.	Does Your Community Need Flood Warning?	25-7
25.3.	How to Develop a Flood Warning System	25-8
25.3.1.	Large Rivers.....	25-8
25.3.2.	Flash Floods	25-9
25.3.3.	Hybrid Systems	25-10



25.1. How a Flood Warning System Works

With sufficient warning of a flood, a community and its floodplain occupants can take protective measures to mitigate potential damage. A flood threat recognition system integrated with an emergency response plan and a multi-level flood inundation map(s) enables emergency warning dissemination to the public and critical facilities. This is the basis of flood warning and response and is part of the emergency management preparedness cycle.

The CRS Program credits the following elements of a Flood Warning and Response Activity:

- a. Flood threat recognition system (FTR): A system that predicts flood elevations and arrival times at specific locations within the community.
- b. Emergency warning dissemination (EWD): Disseminating flood warnings to the public.
- c. Flood response operations (FRO): Implementation of specific tasks to reduce or prevent threats to health, safety, and property.

Critical facilities planning (CFP): Coordinating flood warning and response activities with operators of critical facilities. A flood threat recognition system provides the community with the notification that a flood is imminent. The amount of lead time needed between the recognition of a flood, the ability to forward a timely alert to the public and to critical facilities and with special-needs registrants, and the successful response to a flood warning are factors in determining the level of flood threat recognition system that is necessary. Designing an effective flood threat recognition system also depends on knowing what areas of the community are the most vulnerable; what sensor locations will best serve the vulnerable areas; the type and frequency of measurements that are needed; budgetary constraints; and operational costs. These systems will vary in their level of sophistication.

When an imminent flood threat is identified, the community must be prepared to take action to protect its citizens and its own facilities and staff. Virtually all emergency preparedness planning in New Mexico is done at the county level, although each community within a county should have its own emergency preparedness plan keyed to the county plan.

Warning dissemination is necessary to get the public and target groups to respond in appropriate ways to reduce the risk to life and health, and to reduce flood damage. The public needs to receive warning messages that are specific and give clear directions on what it is expected to do. Target groups, such as schools, nursing homes and critical industries may need to have their own emergency response plans so they know what action to take when a flood warning is received.

Emergency response by a community is defined in the emergency preparedness plan, adjusted for the specific emergency that is occurring. Emergency response includes such actions as deploying emergency personnel (including police and fire personnel), deploying equipment for flood fighting, evacuation and other purposes, and taking action to protect public facilities that are subject to flooding. Warning dissemination to the public and to target populations is an important element of emergency preparedness planning and emergency response.

25.1.1. Flood Threat Recognition

The flood threat recognition system lets local officials know that a flood is coming. It should also enable estimates to be made of the time of onset of flooding and crest height.

There are 3 levels of service provided by flood threat recognition systems:

- **Level 1:** Manual flood threat recognition systems. A manual system relies on a person to interpret the data received from river gages, often using paper tables or graphs. In many cases, the gage data are collected and reported manually, usually by volunteers.
- **Level 2:** Automated flood alarm systems. These systems issue a signal when a flood threatens. When water reaches a certain height on a river gage, an alarm is sent to the monitoring location. Unlike automated flood warning systems (credited as Level 3), Level 2 systems do not predict flood heights or provide any data other than the current water level.
- **Level 3:** Automated flood warning systems. These systems provide information such as the timing and potential crest of an oncoming flood. On larger rivers, they may be operated by the NWS and the U.S. Geological Survey. Where there are flash floods on smaller rivers, a local ALERT system or IFLOWS (Integrated Flood Observing and Warning System) may be established.

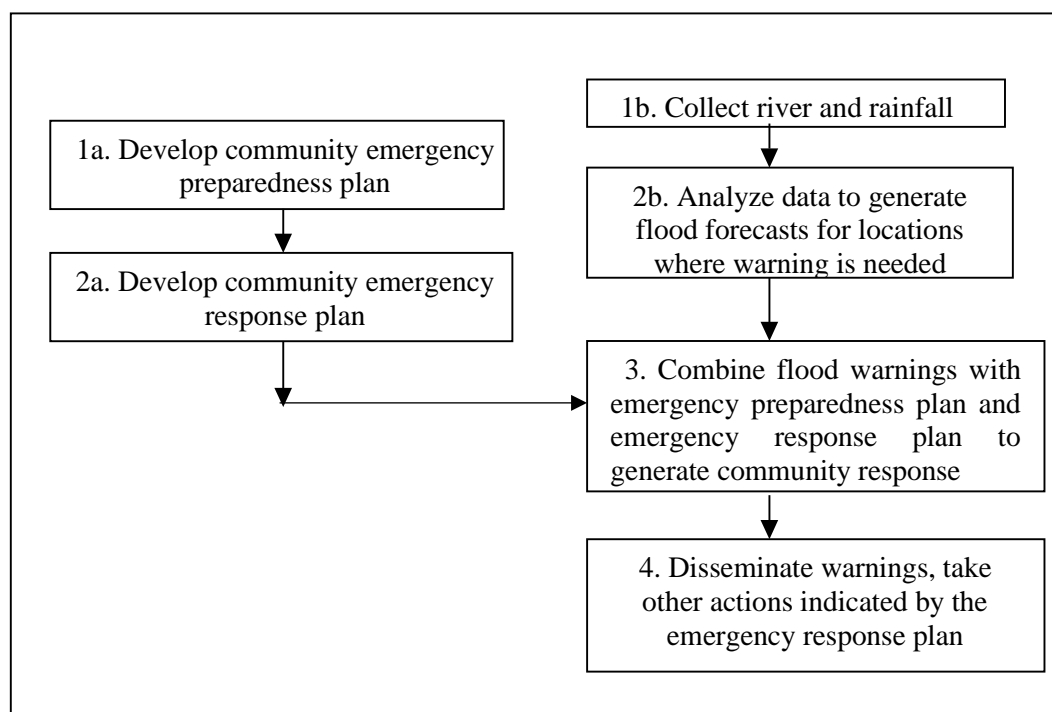


Figure 25-1. Process for developing a flood warning system.

On the large rivers of the United States, river gages have been installed, usually by a federal agency (the US Geological Survey, the National Weather service, the US Army Corps of Engineers or others), to measure the flow of water at the gage site. Most of the



Handbook for New Mexico Floodplain Managers

river gages now have telemetry equipment so that data can be collected periodically from these gages. That means that the level of a river and its calculated flow is known only a few hours ago (or in many cases, minutes ago). These data can be used to forecast flows downstream from those river gages.

In areas subject to flash floods, flood threat recognition is usually based on a locally operated system that collects realtime rainfall data, telemeters it to a central forecast location, and uses the rainfall data to generate flood forecasts.

In Figure 25-1, steps 1.a, 2.a, 3 and 4 are done at the community or county level. Steps 1b and 2b may be done outside the community and county, or they may be done locally.

25.1.2. Emergency Warning Dissemination

The public is most influenced by the multiple alerts and notifications produced by the emergency manager. Therefore, emergency warning procedures and messages must be planned in order to reduce time of issuance and increase public protective actions. The message content and frequency of issuance greatly influence desired behavior. Multiple channels of alerts and notifications must be employed to reach the maximum number of people and facilities.

Once the flood threat recognition system alerts local emergency managers to which areas will be flooded and when, warnings should be issued to the affected populations. The response gap or time delay that takes place between an individual's receiving an alert and taking action can be reduced by pre-scripted messages. The messages that need to be conveyed and the appropriate times to deliver them should be thought out in advance, as part of the flood warning and response plan. Anticipating and targeting potentially impacted people is vital to any alert notification system, pre-planning prevents poor performance.

The warning messages should state when flooding is predicted to occur, its expected severity, and appropriate response actions (e.g., evacuation routes, safe shelters, protective actions). Good messages not only consider those in immediate danger, but also those in adjacent areas who might be subject to related impacts from the threat.

25.1.3. Flood Response Operations

Flood warning and response planning must identify every opportunity to prevent loss of life and property damage during a flood. The community must have a flood inundation map(s), also known as a flood stage forecast map. The map must show areas that are inundated by at least three different flood levels in riverine areas and/or two storm surge levels in coastal areas. If a community is only inundated by flash flooding, impact area maps based on cubic feet per second (cfs) alert levels, rainstorm thresholds, or flow depths are acceptable. Such maps must be used in planning the community's flood response when different flood levels or rainfall amounts are predicted. Using information from the flood inundation maps, the planning team should think about how flooding would occur—what areas will be affected and when. Through this brainstorming, the team can decide what actions and resources will become necessary.



Handbook for New Mexico Floodplain Managers

Developing scenarios can assist this process by helping the community determine what actions it must plan for, and what resources it is likely to need. Scenarios are produced by thinking through what will happen in the community during a flood (e.g., where will the water go, who will get flooded, who will lose access because of high water, what critical facilities will be affected). By accounting for the local geography, the specific characteristics of the community's residents, and other factors, scenarios help with the design of the response operations so that the threats to life and property at identified flood levels or flood impact areas can be minimized.

The flood warning and response plan must include appropriate actions to be implemented at the different flood levels shown on the flood inundation map or series of maps. For each action that needs to be taken, the plan must assign a person or office.

25.1.4. Critical Facilities Planning

There are usually two kinds of critical facilities that a community should address with regard to flooding:

- Facilities that are vital to flood response activities or crucial to the health and safety of the public before, during, and after a flood, such as a hospital, emergency operations center, electric substation, police station, fire station, nursing home, school, vehicle and equipment storage facility, or shelter; and
- Facilities that, if flooded, would make the flood problem and its impacts much worse, such as a hazardous materials facility, power generation facility, water utility, or wastewater treatment plant.

Coordinating the flood warning and response planning with these facilities will allow more timely and effective protection of them and more rapid response and community recovery.

Critical facilities may need special early warning. Every facility should have its own individual flood warning and response plan. Not only will this make them better prepared, but also it will reduce the workload on emergency response teams because the critical facilities will be performing some or all of the response themselves.

25.1.5. StormReady Communities

The National Weather Service established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather related warnings for the public. By participating, local agencies can earn recognition for their jurisdiction by meeting the guidelines established by the NWS in partnership with federal, state, and local emergency management professionals. For more information on StormReady, see <https://www.weather.gov/StormReady>.

25.2. Does Your Community Need Flood Warning?

If there is a lot of development in your floodplains, your community might consider



Handbook for New Mexico Floodplain Managers

developing a flood warning system. Think of all of the bad things that might happen in your community, and think how a flood warning system might help.

Remember the three levels of flood threat recognition systems described above.

- If you are on a river where six hours or more of warning might be provided, your residents can do a lot to protect themselves and their property. These rivers include the Rio Grande and portions of the Gila, the Pecos, the Puerco, and other rivers that extend many miles upstream from your community. Rivers with relatively large dams may also provide these long warning times, because the storage capacity behind the dam can delay the arrival of a flood in your community.
- If the streams in your community are subject to flash flooding, a warning may save lives, but provide little opportunity to reduce flood damage.

It is also important to look at the type of flooding that can occur in your community. If the developed portions of your floodplains are subject to one to two feet of flooding during a base flood, the threat of loss of life and injury are relatively small. Even though flood warning should consider larger floods, they probably will not cause flooding a lot deeper than the base flood. Even in this case, however, there will be places where the flooding may be much deeper, and roads crossing deeper water pose a real hazard.

Where development is subject to flooding more than two feet deep during the base flood, the combination of flood depth and velocity probably indicates a need for flood warning.

A reliable flood warning that provides six hours or more of response time before the onset of flooding can enable a lot of damage reduction activities:

- People can remove vehicles and pets from the floodplain.
- Residents can move some expensive belongings to an upper floor or attic.
- Merchants may be able to do the same with their inventories.
- Feedlot operators and dairies might be able to move their animals to higher ground.
- Farmers in the middle of a harvest can remove the harvested portion of their crops to higher ground.
- Critical facilities including schools, hospitals, nursing homes, day care centers and jails can remove their special populations from harm's way.
- Emergency personnel, including police and fire can deploy to more effectively assist the public.
- Highway, streets or public works personnel can prepare to block streets.

If less than six hours of reliable warning time can be provided, the primary interest should be saving lives and avoiding injuries. The efforts of the community and its residents would be:

- Disseminating the warning to all floodplain occupants.



Handbook for New Mexico Floodplain Managers

- Evacuating the floodplain.
- Preparing to block streets.

It should be obvious that the floodplain manager will need to work with the emergency manager to evaluate the effects of a flood in the community and the viability of a flood warning system for the community.

25.3. How to Develop a Flood Warning System

Although a large flood warning system can be expensive, it does not have to start out that way. In many cases, it may be possible to use data that are being produced, along with planning, to produce effective flood warnings.

It is almost always advantageous for communities to work together in the development of flood warning systems. In most cases, several adjacent communities are affected by the same flood event. In most of the United States, effective flood warning systems are developed at the county level, although a few states have statewide systems. In New Mexico, countywide flood warning systems make sense because the emergency planning and response functions are usually countywide.

The main reason for cooperating with other communities is to save on costs. The costs for hardware and the expertise needed to operate a flood warning system can be shared by the cooperating communities.

In any event, the first step for a community to take if it is considering development of a flood warning system is to contact the National Weather Service Forecast Office in Albuquerque (see Appendix B).

25.3.1. Large Rivers

In the case of large rivers where a knowledge of the river levels upstream can provide an accurate forecast downstream, all that is needed is an ability to receive the upstream data, a means to use that data to forecast flooding in your community, and an emergency response plan that will allow effective use of the warning to reduce damage and the threat to life and health. This is also true where an upstream dam delays the onset of flooding in a downstream community.

The large rivers in New Mexico generally have river gages located at critical points, and most large dams have gages that indicate how full they are. Most of these gages are telemetered, either by ground-based radio or via satellite. Your community can probably get access to these data on a real-time basis.

If data on upstream river conditions are available, you need to determine how these data translate to flooding in your community. The two things you need to determine for a flood forecast in your community are the time it takes a flood to move from the upstream gage to your community and the flood levels at different times. This can be a complex calculation, but you can get help from the National Weather Service.



Handbook for New Mexico Floodplain Managers

If data are available from an upstream source, they must be monitored on a 24-hour basis. The best way to develop and maintain a flood warning capability is probably to have a computer dedicated to that purpose located in a facility that is staffed on a 24-hour basis, like a police station or sheriff's office. This computer would be set up to receive the data and automatically generate predicted river levels in your community. This computer would be programmed to generate an alarm if the forecast river levels approach flood stage. The hardware for this system should cost less than \$10,000.

With this system, if the computer sounds an alarm, the duty personnel would contact the emergency manager or someone else who is familiar with the flood warning system. If there is a real threat of flooding in the community, the emergency response plan would be implemented.

25.3.2. Flash Floods

Forecasting flash floods is more complex, and will almost certainly cost more than using upstream data on a large river.

As discussed in Section 25.1.1, flash flood warning usually involves collecting rainfall data on a realtime basis and converting that rainfall data to a forecast of runoff. Weather radar and other tools may be used to enhance this forecast.

Because rainfall data needs to be collected from a lot of locations in a relatively small area for flash flood forecasting, it is probably not telemetered via satellite. Realtime rainfall data are usually telemetered via ground-based radio. To obtain the rainfall data a community needs for an effective flash flood warning system, it will probably have to install telemetered raingages.

However, there may be realtime rainfall data available to your community. The State Climatologist at New Mexico State University has telemetered raingages in some areas of the state to assist agriculture. Other agencies, such as the National Resource Conservation Service, the US Forest Service, the US Army Corps of Engineers, the Bureau of Land Management, local irrigation districts and others may have realtime raingages in watersheds that affect your community. You should find out what data are available before you start to plan your system.

A small community, or even all of the communities in a sparsely populated county, may only need flood forecasts for a few watersheds. There is no use having telemetered raingages all over the county if you only need to forecast a few watersheds. However, if a county develops a flood warning system for a few watersheds, it may find that there are other people who want to share that data, and who want raingages in other locations. Ranchers may want to use realtime rainfall data to manage their grazing. Farmers may want to use it to adjust their irrigation schedules. This is a good way to generate support for the funding needed to develop a flood warning system.

If your community can obtain any realtime rainfall data from existing sources, you can set up a rudimentary flood forecast capability at a relatively low cost. You will need a



Handbook for New Mexico Floodplain Managers

computer to obtain the data and a program to convert rainfall data to a runoff forecast. Combining this with available weather radar data, you can do some flash flood forecasting, but it may not be very reliable or accurate. You might do this to demonstrate the possibilities so that you can obtain the funding needed to develop a functional flood warning system. To do this might require \$10,000 in hardware and the development of expertise in community or county personnel.

25.3.3. Hybrid Systems

Large communities and counties may need both a large river forecasting capability and a flash flood warning system for smaller streams. These two systems can be combined into a single flood forecast system.

A hybrid system is simply a system that receives data from many sources and combines them to produce flood warnings on different streams. Once a flood is forecast from any source of data, the emergency response is the same.



26. Mitigation Planning

CONTENTS

26.1.	What is Mitigation Planning?	26-2
26.2.	Why do Hazard Mitigation Planning?.....	26-3
26.3.	How is a Hazard Mitigation Plan Developed?	26-4
26.4.	How can a Community get Started in Mitigation Planning?	26-6

26.1. What is Mitigation Planning?

To mitigate means “to lessen the effect of.” Floodplain management itself is a mitigation tool. Through regulating development in the floodplain, the floodplain manager mitigates, or lessens the effects of, future floods. Similarly, emergency preparedness mitigates the effects of a disastrous flood by planning the evacuation of people, planning to provide temporary shelters, and other means. Language in Title 44 of the Code of Federal Regulations (44CFR). § 201.2 defines hazard mitigation as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event.

Hazard mitigation activities provide a critical foundation to reduce the loss-of-life and loss-of-property from natural and/or manmade disasters by avoiding or lessening the impact of a disaster and providing value to the public by creating safer communities. Mitigation seeks to interrupt the cycle of disaster damage, reconstruction, and repeated damage. Hazard mitigation planning is a matter of looking at potential disasters and their effects on the community and its residents, and planning actions that can be taken to mitigate those effects. A hazard mitigation plan should include actions that can be undertaken as soon as the plan is adopted by the community, and other actions that require additional planning or funding to implement. Some of these actions may not be undertaken for years, or until a disaster provides community support and/or funding. A hazard mitigation plan should be coordinated with land use plans, emergency preparedness plans and other plans the community has already adopted.

Because mitigation is generally used to make something less harmful, it stands to reason that mitigation is most often thought of as being applied to existing, at-risk environment. Existing homes, businesses, critical facilities and infrastructure are all candidates for hazard mitigation. Common flood hazard mitigation activities include: floodproofing, elevating, relocating or demolishing at-risk structures; retrofitting existing infrastructure to make it more flood resilient; developing and implementing Continuity of Operations Plans (COPs), structural mitigation measures such as levees, floodwalls and flood control reservoirs; detention/retention basins; and beach and dune restoration. Obviously, mitigation that is utilized in new or planned development can be the most cost-effective approach a community can take to reduce future flood losses.

For example, through the mitigation planning process, the community may determine that rapid development of watershed areas above its floodplains is increasing runoff and therefore increasing flooding. An action item in the hazard mitigation plan might be to adopt an ordinance that requires developers to control increased runoff as they develop. This ordinance can be adopted relatively quickly and with little cost.

As another example, the community may determine that a particular subdivision built before the community had a floodplain management ordinance, is so floodprone that it should be removed from the floodplain altogether. This is an expensive undertaking, and it has a lot of political implications. However, if the community’s hazard mitigation plan



Handbook for New Mexico Floodplain Managers

includes an action item to acquire this subdivision and turn it into a park, and it suffers a disastrous flood, relocation may be feasible. For one thing, if most of the buildings are substantially damaged, they must be brought into compliance with the ordinance (built above the BFE). The residents cannot move back in until this is done, and they may be more willing to relocate to a new home in a flood-free area. Also, there may be state or federal funding available, and flood insurance claims might be used to help fund the project.

Many actual examples of mitigation projects can be found in ASFPMs *Mitigation Success Stories In The United States*(2002).

Although floods are the most frequent disasters in the United States, it makes sense to do mitigation planning for all natural hazards that affect a community in one coordinated document. In many cases, the results of different disasters are related, and mitigation efforts need to be coordinated. For example, if an earthquake causes a dam failure, there may be a flood that causes more damage in a community than the earthquake itself. Also, if a building in a floodway is destroyed by wildfire or earthquake, the flood mitigation elements in the plan may be the best overall way to mitigate future damage.

26.2. Why do Hazard Mitigation Planning?

There are several reasons why a community should undertake hazard mitigation planning.

- Immediately after a disaster, there is a lot of interest within the community and outside the community in reducing the potential for damage from future disasters. The post-disaster period is the best time to adopt more stringent regulations, to get community support for mitigation projects, and to get outside money (county, state and federal) to assist in these projects. However, it is vital to have a plan in place before the disaster so that priorities are already established. If the community has to spend six months or a year developing a plan after the disaster, much of the support for mitigation will have dissipated.
- Since 2000, federal mitigation funding has been tied directly to hazard mitigation funding. That is, if a community has a FEMA-approved hazard mitigation plan, and that community has a disaster that is declared by the President, a significant amount of money is available to implement elements in the hazard mitigation plan. If the community does not have a plan, these funds are not available.

From the *FEMA Website*:

Hazard mitigation works to reduce loss of life and property by reducing the impact of disasters. Through effective mitigation planning and the implementation of mitigation strategies greater risk reduction can be achieved. State, tribal, and local governments undertake hazard mitigation planning to identify risks and vulnerabilities related to natural disasters. Through planning, they develop long-term strategies for protecting people and property from future events. Mitigation plans are key to breaking the cycle of disaster damage, reconstruction, and repeated damage.

Handbook for New Mexico Floodplain Managers

Hazard mitigation plans enable state, tribal, and local governments to:

- Increase education and awareness around threats, hazards, and vulnerabilities;
- Build partnerships for risk reduction with governments, organizations, businesses, and the public;
- Identify long-term, thorough strategies and achieve risk reduction;
- Align risk reduction with other state, tribal, or community objectives;
- Identify implementation actions to focus resources on the greatest risks and vulnerabilities; and
- Connect priorities to potential funding sources
- Increase investment in mitigation actions.

There is a lot of interest in the planning community in the concept of “sustainability,” and floodplain managers across the nation are discussing comprehensive floodplain management using the term, “no adverse impact.” The FEMA publications *Planning for a Sustainable Future: The Link Between Hazard Mitigation and Livability* and *Rebuilding for a More Sustainable Future: An Operational Framework* provide a lot of information on sustainability, and there is a discussion of the “no adverse impact” floodplain management principle on the website of the Association of State Floodplain Managers (ASFPM).



26.3. How is a Hazard Mitigation Plan Developed?

Because each community is different, each hazard mitigation plan will be different. The common elements for hazard mitigation plan are the process used to prepare it.

FEMA’s multi-hazard mitigation planning regulations pursuant to the Disaster Mitigation Act of 2000 are explained in the document [Multi-Hazard Mitigation Planning Guidance Under the Disaster Mitigation Act of 2000](#). The 10-step CRS planning process is consistent with those regulations, which identify four phases of hazard mitigation planning. The 10 CRS steps are aligned with the four phases of mitigation planning requirements in Figure 26-1

Multi-hazard Mitigation Planning	CRS	Maximum
Phase I – Planning process		
§201.6(c)(1)	1. Organize	15
§201.6(b)(1)	2. Involve the public	120
§201.6(b)(2) & (3)	3. Coordinate	35
Phase II – Risk assessment		
§201.6(c)(2)(i)	4. Assess the hazard	35
§201.6(c)(2)(ii) & (iii)	5. Assess the problem	52
Phase III – Mitigation strategy		
§201.6(c)(3)(i)	6. Set goals	2
§201.6(c)(3)(ii)	7. Review possible activities	35
§201.6(c)(3)(iii)	8. Draft an action plan	60
Phase IV – Plan maintenance		
§201.6(c)(5)	9. Adopt the plan	2
§201.6(c)(4)	10. Implement, evaluate, revise	26
Total		382

Figure 26-1. Planning Steps for mitigation and for the CRS

1. **Organize to prepare the plan:** Create a planning committee with representatives from



Handbook for New Mexico Floodplain Managers

- local government, the development industry, the agricultural industry, floodplain residents and others who have, or should have, an interest in mitigating flood damage;
2. **Involve the public:** The planning process must include an opportunity for the public to comment on the plan during its development and before its approval. Members of the public may be part of the planning committee created under Step 1 or they may be organized as a separate committee. This will improve the plan and facilitate adoption;
 3. **Coordinate with other agencies:** , Most communities' flood problems have been studied already. There are likely to be existing plans, studies, and reports on flooding that need to be reviewed. There also may be flood protection activities being considered or implemented by other agencies.
 4. **Assess the hazard(s):** At this step in the planning process, the planner or committee reviews, analyzes, and summarizes data collected about the natural hazard(s) that the community faces. This step focuses on the sources, frequency, extent, and causes of flooding while Step 5 will address the impact of flooding on people, property, infrastructure, the local economy, and natural floodplain functions.
 5. **Assess the problems associated with the hazard(s):** In this step, the planning committee members collect and summarize data on what is at risk. This step looks at the impact of those hazards on the community. Determine how many people, buildings and other facilities are affected by the hazards and how they are affected. Will a flood cause one foot of flooding in a neighborhood, or will it cause six feet of flooding and pose serious threats to life and health?
 6. **Set community mitigation goals:** What can the community reasonably do about each hazard? Can it prevent a flood? Can it protect existing development from a major flood? If existing development cannot be protected from flooding, can the people in that development be protected from death and injury? Can the community protect future development from flood damage? The goals should set the context for the subsequent review of floodplain management activities and drafting of the action plan. They should incorporate or be consistent with other community goals for the affected areas. A multi-hazard mitigation plan should have goals that address all the major hazards that face the community.
 7. **Review possible activities:** At this step, the plan reviews different activities that could prevent or reduce the severity of the problems described in Step 5. This is a systematic review of a wide range of activities to ensure that all possible measures are explored, not just the traditional approaches of flood control, acquisition, and regulation of land use. For each goal, what kind of activities might work? For example, to protect future development from flooding, the community might buy all undeveloped floodplain land; it might require new buildings to be elevated above the flood elevation; it might provide density trades so that all development is outside the floodplain, and there is common open space in the floodplain for the use of the residents;



Handbook for New Mexico Floodplain Managers

8. **Draft an action plan:** After the review of alternatives during Step 7, an action plan is drafted (Step 8) that selects and specifies those activities appropriate to the community's resources, hazards, and vulnerable properties. The community should strive for a balanced program, selecting measures from more than one category of floodplain management activity. In every case, the community should implement preventive activities both to keep its flood problems from getting worse and also to protect new construction from the effects of natural hazards.
9. **Adopt the plan:** The plan must be an official plan of the community, not an internal staff proposal. "Adopted" means that there is a resolution or other formal document that is voted on by the community's governing body.
10. **Implement, evaluate and revise the plan as needed:** To be useful, planning must be ongoing and plans must be dynamic. The plan should not sit on a shelf gathering dust once it is completed. As the plan is implemented, new action items will be discovered, priorities will change, and some action items will be completed and may be removed from the plan. Therefore, the community must have an evaluation and update process.

These steps are discussed in detail in the *CRS Coordinator's Manual* and in numerous FEMA documents. See Appendix C and [FEMA's Hazard Mitigation Planning webpage](#).

26.4. How can a Community get started in Mitigation Planning?

If a community is going to prepare a hazard mitigation plan, it should work to ensure that it complies with the requirements of Section 104 of the Disaster Mitigation Act of 2000 ("DMA2K") (P.L. 106-390). This will make the community eligible for post-disaster mitigation funding. With a little extra effort, a DMA2K plan will also be eligible for credit under the Community Rating System (CRS).

Although much of the information needed to develop a hazard mitigation plan may have already been developed by the community and others, preparing a hazard mitigation plan that meets the DMA2K and/or CRS requirements is still a big job. For that reason, Congress has provided funds for community planning through the State Hazard Mitigation Officer (SHMO), who is with the Department of Homeland Security and Emergency Management (NMDHSEM) (see Appendix B). The Pre-Disaster Mitigation (PDM) program makes available Federal funds to State, Local and Tribal Governments to implement and sustain cost-effective measures designed to reduce the risk to individuals and property from natural hazards, while also reducing reliance on Federal funding from future disasters. NM DHSEM is the only entity eligible to apply to FEMA for EMPG funds. Funds are then distributed to tribal, county, and city agencies across the state through a pass-through application process. Local governments, including cities, townships, counties, special district governments, and Native American tribal organizations are considered sub-applicants and must submit sub-applications for mitigation planning and projects to their State/Territory applicant agency. These funds can be used to hire consulting services to assist in the development of hazard mitigation plans.

Most of the hazard mitigation planning funds in New Mexico are being made available to



Handbook for New Mexico Floodplain Managers

counties for county-wide plans, meaning that they are intended to include the incorporated communities within the county. This means that the planning committee needs to include representatives from each community. Also, the governing body of each community must adopt the plan and implement the portions of the plan that affect its community.

In these cases, there will be differences in the action items for different communities within the plan. For example, a city may choose to regulate future floodplain development by elevation of the buildings or by density trades, while the adjacent community may have a goal of preserving agricultural uses of the floodplain and use tax incentives to reduce future floodplain development.

Whether funds are available or not, the SHMO can provide valuable assistance to your community if it wishes to develop a hazard mitigation plan. Assistance is also available from the Community Rating System Planning Specialist (see Appendix B).



Appendix A. Model Ordinance

The model ordinance in this appendix was prepared by the New Mexico Floodplain Managers Association. It has been reviewed by Region VI of the Federal Emergency Management Agency (FEMA) and by the New Mexico State Coordinator for the National Flood Insurance Program (NFIP). It meets all of the minimum requirements for participation in the NFIP, and therefore, meets all requirements of the State of New Mexico.

There are optional sections that need to be inserted into the Article V of the model ordinance on pages 17 and 18 if your community's Flood Insurance Rate Map (FIRM) includes Zones AO and/or AH, or if floodways have been delineated for your community. These inserts are found on pages 22 – 24.

In addition to meeting the minimum State and federal requirements, this NMFMA model ordinance has recommended optional language that provides for higher floodplain management standards. Although these standards are recommended by the NMFMA, **adoption is strictly up to the community**. These optional higher standards are italicized and in boxes after the sections they are intended to replace. For example, Article V, :Section B.2 on page 16 of the model ordinance reads:

2. **Residential Construction** - new construction and substantial improvement of any residential structure shall have the lowest floor (including basement), elevated to or above the base flood elevation. A registered professional engineer, architect, or land surveyor shall submit a certification to the Floodplain Administrator that the standard of this subsection as proposed in Article 4, Section C(1)a., is satisfied.

2. *Residential Construction* - new construction and substantial improvement of any residential structure shall have the lowest floor (including basement), elevated to at least one foot above the base flood elevation. A registered professional engineer, architect, or land surveyor shall submit a certification to the Floodplain Administrator that the standard of this subsection as proposed in Article 4, Section C(1)a., is satisfied. (*Optional language recommended by NMFMA.*)

In this case, the first “2. **Residential Construction**” is the minimum standard required for residential construction under the NFIP and under the New Mexico statutes. It requires the lowest floor of any residential building to be at least as high as the base flood elevation. The second “2. **Residential Construction**” is a higher standard recommended by the NMFMA. It requires the lowest floor of any residential building to be at least one foot higher than the base flood elevation.

The NMFMA feels that these optional higher standards are needed by New Mexico communities, and should be considered whenever a community is adopting or amending their floodplain management ordinance.



Handbook for New Mexico Floodplain Managers

The higher standards recommended by the NMFMA through this model ordinance are:

1. A penalty section. It is easier to enforce an ordinance if the community has the option of imposing a penalty for violations.
2. A requirement that the Floodplain Administrator obtain and maintain FEMA Elevation Certificates for all new floodplain buildings. The Floodplain Administrator has to have elevation data for each new building anyway, and there are advantages to keeping the FEMA certificate.
3. A requirement that all new and substantially damaged buildings in floodplains, including manufactured houses, be elevated on compacted fill that is at least as high as the base flood elevation and extends at that height to at least 10 feet outside the walls of the building.
4. A requirement that all buildings in the floodplain have the lowest floor elevated to at least one foot above the base flood elevation.
5. A requirement that all nonresidential buildings have the lowest floor at least one foot above the base flood elevation. The NFIP minimum standards allow such buildings to be elevated or floodproofed to the base flood elevation.
6. Enclosures are not allowed below new buildings in the floodplain. This is automatic if all new buildings are constructed on fill.

Any ordinance should be reviewed by your community's legal counsel before being recommended for adoption by your community's governing body.

Floodplain Management Resolution: Pages A-27 and A-28 include a model resolution that the community must submit with its application for participation in the National Flood Insurance Program. If the community has already adopted a floodplain management ordinance based on the NMFMA model ordinance, check with FEMA Region VI to determine if this resolution is required (see Appendix B).



FLOOD DAMAGE PREVENTION ORDINANCE

ARTICLE I

**STATUTORY AUTHORIZATION, FINDINGS OF FACT, PURPOSE AND
METHODS SECTION A. STATUTORY AUTHORIZATION**

The Legislature has in New Mexico Statutes Amended 1978 Section 3-18-7 required that a county or municipality with identified flood or mudslide hazard areas shall by ordinance:

1. designate and regulate flood plain areas having special flood or mudslide hazards;
2. prescribe standards for constructing, altering, installing or repairing buildings and other improvements under a permit system within a designated flood or mudslide hazard area;
3. require review by the local flood plain manager for development within a designated flood or mudslide hazard area provided final decisions are approved by the local governing body;
4. review subdivision proposals and other new developments within a designated flood or mudslide hazard area to ensure that:
 - a. all such proposals are consistent with the need to minimize flood damage;
 - b. all public utilities and facilities such as sewer, gas, electrical and water systems are designed to minimize or eliminate flood damage; and
 - c. adequate drainage is provided so as to reduce exposure to flood hazards;
5. require new or replacement water supply systems or sanitary sewage systems within a designated flood or mudslide hazard area to be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters and require on-site waste disposal systems to be located so as to avoid impairment of them or contamination from them during flooding; and
6. designate and regulate floodways for the passage of flood waters.

Therefore, the _____ of
(governing body)
_____, New Mexico does ordain as follows:
(community)

SECTION B. FINDINGS OF FACT

1. The flood hazard areas of _____ are subject to periodic
(community)



Handbook for New Mexico Floodplain Managers

inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, and extraordinary public expenditures for flood protection and relief, all of which adversely affect the public health, safety and general welfare.

2. These flood losses are created by the cumulative effect of obstructions in floodplains which cause an increase in flood heights and velocities, and by the occupancy of flood hazards areas by uses vulnerable to floods and hazardous to other lands because they are inadequately elevated, floodproofed or otherwise protected from flood damage.

SECTION C. STATEMENT OF PURPOSE

It is the purpose of this ordinance to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

1. Protect human life and health;
2. Minimize expenditure of public money for costly flood control projects;
3. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
4. Minimize prolonged business interruptions;
5. Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in floodplains;
6. Help maintain a stable tax base by providing for the sound use and development of flood-prone areas in such a manner as to minimize future flood blight areas; and
7. Insure that potential buyers are notified that property is in a flood area.

SECTION D. METHODS OF REDUCING FLOOD LOSSES

In order to accomplish its purposes, this ordinance uses the following methods:

1. Restrict or prohibit uses that are dangerous to health, safety or property in times of flood, or cause excessive increases in flood heights or velocities;
2. Require that uses vulnerable to floods, including facilities that serve such uses, be protected against flood damage at the time of initial construction;
3. Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of flood waters;
4. Control filling, grading, dredging and other development which may increase flood damage; and



Handbook for New Mexico Floodplain Managers

5. Prevent or regulate the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards to other lands.

ARTICLE II

DEFINITIONS

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

ALLUVIAL FAN FLOODING - means flooding occurring on the surface of an alluvial fan or similar landform which originates at the apex and is characterized by high-velocity flows; active processes of erosion, sediment transport, and deposition; and unpredictable flow paths.

APEX - means a point on an alluvial fan or similar landform below which the flow path of the major stream that formed the fan becomes unpredictable and alluvial fan flooding can occur.

AREA OF SHALLOW FLOODING - means a designated AO or AH zone on a community's Flood Insurance Rate Map (FIRM) with a one percent chance or greater annual chance of flooding to an average depth of one to three feet where a clearly defined channel does not exist, where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow.

AREA OF SPECIAL FLOOD HAZARD - is the land in the floodplain within a community subject to a one percent or greater chance of flooding in any given year. The area may be designated as Zone A on the Flood Hazard Boundary Map (FHBM). After detailed ratemaking has been completed in preparation for publication of the FIRM, Zone A usually is refined into Zones A, AE, AH, AO or A1-99.

BASE FLOOD - means the flood having a one percent chance of being equaled or exceeded in any given year.

BASEMENT - means any area of the building having its floor sub-grade (below ground level) on all sides.

CRITICAL FEATURE - means an integral and readily identifiable part of a flood protection system, without which the flood protection provided by the entire system would be compromised.

DEVELOPMENT - means any man-made change in improved and unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

ELEVATED BUILDING - means a non-basement building

1. built, in the case of a building in Zones A, AE, AH, AO, A1-99, B, C, X, and D, to have the top of the elevated floor elevated above the ground level by means of pilings, columns (posts



Handbook for New Mexico Floodplain Managers

and piers), or shear walls parallel to the floor of the water and

2. adequately anchored so as not to impair the structural integrity of the building during a flood of up to the magnitude of the base flood.

"Elevated building" also includes a building elevated by means of fill or solid foundation perimeter walls with openings sufficient to facilitate the unimpeded movement of flood waters.

EXISTING CONSTRUCTION - means for the purposes of determining rates, structures for which the "start of construction" commenced before the effective date of the FIRM or before January 1, 1975, for FIRMs effective before that date. "Existing construction" may also be referred to as "existing structures."

EXISTING MANUFACTURED HOME PARK OR SUBDIVISION - means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of the floodplain management regulations adopted by a community.

EXPANSION TO AN EXISTING MANUFACTURED HOME PARK OR SUBDIVISION-

means the preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

FLOOD OR FLOODING - means a general and temporary condition of partial or complete inundation of normally dry land areas from:

1. the overflow of waters.
2. the unusual and rapid accumulation or runoff of surface waters from any source.

FLOOD INSURANCE RATE MAP (FIRM) - means an official map of a community, on which the Federal Emergency Management Agency has delineated both the areas of special flood hazards and the risk premium zones applicable to the community.

FLOOD INSURANCE STUDY - is the official report provided by the Federal Emergency Management Agency. The report contains flood profiles, water surface elevation of the base flood, as well as the Flood Boundary-Floodway Map.

FLOODPLAIN OR FLOOD-PRONE AREA - means any land area susceptible to being inundated by water from any source (see definition of flooding).

FLOODPLAIN MANAGEMENT - means the operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to emergency preparedness plans, flood control works and floodplain management regulations.



Handbook for New Mexico Floodplain Managers

FLOODPLAIN MANAGEMENT REGULATIONS - means zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as a floodplain ordinance, grading ordinance and erosion control ordinance) and other applications of police power. The term describes such state or local regulations, in any combination thereof, which provide standards for the purpose of flood damage prevention and reduction.

FLOOD PROTECTION SYSTEM - means those physical structural works for which funds have been authorized, appropriated, and expended and which have been constructed specifically to modify flooding in order to reduce the extent of the areas within a community subject to a "special flood hazard" and the extent of the depths of associated flooding. Such a system typically includes hurricane tidal barriers, dams, reservoirs, levees or dikes. These specialized flood modifying works are those constructed in conformance with sound engineering standards.

FLOOD PROOFING - means any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

FLOODWAY (REGULATORY FLOODWAY) - means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

FUNCTIONALLY DEPENDENT USE - means a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

HIGHEST ADJACENT GRADE - means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

HISTORIC STRUCTURE - means any structure that is:

1. Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
2. Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
3. Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of Interior; or
4. Individually listed on a local inventory or historic places in communities with historic preservation programs that have been certified either:
 - a. by an approved state program as determined by the Secretary of the Interior or;
 - b. directly by the Secretary of the Interior in states without approved programs.



Handbook for New Mexico Floodplain Managers

LEVEE - means a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding.

LEVEE SYSTEM - means a flood protection system which consists of a levee, or levees, and associated structures, such as closure and drainage devices, which are constructed and operated in accordance with sound engineering practices.

LOWEST FLOOR - means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking or vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; **provided** that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirement of Section 60.3 of the National Flood Insurance Program regulations.

MANUFACTURED HOME - means a structure transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. The term "manufactured home" does not include a "recreational vehicle".

MANUFACTURED HOME PARK OR SUBDIVISION - means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

MEAN SEA LEVEL - means, for purposes of the National Flood Insurance Program, the National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which base flood elevations shown on a community's Flood Insurance Rate Map are referenced.

NEW CONSTRUCTION - means, for the purpose of determining insurance rates, structures for which the "start of construction" commenced on or after the effective date of an initial FIRM or after December 31, 1974, whichever is later, and includes any subsequent improvements to such structures. For floodplain management purposes, "new construction" means structures for which the "start of construction" commenced on or after the effective date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.

NEW MANUFACTURED HOME PARK OR SUBDIVISION - means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after the effective date of floodplain management regulations adopted by a community.

RECREATIONAL VEHICLE - means a vehicle which is:

1. built on a single chassis;
2. 400 square feet or less when measured at the largest horizontal projections;
3. designed to be self-propelled or permanently towable by a light duty truck; and



Handbook for New Mexico Floodplain Managers

4. designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use

START OF CONSTRUCTION - (for other than new construction or substantial improvements under the Coastal Barrier Resources Act (Pub. L. 97-348)), includes substantial improvement and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for basement, footings, piers or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

STRUCTURE - means a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home.

SUBSTANTIAL DAMAGE - means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

SUBSTANTIAL IMPROVEMENT - means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before "start of construction" of the improvement. This includes structures which have incurred "substantial damage", regardless of the actual repair work performed. The term does not, however, include either:

1. Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary conditions or
2. Any alteration of a "historic structure", provided that the alteration will not preclude the structure's continued designation as a "historic structure."

VARIANCE - is a grant of relief to a person from the requirement of this ordinance when specific enforcement would result in unnecessary hardship. A variance, therefore, permits construction or development in a manner otherwise prohibited by this ordinance. (For full requirements see Section 60.6 of the National Flood Insurance Program regulations.)

VIOLATION - means the failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in Section



SECTION D. COMPLIANCE

No structure or land shall hereafter be located, altered, or have its use changed without full compliance with the terms of this ordinance and other applicable regulations.

E. PENALTIES FOR NONCOMPLIANCE

No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this ordinance and other applicable regulations.

Violation of the provisions of this ordinance by failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with conditions) shall constitute a misdemeanor. Any person who violates this ordinance or fails to comply with any of its requirements shall upon conviction thereof be fined not more than \$_____ or imprisoned for not more than _____ days, or both, for each violation, and in addition shall pay all costs and expenses involved in the case. Nothing herein contained shall prevent the _____ from taking such other lawful action as is necessary to

(community)
prevent or remedy any violation. (Optional language recommended by FEMA and NMFMA)

SECTION F. ABROGATION AND GREATER RESTRICTIONS

This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

SECTION G. INTERPRETATION

In the interpretation and application of this ordinance, all provisions shall be:

1. considered as minimum requirements;
2. liberally construed in favor of the governing body; and
3. deemed neither to limit nor repeal any other powers granted under State statutes.

SECTION H. WARNING AND DISCLAIMER OF LIABILITY

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. On rare occasions greater floods can and will occur and flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of the community or any official or employee thereof for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made thereunder.



ARTICLE IV

ADMINISTRATION

SECTION A. DESIGNATION OF THE FLOODPLAIN ADMINISTRATOR

The _____ is hereby appointed the Floodplain _____ Administrator to administer and implement the provisions of this ordinance and other appropriate sections of 44 CFR (National Flood Insurance Program Regulations) pertaining to floodplain management.
(professional title and/or name)

SECTION B. DUTIES & RESPONSIBILITIES OF THE FLOODPLAIN ADMINISTRATOR

Duties and responsibilities of the Floodplain Administrator shall include, but not be limited to, the following:

1. Maintaining and holding open for public inspection all records pertaining to the provisions of this ordinance.
2. Ensuring that all floodplain use permits are reviewed by a Certified Floodplain Manager.
3. Reviewing development permit applications to determine whether proposed building site, including the placement of manufactured homes, will be reasonably safe from flooding.
4. Reviewing and approving or denying all applications for floodplain use permits required by adoption of this ordinance.
5. Reviewing permits for proposed development to assure that all necessary permits have been obtained from those Federal, State or local governmental agencies (including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334) from which prior approval is required.
6. Where interpretation is needed as to the exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be a conflict between a mapped boundary and actual field conditions) the Floodplain Administrator shall make the necessary interpretation.
7. Notifying, in riverine situations, adjacent communities and the New Mexico Department of Public Safety prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Emergency Management Agency.
8. Assuring that the flood carrying capacity within the altered or relocated portion of any watercourse is maintained.
9. When base flood elevation data has not been provided in accordance with Article 3, Section B, the Floodplain Administrator shall obtain, review and reasonably utilize any base flood elevation data and floodway data available from a Federal, State or other source, in order to administer the provisions of Article 5.



Handbook for New Mexico Floodplain Managers

10. When a regulatory floodway has not been designated, the Floodplain Administrator must require that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.
11. Under the provisions of 44 CFR Chapter 1, Section 65.12, of the National Flood Insurance Program regulations, a community may approve certain development in Zones A1-30, AE, AH, on the community's FIRM which increases the water surface elevation of the base flood by more than one foot, provided that the community first applies for a conditional FIRM revision through FEMA (Conditional Letter of Map Revision).

SECTION C. FLOODPLAIN USE PERMIT PROCEDURES

Application for a Floodplain Use Permit shall be presented to the Floodplain Administrator on forms furnished by him/her and may include, but not be limited to, plans in duplicate drawn to scale showing the location, dimensions, and elevation of proposed landscape alterations, existing and proposed structures, including the placement of manufactured homes, and the location of the foregoing in relation to areas of special flood hazard. Additionally, the following information is required:

1. In Zones A or AO or other designated floodplains where no base flood elevation is provided:
 - a. The elevation of the lowest floor of any building above the highest adjacent grade.
 - b. Description of the extent to which any watercourse or natural drainage will be altered or relocated as a result of proposed development.
 - c. Maintain a record of all such information in accordance with Article 4, Section (B)(1).
2. In Zones AE, AH or A1 – A30 or other designated floodplains where a base flood elevation is provided:
 - a. Elevation (in relation to mean sea level), of the lowest floor (including basement) of all new and substantially improved structures;
 - b. Elevation in relation to mean sea level to which any nonresidential structure shall be floodproofed;
 - c. A certificate from a registered professional engineer or architect that the nonresidential floodproofed structure shall meet the floodproofing criteria of Article 5, Section B(2);
 - d. Description of the extent to which any watercourse or natural drainage will be altered or relocated as a result of proposed development.
 - e. Maintain a record of all such information in accordance with Article 4, Section (B)(1).



Handbook for New Mexico Floodplain Managers

Approval or denial of a Development Permit by the Floodplain Administrator shall be based on all of the provisions of this ordinance and the following relevant factors:

1. The danger to life and property due to flooding or erosion damage;
2. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;
3. The danger that materials may be swept onto other lands to the injury of others;
4. The compatibility of the proposed use with existing and anticipated development;
5. The safety of access to the property in times of flood for ordinary and emergency vehicles;
6. The costs of providing governmental services during and after flood conditions including maintenance and repair of streets and bridges, and public utilities and facilities such as sewer, gas, electrical and water systems;
7. The expected heights, velocity, duration, rate of rise and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site;
8. The necessity to the facility of a waterfront location, where applicable;
9. The availability of alternative locations, not subject to flooding or erosion damage, for the proposed use;
10. The relationship of the proposed use to the comprehensive plan for that area.

SECTION D. ELEVATION CERTIFICATES AND FLOODPROOFING CERTIFICATES

1. *The Floodplain Administrator shall require that the owner of a new or substantially improved building in a floodplain provide a FEMA Elevation Certificate or a FEMA Floodproofing Certificate for such building prior to issuance of a Certificate of Occupancy.*
2. *The Floodplain Administrator will review all FEMA Elevation Certificates and Floodproofing Certificates for completeness and correctness.*
3. *The floodplain Administrator shall maintain a file of all FEMA Elevation Certificates and Floodproofing Certificates and make them available to the public upon request.*

(This Section is optional. It is recommended by FEMA and NMFMA.)

SECTION E. VARIANCE PROCEDURES

1. The _____ shall hear and render judgment on requests
(governing body)
for variances from the requirements of this ordinance.



Handbook for New Mexico Floodplain Managers

2. The _____ shall hear and render judgement on an appeal only
(governing body)
when it is alleged there is an error in any requirement, decision, or determination made by the Floodplain Administrator in the enforcement or administration of this ordinance.
3. Any person or persons aggrieved by the decision of the _____
(governing body)
may appeal such decision in the courts of competent jurisdiction.
4. The Floodplain Administrator shall maintain a record of all actions involving an appeal and shall report variances to the Federal Emergency Management Agency upon request.
5. Variances may be issued for the reconstruction, rehabilitation or restoration of structures listed on the National Register of Historic Places or the State Inventory of Historic Places, without regard to the procedures set forth in the remainder of this ordinance.
6. Variances may be issued for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, providing the relevant factors in Section C(2) of this Article have been fully considered. As the lot size increases beyond the one-half acre, the technical justification required for issuing the variance increases.
7. Upon consideration of the factors noted above and the intent of this ordinance, the Appeal Board may attach such conditions to the granting of variances as it deems necessary to further the purpose and objectives of this ordinance (Article 1, Section C).
8. Variances shall not be issued within any designated floodway if any increase in flood levels during the base flood discharge would result.
9. Variances may be issued for the repair or rehabilitation of historic structures upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.
10. Prerequisites for granting variances:
 - a. Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.
 - b. Variances shall only be issued upon:
 - (1) showing a 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 granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create



Handbook for New Mexico Floodplain Managers

nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances.

- c. Any application to whom a variance is granted shall be given written notice that the structure will be permitted to be built with the lowest floor elevation below the base flood elevation, and that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced lowest floor elevation.
11. Variances may be issued by a community for new construction and substantial improvements and for other development necessary for the conduct of a functionally dependent use provided that:
 - a. the criteria outlined in Article 4, Section D(1)-(9) are met, and
 - b. the structure or other development is protected by methods that minimize flood damages during the base flood and create no additional threats to public safety.

ARTICLE V

PROVISIONS FOR FLOOD HAZARD REDUCTION

SECTION A. GENERAL STANDARDS

In all areas of special flood hazards the following provisions are required for all new construction and substantial improvements:

1. All new construction or substantial improvements shall be designed (or modified) and adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy;
2. All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damage;
3. All new construction or substantial improvements shall be constructed with materials resistant to flood damage;
4. All new construction or substantial improvements shall be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

SECTION B. SPECIFIC STANDARDS



Handbook for New Mexico Floodplain Managers

1. In A Zones and other designated floodplains where no base flood elevation is provided, the following provisions are provided:

- a. **All New Construction** - new construction and substantial improvement of any structure, including manufactured housing, shall be built or placed on compacted fill that is at least two (2.0) feet above the highest adjacent grade prior to any disturbance of the building site. Such fill shall extend at least 10 feet from the walls of the structure before it drops below the two foot elevation. All residential structures shall have positive drainage away from the buildings. The finished floor of the structure shall be at least one (1.0) foot above the elevation of the fill.
- b. **Enclosures** - new construction and substantial improvements, with areas below the lowest floor that are usable solely for parking of vehicles, building access or storage in an area other than a basement and which is subject to flooding shall not be enclosed.

(Optional language recommended by the NMFMA.)

2. In all areas of special flood hazards where base flood elevation data has been provided as set forth in Article 3, Section B, Article 4, Section B(8), or Article 5, Section C(3), the following provisions are required:

- a. **All New Construction** – new construction and substantial improvement of any structure, including manufactured housing, shall be built or placed on compacted fill that is at least as high as the base flood elevation. Such fill shall extend at least 10 feet from the walls of the structure before it drops below the base flood elevation. All residential structures shall have positive drainage away from the buildings.

(Optional language recommended by the NMFMA.)

- b. **Residential Construction** - new construction and substantial improvement of any residential structure shall have the lowest floor (including basement), elevated to or above the base flood elevation. A registered professional engineer, architect, or land surveyor shall submit a certification to the Floodplain Administrator that the standard of this subsection as proposed in Article 4, Section C(1)a., is satisfied.

- b. **Residential Construction** - new construction and substantial improvement of any residential structure shall have the lowest floor (including basement), elevated to at least one foot above the base flood elevation. A registered professional engineer, architect, or land surveyor shall submit a certification to the Floodplain Administrator that the standard of this subsection as proposed in Article 4, Section C(1)a., is satisfied.

(Optional language recommended by NMFMA.)

- c. **Nonresidential Construction** - new construction and substantial improvements of any commercial, industrial or other nonresidential structure shall either have the lowest floor (including basement) elevated to or above the base flood level or together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure



Handbook for New Mexico Floodplain Managers

is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. A registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and shall certify that the design and methods of construction are in accordance with accepted standards of practice as outlined in this subsection. A record of such certification which includes the specific elevation (in relation to mean sea level) to which such structures are floodproofed shall be maintained by the Floodplain Administrator.

*c. **Nonresidential Construction** - new construction and substantial improvements of any commercial, industrial or other nonresidential structure meet the requirements for residential construction.*

(Optional language recommended by NMFMA.)

d. **Enclosures** - new construction and substantial improvements, with fully enclosed areas below the lowest floor that are usable solely for parking of vehicles, building access or storage in an area other than a basement and which is subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria:

- (1) A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.
- (2) The bottom of all openings shall be no higher than one foot above grade.
- (3) Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

*d. **Enclosures** - new construction and substantial improvements, with areas below the lowest floor that are usable solely for parking of vehicles, building access or storage in an area other than a basement and which is subject to flooding shall not be enclosed.*

(Optional language recommended by NMFMA.)

If your community has AO, AH or A1 – A99 Zones on its Flood Insurance Rate Map, or if it has adopted floodplains except those shown on its FIRM, insert Sections V.B.4 and V.B.5 from page 20 here.

SECTION C. STANDARDS FOR SUBDIVISION PROPOSALS

1. All subdivision proposals including the placement of manufactured home parks and subdivisions shall be consistent with Article 1, Sections B, C, and D of this ordinance.



Handbook for New Mexico Floodplain Managers

2. All proposals for the development of subdivisions including the placement of manufactured home parks and subdivisions shall meet Development Permit requirements of Article 3, Section C; Article 4, Section C; and the provisions of Article 5 of this ordinance.
3. Base flood elevation data shall be generated for subdivision proposals and other proposed development including the placement of manufactured home parks and subdivisions which is greater than 50 lots or 5 acres, whichever is lesser, if not otherwise provided pursuant to Article 3, Section B or Article 4, Section B (8) of this ordinance.
4. All subdivision proposals including the placement of manufactured home parks and subdivisions shall have adequate drainage provided to reduce exposure to flood hazards.
5. All subdivision proposals including the placement of manufactured home parks and subdivisions shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize or eliminate flood damage.

Communities with AO and/or AH zones on their FIRM must insert Section V.D from page 20 here.

Communities with floodways on their FIRM must insert Section V.E from page 22 here.



Handbook for New Mexico Floodplain Managers

SECTION D. STANDARDS FOR UTILITIES

1. All new and replacement water supply and sanitary sewage systems shall be designed to minimize or eliminate:
 - a. infiltration of flood waters into the systems, and
 - b. discharge from the systems into flood waters.
2. All new water wells shall:
 - a. Either
 - (1) Have the casing extend at least one foot above the base flood elevation; or
 - (2) be sealed so that flood water cannot enter the casing.
 - b. Have all electrical controls and devices elevated at least one foot above the base flood elevation or have such electrical controls and devices floodproofed to at least one foot above the base flood elevation.
2. On-site waste disposal systems shall be located to avoid impairment to them, or contamination from them during flooding.
3. Septic tanks located within floodplains shall:
 - a. Be anchored to prevent flotation in the event that the ground is saturated from the bottom of the tank to ground level;
 - b. Be sealed so that water will not infiltrate the tank;
 - c. Be sealed so that sewage will not escape the tank; and
 - d. Have one-way valves to prevent sewage from leaving the tank if the tank is inundated and the ground is saturated from the bottom of the tank to ground level.



ARTICLE VI

SEVERABILITY

This ordinance and the various parts thereof are hereby declared to be severable. Should any section of this ordinance be declared by the courts to be unconstitutional or invalid, such decision shall not affect the validity of this ordinance as a whole, or any portion thereof other than the section so declared to be unconstitutional or invalid.

CERTIFICATION

It is hereby found and declared by _____ that severe
(community)

flooding has occurred in the past within its jurisdiction and will certainly occur within the future; that flooding is likely to result in infliction of serious personal injury or death, and is likely to result in substantial injury or destruction of property within its jurisdiction; in order to effectively comply with minimum standards for coverage under the National Flood Insurance Program; and in order to effectively remedy the situation described herein, it is necessary that this ordinance become effective immediately.

Therefore, an emergency is hereby declared to exist, and this ordinance, being necessary for the immediate preservation of the public peace, health and safety, shall be in full force and effect from and after its passage and approval.

APPROVED; _____
(community official)

PASSED: _____
(date)

I, the undersigned, _____, do hereby certify that the above is
a true and correct copy of an ordinance duly adopted by the _____,
(community)
at a regular meeting duly convened on _____.
(date)

(Secretary or responsible person)

(SEAL)



Handbook for New Mexico Floodplain Managers

Inserts for Communities with AO and AH Zones and Communities with Delineated Floodways.

4. Manufactured Homes – *If a community has AO, AH or A1 – A99 Zones on its Flood Insurance Rate Map, or if it has adopted floodplains not those shown on its FIRM, insert Sections 4 and 5 after Section V.B.3 on page 17.*

- a. Require that all manufactured homes to be placed within Zone A on a community's FHBM or FIRM shall be installed using methods and practices that minimize flood damage. For the purposes of this requirement, manufactured homes must be elevated and anchored to resist flotation, collapse, or lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable State and local anchoring requirements for resisting wind forces.
- b. Require that manufactured homes that are placed or substantially improved within Zones A1-30, AH, and AE on the community's FIRM on sites
 - (1) outside of an existing manufactured home park or subdivision,
 - (2) in a new manufactured home park or subdivision,
 - (3) in an expansion to an existing manufactured home park or subdivision, or
 - (4) in an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as a result of a flood,

be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to or above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

comply with the provisions of Article V, Section B.1 and be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to at least one foot above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement. (Optional language recommended by NMFMA.)

- c. Require that manufactured homes be placed or substantially improved on sites in an existing manufactured home park or subdivision with Zones A1-30, AH and AE on the community's FIRM that are not subject to the provisions of paragraph 4.a(4) of this section be elevated so that either:
 - (1) the lowest floor of the manufactured home is at or above the base flood elevation,
 - or



Handbook for New Mexico Floodplain Managers

(1) the lowest floor of the manufactured home is at least one foot above the base flood elevation, or (Optional language recommended by NMFMA.)

(2) the manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

5. **Recreational Vehicles** - Require that recreational vehicles placed on sites within Zones A1- 30, AH, and AE on the community's FIRM either:

- a. be on the site for fewer than 180 consecutive days,
- b. be fully licensed and ready for highway use, or
- c. meet the permit requirements of Article IV, Section C(1), and the elevation and anchoring requirements for "manufactured homes" in paragraph 4.a(4) of this section. A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions.

SECTION D. STANDARDS FOR AREAS OF SHALLOW FLOODING (AO/AH ZONES)

Communities with AO and/or AH zones on their FIRM must insert this section after Section

V.C on page 18.

Located within the areas of special flood hazard established in Article 3, Section B, are areas designated as shallow flooding. These areas have special flood hazards associated with base flood depths of 1 to 3 feet where a clearly defined channel does not exist and where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow; therefore, the following provisions apply:

1. All new construction and substantial improvements of **residential** structures have the lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's FIRM (at least two feet if no depth number is specified).

*1. All new construction and substantial improvements of **residential** structures including manufactured houses have the lowest floor (including basement) elevated above the highest adjacent grade at least one foot higher than the depth number specified in feet on the community's FIRM (at least three feet if no depth number is specified). (Optional language recommended by NMFMA.)*



Handbook for New Mexico Floodplain Managers

2. All new construction and substantial improvements of **non-residential** structures;
 - a. have the lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's FIRM (at least two feet if no depth number is specified), or;
 - b. together with attendant utility and sanitary facilities be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads of effects of buoyancy.
- a. *have the lowest floor (including basement) elevated above the highest adjacent grade at least one foot higher than the depth number specified in feet on the community's FIRM (at least three feet if no depth number is specified), or;*
 - b. *together with attendant utility and sanitary facilities be designed so that the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads of effects of buoyancy to an elevation at least one foot higher than the depth number specified in feet on the community's FIRM (at least three feet if no depth number is specified). (Optional language recommended by NMFMA.)*
3. A registered professional engineer or architect shall submit a certification to the Floodplain Administrator that the standards of this Section, as proposed in Article 4, Section C (1)a., are satisfied.
 4. Require within Zones AH or AO adequate drainage paths around structures on slopes, to guide flood waters around and away from proposed structures.
-

SECTION E. FLOODWAYS *This section is required for communities with floodways on their FIRM. Insert this section after Section V.C or V.D on page 18.*

Floodways - located within areas of special flood hazard established in Article 3, Section B, are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles and erosion potential, the following provisions shall apply:

1. Encroachments are prohibited, including fill, new construction, substantial improvements and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.
2. If Article 5, Section E (1) above is satisfied, all new construction and substantial



Handbook for New Mexico Floodplain Managers

improvements shall comply with all applicable flood hazard reduction provisions of Article V.

3. Under the provisions of 44 CFR Chapter 1, Section 65.12, of the National Flood Insurance Regulations, a community may permit encroachments within the adopted regulatory floodway that would result in an increase in base flood elevations, provided that the community first applies for a conditional FIRM and floodway revision through FEMA.

RESOLUTION

WHEREAS, certain areas of _____, are subject to periodic flooding, causing serious damages to properties within these areas; and

WHEREAS, it is the intent of this Council 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 Section 3-18-7 NMSA as amended;;

NOW, THEREFORE, BE IT RESOLVED, that his Council hereby:

1. Assures the Federal Emergency Management Agency 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; and
2. Vests _____ with the responsibility, authority and means to:
 - (a) Assist the Administrator, at his/her request, in the delineation of the limits of the area having special flood hazards.
 - (b) Provide such information concerning present uses and occupancy of the floodplain, mud- slide (i.e., mudflow) or flood-related erosion areas as the Administrator may request.
 - (c) Maintain for public inspection and furnish upon request, for the determination of applicable flood insurance risk premium rates within all areas having special flood hazards identified on a Flood Hazard Boundary Map (FHBM) or Flood Insurance Rate Map (FIRM), any certificates of floodproofing, and information on the elevation (in relation to mean sea level) of the level of the lowest flood (including basement) of all new construction or substantially improved structures, and include whether or not such structures contain a basement, and if the structure has been floodproofed, the elevation (in relation to mean sea level) to which the structure was floodproofed.



Handbook for New Mexico Floodplain Managers

- (d) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map and identify floodplain, mudslide (i.e., mudflow) or flood-related erosion areas, and cooperate with neighboring communities with respect to management of adjoining floodplain, mudslide, (i.e., mudflow) and/or flood-related erosion areas in order to prevent aggravation of existing hazards.
 - (e) Upon occurrence, notify the Administrator in writing whenever the boundaries of the community have been modified by annexation or the community has otherwise assumed or no longer has authority to adopt and enforce floodplain management regulations for a particular area. In order that all FHBM's and FIRM's accurately represent the community's boundaries, include within such notification a copy of the map of the community
suitable for reproduction, clearly delineating the new corporate limits or new area for which the community has assumed or relinquished floodplain management regulatory authority.
 - (f) Submit a biennial report to the Administrator concerning the community's participation in the program, including, but not limited to the development and implementation of flood- plain management measures.
3. Appoints _____ (designate agency or official) with the responsibility, authority, and means to implement the commitments as outlined in this Resolution.
4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the adopted floodplain management measures.

APPROVED:

(Mayor or County Commissioner)

DATE PASSED: _____

CERTIFICATION

I, the undersigned, _____, do hereby certify that the above is a true and correct copy of a resolution duly passed by _____
_____ at a regular meeting duly convened
on _____.

(Secretary or Responsible Person)

(SEAL)



Appendix B. Contacts

Because names, offices and phone numbers change, this handbook has listed all contacts in one separate appendix. This appendix will be updated periodically.

New Mexico Floodplain Managers Association (NMFMA)

General Information:

NMFMA
PO Box 1235
Las Cruces, NM 88004
575-840-3027
nmfma@nmfma.org

Executive Director

J.D. Padilla, CFM
PO Box 1235
Las Cruces, NM 88004
575-820-3027
nmfma.ed@gmail.com www.nmfma.org

Association of State Floodplain Managers

ASFPM
8301 Excelsior Drive
Madison, WI 53717
Phone: (608)828-3000
Fax: (608)828-6319
www.floods.org
asfpm@floods.org

New Mexico Department of Homeland Security and Emergency Management

State NFIP Coordinator

Loretta K. Hatch, CFM
NMDHSEM, Preparedness Bureau
PO Box 27111
Santa Fe, NM 87502
505-476-0612
<https://www.nmdhsem.org/preparedness-bureau/mitigation/floodplain/>
loretta.hatch@state.nm.us

State Hazard Mitigation Officer

Chelsea Morganti
NMDHSEM
PO Box 27111
Santa Fe, NM 87502
505-469-4716
<https://www.nmdhsem.org/preparedness-bureau/mitigation/>
Chelsea.morganti@state.nm.us



Handbook for New Mexico Floodplain Managers

New Mexico Environment Department

General Information

P.O. BOX 5469
Santa Fe, NM 87502
1190 St. Francis Drive, N4050
Santa Fe, NM 87505
800 219-6157 or 505 827-2855

Ground Water Quality Bureau

505 827-2900 Fax 505 827-2965
Michelle Hunter, Bureau Chief

Surface Water Quality Bureau

505 827-0187 Fax 505 827-0160
Shelley Lemon., Bureau Chief

New Mexico Office of the State Engineer/ Interstate Stream Commission

PO Box 25102
Santa Fe, NM
87504-5102
505-827-6091
<https://www.ose.state.nm.us>

New Mexico State Land Office

310 Old Santa Fe Trail
PO Box 1148
Santa Fe, NM 87504-1148
505-827-5760
<http://www.nmstatelands.org/>

New Mexico Regulation and Licensing Department

Construction Industries Division

Regulation and Licensing Department
Construction Industries Division
2550 Cerillos Road – 3rd Floor
Santa Fe, NM 87505
505-476-4700
<http://www.rld.state.nm.us/>

Manufactured Housing Division

Regulation and Licensing Department
Manufactured Housing Division
5500 San Antonio Dr., Suite F
Albuquerque, NM 87109
505-222-9870
<http://www.rld.state.nm.us/>



Handbook for New Mexico Floodplain Managers

New Mexico State Climatologist

Dr. Dave DuBois
New Mexico State University
Department of Agronomy
and Horticulture Box 30001,
Department 3Q
Las Cruces, NM 88003-8003

575-646-2974
dwdubois@nmsu.edu
<http://weather.nmsu.edu>

NM Department of Transportation

New Mexico Department of Transportation
1120 Cerrillos Road,
P.O. Box 1149
Santa Fe, NM 87504-1149 (505) 827-5100

District Offices:

District 1

Trent Doolittle, District Engineer
2912 E. Pine St.
Deming, NM 88031-0231
1-800-444-0745

District 2

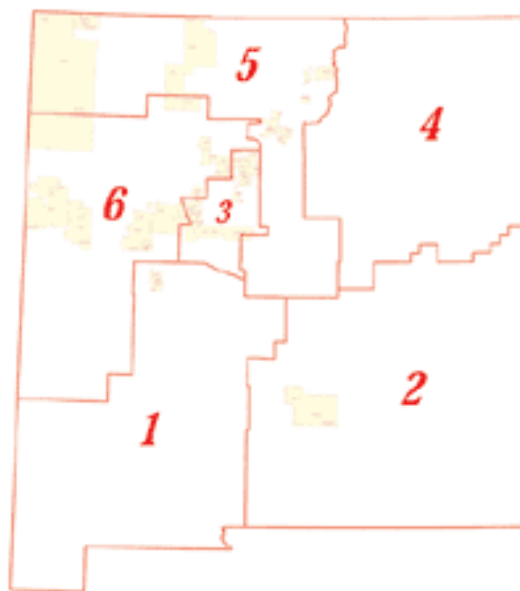
Timothy L. Parker, District Engineer
4505 W. Second, Box 1457
Roswell, NM 88202-1457
1-800-432-7845

District 3

Justin Gibson, District Engineer
7500 Pan American Freeway NE
P.O. Box 91750
Albuquerque, NM 87109
1-505-819-7905

District 4

James Gallegos, District Engineer
28 Bibb Industrial
Las Vegas, NM 87701
1-800-234-7520



District 5

Paul Brasher, District Engineer
Box 4127, Coronado
Santa Fe, NM 87502-4127
1-505-388-6630

District 6

Larry Maynard, District Engineer
P.O. Box 2160
Milan, NM 87021
1-800-361-3596



Handbook for New Mexico Floodplain Managers

NM Department of Cultural Affairs/Historic Preservation Division

Historic Preservation Division
Bataan Memorial Building
407 Galisteo, Suite 236
Santa Fe, NM 87501
(505) 827-6320, fax (505) 872-6338
nm.shpo@state.nm.us
www.nmhistoricpreservation.org

Department of Homeland Security/ Federal Emergency Management Agency

Federal Emergency Management Agency
Region VI
FRC 800 North Loop 288
Denton, TX 76209-3698
www.fema.gov

Community Assistance Program – State Support Services Element

Lisa Jennings
Lisa.Jennings@fema.dhs.gov

The NFIP regulations:

<https://www.fema.gov/flood-insurance/rules-legislation>

The NFIP's [Community Status Book](#) that lists the current status of every community in the NFIP

FEMA publications

<https://www.fema.gov/multimedia-library>

Emergency Management Institute:

<https://training.fema.gov/>

Questions on floodplain maps and map changes:

Federal Emergency Management Agency
FEMA Mapping and Insurance eXchange (FMIX)
877/FEMA-MAP (1-877-336-2627)
FEMAMapSpecialist@riskmapcds.com



Handbook for New Mexico Floodplain Managers

For Fastest Processing, Submit Online Using:

<https://hazards.fema.gov/femaportal/online/omc/signin>

or

<https://hazards.fema.gov/femaportal/wps/portal>

Or Mail to:

LOMC Clearinghouse

3601 Eisenhower Avenue, Suite 500

Alexandria, VA 22304-6426

Community Rating System

ISO/CRS Specialist for New Mexico

CRS publications available at;

Kerry Redente

<https://crsresources.org/>

ISO

719-207-0121

kredente@verisk.com

US Army Corps of Engineers/Albuquerque District

Albuquerque District

U.S. Army Corps of Engineers

Albuquerque District

4101 Jefferson Plaza NE

Albuquerque, NM 87109

505-342-3483

<http://www.spa.usace.army.mil/>

Corps Floodproofing Publications

<https://www.usace.army.mil/Missions/Civil-Works/Project-Planning/nnc/>



Handbook for New Mexico Floodplain Managers

Natural Resources Conservation Service

NRCS
100 Sun Avenue N.E., Suite 602
Albuquerque, NM 87109
505-761-4400
<http://www.nm.nrcs.usda.gov>

National Weather Service –Albuquerque Forecast Office

2341 Clark Carr Loop SE
Albuquerque, NM 87106-5633
505-243-0702
<https://www.weather.gov/abq/%22>

US Geological Survey

USGS
New Mexico District
6700 Edith Blvd NE
Albuquerque, NM 87113

505-830-7900
<https://www.usgs.gov/centers/nm-water>

Repair contractor certification programs

Institute of Inspection Cleaning and Restoration Certification
4043 S. Eastern Ave.
Las Vegas, NV 89119
Phone: 1-844-464-4272

Restoration Industry Association
1120 NJ-73, Suite 200
Mount Laurel, NJ 08054
Phone: 1-856-439-9222



Appendix C. References

Most of the documents listed here are available for free. Available websites are noted. Those with a “.pdf” extension require Adobe Acrobat Reader, which is free software available from www.adobe.com/acrobat

FEMA publications can be downloaded from the [FEMA media library website](#). Community Rating System Publications can also be found at this location.

The noted U.S. Army Corps of Engineers floodproofing publications can be found on the [Corps website](#).

Other publications can be ordered as noted.

[*Answers to Questions about Substantially Damaged Buildings*](#). Federal Emergency Management Agency. Federal Insurance Administration, National Flood Insurance Program Community Assistance Series. FEMA 213. 2018.

[*Answers to Questions about the National Flood Insurance Program*](#). Federal Emergency Management Agency. F-084. 2011.

[*Base Level Engineering: Flood Data to Expand Local Risk Awareness*](#). Federal Emergency Management Agency and the United State Geologic Survey.

[*Below-Grade Parking Requirements for Buildings Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program*](#). Federal Emergency Management

[*Code of Federal Regulations: Title 44—Emergency Management and Assistance*](#). Chapter 1—Federal Emergency Management Agency. Special Edition of the Federal Register. 1997.

[*Community Rating System: A Local Official's Guide to Saving Lives, Preventing Property Damage, and Reducing the Cost of Flood Insurance*](#). Federal Emergency Management Agency. FEMA B 573. 2018.

[*CRS Credit for Higher Regulatory Standards*](#). Federal Emergency Management Agency. National Flood Insurance Program/Community Rating System. 2006.

[*CRS Credit for Stormwater Management*](#). Federal Emergency Management Agency. National Flood Insurance Program/Community Rating System. 2007.

[*Base Level Engineering As Best Available Information*](#). Federal Emergency Management Agency.

[*BLE and Letters of Map Amendment \(LOMAs\)*](#). Federal Emergency Management Agency.

[*Design Guidelines for Flood Damage Reduction*](#). Federal Emergency Management Agency.



Handbook for New Mexico Floodplain Managers

FEMA 15. 1981

Design Manual for Retrofitting Flood-prone Residential Structures. Federal Emergency Management Agency. FEMA 114. 1986

Elevated Residential Structures. Federal Emergency Management Agency. FEMA 54. 1984

[Elevation Certificate](#). Federal Emergency Management Agency. Floodplain Management Bulletin. 2004.

[Elevator Installation for Buildings Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program](#). Federal Emergency Management Agency. Technical Bulletin 4-19, IF-TB-4. 2019.

[Engineering Principles and Practices for Retrofitting Flood Prone Residential Buildings](#). Federal Emergency Management Agency. FEMA 259. 2012.

[Federal Programs Offering Non-Structural Flood Recovery and Floodplain Management Alternatives](#), Executive Office of the President, 1998.

Flood Proofing Regulations. U.S. Army Corps of Engineers, EP 1165-2-314. 1992 (available on the Corps' web site noted on the first page).

[Floodproofing Non-Residential Structures](#). Federal Emergency Management Agency. FEMA P-936. 2013.

[Flood-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program](#). Federal Emergency Management Agency. Technical Bulletin 2-08, IF-TB-2. 2008.

[Guidance for Flood Risk Analysis and Mapping: MT-1 Technical Guidance](#). Federal Emergency Management Agency. Guidance Document 65. 2019.

[Substantial Damage Estimator Best Practices: Approaches for Using FEMA's Substantial Damage Estimator Tool](#). Federal Emergency Management Agency. 2017.

[Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding](#), FEMA 312, 2014.

[How to Determine BFE Outside a Floodplain](#). Federal Emergency Management Agency.

[How to Use the Estimated Base Flood Elevation Viewer](#). Federal Emergency Management Agency.

[Interim Guidance for State and Local Officials: Increased Cost of Compliance Coverage](#). Federal Emergency Management Agency. FEMA-301. 2003.

[Letter of Map Amendment \(Out as Shown\)](#). Federal Emergency Management Agency.

Local Flood Proofing Programs. U.S. Army Corps of Engineers. 2005 (available on the Corps' web site noted on the first page).



Handbook for New Mexico Floodplain Managers

[Managing Floodplain Development in Approximate Zone A Areas: A Guide for Obtaining and Developing Base \(100-Year\) Flood Elevations](#). Includes the computer program QUICK-2: Computation of Water Surface Elevations in Open Channels, Version 1.0. Federal Emergency Management Agency. FEMA 265. 1995.

[Mandatory Purchase of Flood Insurance Guidelines](#). Federal Emergency Management Agency. FEMA 186. 2007.

Manufactured Home Installation in Flood Hazard Areas. Federal Emergency Management Agency. FEMA 85. 1985

[National Flood Insurance Reform Act of 1994](#), Public Law 103-325. Title V in the Community Development and Regulatory Improvement Act of 1994.

[Non-Residential Floodproofing Requirements and Certification for Buildings Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program](#). Federal Emergency Management Agency. Technical Bulletin 3-93, IF-TB-3. 1993.

[Openings in Foundation Walls for Buildings Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program](#). Federal Emergency Management Agency. Technical Bulletin 1-20, IF-TB-1. 2020.

Protecting Floodplain Resources: A Guidebook for Communities. Federal Interagency Floodplain Management Task Force. FEMA 268. 1996

Reducing Losses in High Risk Flood Hazard Areas: A Guidebook for Local Officials. Association of State Floodplain Managers. FEMA 116. 1987

Repairing Your Flooded Home. Federal Emergency Management Agency and the American Red Cross. ARC 4477 or FEMA 234. 2010.

[Subdivision Design in Flood Hazard Areas](#). American Planning Association and Federal Emergency Management Agency, PAS Report 584.

[Understanding and Managing Flood Risk: A Guide for Elected Officials](#). Association of State Floodplain Managers. 2020.

[Use of Flood Insurance Study \(FIS\) Data as Available Data](#). Federal Emergency Management Agency. Floodplain Management Bulletin 1-12. 2012.

[User's Guide to Technical Bulletins](#). Federal Emergency Management Agency. IF-TB-0. 2019.

[Wet Floodproofing Requirements for Structures Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program](#). Federal Emergency Management Agency. Technical Bulletin 7-93, IF-TB-7. 1993.

[What is Risk Map](#). Federal Emergency Management Agency.



Appendix D. FEMA Forms

This Appendix contains three FEMA forms that are useful to a local regulatory program.

- The FEMA Elevation Certificate is explained in Section 19. It can be downloaded from FEMA's web site at https://www.fema.gov/sites/default/files/2020-07/fema_nfip_elevation-certificate-form-instructions_feb-2020.pdf.
- Form MT-EZ, the map revision form for LOMAs and LOMR-Fs, is explained in Section [7](#). It can be downloaded from FEMA's web site at <https://www.fema.gov/flood-maps/change-your-flood-zone/paper-application-forms/mt-ez>.



Handbook for New Mexico Floodplain Managers

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

OMB No. 1660-0008
Expiration Date: November 30, 2022

ELEVATION CERTIFICATE

Important: Follow the instructions on pages 1-9.

Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner.

SECTION A - PROPERTY INFORMATION						FOR INSURANCE COMPANY USE
A1. Building Owner's Name						Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.						Company NAIC Number:
City		State		ZIP Code		
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)						
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.)						
A5. Latitude/Longitude: Lat. Long. Horizontal Datum: <input type="checkbox"/> NAD 1927 <input type="checkbox"/> NAD 1983						
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.						
A7. Building Diagram Number						
A8. For a building with a crawlspace or enclosure(s):						
a) Square footage of crawlspace or enclosure(s) sq ft						
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade						
c) Total net area of flood openings in A8.b sq in						
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No						
A9. For a building with an attached garage:						
a) Square footage of attached garage sq ft						
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade						
c) Total net area of flood openings in A9.b sq in						
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No						
SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION						
B1. NFIP Community Name & Community Number				B2. County Name		B3. State
B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use Base Flood Depth)	
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9: <input type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____						
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input type="checkbox"/> Other/Source: _____						
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input type="checkbox"/> No Designation Date: <input type="checkbox"/> CBRS <input type="checkbox"/> OPA						



Handbook for New Mexico Floodplain Managers

ELEVATION CERTIFICATE

OMB No. 1680-0008
Expiration Date: November 30, 2022

IMPORTANT: In these spaces, copy the corresponding information from Section A.		FOR INSURANCE COMPANY USE	
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.		Policy Number:	
City	State	ZIP Code	Company NAIC Number
SECTION C – BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)			
C1. Building elevations are based on: <input type="checkbox"/> Construction Drawings* <input type="checkbox"/> Building Under Construction* <input type="checkbox"/> Finished Construction *A new Elevation Certificate will be required when construction of the building is complete.			
C2. Elevations – Zones A1–A30, AE, AH, A (with BFE), VE, V1–V30, V (with BFE), AR, AR/A, AR/AE, AR/A1–A30, AR/AH, AR/AO. Complete Items C2.a–h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters. Benchmark Utilized: _____ Vertical Datum: _____ Indicate elevation datum used for the elevations in items a) through h) below. <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input type="checkbox"/> Other/Source: _____ Datum used for building elevations must be the same as that used for the BFE.			
		Check the measurement used.	
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	_____	<input type="checkbox"/> feet	<input type="checkbox"/> meters
b) Top of the next higher floor	_____	<input type="checkbox"/> feet	<input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	_____	<input type="checkbox"/> feet	<input type="checkbox"/> meters
d) Attached garage (top of slab)	_____	<input type="checkbox"/> feet	<input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	_____	<input type="checkbox"/> feet	<input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	_____	<input type="checkbox"/> feet	<input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	_____	<input type="checkbox"/> feet	<input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	_____	<input type="checkbox"/> feet	<input type="checkbox"/> meters
SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION			
This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.			
Were latitude and longitude in Section A provided by a licensed land surveyor? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Check here if attachments.			
Certifier's Name		License Number	
_____		_____	
Title		_____	
Company Name		_____	
Address		_____	
City	State	ZIP Code	
_____	_____	_____	
Signature	Date	Telephone	Ext.
_____	_____	_____	_____
Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner.			
Comments (including type of equipment and location, per C2(e), if applicable)			



Handbook for New Mexico Floodplain Managers

ELEVATION CERTIFICATE

OMB No. 1680-0008
Expiration Date: November 30, 2022

IMPORTANT: In these spaces, copy the corresponding information from Section A.			FOR INSURANCE COMPANY USE	
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.			Policy Number:	
City	State	ZIP Code	Company NAIC Number	
SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)				
For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.				
E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).				
a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ <input type="checkbox"/> feet <input type="checkbox"/> meters <input type="checkbox"/> above or <input type="checkbox"/> below the HAG.				
b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ <input type="checkbox"/> feet <input type="checkbox"/> meters <input type="checkbox"/> above or <input type="checkbox"/> below the LAG.				
E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 1–2 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ <input type="checkbox"/> feet <input type="checkbox"/> meters <input type="checkbox"/> above or <input type="checkbox"/> below the HAG.				
E3. Attached garage (top of slab) is _____ <input type="checkbox"/> feet <input type="checkbox"/> meters <input type="checkbox"/> above or <input type="checkbox"/> below the HAG.				
E4. Top of platform of machinery and/or equipment servicing the building is _____ <input type="checkbox"/> feet <input type="checkbox"/> meters <input type="checkbox"/> above or <input type="checkbox"/> below the HAG.				
E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown. The local official must certify this information in Section G.				
SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION				
The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.				
Property Owner or Owner's Authorized Representative's Name _____				
Address _____		City _____	State _____	ZIP Code _____
Signature _____		Date _____	Telephone _____	
Comments _____				
<input type="checkbox"/> Check here if attachments.				



Handbook for New Mexico Floodplain Managers

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expiration Date: November 30, 2022

IMPORTANT: In these spaces, copy the corresponding information from Section A.		FOR INSURANCE COMPANY USE	
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.		Policy Number:	
City	State	ZIP Code	Company NAIC Number
SECTION G – COMMUNITY INFORMATION (OPTIONAL)			
The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.			
G1. <input type="checkbox"/> The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)			
G2. <input type="checkbox"/> A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.			
G3. <input type="checkbox"/> The following information (Items G4–G10) is provided for community floodplain management purposes.			
G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate of Compliance/Occupancy Issued	
G7. This permit has been issued for: <input type="checkbox"/> New Construction <input type="checkbox"/> Substantial Improvement			
G8. Elevation of as-built lowest floor (including basement) of the building:		<input type="checkbox"/> feet <input type="checkbox"/> meters	Datum <input type="text"/>
G9. BFE or (in Zone AO) depth of flooding at the building site:		<input type="checkbox"/> feet <input type="checkbox"/> meters	Datum <input type="text"/>
G10. Community's design flood elevation:		<input type="checkbox"/> feet <input type="checkbox"/> meters	Datum <input type="text"/>
Local Official's Name		Title	
Community Name		Telephone	
Signature		Date	
Comments (including type of equipment and location, per C2(e), if applicable)			
<div></div>			
<input type="checkbox"/> Check here if attachments.			



Handbook for New Mexico Floodplain Managers

BUILDING PHOTOGRAPHS See Instructions for Item A8.			OMB No. 1660-0008 Expiration Date: November 30, 2022
ELEVATION CERTIFICATE			
IMPORTANT: In these spaces, copy the corresponding information from Section A.			FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.			Policy Number:
City	State	ZIP Code	Company NAIC Number
<p>If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A8. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.</p>			
Photo One			
Photo One Caption			Clear Photo One
Photo Two			
Photo Two Caption			Clear Photo Two

FEMA Form 086-0-33 (12/19) Replaces all previous editions. Form Page 5 of 6



Handbook for New Mexico Floodplain Managers

BUILDING PHOTOGRAPHS		OMB No. 1660-0008
Continuation Page		Expiration Date: November 30, 2022
ELEVATION CERTIFICATE		
IMPORTANT: In these spaces, copy the corresponding information from Section A.		FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.		Policy Number:
City	State ZIP Code	Company NAIC Number
<p>If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.</p>		
Photo Three		
Photo Three		
Photo Three Caption		Clear Photo Three
Photo Four		
Photo Four		
Photo Four Caption		Clear Photo Four

FEMA Form 086-0-33 (12/19) Replaces all previous editions. Form Page 6 of 6



Handbook for New Mexico Floodplain Managers

DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY
APPLICATION FORM FOR SINGLE RESIDENTIAL LOT OR STRUCTURE AMENDMENTS TO
NATIONAL FLOOD INSURANCE PROGRAM MAPS

O.M.B. NO. 1660-0015
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this data collection is estimated to average 2.4 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 submitting this form. This collection of information is required to obtain or retain benefits. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing the burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0015) **NOTE: Do not send your completed form to this address.**

This form should be used to request that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) remove a single structure or legally recorded parcel of land or portion thereof, described by metes and bounds, certified by a registered professional engineer or licensed land surveyor, from a designated Special Flood Hazard Area (SFHA), an area that would be inundated by the flood having a 1% chance of being equaled or exceeded in any given year (base flood), via Letter of Map Amendment (LOMA). It shall not be used for requests submitted by developers, for requests involving multiple structures or lots, for property in alluvial fan areas, for property located within the regulatory floodway, or requests involving the placement of fill. (NOTE: Use MT-1 forms for such requests). Fill is defined as material from any source (including the subject property) placed that raises the grade to or above the Base Flood Elevation (BFE). The common construction practice of removing unsuitable existing material (topsoil) and backfilling with select structural material is not considered the placement of fill if the practice does not alter the existing (natural grade) elevation, which is at or above the BFE. Also, fill that is placed before the date of the first National Flood Insurance Program (NFIP) map showing the area in an SFHA is considered natural grade.

LOMA:

A letter from DHS-FEMA stating that an existing structure or parcel of land that has not been elevated by fill would not be inundated by the base flood.

A – This section may be completed by the property owner or by the property owner's agent. In order to process your request, all information on this form must be completed *in its entirety*, unless stated as optional. Incomplete submissions will result in processing delays.

1. Has fill been placed on your property to raise ground that was previously below the BFE?

☐ No ☐ Yes – If Yes, STOP!! – You must complete the MT-1 application forms; visit
http://www.fema.gov/plan/prevent/fhm/dl_mt-1.shtm
or call the FEMA Map Information eXchange toll free: (877-FEMA MAP) (877-336-2627)

2. Legal description of Property (Lot, Block, Subdivision or abbreviated description from the Deed) *and* street address of the Property (required):

3. Are you requesting that a flood zone determination be completed for (check one):

- ☐ A structure on your property? What is the date of construction? _____ (MM/YYYY)
- ☐ A portion of your legally recorded property? (A certified metes and bounds description and map of the area to be removed, certified by a registered professional engineer or licensed land surveyor, are required. For the preferred format of metes and bounds descriptions, please refer to the MT-EZ Instructions.)
- ☐ Your entire legally recorded property?

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Applicant's Name (required):

E-mail address (optional) ☐ By checking here you may receive correspondence electronically at the email address provided:

Mailing Address (include Company name if applicable) (required):

Daytime Telephone No. (required):

Fax No. (optional):

Signature of Applicant (required)

Date (required)

End of Section A



Handbook for New Mexico Floodplain Managers

B – This section must be completed by a registered professional engineer or licensed land surveyor. Incomplete submissions will result in processing delays.

NOTE: If the request is to have a flood zone determination completed for the structure, and an Elevation Certificate has been completed for this property, it may be submitted in lieu of Section B. If the request is to have a flood zone determination completed for the entire legally recorded property, or a portion thereof, the lowest elevation on the lot or described portion must be provided in Section B.

Applicable Regulations
The regulations pertaining to LOMAs are presented in the National Flood Insurance Program (NFIP) regulations under Title 44, Chapter I, Parts 70 and 72, Code of Federal Regulations. The purpose of Part 70 is to provide an administrative procedure whereby DHS-FEMA will review information submitted by an owner or lessee of property who believes that his or her property has been inadvertently included in a designated SFHA. The necessity of Part 70 is due in part to the technical difficulty of accurately delineating the SFHA boundary on an NFIP map. Part 70 procedures shall not apply if the topography has been altered to raise the original ground to or above the BFE since the effective date of the first NFIP map [e.g., a Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map (FHBM)] showing the property to be within the SFHA.

Basis of Determination
DHS-FEMA's determination as to whether a structure or legally recorded parcel of land, or portion thereof, described by metes and bounds, may be removed from the SFHA will be based upon a comparison of the Base (1%-annual-chance) Flood Elevation (BFE) with certain elevation information. The elevation information required is dependent upon what is to be removed from the SFHA. For Zones A and AO, please refer to Page 7 of the MT-EZ Form Instructions for information regarding BFE development in those areas and supporting data requirements.

Determination Requested For: (check one)	Elevation Information Required: (complete Item 5)
<input type="checkbox"/> Structure located on natural grade (LOMA)	Lowest Adjacent Grade to the structure (the elevation of the lowest ground touching the structure including attached patios, stairs, deck supports or garages)
<input type="checkbox"/> Legally recorded parcel of land, or portion thereof (LOMA)	Elevation of the lowest ground on the parcel or within the portion of land to be removed from the SFHA

1. PROPERTY INFORMATION
Property Description (Lot and Block Number, Tax Parcel Number, or Abbreviated Description from the Deed, etc.):

2. STRUCTURE INFORMATION
Street Address (including Apt. Unit, Suite, and/or Bldg. No.):

What is the type of construction? (check one) ☐ crawl space ☐ slab on grade ☐ basement/enclosure
☐ other (explain): _____

3. GEOGRAPHIC COORDINATE DATA
Please provide the Latitude and Longitude of the most upstream edge of the **structure** (in decimal degrees to nearest fifth decimal place)
Indicate Datum: ☐ WGS84 ☐ NAD83 ☐ NAD27 Lat. _____ . _____ Long. _____ . _____
Please provide the Latitude and Longitude of the most upstream edge of the **property** (in decimal degrees to nearest fifth decimal place)
Indicate Datum: ☐ WGS84 ☐ NAD83 ☐ NAD27 Lat. _____ . _____ Long. _____ . _____

4. FLOOD INSURANCE RATE MAP (FIRM) INFORMATION
NFIP Community Number: _____ Map Panel Number: _____ Base Flood Elevation (BFE): _____ Source of BFE: _____

5. ELEVATION INFORMATION (SURVEY REQUIRED)
• Lowest Adjacent Grade (LAG) to the structure (to the nearest 0.1 foot or meter) _____ ft. (m)
• Elevation of the lowest grade on the property; or within metes and bounds area (to the nearest 0.1 foot or meter) _____ ft. (m)
• Indicate the datum (if different from NGVD 29 or NAVD 88 attach datum conversion) ☐ NGVD 29 ☐ NAVD 88 ☐ Other (add attachment)
• Has FEMA identified this area as subject to land subsidence or uplift? ☐ No ☐ Yes (provide date of current releveling): _____

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: _____	License No.: _____	Expiration Date: _____	Seal (optional)
Company Name: _____	Telephone No.: _____	Fax No.: _____	
Email: _____			
Signature: _____	Date: _____		

Handbook for New Mexico Floodplain Managers

In addition to this form (MT-EZ), please complete the checklist below. **ALL** requests must include one copy of the following:

- ☐ Copy of the effective FIRM panel on which the structure and/or property location has been accurately plotted
- ☐ Copy of the Subdivision Plat Map (with recordation data and stamp of the Recorder's Office)
- OR
- ☐ Copy of the Property Deed (with recordation data and stamp of the Recorder's Office), *accompanied by* a tax assessor's map or other certified map showing the surveyed location of the property relative to local streets and watercourses. The map should include at least one street intersection that is shown on the FIRM panel.
- ☐ Please include a map scale and North arrow on all maps submitted.

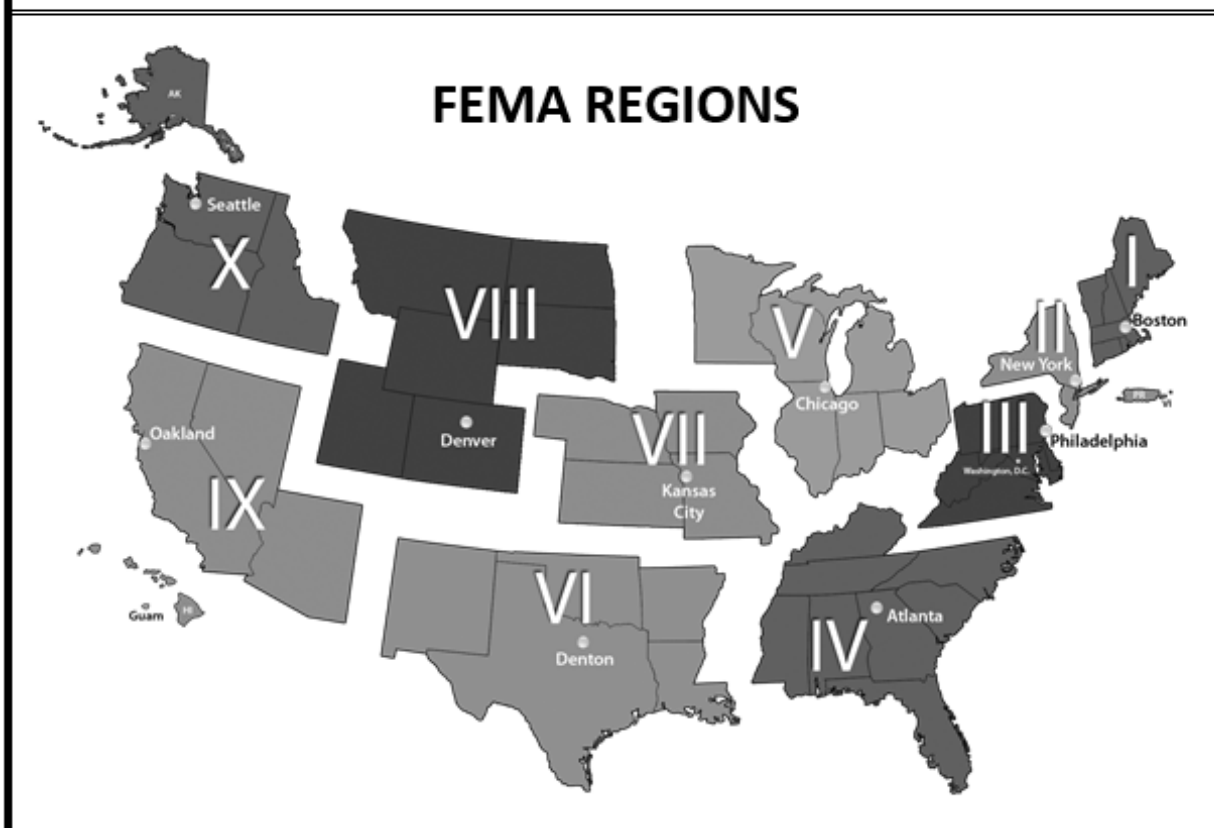
Please do not submit original documents. Please retain a copy of all submitted documents for your records.

DHS-FEMA encourages the submission of all required data in a digital format (e.g. scanned documents and images on Compact Disc [CD]). Digital submissions help to further DHS-FEMA's Digital Vision and also may facilitate the processing of your request.

Incomplete submissions will result in processing delays. For additional information regarding this form, including where to obtain the supporting documents listed above, please refer to the MT-EZ Form Instructions located at http://www.fema.gov/plan/prevent/fhm/dl_mt-ez.shtml.

Mail your request to:

LOMC CLEARINGHOUSE
847 SOUTH PICKETT STREET
ALEXANDRIA, VA 22304-4605
Attn.: LOMA Manager





Appendix E. Flood Zone Designations

Flood zones are geographic areas that the FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area.

Moderate to Low Risk Areas

In communities that participate in the NFIP, flood insurance is available to all property owners and renters in these zones:

Zone	Description
B, C, and X	Areas outside the 1-percent annual chance floodplain, areas of 1% annual chance sheet flow flooding where average depths are less than 1 foot, areas of 1% annual chance stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 1% annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone. Insurance purchase is not required in these zones

High Risk Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

Zone	Description
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
AE, A1-A30	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. In most instances, base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AH	Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.



Handbook for New Mexico Floodplain Managers

AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.

High Risk – Coastal Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

Zone	Description
V	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones.
VE, V1-30	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones

Undetermined Risk Areas

Zone	Description
D	Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.



Appendix F. Common Acronyms and Glossary of Terms

Common Acronyms:

FEMA – The Federal Emergency Management Agency **FIRM** – Flood Insurance Rate Map

LOMA – Letter of Map Amendment

NFIP – The National Flood Insurance Program

NMFMA – The New Mexico Floodplain Managers Association **SFHA** – Special Flood Hazard Area

Glossary:

Some of the technical terms are described in more detail in the section noted. Note that the local floodplain management ordinance will likely have its own definitions section. The definitions in the legal ordinance take precedence over those in this section.

404 Permit: A permit required by Section 404 of the Clean Water Act to protect rivers and adjacent wetlands from being filled. This permit program is administered by the U.S. Army Corps of Engineers. Section 10.

A Zone: See Zone A.

Accessory Structure: An accessory structure is a structure which is on the same parcel of property as a principal structure and the use of which is incidental to the use of the principal structure. For example a residential structure may have a detached garage or storage shed for garden tools as accessory structures. Other examples of accessory structures include gazebos, picnic pavilions, boathouses, small pole barns, storage sheds, and similar buildings. National Flood Insurance Program (NFIP) regulations for new construction generally apply to new and substantially improved accessory structures.

Actual cash value: The replacement cost for a building, minus a depreciation percentage based on age and condition. Section 13.

Alluvial fan: A landform created by the deposition of sediment as flood water flows from a steep canyon onto a relatively flat area such as a riverine floodplain. Section 1.

Amendment: A change to a FEMA floodplain map that removes an area that was inadvertently included in the Special Flood Hazard Area. Section 7.

Anchoring: Special connections made to ensure that a building will not float off or be pushed off its foundation during a flood. Section 12.

Appeal: A request to higher authority such as a Board of Appeals or a City Council to overrule



Handbook for New Mexico Floodplain Managers

a permit denial because the applicant claims that the ordinance has been incorrectly interpreted.

Section 17.

Approximate studies: Flood mapping that shows the *approximate* outline of the base floodplain. An approximate study does not produce a base flood elevation. Section 5.

Available Data: When a community has Zone A areas without elevation and/or floodway data, the community shall obtain, review and reasonably utilize Base Flood Elevation (BFE) and floodway data available from a Federal, State, or other source, including data developed pursuant to paragraph 60.3 (b) (3), as criteria for requiring that new construction, substantial improvement, or other development in Zone A on the community's Flood Insurance Rate Map (FIRM) or Flood Boundary and Floodway Map (FBFM) meet floodplain management standards.

B Zone: See Zone B.

Base flood depth: A measurement of the base flood in feet above ground, used for shallow flooding. Section 5.

Base flood: The 1% chance or 100-year flood adopted by the NFIP as the basis for mapping, insurance rating, and regulating new construction. Section 4.

Base Level Engineering (BLE): BLE is an automated riverine hydrologic and hydraulic modeling approach that builds on lessons learned to produce a base line understanding of flood risk to communities, produced to support the assessment and maintenance of the national flood hazard inventory. BLE provides technically credible flood data for various geographies - community, county, watershed and/or state level. BLE data can be shared with Federal, State, local and tribal governments, this data sharing provides stakeholders at all levels the necessary data to make informed decisions to reduce future flood losses.

Basement: Any area of the building, including any sunken room or sunken portion of a room, having its floor below ground level (subgrade) on all sides. Section 12.

Base flood elevation: The elevation (above sea level or other datum) of the crest of the base flood. Section 4.

Basin: See watershed.

Bench marks: Monuments on the ground that show the elevation of the spot above sea level. Section 4.

Best Available Data: The most recent, approved hydraulic and hydrologic information to show what the 100-year flood elevations and floodplain boundaries are for a particular area. Section 9.

BFE: See base flood elevation.

Building: A structure with 2 or more outside rigid walls and a fully secured roof, that is affixed to a permanent site; or



Handbook for New Mexico Floodplain Managers

- A manufactured home (a "manufactured home," also known as a mobile home, is a structure built on a permanent chassis, transported to its site in 1 or more sections, and affixed to a permanent foundation); or
- A travel trailer without wheels, built on a chassis and affixed to a permanent foundation, that is regulated under the community's floodplain management and building ordinances or laws.
- "Building" does not mean a gas or liquid storage tank or a recreational vehicle, a park trailer, or other similar vehicle, except as described above. (44 CFR 59.1). Section 12.

Building condition survey: A windshield survey conducted to obtain a preliminary evaluation of the extent and severity of damage to buildings after a disaster. Section 22.

CAP: See Community Assistance Program.

Catchment area: See watershed.

CFR: See Code of Federal Regulations.

CFS: Cubic feet per second, the Section by which discharges are measured (a cubic foot of water is about 7.5 gallons). Section 4.

CLOMA: See Conditional Letter of Map Amendment.

CLOMR: See Conditional Letter of Map Revision.

Closed basin lake: A lake that has either no outlet or a relatively small one, where rainfall can cause the lake's level to rise faster than it can drain.

Code of Federal Regulations: A master coding system to identify the federal agency regulations that have been published in the Federal Register. 44 CFR includes all the regulations published by the Federal Emergency Management Agency. Section 3.

Community Assistance Visit (CAV): A major component of the National Flood Insurance Program's (NFIP's) Community Assistance Program (CAP). The CAV is a visit to a community by a FEMA staff member or staff of a State agency on behalf of FEMA that serves the dual purpose of providing technical assistance to the community and assuring that the community is adequately enforcing its floodplain management regulations. Generally, a CAV consists of a tour of the floodplain, an inspection of community permit files, and meetings with local appointed and elected officials.

Community Compliance Program: The National Flood Insurance Act of 1968 prohibits the Federal Emergency Management Agency (FEMA) from providing flood insurance in a community unless that community adopts and enforces floodplain management regulations that meet minimum National Flood Insurance Program (NFIP) criteria. When administrative problems or potential violations are identified in a community, FEMA is committed to working with that community and providing technical assistance to help them bring their floodplain management programs into compliance with NFIP requirements.

Community Rating System: A program developed by FEMA to provide incentives for those



Handbook for New Mexico Floodplain Managers

communities in the Regular Program that have gone beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding.

Community: A city, village, special town or county with the statutory authority to enact floodplain regulations and participate in the National Flood Insurance Program. Section 3.

Compensatory Storage: The NFIP floodway standard in 44CFR 60.3 (d) restricts new development from obstructing the flow of water and increasing flood heights. However, this provision does not address the need to maintain flood storage. Especially in flat areas, the floodplain provides a valuable function by storing floodwaters. When fill or buildings are placed in the flood fringe, the flood storage areas are lost and flood heights will go up because there is less room for the floodwaters. This is particularly important in smaller watersheds which respond sooner to changes in the topography.

Conditional Letter of Map Amendment FEMA's comment on a proposed project that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective Base Flood Elevations (BFEs), or the Special Flood Hazard Area (SFHA). The letter does not revise an effective NFIP map, it indicates whether the project, if built as proposed, would be recognized by FEMA. FEMA charges a fee for processing a CLOMR to recover the costs associated with the review. Section 7

Conditional Letter of Map Revision: A statement that if a project is constructed as planned, a Letter of Map Revision can be issued later. Section 7.

Contour map: A map that shows points with the same elevation as connected by a contour line. Section 4.

Contour: A line of equal elevation on a topographic (contour) map.

Countywide Map: A Flood Insurance Rate Map (FIRM) that shows flooding information for the entire geographic area of a county, including the incorporated communities within the county.

Conveyance shadow: An area upstream or downstream of an existing obstruction to flood flows. Section 11.

Crawlspace: Crawlspace foundations are commonly used in some parts of the nation to elevate the lowest floors of residential buildings located in Special Flood Hazard Areas (SFHAs) above the Base Flood Elevation (BFE). Crawlspace should be constructed so that the floor of the crawlspace is at or above the lowest grade adjacent to the building. Crawlspace that have their floors below BFE must have openings to allow the equalization of flood forces.

Cross section: Surveyed information that describes the stream and the floodplain at a particular point along the stream. Section 4.

CRS: See Community Rating System.

Cumulative Damage Building: Any building that has incurred flood-related damage as a result of two or more flooding events in which the cumulative amounts of payments equals or



Handbook for New Mexico Floodplain Managers

exceeds the fair market value of such building, as determined through use of the following procedure. To determine whether a building has been cumulatively damaged, a loss percentage will be calculated, for each loss, equal to the claim payment amount for that loss divided by the fair market value of such building on the day before each loss.

Cumulative Damage Property: Either a cumulative damage building or the contents within a cumulative damage building, or both.

Dam breach inundation area: The area flooded by a dam failure. Section 14.

Damage Survey Report: A form completed by disaster assistance staff to determine the repair and reconstruction needs of public and private nonprofit facilities. Section 23.

Datum: A common vertical elevation reference point, usually in relation to sea level. Section 4.

Detailed studies: Flood mapping that produces base flood elevations, floodways, and other pertinent flood data. Section 4.

Development: Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or material. Section 10

Discharge: The amount of water that passes a point in a given period of time. The rate of discharge is measured in cubic feet per second (cfs). Section 4.

DSR: See Damage survey report.

Elevation Certificate: A community's permit file must have an official record that shows new buildings and substantial improvements in all identified Special Flood Hazard Areas (SFHAs) are properly elevated. This elevation information is needed to show compliance with the floodplain management ordinance.

Elevation reference marks: See bench marks.

Emergency Operations Center: A facility that houses communications equipment that is used to coordinate the response to a disaster or emergency. Section 22.

Emergency Program: The initial phase of a community's participation in the National Flood Insurance Program, as prescribed by Section 1306 of the Act.

Eminent domain: Governmental power to acquire a property without the owner's consent. Section 8.

Enclosure: That portion of an elevated building below the lowest elevated floor that is either partially or fully shut in by rigid walls.

Encroachments: Encroachments are activities or construction within the floodway including fill, new construction, substantial improvements, and other development.

EOC: See Emergency Operations Center.



Handbook for New Mexico Floodplain Managers

EO 11988: Executive Order 11988 Floodplain Management. A directive by the President that sets procedures Federal agencies must follow before they take or fund an action in the floodplain. Sections 14 and 24.

Erosion: a. The collapse, undermining or subsidence of land along the shore of a lake or other body of water. Erosion is a covered peril if it is caused by waves or currents of water exceeding their cyclical levels which result in flooding.

b. The process of the gradual wearing away of land masses. Erosion can occur along coasts and rivers and streams. Although flood-related erosion is covered by flood insurance, this peril is not covered per se under the National Flood Insurance Program (NFIP). The mapping and regulatory standards of the NFIP do not currently address erosion, but Community Rating System (CRS) credit is given to communities that include this hazard in their regulations, planning, public information, hazard disclosure, and flood warning programs. Many States and communities have established setbacks and other requirements in areas subject to erosion.

Executive Order 11988: Issued in May 1977, this Executive Order directs Federal Agencies to:

1. assert leadership in reducing flood losses and losses to environmental values served by floodplains;
2. avoid actions located in or adversely affecting floodplains unless there is no practicable alternative;
3. take action to mitigate losses if avoidance is not practicable; and
4. establishes a process for flood hazard evaluation based upon the 100-year base flood standard of the National Flood Insurance Program (NFIP). It also directed Federal agencies to issue implementing procedures; provided a consultation mechanism for developing the implementing procedures; and provided oversight mechanisms.

Under the Constitution, a Federal agency does not have to obtain local community permits to develop property within the community. However, all Federal agencies are responsible for implementing Executive Order 11988 through their own regulations. The Order states that, at a minimum, Federal agencies must comply with NFIP regulations.

Existing Construction: For the purposes of determining flood insurance rates, structures for which the "start of construction" commenced before the effective date of the Flood Insurance Rate Map (FIRM) or before January 1, 1975, for FIRMs effective before that date. "Existing construction" may also be referred to as "existing structures."

Factory built home: Any structure, designed for residential use, which is wholly or in substantial part, made, fabricated, formed or assembled in manufacturing facilities for installation or assembly and installation, on a building site. Section 12.

Factory built home park: A parcel or contiguous parcels of land divided into two or more factory-built home lots for sale or lease. Section 12.

FBFM: Flood Boundary Floodway Map. An official map of a community, on which the Federal Insurance Administration has delineated the regulatory floodway. Section 5.

Federal Register: A daily publication of the Federal government used to publicize Federal



Handbook for New Mexico Floodplain Managers

agencies' rules.

FEMA: Federal Emergency Management Agency. Most of the National Flood Insurance Program field work and community coordination are done by FEMA's Region VI Office.

FHBM: Flood Hazard Boundary Map. The map published by FEMA that delineates the approximate boundary of the floodplain. Section 5.

FIA: Federal Insurance Administration. FIA is the part of the Federal Emergency Management Agency that administers the National Flood Insurance Program.

Fill: Earthen fill is sometimes placed in an Special Flood Hazard Area (SFHA) to reduce flood risk to the filled area. The placement of fill is considered development and will require a permit under applicable Federal, state and local laws, ordinances, and regulations.

FIRM: Flood Insurance Rate Map. An official map of a community, on which the Federal Insurance Administration has delineated both the Special Flood Hazard Areas and the risk premium zones applicable to the community. Section 5.

Flash flood: A flood in hilly areas that may come scant minutes after a heavy rain. One can also occur in urban areas where pavements and drainage improvements speed runoff to a stream. Section 1.

Flood: The NFIP's definition is "A general and temporary condition of partial or complete inundation of 2 or more acres of normally dry land area or of 2 or more properties." Section 3.

Flood fringe: See floodway fringe.

Flood hazard mitigation: All actions that can be taken to reduce property damage and the threat to life and public health from flooding. Section 23.

Flood Insurance Study: A report published by FEMA for a community in conjunction with the community's Flood Insurance Rate Map. The study contains such background data as the base flood discharges and water surface elevations that were used to prepare the FIRM. Section 5.

Flood Mitigation Assistance: A grant program funded by the National Flood Insurance Program. Section 23.

Flood of record: The highest known flood level for the area, as recorded in historical documents. Section 9.

Floodplain: Any land area susceptible to being inundated by flood waters from any source. Section 1.

Floodplain Management: a. The operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to, emergency preparedness plans, flood-control works and floodplain management regulations.

b. Floodplain management is a decision-making process that aims to achieve the wise use of the nation's floodplains. "Wise use" means both reduced flood losses and protection of the



Handbook for New Mexico Floodplain Managers

natural resources and function of floodplains.

Floodplain Management Ordinances: Once FEMA provides a community with the flood hazard information upon which floodplain management regulations are based, the community is required to adopt a floodplain management ordinance that meets or exceeds the minimum NFIP requirements.

Floodproofing: Any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents. Section 12.

Floodproofing Certificate: Documentation of certification by a registered professional engineer or architect that the design and methods of construction of a nonresidential building are in accordance with accepted practices for meeting the floodproofing requirements in the community's floodplain management ordinance.

Floodway: A "Regulatory Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Section 4.

Floodway fringe: The portion of the floodplain lying on either side of the floodway. Section 4.

Floodway Data Table: The table provided in the flood insurance study which provides detailed information for each cross section on streams studied in detail. Section 6.

FMA: See Flood Mitigation Assistance.

Freeboard: a. An additional amount of height above the Base Flood Elevation used as a factor of safety (e.g., 2 feet above the Base Flood) in determining the level at which a structure's lowest floor must be elevated or floodproofed to be in accordance with state or community floodplain management regulations.

b. Freeboard is a factor of safety usually expressed in feet above a flood level for purposes of floodplain management. "Freeboard" tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed. Freeboard is not required by NFIP standards, but communities are encouraged to adopt at least a one-foot freeboard to account for the one-foot rise built into the concept of designating a floodway and the encroachment requirements where floodways have not been designated. Freeboard results in significantly lower flood insurance rates due to lower flood risk. Section 12.

Functionally dependent use: Development that must be located or carried out close to water, e.g., such as a docking or port facility. Section 17.

Geographic information system: Computer based map systems that allow the user to keep a map updated easily and to correlate geographic information with other data, such as tax records on properties. Section 5.



Handbook for New Mexico Floodplain Managers

GIS: See Geographic information system.

Hazard Mitigation Grant Program: A FEMA disaster assistance grant that funds mitigation projects. Section 23.

HEC-2: A computer model used to conduct a hydraulic study, which produces flood elevations, velocities and floodplain widths. Section 4.

HEC-RAS: A computer model used to conduct a hydraulic study, which produces flood elevations, velocities and floodplain widths. Section 4.

Higher Standard: Federal Emergency Management Agency (FEMA) has established minimum floodplain management requirements for communities participating in the National Flood Insurance Program (NFIP). Communities must also enforce any more restrictive state requirements. Any community may exceed the minimum standards by adopting more comprehensive floodplain management regulations. In some instances, community officials may have access to information or knowledge of conditions that require, particularly for human safety, higher standards than the minimum NFIP criteria.

Highest Adjacent Grade: The highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure. In AO Zones, all new construction and substantial improvements of residential structures shall have the lowest floor including basement elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's Flood Insurance Rate Map (FIRM); or at least two feet if no depth number is specified.

Historic structure: A building or other structure that has been declared worthy of preservation by a recognized agency. Section 13.

Home rule: A community authorized to do anything that is not prohibited by statute. Section 7.

Human intervention: Actions that must be taken by one or more persons in order for a building to be floodproofed before floodwaters arrive. Section 12.

Hydraulics: The study of moving water. A hydraulic analysis in a flood insurance study calculates how high and how fast a flood discharge flows. Section 4.

Hydrodynamic force: Hydrodynamic forces are imposed on an object, such as a building, by water flowing against and around it. Among the forces are positive frontal pressure against the structure, drag effect along the sides, and negative pressure in the downstream side. Section 1.

Hydrologic cycle: The natural cycle that circulates water throughout the environment to maintain an overall balance between water in the air, on the surface and in the ground. Section 1.

Hydrology: The science dealing with the waters of the earth. A flood discharge is developed by a hydrologic study. Sections 1 and 4.



Handbook for New Mexico Floodplain Managers

Hydrostatic Forces: Standing water or slowly moving water can induce horizontal hydrostatic forces against a structure, especially when floodwater levels on different sides of a wall are not equal. Also flooding can cause vertical hydrostatic forces, or flotation. Section 1.

ICC: See Increased Cost of Compliance.

IFG: See Individual and Family Grants.

Increased Cost of Compliance: Coverage for expenses that a property owner must incur, above and beyond the cost to repair the physical damage the structure actually sustained from a flooding event, to comply with mitigation requirements of state or local floodplain management ordinances or laws. Section 13.

Individual and Family Grants: A disaster assistance grant that helps people with their unmet needs (i.e., needs not helped by other disaster assistance programs. Section 23.

Inverse condemnation: See “taking.” Section 8.

ISO: The Insurance Services Office, Inc., an insurance organization that administers the Community Rating System for FEMA. Section 21.

Lateral pressure: The amount of pressure imposed sideways by standing water. Deeper water exerts more lateral pressure than shallow water. Section 1.

Letter of Determination Review (LODR): FEMA's ruling on the determination made by a lender or third party that a borrower's building is in a Special Flood Hazard Area (SFHA). A LODR deals only with the location of a building relative to the SFHA boundary shown on the Flood Insurance Rate Map (FIRM).

Letter of Map Amendment (LOMA): An official revision to a FEMA map done by describing the property affected. Section 7.

Letter of Map Change (LOMC): Letter of Map Change (LOMC) is a general term used to refer to the several types of revisions and amendments to FEMA maps that can be accomplished by letter. They include Letter of Map Amendment (LOMA), Letter of Map Revision (LOMR), and Letter of Map Revision based on Fill (LOMR-F).

Letter of Map Revision (LOMR): A Letter of Map Revision is FEMA's modification to an effective Flood Insurance Rate Map (FIRM), or Flood Boundary and Floodway Map (FBFM), or both. Letter of Map Revisions are generally based on the implementation of physical measures that affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective Base Flood Elevations (BFEs), or the Special Flood Hazard Area (SFHA). Section 7.

LOMA: See Letter of Map Amendment LOMR: See Letter of Map Revision.

Lowest Adjacent Grade: The lowest point of the ground level immediately next to a building.

Lowest Floor: The lowest floor of the lowest enclosed area (including basement) of a building. Section 12.



Handbook for New Mexico Floodplain Managers

Manufactured home: A building that is transportable in one or more sections, built on a permanent chassis and designed for use with or without a permanent foundation when attached to utilities. The term includes mobile home and “double wides.” Section 12.

Market value: The price a willing buyer and seller agree upon. Section 13.

Meander: A curve in a river. Section 1.

Mitigation Directorate: The FEMA office that sets national policy for the NFIP and administers the mapping program. Section 3.

M-O-M: See Multi-objective management.

Multi-objective management: An approach to planning and funding local programs that involves a variety of local interests and concerns. Section 23.

NAVD: North American Vertical Datum. The national elevation datum that is replacing NGVD. See NGVD.

NEPA: The National Environmental Policy Act, a Federal law that requires agencies to evaluate the environmental impact of a proposed project. Section 14.

New Construction: Buildings for which the "start of construction" commenced on or after the effective date of an initial Flood Insurance Rate Map (FIRM) or after December 31, 1974, whichever is later, including any subsequent improvements.

a. For Floodplain Management Purposes: Structures for which the start of construction commenced on or after the effective date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.

b. For Determining Insurance Rates: Structures for which the start of construction commenced on or after the effective date of an initial FIRM or after December 31, 1974, whichever is later, and includes any subsequent improvements to such structures. Flood insurance rates for new construction are based on the elevation of the lowest floor (including basement) in relation to the BFE.

NGVD: National Geodetic Vertical Datum of 1929, the national datum used by the National Flood Insurance Program. NGVD is based on mean sea level. It was known formerly as the "Mean Sea Level Datum of 1929 (MSL)." Section 4.

NMDHSEM: New Mexico Department of Homeland Security and Emergency Management

Non-structural flood protection measures: Administrative tools for controlling flooding and flood damage, including regulations on development, building codes, property acquisition and structure relocation, and modification of existing buildings. Section 3.

No-Rise Certification for Floodways: Any project in a floodway must be reviewed to determine if the project will increase flood heights. An engineering analysis must be conducted before a permit can be issued. The community's permit file must have a record of the results of this analysis, which can be in the form of a No-rise Certification.



Handbook for New Mexico Floodplain Managers

Out-As-Shown Determination: An alternative outcome of the FEMA letter of Map Amendment (LOMA) review process stating that a specific property is located outside the Special Flood Hazard Area (SFHA) as indicated on the Flood Hazard Boundary Map (FHBM) or Flood Insurance Rate Map (FIRM).

Overbank flooding: Flooding that occurs when downstream channels receive more rain or snowmelt from their watershed than normal, or a channel is blocked by an ice jam or debris. Excess water overloads the channels and flows out onto the floodplain. Section 1.

Participating Community: A community for which FEMA has authorized the sale of flood insurance under the NFIP.

Participation in the NFIP: Participation in the National Flood Insurance Program (NFIP) is voluntary. To join, the community must:

1. Complete an application;
2. Adopt a resolution of intent to participate and cooperate with FEMA;
3. Adopt and submit a floodplain management ordinance that meets or exceeds the minimum NFIP criteria. The floodplain management ordinance must also adopt any FIRM or FHBM for the community.

Within participating communities, the Federal government makes flood insurance available throughout the community.

Planned unit development. A regulatory approach that allows a developer to design the entire area while individual requirements are relaxed to allow for open space, mixed land uses, and other variances to traditional zoning rules. Section 14.

Ponding: Runoff that collects in depressions and cannot drain out, creating a temporary pond. Section 1.

Post-FIRM building: For insurance rating purposes, a post-FIRM building was constructed or substantially improved after December 31, 1974, or after the effective date of the initial Flood Insurance Rate Map of a community, whichever is later. A post-FIRM building is required to meet the National Flood Insurance Program's minimum Regular Program flood protection standards. Section 3.

Pre-FIRM building: For insurance rating purposes, a pre-FIRM building was constructed or substantially improved on or before December 31, 1974, or before the effective date of the initial Flood Insurance Rate Map of the community, whichever is later. Most pre-FIRM buildings were constructed without taking the flood hazard into account. Section 3.

Probability: A statistical term having to do with the size of a flood and the odds of that size of flood occurring in any year. Section 4.

Probation: A FEMA-imposed change in a community's status resulting from violations and deficiencies in the administration and enforcement of NFIP local floodplain management regulations.



Handbook for New Mexico Floodplain Managers

Professional Engineer: An engineer who has been tested and registered by the New Mexico State Board of Licensure for Professional Engineers and Surveyors.

Project Impact: A FEMA program to encourage businesses, government agencies and the public to work together to build disaster resistant communities. Section 23.

Profile: A graph that shows elevations of various flood events. Section 4.

Public/Infrastructure Assistance: A disaster assistance grant that helps public agencies and nonprofit organizations finance repairs and reconstruction. Section 23.

PUD: See Planned unit development.

"Q": An abbreviation used by engineers to stand for discharge. Section 4.

Q3 flood data product: A digital picture of some of the features shown on a Flood Insurance Rate Map. Section 5.

Reasonably Safe from Flooding: The community must review all permit applications to determine whether the proposed building sites will be reasonably safe from flooding as one of the minimum National Flood Insurance Program (NFIP) floodplain management requirements established by NFIP regulations. If the community determines that a site is not reasonably safe from flooding, it must require mitigation actions be undertaken to reduce the structures flood damage potential.

Recreational vehicle: A vehicle designed primarily for use as temporary living quarters. Section 12.

Reconstruction: Building a new structure on the old foundation or slab of a structure that was destroyed, damaged, purposefully demolished or razed. The term also applies when an existing structure is moved to a new site. Section 13.

Regular Program: Also called the Regular Phase. The phase of community participation in the National Flood Insurance Program that begins on the date of the Flood Insurance Rate Map or when the community adopts an ordinance that meets the minimum requirements of the NFIP and adopts the technical data provided with the FIRM, whichever is later. Nearly all communities participating in the NFIP are in the Regular Program. Section 3.

Rehabilitation: An improvement made to an existing structure which does not affect its external dimensions. Section 13.

Repetitive Loss Structure: An NFIP-insured structure that has had at least 2 paid flood losses of more than \$1,000 each in any 10-year period since 1978.

Retrofitting: Retrofitting techniques include floodproofing, elevation, construction of small levees, and other modifications made to an existing building or its yard to protect it from flood damage.

Revision: A change to a floodplain map based on new data submitted to FEMA. Section 7.



Handbook for New Mexico Floodplain Managers

Riverine: Of or produced by a river. Riverine floodplains have readily identifiable channels. Floodway maps can only be prepared for riverine floodplains. Section 1.

Roughness: A measure related to ground surface conditions that reflects changes in floodwater velocity due to ground friction. Section 4.

Runoff: Rainfall and snowmelt that reaches a stream. Section 4.

Section 1316: A section in the National Flood Insurance Act of 1968 that authorizes local officials to request that FIA deny flood insurance coverage on a building built contrary to a local ordinance. Section 18.

SFHA: See Special Flood Hazard Area.

Sheet flow: Floodwater that spreads out over a large area that does not have defined channels at a somewhat uniform depth. Section 1.

Sheet Flow Hazard: A type of flood hazard with flooding depths of 1 to 3 feet that occurs in areas of sloping land. The sheet flow hazard is represented by the zone designation AO on the FIRM.

Special Flood Hazard Area: The base floodplain displayed on FEMA maps. It includes all of the A zones. Section 5.

Stafford Act: The Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 which authorizes FEMA's current disaster assistance programs and the Hazard Mitigation Grant Program. Section 23.

Stationing: Determining the distance along a stream. Section 6.

Statutory authority: The powers granted to a local government by state law. Section 8.

Stormwater management: Efforts to reduce the impact of increased runoff that results from new development. Section 14.

Stormwater detention: Storing stormwater runoff for release at a restricted rate after the storm subsides. Section 14.

Stormwater retention: Storing stormwater runoff for later use in irrigation or groundwater recharge, or to reduce pollution. Section 14.

Structural flood control: Measures that control floodwaters by construction of barriers or storage areas or by modifying or redirecting channels. Section 3.

Subdivision: The division of land into three or more parcels.

Submit to rate: a process used when an insurance agent cannot complete the rate calculation for a flood insurance policy. The application is sent to FEMA. Section 20.

Substantial damage: Damage of any origin sustained by a structure whereby the cost of restoring the structure to its undamaged condition would equal or exceed 50 percent of the



Handbook for New Mexico Floodplain Managers

market value of the structure before the damage occurred. Section 13.

Substantial improvement: Any reconstruction, rehabilitation, addition or other improvement to a structure, the total cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement. The definition of “substantial improvement” includes buildings that have been repaired after suffering substantial damage. Section 13.

Taking: Obtaining private property or without compensating the owner. The term also includes reducing the value of private property to such an extent that the owner is deprived of all economic interest. Section 8.

Thalweg: The bottom of a river channel. Section 1.

Topographic map: See contour map.

Uplift: Hydrostatic pressure placed on a floor as water below the floor tries to rise. Section 1

Variance: A grant of relief by a community from the terms of a land use, zoning or building code regulation. Section 17.

Velocity: The speed of moving water, a force that is measured in feet per second. Section 1.

Watercourse: A watercourse means only the channel and banks of an identifiable watercourse, and not the adjoining floodplain areas. The flood carrying capacity of a watercourse refers to the flood carrying capacity of the channel (except in the case of alluvial fans, where a channel is not typically defined).

Watershed: An area that drains into a lake, stream or other body of water. Section 1.

Wet floodproof: Protecting a building from flood damage by using flood-resistant materials below the flood level and elevating things subject to flood damage above the flood level. Section 12.

Write Your Own: An insurance company that has agreed to sell flood insurance policies on behalf of the NFIP. Section 20.

WYO: See Write Your Own. X Zone: See "Zone X."

Zone A: The Special Flood Hazard Area shown on a community's Flood Insurance Rate Map. Section 5. There are five types of A Zones:

- A: SFHA where no base flood elevation is provided.
- A#: Numbered A Zones (e.g., A7 or A14), SFHA where the FIRM shows a base flood elevation in relation to NGVD.
- AE: SFHA where base flood elevations are provided. AE Zone delineations are now used on new FIRMs instead of A# Zones.
- AO: SFHA with sheet flow, ponding, or shallow flooding. Base flood depths (feet



Handbook for New Mexico Floodplain Managers

above grade) are provided.

- AH: Shallow flooding SFHA. Base flood elevations in relation to NGVD are provided.

Zone B: Area of moderate flood hazard, usually depicted on Flood Insurance Rate Maps as between the limits of the base and 500-year floods. B Zones are also used to designate base floodplains of little hazard, such as those with average depths of less than 1 foot. Section 5.

Zone D: Area of undetermined but possible flood hazard. Section 5.

Zone V: The Special Flood Hazard Area subject to coastal high hazard flooding. There are three types of V Zones: V, V#, and VE, and they correspond to the A Zone designations. Section 5.

Zone X: Newer Flood Insurance Rate Maps show Zones B and C (see above) as Zone X. Section 5.

Zoning: A regulatory program that sets and enforces development standards for different zones or districts of a community. Section 8.



Appendix G. New Mexico Floodplain Management Statutes

3-18-7. ADDITIONAL COUNTY AND MUNICIPAL POWERS--FLOOD AND MUDSLIDE HAZARD AREAS--FLOOD PLAIN PERMITS--LAND USE CONTROL--JURISDICTION—AGREEMENT --

A. For the purpose of minimizing or eliminating damage from floods or mudslides in federal emergency management agency and locally designated flood-prone areas and for the purpose of promoting health, safety and the general welfare, a county or municipality with identified flood or mudslide hazard areas shall by ordinance:

- (1) designate and regulate flood plain areas having special flood or mudslide hazards;
- (2) prescribe standards for constructing, altering, installing or repairing buildings and other improvements under a permit system within a designated flood or mudslide hazard area;
- (3) require review by the local flood plain manager for development within a designated flood or mudslide hazard area provided final decisions are approved by the local governing body;
- (4) review subdivision proposals and other new developments within a designated flood or mudslide hazard area to ensure that:
 - (a) all such proposals are consistent with the need to minimize flood damage;
 - (b) all public utilities and facilities such as sewer, gas, electrical and water systems are designed to minimize or eliminate flood damage; and
 - (c) adequate drainage is provided so as to reduce exposure to flood hazards;
- (5) require new or replacement water supply systems or sanitary sewage systems within a designated flood or mudslide hazard area to be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters and require on-site waste disposal systems to be located so as to avoid impairment of them or contamination from them during flooding; and

(6) designate and regulate floodways for the passage of flood waters.

B. A flood plain ordinance adopted pursuant to this section shall substantially conform to the minimum standards prescribed by the federal insurance administration, regulation 1910 issued pursuant to Subsection 7(d), 79 Stat. 670, Section 1361, 82 Stat. 587 and 82 Stat. 575, all as amended.



Handbook for New Mexico Floodplain Managers

- C. A county or municipality that enacts a flood plain ordinance shall designate a person, certified pursuant to the state-certified flood plain manager program, as the flood plain manager to administer the flood plain ordinance.
- D. A county or municipality that has areas designated by the federal emergency management agency and the county or municipality as flood-prone shall participate in the national flood insurance program.
- E. A county or municipality shall have exclusive jurisdiction over flood plain permits issued under its respective flood plain ordinance in accordance with this section and so long as all structures built in flood plains are subject to inspection and approval pursuant to the Construction Industries Licensing Act. Notwithstanding Section 3-18-6 NMSA 1978, when a municipality adopts a flood plain ordinance pursuant to Paragraph (2) of Subsection A of this section, the municipality's jurisdiction under the flood plain ordinance may take precedence over a respective county flood plain ordinance within the municipality's boundary and within the municipality's subdividing and platting jurisdiction.
- F. A county or municipality shall designate flood plain areas having special flood or mudslide hazards in substantial conformity with areas identified as flood- or mudslide-prone by the federal insurance administration pursuant to the national flood insurance program and may designate areas as flood- or mudslide-prone that may not be so identified by the federal insurance administration.
- G. A municipality or county adopting a flood plain ordinance pursuant to this section may enter into reciprocal agreements with any agency of the state, other political subdivisions or the federal government in order to effectively carry out the provisions of this section.
- H. The department of public safety is designated as the state coordinating agency for the national flood insurance program and may assist counties or municipalities when requested by a county or municipality to provide technical advice and assistance.

13-5-3: PUBLIC BUILDINGS--COMPLIANCE WITH THE NATIONAL FLOOD INSURANCE PROGRAM—

A building that receives state appropriations for its construction or that is repaired or improved with state appropriations in an amount greater than fifty percent of the building's value before the repair or improvement shall comply with standards of the national flood insurance program and Section 3-18-7 NMSA 1978.



Appendix H. NMFMA Constitution

CONSTITUTION OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION

ARTICLE I. NAME AND LOCATION: The name of this organization shall be the New Mexico Floodplain Managers Association, also less formally known as NMFMA. The principal place of business of the Association shall be within the State of New Mexico.

ARTICLE II. PURPOSE: The purpose of the New Mexico Floodplain Managers Association is the following:

1. To promote public awareness of proper floodplain management;
2. To promote the professional status of floodplain management and secure all benefits resulting therefrom;
3. To promote a liaison between individuals concerned with proper floodplain management and to encourage the exchange of ideas;
4. To keep individuals concerned with proper floodplain management well informed through educational and professional seminars and to provide a method for dissemination of information, both general and technical;
5. To inform concerned individuals of pending floodplain legislation and other related management matters; and
6. To study and support legislation pertinent and necessary to the effective implementation of floodplain management matters.

ARTICLE III. MEMBERSHIP AND VOTING RIGHTS

Section 1. Membership: Membership shall be open to all persons actively involved in floodplain or stormwater management in the State of New Mexico. This includes elected officials, appointed officials, Federal, State and local employees, engineers, planners, consultants, and others involved in floodplain and stormwater management.

Section 2. Voting Rights: Each member whose dues are current shall be allowed one (1) vote on each matter submitted to this Association. A member may designate, in writing to the Board of Directors, another member to cast that member's vote by proxy.



Handbook for New Mexico Floodplain Managers

ARTICLE IV. BOARD OF DIRECTORS, OFFICERS, COMMITTEES, AND EXECUTIVE DIRECTOR

Section 1. Board of Directors: The Board of Directors shall be determined in accordance with the Bylaws of the Association.

Section 2. Officers: The officers of this Association shall be Chair, Vice Chair, Second Vice Chair, Secretary and Treasurer.

Section 3. Committees: The Chair shall appoint such standing and special committees as he/she may deem necessary.

Section 4. Executive Director: The Board of Directors may provide an Executive Director in accordance with the Bylaws of the Association.

ARTICLE V. MEETINGS: Membership meetings shall be held in accordance with the Bylaws of the Association.

ARTICLE VI. AMENDMENT OR REPEAL

Section 1. Amendments (and/or Repeals): Amendments to this Constitution may be proposed by the Board of Directors or by written petition signed by fifteen (15) voting members or ten percent (10%) of the Association, whichever is less.

Section 2. Notice: Any proposed amendment to this Constitution shall be submitted to the Secretary not less than sixty (60) days prior to a membership meeting at which the amendment is to be considered. The Secretary shall give written notice of the proposed amendment to the membership not less than twenty-one (21) days prior to a meeting at which the amendment is to be considered.

Section 3. Vote Required: This Constitution may be amended or repealed by a majority vote of the voting members present at a meeting of the Association. The proposed amendment shall be discussed at any membership meeting and may be amended by a majority vote at said meeting. All amendments shall be voted upon by ballot.

Section 4. Effective Date: Any amendment adopted by the Association shall become effective upon approval.

ARTICLE VII. DISSOLUTION: Upon dissolution of this Association, the Board of Directors shall after paying or making provision for the payment of all liabilities of the Association, dispose of all assets of the Association to such organization or organizations operating exclusively for charitable, educational or scientific purposes as shall at that time qualify as an exempt organization or organizations under Section 503 (c) of the Internal Revenue Code of 1953 (or corresponding provision of any future United States Internal Revenue Law), as the Board of Directors shall determine.



Handbook for New Mexico Floodplain Managers

ARTICLE VIII: PARLIAMENTARY LAW: In all questions involving parliamentary procedure, including election procedures not covered by the Bylaws of the Association or established by the Board of Directors, Robert's Rules of Order (Revised) shall be considered the governing authority. The Chair shall be the Parliamentarian and shall rule on all issues of parliamentary procedure.

ARTICLE IX. ASSOCIATION RECORDS AND REPORTS:

Section 1. Constitution and Bylaws: The original Constitution and Bylaws and copies of amendments thereto to date, certified by the Secretary, shall be kept on file at a location selected by the Board of Directors, and open to inspection at all reasonable times.

Section 2. Minutes, Membership Register and Books of Account: The minutes of Board of Directors and membership meetings, membership register and books of account shall be kept on file at a location selected by the Board of Directors and open to inspection at any reasonable time upon written demand of any member for any purpose reasonably related to his or her interest as a member.

ARTICLE X. SAVING CLAUSE: Should any provisions of this Constitution, or the application thereof to any person or circumstances be held invalid, then the remainder of the same or the application of such provision to other circumstances shall not be affected thereby.

[Amended October 21, 1999.]

[Amended April 17, 2003.]



Appendix I. NMFMA Strategic Plan

The development of a strategic plan was an important step in the growth of the NMFMA and in its support of New Mexico floodplain managers. It represents an ever-changing statement of what the NMFMA is and what it strives to become.



FINAL COPY

APPROVED BY BOARD OF DIRECTORS 8/23/2014

NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION

www.nmfma.org

VISION

The New Mexico Floodplain Managers Association (NMFMA) is the premier voice for advancing flood safety and promoting environmentally and economically sustainable floodplains for the public.

2014

STRATEGIC PLAN

MISSION

It is the mission of the NMFMA to reduce the losses, costs, and human suffering caused by flooding; to further educate all of New Mexico and its citizens about floods, floodplains and floodplain management; and to promote a balance between development and the natural and beneficial functions of floodplains.



www.nmfma.org

A chapter of the Association of State Floodplain Managers (ASFPM)



GOALS AND OBJECTIVES



GOAL A: Reduce losses, costs and human suffering caused by flooding

OBJECTIVES:

- ◆ Encourage staff and elected officials in NFIP communities to understand and enforce all minimum NFIP floodplain management standards
- ◆ Encourage the development of higher floodplain management standards
- ◆ Support federal, state and local funding for floodplain management
- ◆ Encourage communities to develop, and adopt FEMA approved mitigation plans

GOAL B: Promote leadership in floodplain management

OBJECTIVES:

- ◆ Recognize and encourage industry professionals, politicians, media and citizens for their efforts and contributions to floodplain management
- ◆ Provide opportunities and encourage member and non-member participation in Association activities, floodplain management policy and other activities at the local, state and federal levels to advance the Association mission.
- ◆ Promote reduced flood velocities, advanced materials and innovative engineering concepts

GOAL C: Strengthen Association partnerships with agencies, academia, and other Associations

OBJECTIVES:

- ◆ Partner with local, state and federal agencies to promote, coordinate and facilitate implementation of public sector floodplain management programs, outreach and education efforts.
- ◆ Look for opportunities to collaborate with other local, state and national Associations of common interest through symposiums, committees, special outreach or other joint efforts.
- ◆ Develop and implement a strategy for collaboration with academia to identify and advance floodplain management research priorities and advance education on related issues.

GOAL D: Encourage the use of effective floodplain management principles and practices through education, outreach and training

OBJECTIVES:

- ◆ Design and promote semi-annual conference's as the premier networking and educational event in New Mexico floodplain management
- ◆ Promote awareness of floodplain management issues to elected officials, public, agencies and organizations through symposiums, websites, newsletters, special materials, media outreach and social media
- ◆ Develop and implement a premier professional training and education program
- ◆ Develop and train floodplain managers to assist in local, state and federal outreach efforts
- ◆ Promote the use of local flood early warning systems

STRATEGIC PLAN



This Strategic Plan serves as an ever-changing statement of what the NMFMA is and what it strives to become. With continued input from members and stakeholders, the NMFMA leadership will periodically update the Strategic Plan to remain in tune with critical issues and priorities in floodplain management.



GUIDING PRINCIPLES



Stewardship: Manage, preserve and responsibly use Association resources to benefit the membership, the profession and the public.

Collaboration: Seek opportunities to work with others who share our mission and goals and enhance our work through partnerships.

Integrity: Promote ethical behavior in floodplain management and demonstrate commitment to high professional standards; value honest dialogue.

Respect: Recognize the worth, diversity, and importance of all individuals with whom we work and serve.

Knowledge: Strive for excellence in informing, tracking and promoting cutting-edge floodplain management strategies. Foster inquiry, reflection, creativity and innovation and value the exchange of ideas. Develop and promote leaders in floodplain management and recognize and applaud achievement.

Leadership: The NMFMA shall strive to be the foremost authority on floodplain management issues in New Mexico.

NMFMA VALUES



The NMFMA **values** are guided by the practice of floodplain management, a dynamic set of strategies and actions that reduce flood risk and restore, enhance and maintain the natural functions and resources of floodplains.

- **Effective floodplain management** incorporates structural and non-structural **flood risk reduction** strategies, considering the **social, economic and environmental benefits**.
- Floodplain management must be carried out in a **pro-active** manner, not merely in response to flood events.
- Floodplains should be managed for **sustainability**. Floodplain management policy and practice at **local, state and federal** levels must reflect **integrated, multi-objective** approaches to managing **flood risk, land use and natural resources**.
- Floodplain management must leverage the **state of the art** scientific, technical and technological resources and methods available.
- Effective floodplain management is critically dependent on the **collaborative** efforts among **federal, state, local agencies, Tribal communities, landowners and other stakeholders**.
- Consistent local, state and federal **policy, guidance and legislation** are essential to providing a reliable **social and legal** foundation for floodplain management.
- **Local communities** must be effectively **informed** of flood risk and exposure to flood hazards. These risks should be clearly **communicated** by local agencies on **maps, plans and title documents** to enable **individuals** (living in or developing in) floodplains to assess **flood risk**.
- Regional/local **floodplain management plans** are an essential mechanism for realizing the multiple objectives of floodplain management to address **existing, future and residual flood risk**, and must be developed at the appropriate, watershed-based scale **regardless of institutional boundaries**.
- Regional/local **flood emergency plans**, encompassing flood warning, evacuation, clean-up and recovery arrangements are an effective way to address **residual flood risk**, and should be based on effective **multi-jurisdictional coordination** at the optimal scale.
- **Mitigation Plans** must accurately reflect the **existing, residual and future** potential risk of flooding associated with current and future land uses.
- The **State, local and Tribal entities** should engage in close coordination at regional and local scales, as appropriate, to evaluate and **mitigate the effects of flood-related disasters**.
- **Hazard mitigation planning** at the most effective scale should reflect a comprehensive, **multi-hazard** approach to address **natural and man-made hazards**.



Appendix J. NMFMA Resolutions

The NMFMA adopted a policy that allows members to present resolutions on floodplain management and related issues to the membership during any scheduled membership meeting. The membership discusses each resolution and then votes to accept or reject it.

The following resolutions have been adopted by the NMFMA membership.



Handbook for New Mexico Floodplain Managers

NMFMA RESOLUTION 00-1a NMFMA OFFERS RECIPROCITY TO ANY CFM CERTIFIED BY AN ACCREDITED PROGRAM

WHEREAS, the New Mexico Floodplain Managers Association (NMFMA) is affiliated with the Association of State Floodplain Managers (ASFPM); and

WHEREAS, NMFMA has a Certified Floodplain Manager program accredited by ASFPM; and

WHEREAS, NMFMA desires to offer reciprocity to Floodplain Managers certified by other ASFPM accredited programs;

THEREFORE, be it resolved that the Board of Directors of the New Mexico Floodplain Managers Association does hereby offer reciprocity to any Certified Floodplain Manager certified by an ASFPM accredited program.

ADOPTED BY THE BOARD OF DIRECTORS OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 25TH DAY OF MAY, 2000.

Mike Czosnek, Chair, NMFMA



Handbook for New Mexico Floodplain Managers

NMFMA RESOLUTION R 00-1 COMMUNITIES SHOULD ADOPT FLOODPLAIN REGULATIONS AND PARTICIPATE IN THE NFIP

WHEREAS the National Flood Insurance Program (NFIP) has been developed to provide protection to residents of the nation's floodplains; and

WHEREAS floodplain residents may not purchase flood insurance through the NFIP unless the community in which they reside participates in the NFIP; and

WHEREAS communities must implement floodplain management regulations for new development in floodplains in order to participate in the NFIP; and

WHEREAS the regulatory requirements of the NFIP are the basis for the statutory requirements for New Mexico communities which regulate floodplain development; and

WHEREAS failure to participate in the NFIP makes a community ineligible for certain types of disaster assistance; and

WHEREAS some communities in New Mexico do not participate in the NFIP and therefore deprive their floodplain residents the privilege of purchasing flood insurance through the National Flood Insurance Program; and

WHEREAS participation in the NFIP is beneficial to the floodplain residents, the communities in which they reside and the State of New Mexico; and

WHEREAS non-participation in the NFIP by any New Mexico community will pose an undue hardship on the floodplain residents of that community, the community itself and the State of New Mexico:

IT IS THEREFORE RESOLVED that all communities in New Mexico should adopt appropriate floodplain management regulations and apply to participate in the National Flood Insurance Program.

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 21ST DAY OF SEPTEMBER, 2000.

Mike Czosnek, Chair, NMFMA



Handbook for New Mexico Floodplain Managers

NMFMA RESOLUTION R 00-2 DPS RECOGNIZED AS STATE FLOODPLAIN COORDINATING AGENCY, RESPONSIBLE FOR CERTIFICATION OF FLOODPLAIN MANAGERS

WHEREAS in 1992, the Governor of the State of New Mexico designated the State Department of Public Safety (DPS) as the State Coordinating Agency for the National Flood Insurance Program (NFIP); and

WHEREAS § 3.18.7.C NMSA 1978 as amended requires New Mexico communities which regulate floodplain development to have an inspector approved pursuant to the Construction Industries Licensing Act; and

WHEREAS § 3.18.7.F NMSA 1978 as amended states that the Environmental Improvement Agency or the Construction Industries Commission may assist communities by providing technical advice and assistance; and

WHEREAS the Construction Industries Commission has not established an appropriate approval program for persons qualified to administer community floodplain management regulations; and

WHEREAS the Construction Industries Commission has not effectively assisted communities in administering their floodplain management regulations by providing technical advice and assistance; and

WHEREAS staff of the DPS has assisted the New Mexico Floodplain Managers Association (NMFMA) in the development of a nationally accredited certification program for floodplain managers; and

WHEREAS staff of the DPS has, since 1992, assisted the NMFMA and many communities in implementing floodplain management regulations adopted pursuant to §3.18.7.A NMSA 1978 as amended:

IT IS THEREFORE RESOLVED that the DPS should be recognized as the state floodplain coordinating agency; and

FURTHERMORE that the DPS should be designated as the state agency responsible for administering the certification program for New Mexico floodplain managers; and

FURTHERMORE that DPS should be designated as the state agency responsible for providing training and technical advice and assistance to community floodplain managers in implementing floodplain management regulation adopted pursuant to §3.18.7.A NMSA 1978 as amended.

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 21ST DAY OF SEPTEMBER, 2000.

Mike Czosnek, Chair, NMFMA



Handbook for New Mexico Floodplain Managers

NMFMA RESOLUTION R 00-3 NEW MEXICO FLOODPLAIN MANAGERS SHOULD BE CERTIFIED

WHEREAS a national certification program has been developed for floodplain managers; and

WHEREAS a training course is available to prepare community floodplain managers to pass the examination required for this certification; and

WHEREAS the New Mexico Floodplain Managers Association (NMFMA) is accredited as an administrator of the examination for national certification; and

WHEREAS the Department of Public Safety (DPS) has worked with the NMFMA to develop this certification program and has assisted in providing training for floodplain managers who desire to become certified; and

WHEREAS nationally certified floodplain managers have proven their knowledge of the profession of floodplain management:

IT IS THEREFORE RESOLVED that all floodplain managers in New Mexico should become Certified Floodplain Managers (CFMs) by passing the New Mexico CFM examination; and

FURTHERMORE that the DPS should ensure that training and other assistance is provided to any New Mexico floodplain manager who wishes to become a CFM; and

FURTHERMORE that New Mexico communities should support this certification by providing time for their floodplain managers to study for the CFM examination and should pay the fees for certification for their floodplain managers; and

FURTHERMORE that all New Mexico communities should employ or contract for the services of at least one CFM no later than June 30, 2002; and

FURTHERMORE, starting June 30, 2002, that whenever the State of New Mexico or its communities contract for floodplain management work, including floodplain management plans and hazard mitigation plans, the contractor must have at least one CFM on staff.

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 21ST DAY OF SEPTEMBER, 2000.

Mike Czosnek, Chair, NMFMA



Handbook for New Mexico Floodplain Managers

NMFMA RESOLUTION R 00-4 STATE SHOULD FUND TWO ADDITIONAL STAFF FOR DPS

WHEREAS the Department of Public Safety (DPS) has been designated as the State Coordinating Agency for the National Flood Insurance Program (NFIP); and

WHEREAS the State NFIP Coordinating Agency provides training and technical assistance to New Mexico communities that are administering floodplain management regulations; and

WHEREAS New Mexico communities need more technical assistance in floodplain management than can be provided by the current DPS staff;

IT IS THEREFORE RESOLVED that the State of New Mexico should provide funding for two additional staff persons for DPS to provide training and technical assistance in floodplain management for New Mexico communities

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 21ST DAY OF SEPTEMBER, 2000.

Mike Czosnek, Chair, NMFMA



Handbook for New Mexico Floodplain Managers

NMFMA RESOLUTION R 00-5 DPS SHOULD DETERMINE NEED FOR NEW MAPS, STATE SHOULD PROVIDE FUNDS

WHEREAS the Department of Public Safety (DPS) has been designated as the State Coordinating Agency for the National Flood Insurance Program (NFIP); and

WHEREAS floodplain management depends on current floodplain maps; and

WHEREAS the floodplain maps for many New Mexico communities were produced more than ten years ago, and several are more than 20 years old; and

WHEREAS the Federal Emergency Management Agency (FEMA) is requesting funds for a national floodplain map modernization effort; and

WHEREAS priorities for the FEMA map modernization program will be partially determined by matching funds from states and communities:

IT IS THEREFORE RESOLVED that the DPS should determine the need for new floodplain maps for New Mexico communities; and

FURTHERMORE based on this determination, the State should provide funds to DPS to obtain new topographic maps for floodplains in New Mexico to serve as a match for FEMA mapping funds.

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 21ST DAY OF SEPTEMBER, 2000.

Mike Czosnek, Chair, NMFMA



Handbook for New Mexico Floodplain Managers

NMFMA RESOLUTION R 00-6 STATE SHOULD DETERMINE NEED FOR STREAM GAGE DATA, PROVIDE NECESSARY FUNDING

WHEREAS the Department of Public Safety (DPS) has been designated as the State Coordinating Agency for the National Flood Insurance Program (NFIP); and

WHEREAS floodplain management depends on floodplain maps; and

WHEREAS the best floodplains maps are based on hydrologic analysis of stream flow data:

IT IS THEREFORE RESOLVED that the DPS should work with the State Engineer, the US Geological Survey and others to determine the need for stream gage data throughout the state ; and

FURTHERMORE the State should provide funding for the development and maintenance of a stream gage system that will provide the hydrologic data needed to develop good floodplain maps.

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 21ST DAY OF SEPTEMBER, 2000.

Mike Czosnek, Chair, NMFMA



Handbook for New Mexico Floodplain Managers

NMFMA RESOLUTION R 00-7 DPS SHOULD DEVELOP A TECHNICAL GUIDE FOR UNMAPPED WATERCOURSES TO BE USED BY ALL COMMUNITIES

WHEREAS the Department of Public Safety (DPS) has been designated as the State Coordinating Agency for the National Flood Insurance Program (NFIP); and

WHEREAS floodplain management depends on floodplain maps; and

WHEREAS many watercourses in New Mexico are not mapped; and

WHEREAS new development in unmapped watercourses are usually not protected from future flooding; and

WHEREAS there are techniques for estimating floodplain boundaries, flood elevations and floodways for unmapped watercourses:

IT IS THEREFORE RESOLVED that the State should provide funds to the DPS to develop a technical guide for estimating the floodplain boundaries, flood elevations and floodway limits for unmapped watercourses in New Mexico; and

FURTHERMORE the statutes should be amended to require that this guide be used by all New Mexico communities as a minimum requirement to make determinations in the floodplains of unmapped watercourses.

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 21ST DAY OF SEPTEMBER, 2000.

Mike Czosnek, Chair, NMFMA



NMFMA RESOLUTION R 00-8
CURRENT MEMBERS OF THE NMFMA
CERTIFICATION COMMITTEE MAY APPLY FOR CERTIFICATION

WHEREAS the NMFMA Certification Committee has developed the CFM program for New Mexico and developed an examination which is normally required for certification; and

WHEREAS the NMFMA certification program is accredited by the Certification Board of Regents (CBOR) of the Association of State Floodplain Managers ; and

WHEREAS the CBOR has said that persons who developed an examination for certification may not take such exam until at least one year after they are off of the committee which developed such exam; and

WHEREAS the NMFMA Certification Committee members have demonstrated their knowledge of floodplain management, their professionalism and their character by developing the program and the examination:

IT IS THEREFORE RESOLVED that the five current members of the NMFMA Certification Committee, specifically Diane Calhoun, Mike Dunagan, Jerry Lazari, Bet Lotosky and Grant Pinkerton, be allowed to become Certified Floodplain Managers (CFMs) upon completion of the CFM application and payment of the application fees no later than December 31, 2000; and

FURTHERMORE that if they make application and become certified, these five current members of the NMFMA Certification Committee shall have all of the rights and privileges granted to any CFM under the NMFMA Certification Charter; and

FURTHERMORE that if they make application and become certified, these five current members of the NMFMA Certification Committee must renew their certification as required under the NMFMA Certification Charter; and

FURTHERMORE that all future members of the NMFMA Certification Committee must be CFMs, and that the NMFMA Charter should be revised to reflect this requirement; and

FURTHERMORE that this action does not create or imply any precedent for any other persons now or in the future to receive certification through the NMFMA certification program without taking the required examination.

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 21ST DAY OF SEPTEMBER, 2000.

Mike Czosnek, Chair, NMFMA



**NMFMA RESOLUTION R 00-9
CID AND MHD MUST REGULATE NEW DEVELOPMENT**

TO STANDARDS IN § 3.18.7.B

WHEREAS the New Mexico Floodplain Managers Association (NMFMA) is an organization of professionals with the purpose of improving floodplain management throughout the State; and

WHEREAS § 3.18.7.A NMSA 1978 as amended enables New Mexico communities to adopt and enforce floodplain management regulations; and

WHEREAS a number of New Mexico communities have not adopted regulations under § 3.18.7.A NMSA; and

WHEREAS the Construction Industries Division (CID) and the Mobile Home Division (MHD) of the State Regulation and Licensing Department have specific responsibilities to regulate new construction in floodplains; and

WHEREAS there are communities where CID and MHD have sole responsibility for buildings or mobile homes placed in identified flood hazard areas; and

WHEREAS if CID and MHD do not require all new buildings and mobile homes to be built in compliance with the standards in § 3.18.7.B NMSA 1978 as amended, some of those buildings will be subject to flooding, even though the flood hazard has been identified;

IT IS THEREFORE RESOLVED that the CID and the MHD must ensure that new development in floodplains shall be regulated to consistent standards as prescribed by § 3.18.7.B NMSA 1978 as amended; and

FURTHERMORE that these consistent standards will provide a higher level of protection from flood damage to all occupants of new development throughout the State; and

FURTHERMORE that the NMFMA will assist CID and MHD in this regulation.

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 21ST DAY OF SEPTEMBER, 2000.

Mike Czosnek, Chair, NMFMA



Handbook for New Mexico Floodplain Managers

NMFMA RESOLUTION R 00-10 RESIDENTS SHOULD LEARN ABOUT FLOOD HAZARD AND PURCHASE FLOOD INSURANCE

WHEREAS the National Flood Insurance Program (NFIP) has been developed to provide protection to residents of the nation's floodplains; and

WHEREAS floodplain residents who do not have insurance which specifically covers their buildings and contents for flood damage may only receive minimal federal disaster assistance; and

WHEREAS uncompensated flood damage is a burden to the owner, the community and the State of New Mexico:

IT IS THEREFORE RESOLVED that all New Mexico residents should find out if their buildings are in floodplains, if they are in a community which participates in the NFIP, and should purchase flood insurance if they are.

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 21ST DAY OF SEPTEMBER, 2000.

Mike Czosnek, Chair, NMFMA



Handbook for New Mexico Floodplain Managers

NMFMA RESOLUTION R 00-11 NM COMMUNITIES NEED CAVS

WHEREAS many New Mexico communities participate in the National Flood Insurance Program (NFIP), which is administered by the Federal Emergency Management Agency (FEMA); and

WHEREAS participation in the NFIP requires a community to perform certain floodplain management activities and keep certain records; and

WHEREAS these requirements for NFIP participation require specific knowledge and expertise in floodplain management and the NFIP; and

WHEREAS the only way the FEMA can know if these communities are performing these activities as required for participation in the NFIP is to perform Community Assistance Visits (CAVs) for these communities; and

WHEREAS FEMA has not performed CAVs for most New Mexico communities in several years:

IT IS THEREFORE RESOLVED that the NMFMA requests that FEMA perform CAVs for all New Mexico NFIP communities which have not had a CAV since January 1, 1998; and

FURTHERMORE that the staff of FEMA Region VI perform at least one third of these CAVs in each federal fiscal year beginning October 1, 2000 and completing these CAVS no later than September 30, 2003; and

FURTHERMORE that the New Mexico State NFIP Coordinator be informed of each of these CAVs as far in advance as possible and be encouraged to participate in each CAV; and

FURTHERMORE that after the New Mexico State NFIP Coordinator has participated in at least 20 CAVs, he/she may conduct CAVs equally with FEMA Regional staff.

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 21ST DAY OF SEPTEMBER, 2000.

Mike Czosnek, Chair, NMFMA



Handbook for New Mexico Floodplain Managers

NMFMA RESOLUTION R 00-12 FEMA SHOULD REVIEW STATUS OF COMMUNITIES WITH NO IDENTIFIED FLOOD HAZARDS

WHEREAS the National Flood Insurance Program (NFIP) only makes flood insurance available to property owners in communities that participate in the NFIP; and

WHEREAS the Federal Emergency Management Agency (FEMA) or the Department of Housing and Urban Development (HUD) identified communities with flood hazard areas at least 25 years ago; and

WHEREAS there are a number of communities in New Mexico which have not been identified as having flood hazard areas; and

WHEREAS these communities may actually have flood hazard areas; and

WHEREAS property owners in those communities that have not been identified as having flood hazard areas may need and desire flood insurance:

IT IS THEREFORE RESOLVED that the NMFMA requests that the staff of FEMA Region VI review all New Mexico communities which have no identified flood hazard areas; and

FURTHERMORE that if the FEMA staff determine that there are flood hazard areas in any of those communities, they request floodplain maps for those communities; and

FURTHERMORE that the FEMA staff inform the NMFMA and the State NFIP Coordinator of the existence of any such communities.

**ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN
MANAGERS ASSOCIATION THIS 21ST DAY OF SEPTEMBER, 2000.**

Mike Czosnek, Chair, NMFMA



Handbook for New Mexico Floodplain Managers

NMFMA RESOLUTION R 00-13 STATE FUNDED BUILDINGS SHOULD COMPLY WITH § 3.18.7.B

WHEREAS § 3.18.7.B NMSA 1978 as amended specifies sound practices for development of identified floodplain areas; and

WHEREAS buildings built with state funds are not subject to local floodplain regulations; and

WHEREAS buildings built with state funds are not otherwise subject to floodplain management regulation;

IT IS THEREFORE RESOLVED that all buildings built wholly or partially with state funds, including buildings which are included in Community Development Block Grant projects and public schools, be built in compliance with § 3.18.7.B NMSA 1978 as amended; and

FURTHERMORE that each state agency responsible for construction of such buildings ensure that the requirements of § 3.18.7.B NMSA 1978 as amended be complied with.

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 21ST DAY OF SEPTEMBER, 2000.

Mike Czosnek, Chair, NMFMA



Handbook for New Mexico Floodplain Managers

NMFMA RESOLUTION R 02-1 COMMUNITY FLOODPLAIN MANAGERS SHOULD ASSIST IN EMERGENCY PLANNING WITHIN THEIR COMMUNITIES

WHEREAS New Mexico community floodplain managers have specific knowledge about flood hazards within their communities; and

WHEREAS communities or their counties have prepared emergency response plans for various emergencies; and

WHEREAS these plans may have been prepared without the specific knowledge available from community floodplain managers; and

WHEREAS community floodplain managers will become a resource to emergency managers during a flood emergency;

IT IS THEREFORE RESOLVED that each New Mexico floodplain manager should review the emergency response plans for his/her community; and

FURTHERMORE each New Mexico floodplain manager should work with his/her emergency manager to revise emergency response plans for his/her community based on his/her specific knowledge of flood hazards in the community.

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 18th DAY OF APRIL, 2002.

Paul Dugie, Chair, NMFMA



**NMFMA RESOLUTION R 02-2
OWNERS OF HIGH AND SIGNIFICANT HAZARD DAMS SHOULD PREPARE
EMERGENCY ACTION PLANS**

WHEREAS there are over 200 dams in New Mexico that pose high or significant hazards in the unlikely event of failure; and

WHEREAS dam failure poses a significant hazard to floodplain residents and others; and

WHEREAS emergency action plans prepared by dam owners are necessary for emergency response planning in communities downstream from these dams; and

WHEREAS emergency action plans have only been prepared for 26 dams that pose high and significant hazards to New Mexico floodplains;

IT IS THEREFORE RESOLVED that owners of dams that pose high or significant hazards to New Mexico floodplains should prepare emergency action plans; and

FURTHERMORE that these emergency action plans should be provided to community emergency managers in all affected communities downstream from these dams.

**ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO
FLOODPLAIN MANAGERS ASSOCIATION THIS 18th DAY OF
APRIL, 2002.**

Paul Dugie, Chair, NMFMA



Handbook for New Mexico Floodplain Managers

NMFMA RESOLUTION R 03-1 NEW MEXICO COMMUNITIES SHOULD COUNT THE NUMBER OF BUILDINGS IN THEIR FLOODPLAINS

WHEREAS communities will complete the Biennial Report to the Federal Emergency Management Agency (FEMA) during 2003; and

WHEREAS the Biennial Report requires a count of various types of buildings in each community's floodplains; and

WHEREAS these building counts have not been done accurately by most communities for a number of years; and

WHEREAS an accurate count of buildings in the floodplain will benefit the community's floodplain management program, the community's emergency management services and the National Flood Insurance Program (NFIP);

IT IS THEREFORE RESOLVED that each New Mexico community that participates in the NFIP should perform an accurate count of the types of buildings specified in the FEMA Biennial Report prior to completing that report;

AND FURTHERMORE that the NMFMA should provide training in various ways to count or accurately estimate building counts in floodplains;

AND FURTHERMORE that NMFMA will assist New Mexico communities in performing this building count upon their request.

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 17th DAY OF APRIL, 2003.

Phil Butz, CFM, Chair, NMFMA



NMFMA RESOLUTION R 03-2
NEW MEXICO COMMUNITIES SHOULD CONSIDER ADOPTION OF HIGHER
FLOODPLAIN MANAGEMENT STANDARDS

WHEREAS the minimum floodplain management standards in the National Flood Insurance Program (NFIP) allow significant damage during a 100-year flood; and

WHEREAS the NMFMA desires to reduce the flood damage potential from all floods, including the 100-year flood; and

WHEREAS flood damage reduction is primarily reduced through the management of new development and redevelopment in communities through the floodplain management ordinances of those communities; and

WHEREAS higher floodplain management standards will reduce future flood damage; and

WHEREAS higher floodplain management standards are eligible for credit under the Community Rating System; and

WHEREAS credit under the Community Rating System can reduce the cost of NFIP flood insurance premiums;

IT IS THEREFORE RESOLVED that the NMFMA should develop a model floodplain management ordinance for voluntary use by all New Mexico communities

AND FURTHERMORE that the NMFMA model ordinance should include all minimum requirements of the NFIP;

AND FURTHERMORE that the NMFMA model floodplain management ordinance should include the following higher standards:

1. That all residential buildings and manufactured homes in floodplains be constructed or placed on compacted fill that is at least at the 100-year flood elevation, and that extends at least ten feet in all directions from the building or manufactured home;
2. That all residential buildings be elevated at least one foot above the 100-year flood elevation; that all non-residential buildings be elevated or floodproofed to at least one foot above the base flood elevation;
3. That all manufactured houses be elevated so that the lowest structural member is at least one foot higher than the 100-year flood elevation;
4. That the builder or owner of a new building in the floodplain provide a FEMA elevation certificate to the community floodplain administrator, and that the Floodplain Administrator maintain these elevation certificates and make them available upon request;

AND FURTHERMORE that each community in New Mexico should consider adoption of these higher standards into its floodplain management ordinance.

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO
FLOODPLAIN MANAGERS ASSOCIATION THIS 17th DAY OF
APRIL, 2003.

Phil Butz, CFM, Chair, NMFMA



NMFMA RESOLUTION R 06-1: ALL BUILDING PERMITS AND PLACEMENT PERMITS FOR MANUFACTURED HOMES IN ANY COMMUNITY WITH IDENTIFIED FLOOD HAZARDS MUST BE REVIEWED BY THE COMMUNITY PRIOR TO ISSUANCE OF THE PERMIT

WHEREAS all communities with identified flood hazard areas have been required by § 3.18.7 NMSA 1978 as amended to adopt floodplain management ordinances, have certified floodplain managers to administer those ordinances and join the National Flood insurance Program since 2003; and

WHEREAS some communities have not met these statutory requirements; and

WHEREAS some communities that have met these statutory requirements are not actively enforcing the provisions of their ordinances and § 3.18.7.B NMSA 1978 as amended; and

WHEREAS the Construction Industries Division (CID) and the Manufactured Housing Division (MHD) of the State Regulation and Licensing Department have specific responsibilities to regulate new construction in floodplains; and

WHEREAS if CID and MHD do not require all new buildings and mobile homes to be built in compliance with the standards in § 3.18.7.B NMSA 1978 as amended, some of those buildings will be subject to flooding, even though a flood hazard has been identified;

IT IS THEREFORE RESOLVED that all communities with identified flood hazard areas should adopt floodplain management ordinances, have certified floodplain managers to administer those ordinances and join the National Flood Insurance Program.

AND FURTHERMORE that in any New Mexico community with identified flood hazard areas, CID should not issue any new building permits unless and until they have received written notification from the Certified Floodplain Manager for the community that the proposed building is outside the identified flood hazard area, or that specified conditions must be met during the construction of the building in order for it to comply with the community's floodplain management regulation;

AND FURTHERMORE that in any New Mexico community with identified flood hazard areas, neither MHD nor its agents should issue any new manufactured housing placement permits unless and until they have received written notification from the Certified Floodplain Manager for the community that the proposed manufactured housing unit is outside the identified flood hazard area, or that specified conditions must be met during the placement of the manufactured housing unit in order for it to comply with the community's floodplain management regulation;

ADOPTED BY THE MEMBERSHIP OF THE NEW MEXICO FLOODPLAIN MANAGERS ASSOCIATION THIS 19th DAY OF OCTOBER, 2006.

Mike Rudloff, Chair, NMFMA