

FEMA 309
1996

ADDRESSING YOUR COMMUNITY'S FLOOD PROBLEMS

*A Guide
for Elected
Officials*



"This is an outstanding document — should be in every elected official's library."

Dr. W. J. LoPiano, former Mayor, Tempe, Arizona

"I could not set this document aside upon receipt. [It] is a very informative and useful guide. And will be of much value to elected officials such as myself."

Frank E. Knittle, Trustee, South Holland, Illinois

"This guide is an outstanding resource that should be shared with all the key players in your community." *Christopher C. Johnson, Mayor, Agawam, Massachusetts*

"This is a guide to help officials take action now and try to ward off problems from future flooding. After reading this document I am recommending that we as a city implement some of the actions that have not been taken for our community."

Phillis Roberts, Councilwoman, Arnold, Missouri

ADDRESSING YOUR COMMUNITY'S FLOOD *A Guide for Elected Officials* PROBLEMS

A joint project of the Association of State Floodplain Managers, Inc. and
the Federal Interagency Floodplain Management Task Force, 1996

Prepared by James M. Wright, The Floodplain Management Group, Knoxville, Tennessee
and Jacquelyn L. Monday, Consultant, Lakewood, Colorado

*Additional copies available from: ASFPM Executive Office, 4233 West Beltline Highway,
Madison, Wisconsin 53711, telephone (608) 274-0123.*

PREFACE It was 3 a.m. The newly elected city commissioner, in office only 19 days, was jarred from fitful sleep by the loud ringing of his bedside phone.

"Commissioner!" Through phone static, he recognized the voice of the mayor. *"I need you to come to the emergency operations center right away. I'll send a truck to get you. It's flooding."*

"No!" said the commissioner. *"Where?"*

"Everywhere."

Thus began Tulsa's worst natural disaster, our 1984 flood. City leaders huddled in the Emergency Operations Center throughout the nightmare night, shell-shocked by volley after volley of horrifying reports of destruction all across town. They mustered all available forces to battle the flood. There were miraculous victories, such as in Holiday Mobile Home Park, where a life flight helicopter pilot braved the storm to rescue 40 people; they were plucked from their roofs, one by one, by the outstretched hand of the chopper nurse. Overall, our forces were puny by comparison to the overwhelming power of the water reclaiming its floodplains. Before dawn, as much as 15 inches of rain had fallen. Fourteen Tulsans had lost their lives in flashing waves of water. Another 288 were hurt. Nearly 7,000 homes and businesses were ruined, and another 7,000 cars and trucks — including city fire trucks, police cars, and ambulances — were destroyed. Damage was \$183 million.

In the darkest hours of that terrible night, the commissioner and our new young mayor vowed to do whatever they could — and the political cost be damned — to prevent Tulsa from suffering such a disastrous flood again. That commitment produced Tulsa's comprehensive stormwater management program — a program born of great loss, hard lessons, and tremendous political courage. *Ann Patton, Community Affairs Manager, Tulsa, Oklahoma*

This document was prepared to help you, as an elected official, plan and take action to prepare your community for floods that will happen, if not during your term of office, then later. It is hoped that, by taking these measures, you will avoid facing what Tulsa, Oklahoma, experienced.

ACKNOWLEDGEMENTS This guidebook is the result of a common interest and cooperative arrangement between the Association of State Floodplain Managers and the Federal Interagency Floodplain Management Task Force, along with considerable assistance from two advisory committees and a selected group of elected officials. The Association arranged for preparation of this report, which would not have been possible without funding and other support from the Task Force.

An advisory committee comprising mainly local officials was formed by the Association. The Task Force also formed a working committee for this project. These committees reviewed outlines and drafts of the guidebook and provided important and helpful guidance and advice in arriving at the format and content of this document.

MEMBERS OF THE ASSOCIATION COMMITTEE WERE:

Beverly Anderson, City of Darlington, Wisconsin
Dan Bunting, Pikes Peak Regional Building Department, Colorado Springs, Colorado
Dr. Mow-Soung Cheng, Prince Georges County, Maryland
Kevin Coulton, Consultant, Portland, Oregon
Windell Curole, South LaFourche Levee District, Galliano, Louisiana
Janie Douglass, Consultant, Louisville, Kentucky
Peggy Glassford, Village of Flossmoor, Illinois
Mike Houck, Consultant, Portland, Oregon
Christopher C. Johnson, Town of Agawam, Massachusetts
David Johnson, Flood Control District of Maricopa County, Arizona
John LaBrune, Union County, South Dakota
Sky Miller, Snohomish County, Washington
Paul Osman, Illinois Department of Natural Resources, Springfield, Illinois
Ann Patton, City of Tulsa, Oklahoma
Don Porter, Consultant, Waverly, Tennessee
Phillis Roberts, City of Arnold, Missouri

MEMBERS OF THE TASK FORCE COMMITTEE WERE:

Curt Barrett, National Weather Service
Jack Frost, Natural Resources Conservation Service
John McShane, Federal Emergency Management Agency
Jeanne Melanson, Natural Resources Conservation Service
Jerry Peterson, U.S. Army Corps of Engineers
Robert Plott, U.S. Army Corps of Engineers
Walter Prybyla, Department of Housing and Urban Development
Charlie Stockman, National Park Service
Martin Topper, Environmental Protection Agency
Jori Wesley, Environmental Protection Agency

IN ADDITION, A SELECTED GROUP OF ELECTED OFFICIALS AGREED TO REVIEW THE FINAL DRAFT OF THE REPORT AND TO PROVIDE COMMENTS ON ITS USEFULNESS FOR THEIR FELLOW OFFICIALS. THEY WERE:

David Evans, City of Searcy, Arkansas
Ed Harris, Harlan County, Kentucky
Ruth Joseph, City of Waterville, Maine
Frank Knittle, Village of South Holland, Illinois
William LoPiano, City of Tempe, Arizona
Gussie McRobert, City of Gresham, Oregon
Vincent Melvin, LaFourche Parish, Louisiana
Bob Schnur, St. Charles County, Missouri

The potential success of this guidebook is largely attributable to the efforts and contributions of the above individuals. The photographs used in this guidebook came from the authors' files and the graphic design was done by Inge Fox-Jones Design.

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HOW FLOODS CAN AFFECT YOU

"Elected public officials must give the same attention and priority to their flood problems as they give to their police and fire problems. In the history of Rapid City, perhaps 35 people have died in fires and another 35 have been killed during the commission of crimes. But in just two hours, 238 died in a [June 1972] flood." — Don Barnett, former Mayor of Rapid City, South Dakota

INTRODUCTION If you are a local official in one of America's 22,000 flood-prone jurisdictions, you face a major dilemma. How should you plan now to be prepared for future floods? Should you do nothing and hope you won't have to answer to angry and confused citizens after a flood occurs? Unless your community has planned ahead, it will be very difficult to resolve tough issues during the chaotic and emotional period after a flood. This guide will help you, as an elected official, to plan and take action to prepare your community for floods that *will* happen, either during your term in office or at a later date. Everyone will benefit from your initiative.

FLOODS AND FLOODPLAINS IN YOUR COMMUNITY

Floods are natural processes. Throughout time they have shaped the landscape, provided habitat for wildlife, and created rich soils. Cumulatively, floods have also been our nation's greatest natural disaster, disrupting lives, and often causing significant economic losses. Television coverage of floods and their consequences has provided vivid images of the damage that can be done.

Floods happen when runoff exceeds the capacity of the river or stream channel. Water overflows onto the nearby

low-lying lands called *floodplains*. In hilly and mountainous areas, flooding is likely to be rapid, deep, and dangerous. In relatively flat floodplains, land may stay covered with shallow, slow-moving flood water for days or even weeks.

Human activity often leads to flood *damage*. When people use flood-prone areas along rivers and streams, they do two risky things.

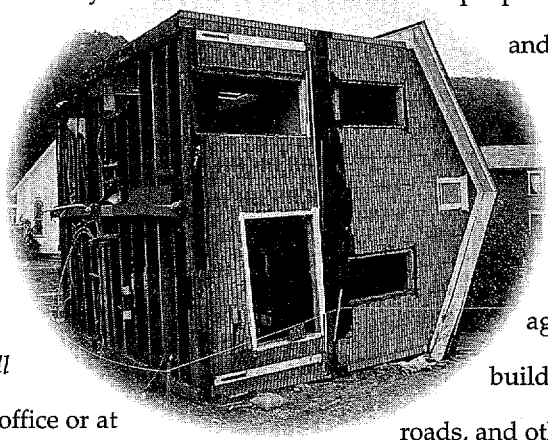
First, their homes, businesses, and activities get in the way of the natural overflow of the waterway.

Sooner or later, they will be damaged or destroyed. Second, their buildings, pavement, landscaping,

roads, and other facilities take up space in the

normal floodplain that is needed to carry extra water during a flood. This forces the flood water to move farther away from the natural waterway, flooding more land. It sometimes also increases the velocity and height of the floodwater.

In addition, there may be flood hazard areas along the smaller streams and other watercourses in your community that have not have been identified or mapped through a study of its flood problems. And new development can increase water run-off, causing flooding in places that have never been flooded before. Some flood



problems result from water runoff or its accumulation in low-lying areas. Again, development may make the situation worse.

Our ancestors did not have the information you have about where floods occur.

They settled along rivers and streams for reasons that were valid then — rivers

provided fresh water, transportation, and energy. This pattern of development continued as communities

"The first time the floods came they were an Act of God. The next time the floods came they were my responsibility." — Pennsylvania official

grew to their present form. As a result, a large portion of your community's tax base and major economic centers may already be located in areas susceptible to flooding.

YOUR ROLE AS AN ELECTED OFFICIAL As a local official, you may now have to deal with the consequences of those past decisions. You are likely the one who needs

"All local officials should take the time to familiarize themselves with the areas that are prone to flooding, their community's flood protection program, and its emergency response plan. Your constituents are counting on you to do your homework and be prepared."

— Christopher C. Johnson, Mayor, Agawam, Massachusetts

to provide leadership so that your constituents do not make the same mistakes in the future.

Unless there has been a recent flood, you may not know much about the actual flood risk in your

community. You may not realize that many community problems and needs are closely connected to how its floodplain areas are used.

By recognizing the problems that floods can cause to your community and the resources that floodplains can provide, you can create opportunities for finding far-reaching solutions to flooding and other, related issues. You can do this by:

- Understanding where flooding occurs in your community and why.
- Understanding the *benefits* that floodplains can provide to your community.
- Leading an investigation of the best ways your community can avoid flood damage and maximize the potential of your floodplains.
- Providing leadership in setting goals, implementing them, coping with a flood disaster, and supporting wise flood recovery measures.
- Ensuring the public health and safety of your constituents — always your primary concern.



- Setting a positive public example.
- Keeping long-range, community-wide goals in mind and balancing them against potential short-term economic gains.
- Making sure that all available local resources are used wisely.
- Obtaining technical and financial assistance when needed.
- Building support for your community's vision of its future floodplains.

There are many different kinds of floodplains and flood problems. But experience has shown that cer-

tain techniques and activities usually reduce flood damage and make the most of floodplain lands no matter what the situation. This document shares with you some of the problems, opportunities, and techniques that have brought success to other communities like yours.

*"We need to do a better job of making people aware of hazards." —
Phillis Roberts, Councilwoman, Arnold, Missouri*

BENEFITS OF TAKING ACTION NOW

Don't wait for a flood. Start working on reducing your flood problems and protecting your floodplain resources NOW and you will be:

1. Alleviating existing flooding problems and minimizing future damage.
2. Improving your chances of getting funding from outside sources for a variety of flood- and floodplain-related programs.
3. Reducing the *public* expenses that will have to be absorbed in your community's budget when a flood occurs.
4. Helping your community become more aware of flood hazards.
This awareness can translate into actions and support to reduce the risk to individual properties and into better preparedness.
5. Reducing your community's legal liability for failure to act to reduce risks to public health and safety.
6. Making your citizens eligible for reduced flood insurance premiums.
7. Meeting other community needs, such as recreation and economic development.

WHAT YOU CAN DO BEFORE A FLOOD

"Taking the time to plan and prepare a solid floodplain management and emergency response program is the only way to minimize the devastating impact that flood waters can have on your community." — Christopher C. Johnson, Mayor, Agawam, Massachusetts

UNDERSTAND YOUR FLOOD PROBLEM First, investigate your community's flood risk so that you understand its magnitude and the places most at risk. Read newspaper accounts about past floods and examine the photographs. But do not assume that what you can find in old newspapers is the whole story. Flooding may have occurred infrequently, so they probably do not give a full history of your past floods.

Technical studies of your community's flood risk may have already been done by a federal or state agency so there are reports and maps that describe the flood risk for most of the streams in your community. Find out which of your departments has this information in their files. Or check with a state agency, regional planning or special district office, or the nearest office of the U.S. Army Corps of Engineers, the Natural Resources Conservation Service, or the Federal Emergency Management Agency (see Appendix A).

After studying the technical reports and maps, visit the areas that are subject to flooding. Visualize how deep the flood waters will be in each neighborhood (you can obtain that information from the technical study mentioned above). Notice which properties would be affected and how. Get first-hand accounts of past floods from your

constituents who live or have businesses in these areas.

UNDERSTAND YOUR FLOODPLAIN Although floods are a problem for many communities, floodplain lands are valuable community assets. The natural resources contained in flood-prone lands and their natural functions can

increase a community's overall quality of life. This role has been undervalued

all too frequently in the past.

Substantial gains can be made by transforming stream and river floodplains from problem areas into value-added community assets. Parks,

bikepaths, open spaces, wildlife areas, and aesthetic features are important quality-of-life issues to today's citizens. And assets like these make your community more appealing to potential employers, investors, homeowners, and tourists. You are uniquely positioned to tap these resources for the benefit of your community.

When portions of floodplains are left in or restored to a nearly natural state, not only do they reduce the number and severity of floods, but they also can help handle stormwater runoff and minimize nonpoint water pollution, for *far less money* than it would take to build facilities to correct these problems.



DISCOVER WHAT YOUR COMMUNITY HAS DONE INVESTIGATE WHAT IS
ALREADY IN PLACE Find out what your community has already done to lessen
the consequences of future floods. Most communities

- Have zoning ordinances, subdivision regulations, and other measures that regulate development in identified flood-hazard areas.

NATURAL FUNCTIONS OF FLOODPLAINS

Natural or relatively undisturbed floodplains:

- limit flooding naturally, by temporarily storing flood waters
- maintain water quality by filtering sediments, nutrients, and impurities
- preserve and recharge groundwater supply
- support natural vegetation
- provide fish and wildlife habitat
- provide many kinds of recreational opportunities
- provide places for outdoor education and scientific study.

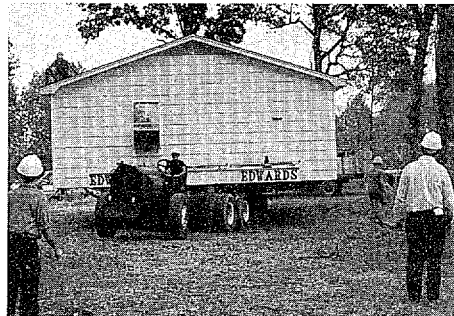
- Participate in the National Flood Insurance Program so that citizens can purchase flood insurance.

You may find that your community also has taken some of these additional steps:

- Using flood forecasting and warning systems.
- Having emergency plans telling what to do when a flood threatens.
- Buying flood-damaged properties.

Usually this means relocating the residents or businesses, demolishing or moving the structures, and using the newly vacant land for open space.

- Participating in the construction or maintenance of flood protection facilities like upstream dams, dikes, levees, floodwalls, and channel alterations.
- Individual property owners may have elevated their buildings above expected flood levels or built walls or dikes.
- Adopting measures to control runoff from developing areas outside the floodplain.



TYPICAL FLOOD-RELATED RESPONSIBILITIES OF LOCAL DEPARTMENTS:

BUILDING PERMITS AND ZONING

Enforcement of codes and ordinances adopted by the council or board, including those for flood-hazard areas.

PARKS AND RECREATION *Planning, development, and management of parks, recreation, and other open-space facilities in flood-prone areas.*

PUBLIC AFFAIRS *Public awareness of flood hazards and individual protective measures.*

URBAN RENEWAL *Incorporating flood damage reduction measures into urban renewal.*

PLANNING *Incorporating the flood risk and actions to address that risk into the community's vision for the future.*

ECONOMIC DEVELOPMENT *Providing opportunities for economic development while accounting for the exposure of such development to flood risk and economic loss.*

PUBLIC WORKS *Stormwater management, erosion control, water supply, waste treatment, flood emergency measures, and repairs.*

EMERGENCY MANAGEMENT AGENCY *Response to emergencies, including floods.*

FIRE AND POLICE DEPARTMENTS *Public notification of flood threat, evacuation, roadblocks, traffic control.*

IDENTIFY DEPARTMENTAL RESPONSIBILITIES Various offices or departments of your local government probably have been assigned responsibility for flood-related tasks. Take inventory of who does what. Review coordination and cooperation

among the departments. This review should be repeated at least every few years because of staff turn-over and changes in responsibilities.

LOCATE ASSISTANCE SOURCES OUTSIDE YOUR COMMUNITY Your staff has probably received some technical assistance on floodplain management from a regional, state, or federal agency in the past, such as grants or loans for mitigation, reconstruction, or other flood-related activities. If there are flood control structures

within your jurisdiction, your community may have entered into cost-sharing or maintenance agreements for them with a federal or state agency or with another jurisdiction.

Find out when and in what ways

regional, state, and federal agencies and private groups have helped your community with floodplain-related activities in the past. Review any past agreements with other entities to be sure your community is carrying out what was intended. This will also help you find places to get advice and assistance in the future.

COORDINATE WITH OTHER ACTIVITIES AND PROGRAMS Floods and floodplains are interrelated to many of the rest of your community's concerns. Just as a

serious flood would affect everyone to some extent, so does the floodplain benefit everyone. There can be a lot of beneficial overlap between floodplain management and urban renewal, economic development, parks and recreation, stormwater management, and maintaining or improving water quality and fish and wildlife habitat.

"[As a nation we need to] recognize the importance of continuing to . . . reduce the loss of life and property caused by floods and to preserve natural resources and functions of floodplains in an economically and environmentally sound manner. . . . [T]he natural resources and functions of our riverine and coastal floodplains help to maintain the viability of natural systems and provide multiple benefits for the people." — The President's letter transmitting A Unified National Program for Floodplain Management to the U.S. Congress, March 1994.

Even if your community is already actively managing its floodplains, finding ways to combine those activities with other community functions can still save time and money, improve the quality of life for your constituents, and build a broader and longer-lasting base of support.

EVALUATE YOUR COMMUNITY'S CONCERNS, INTERESTS, AND NEEDS When investigating ways to reduce your flood losses, you can also find out how flood-prone areas are being used, what kind of development is there, and how important these areas are to your community and its plant and animal life, recreation, historical sites, tourism, and quality of life.

Evaluate community needs and interests. Think about whether your flood problem areas could be put to better use by meeting some of these other needs. This evaluation involves identifying the interests and concerns of other residents and community groups that can complement or support floodplain-related activities.

THE NATIONAL FLOOD INSURANCE PROGRAM

Your community likely participates in the National Flood Insurance Program (NFIP) administered by the Federal Emergency Management Agency. If it is in the NFIP, it has agreed to enforce floodplain management regulations. In exchange, residents are eligible to purchase flood insurance, which is not normally available through private insurance companies. Disaster assistance and many types of grants and loans are also made available. If your community is in the NFIP, it has one or more maps that show local flood hazard areas (usually the land that would be covered with water during a 1% annual chance ["100-year"] flood).

There are four major floodplain regulatory requirements, and others can be set by state or local law.

- All development in the floodplain must have a local permit. "Development" includes new buildings, improvements to buildings, filling, grading, or any other human-caused change to the land.
- New buildings in the floodplain must be built or located to resist flood damage.
- Additions, improvements, or repairs to a damaged building that exceed 50% of the original building's value also must be made flood-resistant.
- Only certain types of development are allowed in the *floodway* part of the floodplain. It is the most hazardous area and includes the stream channel and the adjacent land that is needed to safely pass flood flows.

During a typical 30-year mortgage, a building in a flood hazard area is 25 times more likely to be damaged by a flood than by a fire. Structures built to meet or exceed the minimum standards of the NFIP suffer 77% less damage in a flood than those not built to these standards.

FLOOD LOSSES IN YOUR COMMUNITY FALL INTO TWO GENERAL CATEGORIES:

(1) PRIVATE LOSSES are those

suffered by individuals

- loss of life
- property damage
- disruptions to business and employment
- costs for health care for flood-induced illnesses
- expenses for temporary housing and travel and transportation disruptions.

(2) PUBLIC LOSSES affect everybody

and have to be absorbed by your community's present and future budgets

- emergency flood protection
- debris removal
- repairs to roads, streets, public utilities, public buildings and equipment, water control facilities, and parks and recreation.

GOALS ARE GENERAL STATEMENTS OF DIRECTION; OBJECTIVES ARE MORE SPECIFIC TARGETS.

(1) **GOAL:** Reduce flood damage to existing buildings.

OBJECTIVE: Acquire from willing sellers all homes that were damaged along River Road during the 1995 flood.

(2) **GOAL:** Create trails that connect neighborhoods.

OBJECTIVE: Create a hiking, jogging, and biking trail along Floody Creek that connects Sunset and Sunrise Parks.

A 7-FOOT DIFFERENCE

in the elevation of the bottom floor of an insured \$150,000 home in a floodplain with \$25,000 contents can mean the difference between an annual flood insurance premium of \$274 and \$5230.

The goal is to bring these diverse interests together, reduce conflicts, and increase the opportunities for mutual support. Broad-based solutions will cost less than dealing with each problem separately.

ESTABLISH COMMUNITY GOALS AND OBJECTIVES You and other elected officials can form a group to identify common goals and objectives for the community. Organizing can be done informally, but a more formal organization may be more productive if the issues are complex. A group may already exist, such as a neighborhood association.

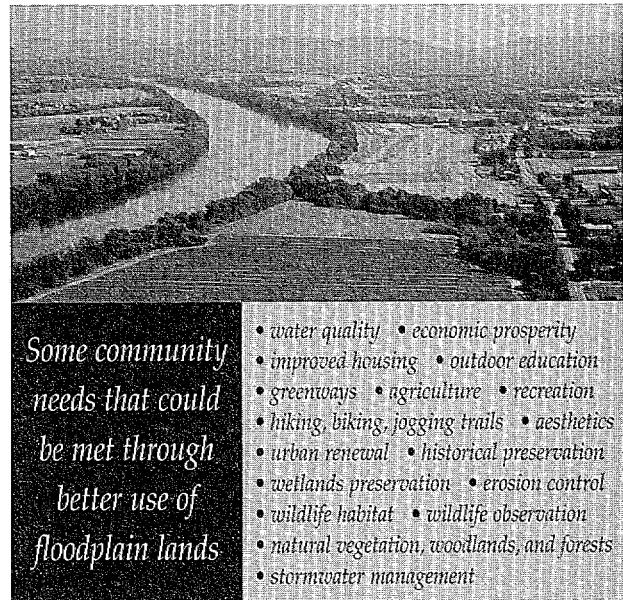
It may take the organized group, and the public, some time to reach a consensus on the community goals and objectives. However, the time spent is well worth it because this process is vital to getting cooperation from everyone. Where possible, settle on goals and objectives that support more than one interest.

Agreeing to "maintain wetlands" can meet many needs at once. For example,

they (1) provide natural flood storage areas, (2) reduce flood levels, (3) perpetuate natural vegetation, and (4) improve wildlife habitat. It may not be possible to obtain complete agreement on everything, but you should try to build consensus among all affected stakeholders so that everyone can live with the recommendations.

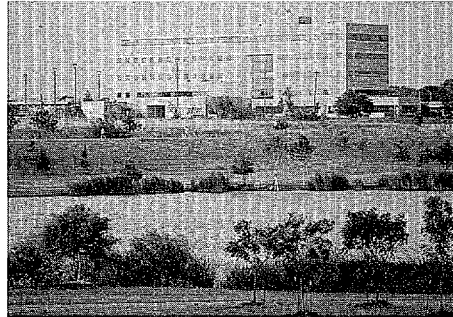
SELECT APPROPRIATE MEASURES Your community has at its disposal many proven measures for managing its floodplains. (They are described in some detail in Appendix B). You can combine them to tailor a program especially for your community's floodplains and its goals. A consensus should be reached on which measures to employ. Compromise may be required. Here are some things to consider when deciding which techniques to use.

- Measures that will meet more than one community need are more cost-effective and easier to defend before critics. For example, water detention basins for



storm and flood waters can also be used as athletic fields and parks. In many cases, the renewal of a flood-blighted waterfront can stimulate economic redevelopment and tourism.

- Measures that will achieve the most *public good* are those that prevent an increase in flood risk. They keep future development out of flood hazard areas with zoning ordinances, subdivision regulations, and other codes. They should also control water runoff from other developing areas.
- Measures that achieve the most *public goodwill* are those that reduce the exposure of existing development to flood risk and that provide amenities to the community. These include controlling flood waters, raising some structures above projected flood levels, or removing others from the floodplain.
- Many state, federal, and private groups specialize in certain flood loss reduction measures. It is possible to capitalize on the help that is available. See the list of sources at the end of this guidebook.



WHO TO INVOLVE?

The process of choosing ways to reduce flood losses and meet other community needs should involve:

- owners or renters of flood-prone properties (residential and business)
- neighborhood organizations
- homeowner associations
- farmers, industries, and anyone else whose use of the land affects the floodplain
- land developers, real estate agents, lenders, and anyone else whose activities affect the future of local land
- organizations interested in the stream corridor
- the media.

BUILD SUPPORT BY PROMOTING FLOODPLAIN MANAGEMENT You will be

faced with the prospect of generating interest and support for floodplain management from the rest of the community.

Unless your community has experienced a flood within the past year or two, you will face a number of daunting challenges.

CHALLENGES YOU WILL FACE

- The public pays little attention to flooding potential. Most people do not believe that their community will experience a flood disaster.
- The political rewards for dealing with flood hazards before a flood are often small but they may have a big payoff *after* a flood. Many immediate problems command your attention and that of other elected officials. It is hard to commit public funds to avoid a flood disaster when the benefits will not be realized until some uncertain future date.

"Tulsa's flooding problems were legendary, and only the most courageous of community leaders would have tackled the task of finding long-range solutions. In the short term, floodplain management can be controversial, but in the long term it is rewarding, because you are willing to do whatever it takes for the good of your community." — M. Susan Savage, Mayor, Tulsa, Oklahoma

EFFECTS OF NON-PARTICIPATION IN THE NATIONAL FLOOD INSURANCE PROGRAM

If a community chooses not to participate, or if it loses its eligibility,

- *No resident can purchase or renew flood insurance.*
- *No federal mortgage insurance (like VA and FHA) will be provided for properties in flood hazard areas.*
- *No federal grants or loans may be made for buildings in flood hazard areas.*
- *No federal flood disaster assistance will be provided in flood hazard areas.*
- *In some states, state disaster assistance, grants, and loans are denied.*
- *Homes and other construction in flood hazard areas may become unmarketable.*
- *Your local government may be legally liable for denying its citizens the opportunity to purchase flood insurance and for failing to take other measures to reduce the risk to life and property.*

- Few citizens place a high priority on flood preparedness. But these same people expect you, as their elected leader, to limit damage to life and property from flood disasters when they do occur.
- Prevailing attitudes toward personal property rights and government regulation may work against the adoption of many flood damage reduction measures.
- Interest groups opposing floodplain management measures are well organized and vocal, while coalitions supporting local flood prevention programs are rare.

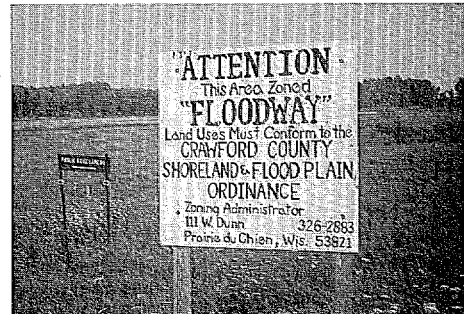
The decisions that you have to make in

the face of these challenges involve basic and sometimes emotional issues: balancing individual and community property rights, and the need to protect the public health, safety and welfare, along with balancing short-term gains against long-term benefits.

OVERCOMING BARRIERS Perhaps the most effective way to combat these attitudes and misperceptions is by building understanding and consensus about your community's flood problems and floodplain management goals, and other goals. Getting other community leaders (business, industry, organizations, groups) involved also builds a sense of ownership of the problem and its solution.

Here are some things to keep in mind.

- Recent court decisions have upheld laws that restrict use of private property subject to flood hazards.
- Emphasize the public safety aspects of flood reduction measures. Careful planning and management of floodplains reduces jeopardy not only to the residents of these areas but to workers and volunteers who must undertake response efforts after a flood disaster.
- Have a vision of your community's future that includes floodplain resources.
- Make the case for wise use of flood-prone lands to the public as well as to your own department heads. This can be done through the media, and presentations before clubs and organizations, "special interest" groups, and in staff and department meetings.
- Gain the public's confidence by being knowledgeable, setting a good example, and



making it clear that you have the whole community's long-term well being in mind.

- Flood damage is not paid for solely by people who knowingly subjected themselves to the risk. The costs of rescue, cleanup, and reconstruction, for example, are shifted wholly or in part to society at large.

CARRY OUT YOUR PROGRAM Once planning has been accomplished, you may find that your community does not have financial and technical resources to carry out everything it has decided would be worthwhile. Priorities will have to be estab-

SOME MEASURES FOR FLOODPLAIN MANAGEMENT

Prevent increases in flood losses

- Floodplain regulations — zoning ordinances, subdivision regulations, building codes
- Development and redevelopment policies
- Information and education

Reduce the flood risk to existing development

- Disaster preparedness
- Acquisition and relocation
- Individual protective measures
- Flood forecasting and warning systems, emergency plans
- Flood insurance
- Structural measures — dams and reservoirs, dikes, levees, floodwalls, channel alterations, land treatment measures, on-site detention

Preserve and restore natural floodplains

- Floodplain, wetland, coastal barrier resources regulations
- Development and redevelopment policies
- Tax adjustments
- Greenbelts and open space
- Wetland and riparian restoration

lished. Then your community can implement measures as soon as funding and other types of support become available. Often, this occurs after a flood disaster in the form of disaster assistance.

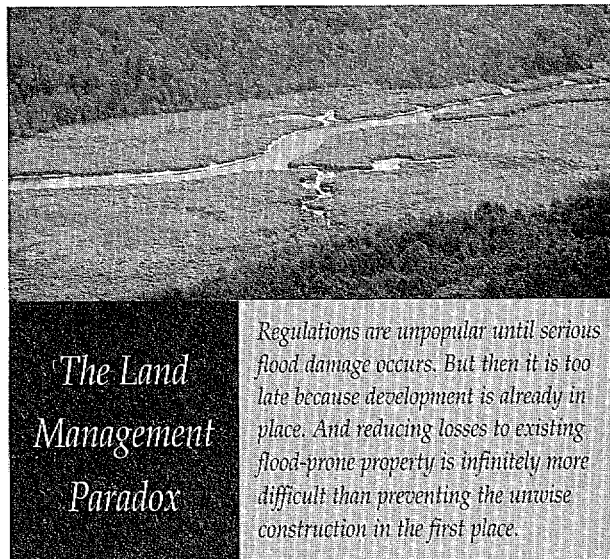
Different floodplain management activities require different implementation techniques. Some can be accomplished for little or no money. Some require a great deal of technical expertise. Some may require taking an unpopular stand on a public policy. Among the techniques are:

- Administrative procedures — adoption of ordinances controlling future use of

A TYPICAL SCENARIO that many local officials face involves proposals for development of flood hazard lands. The developer offers the prospects of jobs and an increase in the tax base. The flood problems are trivialized or the developer states that "the flood problem can be fixed." These sound like very persuasive reasons for supporting the proposed development. BEWARE, the short-term gains in your tax base from such development can quickly be lost to later flood damage that can become a chronic problem. Many communities have realized only later that the flood problem at that site was never "fixed." (In most instances, it is very difficult to "fix" a flood problem.) You should seek an independent opinion and not rely solely on the opinions, plans, or promises of the developer.

flood hazard areas.

- Assignment of responsibility to existing departments — preparing public awareness and education materials about flood risks.
- Using volunteer groups — public awareness campaigns, stream cleanup projects, building or maintaining trails.
- The budget process — improving the local flood warning and response system.
- Contracts or agreements with other parties — construction of flood control works; obtaining technical or financial assistance.
- Official policies — limiting services and utilities to control unwanted development in certain areas.
- Working with other communities to manage stormwater in developing areas.



YOUR ROLE IN MANAGING YOUR COMMUNITY'S FLOODPLAIN PROGRAM

Your commitment — and that of other elected officials — will determine the success or failure of your community's floodplain management effort. If you believe in the program's need and purpose, then you will take actions to ensure that it is carried

"I have noticed that addressing the flood threat issue will not help get an official elected, but experiencing a flood will help the official lose the election." — Windell Curole, General Manager,

South LaFourche Levee District, Galliano, Louisiana

out within the limitations of your community's resources.

- Take the lead in choosing a few easy win-win projects to do quickly. Tangible results will demonstrate to the community that you and other officials are serious and can deliver. This can help overcome public skepticism.
- Maintain a vision of the future. Do not lose sight of the complex projects, which may be more important overall in addressing your community's flood problems.
- Invite neighborhoods to meet to discuss flood-related activities and other community needs that might be tied to them.

- Support your staff by making sure they get the special training they need and by letting them know what is expected of them.

The “action items” described in this chapter are listed in the Checklist for Addressing Your Community’s Flood Problems, found at the end of this document.

HOW TO GET MORE CREDIT FOR MANAGING YOUR FLOODPLAIN

The Community Rating System (CRS) was initiated by the Federal Emergency Management Agency to reward communities that are doing more to prevent or reduce flood losses than the minimum requirements of the National Flood Insurance Program. Under the CRS, communities with extra flood loss reduction activities can apply for a classification that gives their residents lowered flood insurance premiums.

Your community may obtain credit for these and other activities:

Map Information	Stormwater Management
Outreach Projects	Repetitive Loss Projects
Hazard Disclosure	Acquisition and Relocation
Flood Protection Library	Retrofitting
Flood Protection Assistance	Drainage System Maintenance
Open Space Preservation	Flood Warning Program
Higher Regulatory Standards	Levee & Dam Safety
Flood Data Maintenance	

All residents of Tulsa, Oklahoma, have benefited from the city’s comprehensive stormwater and floodplain management program. But the 2,600 families and businesses with flood insurance policies also enjoy a 25% reduction in their annual premiums because of Tulsa’s high CRS rating. Collectively they pay \$250,000 *less* for flood insurance each year than they would if Tulsa met only the minimum requirements.

The Village of South Holland, Illinois, has utilized the CRS as a model to inform and protect those citizens located in flood-prone areas. That, and appointment of a Flood Assistance Coordinator to the staff, has relieved public skepticism.

SEVERAL FEDERAL AND STATE assistance programs require that your community has adopted plans for various aspects of floodplain management. Make your plans “count” for as many programs as possible by having funding agencies review them.

MANAGING THE WHOLE WATERSHED Ideally, flooding and floodplains are managed at the *watershed* level. A watershed is all the land area that drains to a specific location along a stream or to a water body. Activities that result in runoff anywhere within the watershed can increase the incidence and magnitude of floods, with dire consequences for those downstream. You should try, therefore, to reduce

and store runoff naturally *throughout* the watershed. Take measures to make sure water can infiltrate the soil. Preserve as many wetlands, depressions, and other natural storage areas as possible. Adequate detention of water runoff from developing areas should be a primary goal.

Obviously, these watershed-wide techniques are much easier to achieve if the watershed is entirely within your community's jurisdiction. But if other jurisdictions contribute to your flood problems (or detract from your floodplain resources), or you to theirs, then coordination and

"If we really want to help local officials do a better job, we have to convince them of the importance of watershed planning and respect for natural forces. I have had to be convinced myself. To a large extent, ignoring these factors has caused our flooding problems."
— Peggy Glassford, Village Manager, Flossmoor, Illinois

cooperation with them is important. Regulatory consistency and coordinated flood response will ensure that land uses are compatible and mutual aid available in a flood emergency. There are many ways localities can pool their resources — technical, financial, and personnel — for flood damage reduction studies and projects.

COMMON MISTAKES IN IMPLEMENTING LOCAL FLOODPLAIN MANAGEMENT

- Taking official action to adopt a program — like installing a flood warning system — and then failing to allocate sufficient (or any) resources to carry it out.
- Adopting land use regulations for flood hazard areas, such as those required to participate in the National Flood Insurance Program, and then failing to enforce them. For example, "failure" can mean issuing permits that do not comply with the ordinance, or unwisely overruling the professional staff that administers the ordinance.
- Taking the position of doing only the minimum necessary to meet state or federal requirements, and not integrating the broader issues of community health and safety and quality of life.
- Agreeing to maintain a flood control or other project built with state or federal assistance, and then failing to provide for the maintenance in the community budget.
- Taking "piecemeal" approaches that may correct one problem area but create a worse problem elsewhere.

THE FOLLOWING ACCOUNTS of how four localities addressed their flood problems — and, in doing so, met multiple community needs and goals — are truly “success stories.” They are included to give you a chance to hear about the situations that officials in other communities faced, what they did, and how well it worked. Their experiences also reveal some of the local elements that appear to be necessary for success.

Mayor Beverly Anderson of *Darlington, Wisconsin*, describes her community’s flood mitigation efforts, which included historic preservation, economic revitalization, and land use/reuse compatible with the flood risk. Their objective was “to reflect a change in our River’s image” through flood mitigation. A mixture of projects was carried out with assistance and funding from several sources. The importance of having a previously prepared flood mitigation plan is demonstrated.

Community Affairs Manager Ann Patton of *Tulsa, Oklahoma*, shares her community’s journey from “worst to best.” From having the nation’s worst flood record in the 1980s to having one of its best programs for dealing with flood and stormwater at the present, Tulsa has a program characterized as “born of great loss, hard lessons, and tremendous political courage.” Lessons Tulsa “learned the hard way” are shared for the benefit of others.

Former *Union County, South Dakota*, official John LaBrune recounts the pressures local elected officials often face when confronted with attractive economic development proposals. Much of the land in this instance was flood-prone. The experience is described as “a *cooperative* beginning in which flood-plain management *and* economic development can survive and be beneficial to everyone involved.”

Village Manager Peggy Glassford of *Flossmoor, Illinois*, reveals the path traveled by a committee formed by governments under extreme pressure to “do something” about flooding. The group “began by looking for a quick fix to the flood problem and found instead that the only effective solution is a long, cooperative journey in multi-objective stormwater management,” involving the entire Butterfield Creek watershed. Their experience provides information that may be useful to others.

FLOODED WITH PRIDE — MITIGATION FOR REVITALIZATION

BY BEVERLY ANDERSON FORMER MAYOR, DARLINGTON, WISCONSIN

Darlington, nestled in a valley in southwest Wisconsin, is the county seat of Lafayette County, the most agriculturally dependent county in the state. It was settled in 1836 along the banks of the Pecatonica River, which was used to transport products, provided recreation (boating, fishing, swimming), and also generated the community's electrical power until the turn of the century when the dam was removed.

Historically, the river would rise in the spring, flooding the lowlands, and approximately every 20 years when summer torrential rains caused major flooding covering the lower two-and-one-half blocks of the retail and service business sector, residences, businesses and farm lands up and down the river.

Having literally grown up on Main Street, actively involved in a family business for 42 years, it always bothered me that during flooding episodes the news media printed pictures of the "old timers" standing on the bridge watching the river rise and then of us, shirt sleeves and pant legs rolled up, wading in mud, cleaning but seemingly doing nothing to prevent the repeated damage of future flooding.

So upon becoming involved in city and county government in the mid 1970s, we began initiating an extensive land use program using Land and Water Conservation and Wisconsin local park aides' funding to relocate extensive land use businesses (lumber yards, fuel companies, agricultural supply, etc.) out of the floodway, rid ourselves of blighted areas, and use the land along the river for parkland, for recreation, and other compatible uses.

We engaged the U.S. Army Corps of Engineers to do a topographical study before allowing further development in the floodplain. The abandoned rail system, which ran adjacent to the river, was Interstate Commerce Commission railbanked and a 49-mile multi-use recreation trail was implemented.

After the major flooding of 1990, the city government immediately began organizing a task force of pertinent agencies of higher levels of government and state and federal elected officials to meet, coordinate, and collaborate as to what resources and/or financing each could offer for an acceleration of an extensive flood mitigation effort that would also include historic preservation, economic revitalization, and ultimately contamination remediation.

Wisconsin Emergency Government and the National Trust for Historic Preservation agreed to fund a flood mitigation plan. The city, Wisconsin Emergency Government, the Federal Emergency Management Agency, and pertinent agencies within the Department of Natural Resources had been meeting on flood mitigation issues for several years, so much of the groundwork had been laid and, of course, all continue to be involved. The Corps of Engineers and Soil Conservation Service furnished the personnel to provide research data and statistical information. The state historical society also provided personnel to do the necessary survey and research work to enable Darlington's designation to the state and national registry of historic places.

When the 1993 flood and second presidential declaration occurred and monies became available for grant applications, Darlington had its mitigation plan and was ready to move ahead. The Economic

Development Administration had provided monies to the regional planning agencies to hire a professional to help communities coordinate flood mitigation efforts. A state interagency team was formed of many of the same agencies and staff who had previously met with Darlington, so everyone was very familiar with our goals. Nevertheless, we embarked on what has become a very energetic, challenging, and complicated mix of projects that were to have been completed at the end of 1997, but will be ongoing due to regulatory requirements for contamination and limitations in funding. Estimating the costs of the many required studies, regulatory changes, and code requirements such as those of the American Disability Act or the acquisition/relocation laws, is virtually impossible.

Next I will outline our complex mix of projects using funding from the numerous sources and listing our successes and remaining challenges.

RESIDENTIAL FLOODPROOFING Accomplished through a Community Development Block Grant through the Wisconsin Department of Administration in the amount of \$431,000. Four homes were



elevated and basements filled; others mitigated with flood walls, sump pumps, back-flow valve installation, utilities and entrances raised, or land excavating improvements for proper drainage. The cost of mitigating 52 houses/properties ranged from \$200 to \$33,000 each. In most instances, residents put additional funding into their

projects thus improving the value of their property and quality of their lives and neighborhoods. Low income, elderly, and large families were given priority and the project has been a complete success!

FLOODPROOFING OF HISTORIC DOWNTOWN AND BUSINESS COMMUNITY FEMA's 404 program funding of \$1,500,414, inclusive of matches by WDEG and DOD/CDBG, and the Department of Development providing \$355,500 for architectural and engineering fees. This was the original estimate for wet floodproofing 38 buildings (¾ having historical status), raising utilities and floors, and installing sump and generator systems. The National Trust had previously furnished 10 desiccant-type dehumidifiers and a sump pump to dry out the foundations and infrastructure of the buildings. The project became complicated by several factors. First, the regulatory requirements of dry floodproofing, filling basements, and raising floors two feet above the BFE escalated the cost by ½ to ¾ the original estimate of \$40,000 per building.

Second, there was the need to simultaneously deal with five major issues: (1) flood mitigation and remodeling had to maintain the historic integrity of the buildings; (2) the need to maintain an economically viable downtown business district throughout the process; (3) implementation of a temporary relocation plan allowing businesses to move temporary facilities maintaining the business activities and income; (4) meeting ADA compliance by installing shared ramps in the rear of the buildings; and (5) the installation of a central sump and generator system and flood gates.

We have completed eight buildings, have three in progress, and two ready to begin. Benefits of this project are reduced economic and structural loss, quicker recovery after flooding, preservation of

historic buildings, and economic diversification from our agricultural dependency.

Recognizing the need for an intensive retention and recruitment program and long-range planning in conjunction with the flood mitigation projects, we applied for and received a Community Based Economic Development grant for \$19,000 through the Department of Development and have begun a succession of town meetings. Again the major problems encountered have been due to the changing program regulations, code, and escalated cost. Thus we will fall short in funding, even though building owners are responsible for all code requirements and building improvements not associated with flood mitigation. Many are also remodeling second stories, creating offices or badly needed living quarters. We will continue to strive to obtain funding for completion of this critical project.

ACQUISITION/RELOCATION OF SEVERAL BUSINESSES Supplement I providing \$20,500, including matches by WDEG and DOD/CDBG, for acquisition appraisal for 13 designated properties, and Supplement II providing \$798,500, including matches by WDEG and DOD/CDBG, for actual acquisition and/or relocation. When demolition is required, WEG with in-kind match by city crew and equipment, will provide funding. There are three important reasons for moving these commercial activities out of the floodplain:

- The farm implement dealership, car dealership, and mill are magnet businesses impacting other businesses and lie directly on the river bank. If lost due to flooding, customers will go elsewhere.
- By the very nature of the types of businesses that located along railroads (fuel companies, agricultural supply, chemical) contamination occurred and one fuel company is still operating just above town, thus creating a potential hazard with each flood.
- The deed restricted to green space designation all floodway land along the river. Parkland, recreation, natural plant and habitat restoration adds to the economic, ecological, and social welfare of the community.

SUPPORTING INFORMATION FOR ACQUISITION/RELOCATION PROJECT The city purchased 33 acres of land at \$330,000 on the southwest end of the city for a business park for the relocation process. The Economic Development Administration granted \$697,000 to install the utilities and a lift station. The owner donated \$100,000 of the purchase price to our library, \$50,000 toward our new ambulance, and \$5,000 to our fire department. The remaining \$175,000 was used as local match for grants. Four properties have been acquired and cleared, the papers have been signed for another four, four properties are under contamination remediation, and we will be short of funding for two properties. Again, funding will be sought to complete the work.

Contamination has been the major problem and we are now waiting for the final results of testing, determining type and extent. It has been determined that the properties are PECFA eligible. The Department of Development furnished the \$69,000 deductible for testing so if all goes well we should be able to soon acquire and relocate before another flood. The city assumed the role of agent for the affected businesses. It is our desire to relocate the businesses, do contamination remediation, then

acquire ownership. This is being negotiated as administrative policy demands contamination-free land before acquisition, which greatly escalates the cost and hardship.

UTILITY/INFRASTRUCTURE REPLACEMENT Last but of utmost importance, were the city's failing utility systems. Our water system was inadequate both in flow and pressure to serve the business park or even guarantee proper fire protection. We had been negotiating for several years with EDA for a new south side tower and received a \$974,280 grant. To realize the economic advantage, we upgraded the entire system at a cost of \$2.6 million. It went into operation early in 1995.

Since the flooding in 1990, our wastewater treatment plant, located in the floodway on an elevated mound, has not provided treatment sufficient to allow main extension and we have been under moratorium. A new \$5.5 million plant out of the floodway went into operation in the summer of 1996. Rural Development (formerly Farmers Home Administration) provided a grant of \$2,747,000 and lent us the remainder. The old plant will be removed at a cost of \$250,000 from the unused contingency in the plant project, providing added parkland, lowering the base flood level 6 to 12 inches, and reducing the water velocity during flooding.

This month we also received notice that we are the recipients of a \$108,000 grant from the Department of Development's public facility fund. It will be used to install a new lift station on the northwest side of the community. This is a problem area during flooding, when many homes occupied primarily by the elderly or young families experienced sewage backup in their basements.

CONCLUSION Darlington has worked continuously and aggressively to mitigate and reduce damage incurred by businesses and residents during flooding. We want to recognize the agencies, their personnel, and those who have worked so hard and been sensitive to our needs. This was to be a model project so we want it to be a "model of success." So often, regulatory issues look good on paper, but in the real world don't accomplish what is intended but merely elevate the cost beyond evaluation or expectation. Each project encounters its own challenges and flexibility is imperative.

Our objective is that through flood mitigation we will be able to change our river's image to a positive one, accomplish historic preservation, economic revitalization, contamination remediation, and be a safe, prosperous, and viable community for generations to come. Therefore, we have erected signs at the four major community entrances, financed through a fund drive by the local Chamber of Commerce, stating, "Darlington, The Pearl of the Pecatonica" . . . where the river flows and opportunity grows!

For more information, contact Bev Anderson, City of Darlington, 530 Washington Street, Darlington, Wisconsin 53530, (608) 776-4093.

NATURE BATS LAST: TULSA'S FLOOD STORY

BY ANN PATTON COMMUNITY AFFAIRS MANAGER, CITY OF TULSA, OKLAHOMA

It was 3 a.m. The newly elected city commissioner, in office only 19 days, was jarred from fitful sleep by the loud ringing of his bedside phone.

"Commissioner!" Through phone static, he recognized the voice of the mayor. "I need you to come to the emergency operations center right away. I'll send a truck to get you. It's flooding."

"No!" said the commissioner. "Where?"

"Everywhere."

Thus began Tulsa's worst natural disaster, our 1984 flood.

City leaders huddled in the Emergency Operations Center throughout the nightmare night, shell-shocked by volley after volley of horrifying reports of destruction all across town. They mustered all available forces to battle the flood. There were miraculous victories, such as in Holiday Mobile Home Park, where a life flight helicopter pilot braved the storm to rescue 40 people; they were plucked from their roofs, one by one, by an outstretched hand of the chopper nurse. Overall, our forces were puny by comparison to the overwhelming power of the water reclaiming its floodplains.

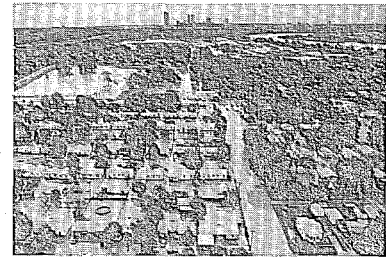
Before dawn, as much as 15 inches of rain had fallen. Fourteen Tulsans had lost their lives in flashing waves of water. Another 288 were hurt. Nearly 7,000 homes and businesses were ruined, and another 7,000 cars and trucks — including city fire trucks, police cars, and ambulances — were destroyed. Damage was \$183 million.

During that terrible night, the commissioner and our new young mayor vowed to do whatever they could — and the political cost be damned — to prevent Tulsa from suffering such a flood again. That commitment produced Tulsa's comprehensive stormwater management program — a program born of great loss, hard lessons, and tremendous political courage.

BACKGROUND Floods have haunted Tulsa's history. Tulsa was built over the past hundred years on the banks of the Arkansas River, on rolling terrain networked with floodplains. The city, now encompassing 200 square miles and 380,000 citizens, lies within the infamous "tornado alley," where colliding weather systems often produce spectacular thunderstorms, most treacherous in the spring and fall. As we grew, lowland development was ripe for flooding that seemed worse every year.

By the 1980s, Tulsa County had garnered the worst flood record in the United States, nine federal flood disaster declarations in 15 years. Real estate markets were virtually dead in sprawling sectors of our community; and we were gaining a reputation as the nation's flood capital, thwarting economic development.

The city's record was transformed from "worst to best" after that flash flood on Memorial Day 1984. The program actually began in the 1970s, when Tulsa entered the National Flood Insurance Program (NFIP), but local political opposition stunted implementation. After the '84 flood, leaders were able to muster community-wide consensus that continues today. Since 1993, our citizens have enjoyed the lowest flood insurance rates in the U.S. because the federal government's community rating system has ranked our program first in the nation.



We call our flood and stormwater management program comprehensive because we plan and regulate over entire watersheds, not just the lands along lowland waterways; and because it includes a broad spectrum of carefully integrated elements. Here are some key features:

- Strict regulations, in floodplains and throughout watersheds, are based on performance standards that allow new buildings — if, and only if, the developers can prove they won't flood or make others flood. Our baseline priority is sound regulation, to avoid developing new flood problems.
- Nonstructural flood-hazard mitigation programs include acquisition of floodprone buildings to correct existing problems. About 300 flooded homes and 200 mobile home pads were cleared after the 1984 flood. We've cleared about 1,000 buildings from floodplains so far. We prefer smaller, continual, pre-flood acquisition programs that allow us to work one-on-one with owners and tenants.
- Combination capital programs include open space greenbelts, channels, sewers, and stormwater detention basins. They are based on citywide master drainage plans and are funded by general obligation bonds or sales taxes, plus supplemental federal dollars. Over the past 15 years, Tulsans have committed more than \$200 million to flood-management capital works.
- A stormwater utility fee provides about \$10 million a year for on-going system maintenance and management. Everybody contributes to flooding runoff, so everybody contributes to the fund for its management. All residences pay \$2.78 a month. Business fees are based on impervious area.
- Aggressive public education and awareness programs include media campaigns, direct mail, water-quality education, warning and evacuation programs. Every year, we send notices reminding floodplain occupants that they are in a flood-hazard area and urging them to buy flood insurance.
- Multiple-use facilities. Many floodplains and detention basins are used for passive or active recreation. Maintenance trails along channels are also used for hiking and biking, in a Tulsa Trails system that ultimately will network the city.

LESSONS LEARNED Among lessons Tulsa learned the hard way:

- Nature bats last. The most natural way is best. When it's feasible, preserve or clear floodplains and give the flood the right of way. The floodplain belongs to the river that carved it.
- Erase your mistakes. When possible, keep buildings out of the floodplain, or move them out. Floodplains can be safely used for some purposes, such as recreation, but they are not safe places for people to sleep. It's human nature to want to rebuild after a flood, but it may be more prudent to pause and evaluate, to see if there are better options.
- Marry structural with nonstructural. When it's not possible to just retain floodplains as open space, management strategies must be comprehensive and fairly sophisticated. Structural projects, such as channels or levees, may be the only short-term possibility, but they have inherent long-term negative consequences because, sooner or later, the flood will reclaim its floodplain.
- Everybody pays, everybody wins. Flood disasters can divide a community, but they can also draw people together. It takes commitment from people on the hills as well as those in the lowlands to curb flooding.

- Go beyond federal requirements. Build on the NFIP, which offers flood insurance to communities who use basic floodplain management tools. But if we had stopped there, we would have cheated our citizens in the long term. Prudent floodplain management requires an extra margin of safety, going beyond the NFIP to consider, for example, the effects of future watershed urbanization. (All that paving and piping can speed runoff and increase downstream flooding. That's why we base Tulsa's floodplain maps on ultimate watershed urbanization; require upstream detention or fee in lieu of detention; require compensatory valley storage; and require new buildings to have the lowest floor at least one foot above the predicted flood level.)
- Go for the green. With good floodplain management, a community can reap great rewards. Open spaces can be used for greenway strip parks and trails, for example. Using the same land or resources to achieve multiple goals such as water quality, recreation, transportation, and flood control, all in the same project, can make every project more effective and broaden your constituency.
- Don't give out. Floodplain management is a long-term proposition, and you can't sell out the long-term for short-term gains. Getting that point across to citizens probably requires an education program. Your best friend may be your local news media; in Tulsa we are blessed with aggressive local journalists and editors who understand long-term issues and help us explain them to the public.

CONCLUSION Tulsa hasn't suffered a major flood in a decade, the longest flood-free period in our history. We have no record of flood damage to any building built in accord with our updated, comprehensive regulations. Several rains have occurred that would have caused flooding previously, but the upgraded stormwater system has handled them without significant damage.

We know that, inevitably, Tulsa will flood again. We believe, however, that flood dangers and damages have been immeasurably reduced because our leaders had the foresight to make a hard-willed commitment to progress. The greatest challenge in developing a flood program is finding the community will, the vision, the local leadership, and the political courage. If you have ideas to share with us, or if you would like more information, please contact Ann Patton, 515 City Hall, Tulsa, Oklahoma 74103; (918) 596-7808; fax (918) 596-7265.

RIDING A "WAVE" OF COOPERATION

BY JOHN LABRUNE MITIGATION CONSULTANTS & ASSOCIATES
FORMER UNION COUNTY, SOUTH DAKOTA, FLOODPLAIN MANAGER

Union County is a largely rural county, population 10,500 and growing, in extreme southeastern South Dakota. It is bordered on the south by the Missouri River (adjacent to Nebraska), and to the east by the Big Sioux River (adjacent to Iowa). In the late 1980s a major utility company began assembling parcels of land at the confluence of the Big Sioux and Missouri rivers. The developers acquired approximately 2,000 acres, and a formal announcement was made that they had plans to develop this raw, undeveloped piece of unproductive land into a premiere "planned development" with areas set aside for schools, churches, a

professional business park, strip mall, 18-hole professionally designed golf course, and a 2,000-square-foot clubhouse. Plans called for approximately 50 "estate" lots, ranging in price from \$65,000 to \$85,000 each, along the Missouri River. Areas were also set aside for denser, zero-lot-line residences as well.

This was to be the largest single development from Minneapolis to Denver to Kansas City. The economic considerations were overwhelming, not only for Union County, but the entire tri-state area of South Dakota, Iowa, and Nebraska. The developers were aggressively pursuing their own exit off Interstate 29 at mile marker one, in South Dakota. They announced that Arnold Palmer was to design their golf course and was to get professional tournaments sponsored here. They were working on legislation to address their development's needs and legal requirements.

Naturally, much of this land was flood-prone and a re-study was immediately started. Changes had occurred since the last flood study and it was felt that due to these changes, a new floodplain may be realized and also we would have new and current base flood elevation data to work with, as this area was never engineered for the determination of base flood elevation. The study revealed that there were numerous lots still in the floodplain, after the re-study, and certain construction practices would have to be adhered to, as outlined by the floodplain ordinance. Union County was zoned and building permits were required. Union County is also a participant of the National Flood Insurance Program. The determined developers were not about to let this deter them from realizing their goals. They decided to work *with* Union County and the NFIP regulations to effect the best possible result. From that point on, it was win/win for both of us. Together, they worked with Union County, the state of South Dakota and all other federal agencies to make this the newest and most state of the art community it envisioned. Union County was able to interpret the regulations and apply these principles and practices into a sound overall floodplain management program, and, now working hand in hand with the developers, were able to effect a community today known as Dakota Dunes, South Dakota.

Dakota Dunes today has a growing population of approximately 750 residents and does, in fact, have its own Interstate exit at mile marker one, an 18 hole "Arnold Palmer" designed golf course with an annual pro-am tournament, a 2,000-square-foot clubhouse and a growing business park. It currently has approximately 200 homes ranging in value from \$140,000 to \$4 million. There are also numerous townhomes and apartment buildings, all located to complement each other. There is a medical facility specializing in same-day surgery, numerous buildings offering office space for lease, and Iowa Beef Processors, the nation's largest beef processor, recently announced plans to locate their corporate offices here. Construction is constant. The developers and architects and I were able to integrate good floodplain management techniques into the overall construction to the benefit of both Union County and Dakota Dunes' Community Improvement District.

Union County has since had two storms in which high water levels were of great concern, one of which where the adjacent counties in South Dakota were Presidentially declared flood disaster areas. At neither time were any structures in Dakota Dunes in danger of being flooded.

Because this was a cooperative beginning, floodplain management and economic development survived and were beneficial to everyone. I credit the success of our floodplain management program to the very capable Federal Emergency Management Agency's NFIP specialists at Region VIII in Denver, Colorado, for their expert guidance, the developers who showed a genuine concern for their future tenants and residents, and, most of all, the Board of Union County Commissioners, who stood behind their ordinance, often at tenuous times, to the betterment of Union County. By adhering to their ordinance, not only did they save countless dollars in potential disaster response and recovery, but they also mitigated the threat to human safety during these operations. This is truly a success story. For more information contact John LaBrune, 115 E. Main, P.O. Box 640, Elk Point, South Dakota, 57025; (605) 356-3242.

SEVEN COMMUNITIES TAKE A WATERSHED APPROACH

BY PEGGY A. GLASSFORD VILLAGE MANAGER, FLOSSMOOR, ILLINOIS

On June 13, 1981, it flooded in the Butterfield Creek Watershed. The rain came in torrents, sheets, buckets — it flowed across our communities, filling streets and lapping at doorways. We watched with wonder as the water flowed through our towns — both in and out of creek, ditch, channel, and street. The water's sheer strength was impressive. It was soon to be matched, however, by an equally impressive show of force — this one was political.

At the municipal Board meetings following the June storm, it was standing room only. And it was not enough for the local government to say that "God makes rain." The government was under extreme pressure to "do something" about flooding. Political pressure to end flooding resulted in the formation of the Butterfield Creek Steering Committee, a watershed group that began by looking for a quick fix to the flood problem and found instead that the only effective solution is a long, cooperative journey in multi-objective stormwater management.

The Butterfield Creek watershed is a 26-square mile area located 30 miles south of Chicago, Illinois. It is a steadily developing watershed with about 65% in typical suburban land use and 20% still agricultural. The Watershed Committee is formed by seven communities who send appointed representatives; the group is advisory to the individual communities.

When the Committee was first formed, the hope was that by working together, the communities could attract state and federal dollars for a structural solution. The state and federal governments did combine efforts to provide for a significant engineering study which was concluded in 1987. At first, the communities were extremely disappointed with the results of the study. The required benefit/cost ratio was not sufficient to attract federal or state funds for the series of huge detention basins which could bring relatively quick relief. There would be no infusion of money and no easy answers.

Although the engineering study did not provide easy solutions, it did reveal three very important facts about our watershed. First, the flood insurance maps for Butterfield Creek were inaccurate. Our recalculated 100-year flood levels are higher — by as much as 2.5 feet in some locations. Second, deten-

tion standards in force in several watershed communities were inadequate to prevent increases in downstream flooding. Finally, the study identified significant areas of natural storage upstream. If this storage were to be removed, flood damages in our watershed would go up by 50% or more.

Recognizing their vulnerability, downstream communities requested the cooperation of all the towns of the watershed to continue to work together to prevent flooding from becoming worse. Fortunately, communities responded positively; the study had driven home the fact that flooding is a watershed problem that begins when the first raindrop hits the upland.

MULTI-OBJECTIVE GOALS Our Committee first established the following goals that clearly lay out the multi-objective nature of our work:

1. Reduce flooding and minimize streambank erosion in the Butterfield drainage basin.
2. Protect the storm and floodwater capacities of natural detention areas and protect wetlands.
3. Preserve public open space to increase recreational opportunities (including trails), protect and enhance natural resources, and improve the environment of communities and neighborhoods.
4. Improve stream maintenance to maximize natural resource benefits and aesthetics.
5. Improve the quality of water in Butterfield Creek and its tributaries.
6. Achieve a mutually supportive, basin-wide management and regulatory framework for development activities affecting Butterfield Creek.

TAKING ACTION With goals adopted, our next step was regulatory. We needed to address those critical issues pointed out by the engineering study. The Butterfield Creek Model Floodplain and Stormwater Management Code was published in November, 1990 and has since been adopted by all five of the critical upstream communities of the watershed. Here are some highlights of our model code:

- We are requiring that the storage capacity of those all important natural storage areas be maintained. Because portions of these areas are outside wetlands and floodplains, they were previously unregulated. Now, any construction on these properties will require compensatory storage to make up for lost natural storage. This is in addition to the usual detention requirements.
- Detention requirements have been significantly strengthened. We have beefed up detention standards to match real world conditions. Release rates must meet 100-year storm limits of 0.15 cubic feet per second per acre and two-year storm limits of 0.04 cubic feet per second per acre. The two-year requirement is aimed at stabilizing runoff rates to prevent increased erosion of downstream channels.
- The adverse water quality effects of development are addressed by requiring effective soil erosion and sediment control, encouraging "natural" drainage practices such as swales and vegetative filters, and specifying detention basin designs which enhance pollutant removal.
- Our regulatory floodplains have been expanded to coincide with those demonstrated by the engineering study. The revised mapping has also been adopted at our request by the State regulatory agency.
- We have limited uses in the floodway, allowing only public flood control, public recreation and open space, crossing roads and bridges.

- We are requiring 75-foot setbacks and 25-foot vegetated buffer strips for new development along streams.
- We are requiring site permits for all development. Development is defined as “any manmade change to real estate” and includes a catch-all provision that covers “any other activity that changes the direction, height or velocity of flood or surface water” This regulation applies to the grading of all private property including residential. Improperly graded property has been a source of neighborhood flooding problems for years — this is our effort to keep this from happening in the future.
- We have assembled all regulations related to stormwater management into one code. Therefore, our code includes floodplain regulations, stormwater detention, wetlands protection, and erosion control.

With stronger regulations, the residents threatened by floods have been given some insurance. We have not eliminated flooding, but it should not get any worse as long as we enforce our codes.

Over the last decade, our group has worked diligently toward our goals. We have attracted grant monies for demonstration projects illustrating improved detention and erosion techniques. We held a very successful open house to educate our residents on the advantages of floodproofing. We produced a video tape for our cable channel to explain the work of the committee. Our greenway plan has been incorporated into our region’s master greenway plan. We have created a Vision Plan which is shown graphically on a two-sided foldout publication. Most recently, we have been working through a State grant to purchase a portion of those all-important natural storage areas.

BUTTERFIELD EXPERIENCE AS A MODEL We believe there are four universally applicable lessons from the Butterfield experience. The first is that streams do not respect geographic or political boundaries. Stormwater management must have the cooperation of all the watershed communities in order to solve problems. Demonstrating a united effort also makes it much easier to get outside help.

The second lesson is that help is available. State and Federal agencies often receive criticism because of their regulatory responsibility; in fact, they are a resource of unbelievably knowledgeable and dedicated people who really want to help. We have been blessed with the help of these agencies. They cannot do all things, but if the locality is willing to work with what is possible, much can be accomplished.

The third lesson is that it is as important to know what can’t be done as what can be done. Our watershed had to accept that there would be no quick fix for flooding problems. We were going to have to help ourselves and really significant results for our stream and our residents would take years of hard work.

Finally, efforts to manage stormwater also provide an opportunity to protect the environment and provide recreation, but these efforts must be viewed in a holistic way in order to take advantage of the opportunities. A multi-objective approach is critical.

Our creek, like all streams, bears the imprint of the watershed, its geographical gathering area, in such a way that every activity on the land is registered in its waters. Flooding, erosion, and environmental degradation are the creek’s reaction to poor watershed planning. The Butterfield Committee hopes that the waters of our creek will one day bear the positive imprint of our improved planning. For further information, contact Peggy A. Glassford, (708) 798-2300 or Ralph Coglianese, (708) 481-8373.

SITUATIONS YOU WILL FACE AFTER A FLOOD

"The wake of a flood is a traumatic time and the easy thing to do is to rush in and fix what's been destroyed. We've learned that this is the time to ask if rushing to rebuild is just reinvesting in a future disaster and causing other long-term problems." — Terry Young, former Mayor, Tulsa, Oklahoma

Your job after a flood will be far easier if your community has undertaken both emergency preparedness and mitigation planning before the flood. Without such planning, very little gets done immediately after a flood. Emotions run too high.

At this time you have two primary responsibilities as a local official:

- Directing the immediate use of your community's resources to deal with the emergency; and
- Directing your community's longer-term recovery effort.

EMERGENCY RESPONSE At the local and county levels of government, elected officials play key roles in an emergency. The public expects its elected officials to show up and take charge. If your community is flooded, you and other local officials must respond to supply lifesaving operations, restore vital services, and provide for the human needs of the victims.

Successful emergency operations are the result of having been prepared. Experience shows that when emergency plans and procedures are made, understood, practiced, and used, reaction times during the emergency are reduced, coordination is improved, and overall response and recovery measures are more effective. The

pay-off will be lives saved and property preserved.

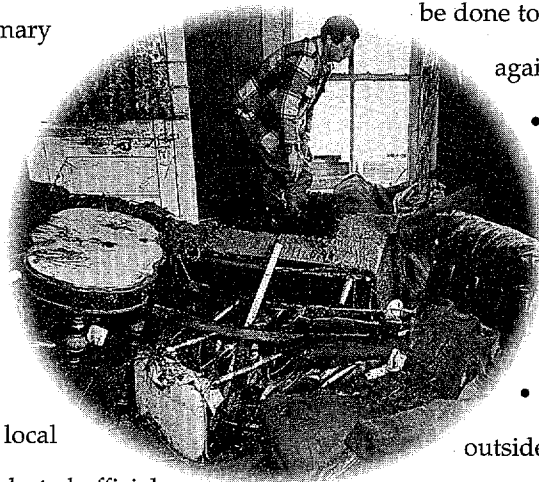
MITIGATION After the immediate flood emergency has passed, you face a number of other tasks that should be done to mitigate (reduce or eliminate risk)

against future flood losses:

- Learning what caused the flood, who was affected, and to what extent.
- Dealing with an emotional citizenry who want answers and immediate action.
- Finding out exactly what type of outside aid to expect, and when.
- Taking advantage of the "window of opportunity" to guide redevelopment.
- Leading your community's post-flood efforts.

FINDING OUT WHAT HAPPENED First, you need to investigate what happened and who was affected. If you were involved in the emergency response, then you may already have much information. If not, then your previously acquired understanding of your community's flood problem will greatly help you.

You will also want to know the *cause* so you can respond to the public and the media. The state and federal



YOUR COMMUNITY'S FLOOD-PLAIN management regulations probably have specific provisions for the repair or reconstruction of buildings that are damaged in a flood. Most communities use the National Flood Insurance Program standard. That is, if a building is "substantially damaged," (more than 50% of its pre-flood market value), it can only be repaired or rebuilt to meet the same requirements applied to new construction in flood hazard areas. Because very few citizens likely will be aware of this restriction, you should immediately see to it that this information gets out, along with the fact that they will need a permit for repair and rebuilding. You should also be prepared to explain the community's rationale for having such measures and the long-term benefit that they confer on present and future owners of the property.

agencies that have helped your community in the past can help provide answers to this and other questions.

DEALING WITH THE EXPECTATIONS OF YOUR CONSTITUENTS After a flood, be prepared for an emotional citizenry who want something done immediately. The human tendency is to want to repair the damages and to restore conditions to the way they were before the flood. People will want to get on with their lives as soon as possible. They will want you to allow them to do what they want, restore community services, and provide public assistance for cleanup and recovery. They will probably demand that you do something to prevent this from happening again.

After a flood, you have to balance a number of conflicting needs.

- How do I support the people who want to restore their lives and businesses as rapidly as possible and yet not place people back in harm's way?
- How do I restore community services quickly without putting them back in their at-risk, pre-flood condition and repeat our past mistakes?

Perhaps the most contentious situation you will face is that involving people who want to immediately repair or rebuild their flood-damaged homes or businesses. In many cases, public safety concerns will prevent people from re-entering the flooded



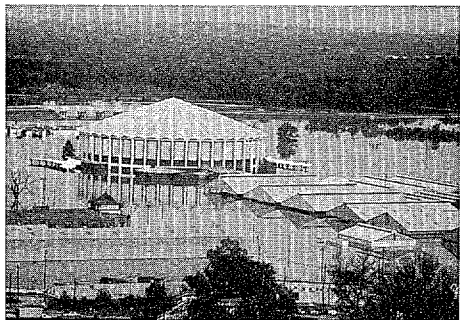
area for several days. Even when repairs can begin, people may be surprised to learn about local permit requirements and ordinances that "restrict" what they can do. Or they may expect you to waive all such restrictions because of the disaster.

One way to ensure that repair and rebuilding takes place carefully and in accord with your local regulations is to enact a temporary moratorium on issuing building permits for repairs or reconstruction after the flood. That way you and other officials buy valuable time to figure out what course of action the community needs to prevent a return to the status quo. The time required will be far shorter if your community has planned in advance for this situation.

OBTAINING OUTSIDE AID Your community will probably need to supplement its own resources with outside aid in order to recover from a flood. In most cases, a community does not know exactly what type and amount it can obtain. However,

residents will expect you to be familiar with the various assistance programs. You should also know about the state and federal requirements for obtaining various forms of flood recovery assistance.

Requests for outside aid are made through the state emergency management agency. The state may supply additional resources itself and/or coordinate a request for federal aid. If a major flood has occurred, the governor can request a federal



disaster declaration. The federal government, in turn, has three options. It could

- Issue a *disaster declaration*, which would make the resources of several dozen programs available to help your community recover from the disaster.

- Issue an *emergency declaration*, which provides assistance in the event of a short-term emergency.
- Provide *direct assistance* from various federal agencies through their own programs.

Most local officials who have had experiences with floods recommend figuring out what aid you might qualify for *before* a flood — that is, while you are formulat-

ing your emergency preparedness and mitigation plans. Start with the

Digest of Federal Disaster Assistance, published by the Federal Emergency

Management Agency (FEMA). The National Governors Association and FEMA have another publication, *National Emergency Assistance Programs*. Your state emergency management agency will know how to get copies for you.

"Any great disaster or problem usually produces a by-product called 'opportunity.' This is no less true today as we review our policies for managing floodplains." — Honorable Jim Edgar, Governor of Illinois

WITHOUT A PREVIOUSLY
prepared post-flood mitigation plan, your community will probably "recover" from the flood by restoring the affected area to pre-flood conditions. Unfortunately, it will then simply await the next flood, which will have similar results. Then the cycle will be repeated.

LEADING YOUR COMMUNITY'S POST-FLOOD EFFORTS The perfect time to make sure that flood damage does not occur again is before repairs or reconstruction of flood-damaged structures begin. But quickly putting everything back the way it was will only condemn your community to repeat the cycle. The best approach is a rational one that strives for long-term reductions in flood risk. This is the time to implement appropriate steps from your community mitigation plan, or to develop your own really innovative approaches to reduce future flood risk. If you and your professional staff have done your homework, you will be able to offer appropriate

THE AVERAGE LENGTH of a Small Business Administration disaster home loan is 18.5 years. For this period, the average monthly loan payment is \$140. Depending on the location, a flood insurance policy can be purchased for the equivalent of about \$12 a month.

recommendations when the opportunity arises.

This so-called "mitigation" approach involves *sustained* action to reduce or eliminate long-term risk to people and property from flood hazards. Some of the most successful mitigation measures are

- purchasing damaged structures and removing them from the floodplain
- building codes that specify flood-resistant construction techniques
- land use controls that guide development to safe areas
- public awareness campaigns
- elevating or floodproofing existing buildings
- setting up water retention, stormwater, or diversion measures.

"The [1979] buyout was the hardest thing we did in Kampsville but now I see it was the best thing we ever did." — Mayor, Kampsville, Illinois [The city suffered much less damage from the 1993 floods than neighboring communities did.]

There is a broad range of technical and financial assistance available for undertaking mitigation measures.

Some of the grant and cost-sharing programs do require that you have

an already-prepared mitigation plan and likely require that the community participates in the National Flood Insurance Program. This is another good reason for thinking about a post-disaster scenario before a drop of rain has fallen.

THE WINDOW OF OPPORTUNITY

For a short period after a flood hits your community, there will be an interval that has come to be called the "window of opportunity." During this time, you have the attention of the media. You have heightened awareness and support from both the public and other local officials. You have the availability of outside funding and a wide array of technical expertise that was not available before the flood. You can get things done quickly that you would never be able to do when flooding is the farthest thing from people's minds. You can take advantage of this window to make progress toward long-term community goals.

RESOURCES YOU CAN USE TO COPE WITH FLOODING

"The way flooding has been handled in the past has been too costly and repetitive. Money from higher levels of government is going to be less accessible so therefore, we must work together and come up with proactive solutions." — Beverly Anderson, Mayor, Darlington, Wisconsin

Your community's flood problems and its other needs are unique. Only you can know how much and what kind of financial, technical, and personnel support will be needed to minimize disruption from flooding and manage your floodplains to meet other community goals. However, whatever you do, it will likely require (1) allocation or reallocation of local resources, (2) careful administration and continuing public support for their use, (3) outside sources of assistance, and (4) learning from other communities' experience.

LOCAL RESOURCES As an elected official, you have the authority and responsibility to allocate community resources among competing interests and needs for the overall benefit of your constituents. When it comes to dealing with your community's flood problems, this includes identifying sources of local support of all kinds. Assess your resources. Do not overlook unusual sources of expertise or personnel, like volunteer groups, retired citizens, students, and business or professional organizations.

Among the possibilities are the following.

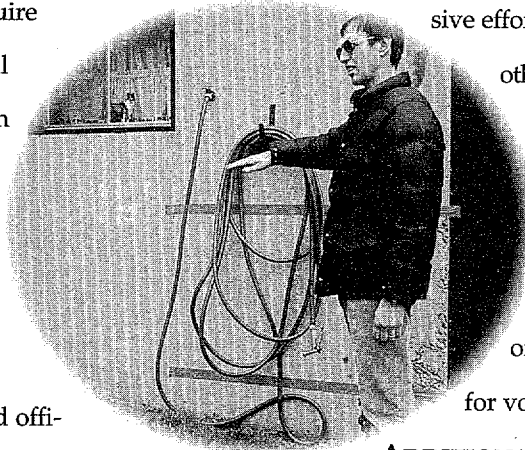
EXISTING OPERATIONS Your present staff may be able to carry out a number of measures including drafting ordinance provisions, preparing public information programs, and providing advice to floodplain residents.

SPECIFIC PROJECTS OR BUDGET ITEMS More extensive efforts, such as clearing debris and other obstructions from the community's streams and other water-courses and restoring them to their natural condition, may require a special budget item. Or you may need to organize a community-wide effort for volunteer assistance.

ADDITIONAL FUNDING (BOND ISSUE, SPECIAL ASSESSMENT, SPECIAL SERVICE DISTRICT, ETC.)

Larger projects, such as establishment or improvement of a local flood warning and response system, may require creating funding arrangements like a special assessment, so that beneficiaries contribute proportionally to the cost.

Appropriate resources should be allocated or reallocated to carry out selected measures within a designated time frame. It may take several years to accomplish some tasks, either because of their complexity or because only



limited resources are available. In these situations, you will need to make long-term plans for the continuity of the effort and for future budgets.

Be ready to answer questions like these:

- Why are local funds being spent to correct flood problems when we have so many other, higher priorities?
- What other community programs will have to be reduced or eliminated to pay for this program?
- Why should all of us have higher taxes, when only those people near the river need flood protection?

"The rain falls everywhere. Everyone contributes, pays, and benefits." — Ann Patton, Manager, Community Affairs and Planning, Tulsa, Oklahoma

It is obvious that the more support you have built, the easier it will be to justify using local resources. When individuals and organizations with diverse concerns and agendas already know how they will benefit from various floodplain measures, your support is broadened, and your task simplified.

PROGRAM MANAGEMENT Program management means finding and assigning sufficient resources to accomplish your community's goals, and also continually

"Show support for floodplain management toward your constituents, other local officials and your staff." — David Johnson,

Manager, Flood Control District of Maricopa County, Arizona

DIRECTION Responsibility for implementing a given measure can be assigned to an individual or to a specific department or office. Private groups may volunteer for or be persuaded to undertake a given project. This includes the establishment of timeframes for action.

OVERSIGHT After the initial assignment or commitment, you should support your professional staff and volunteer colleagues in their efforts.

VISIBILITY As a community leader, you need to keep the spotlight on the identified flood-related problems and opportunities. Make sure they are not overlooked by any relevant department or office — community planning, emergency services, zoning, public service, and economic growth, for example. Remind other elected officials of their importance, too.

BUDGETS You need to ensure that the community's annual budget always includes funding to implement previously adopted long-term measures. This includes com-

mitments the community has made to cost-share, maintain, operate, repair, or otherwise bear the burden for activities that may have been undertaken with outside assistance. Don't forget those agreements that were made before you took office.

OUTSIDE RESOURCES **USING OUTSIDE RESOURCES** Outside assistance can help alleviate some of the burdens of cost, expertise, and personnel. Some state and federal agencies provide advice and guidance, some can help fund certain activities, and some do both. In many instances they can offer information, data, and expertise that may not be available locally. They can also help interpret and effectively utilize data that are in the hands of local officials. Securing a major portion of the costs from outside sources can increase the likelihood of support from other officials and the public.

"In dry years, both financial and precipitation, it's very tempting to cut emergency management. Don't do it!" —
Gussie McRobert, Mayor, Gresham, Oregon

Do not overlook the private sector. Commercial and industrial concerns and nonprofit organizations may be willing to join local efforts. The publicity generated by such cooperative efforts can be a strong incentive for private participation.

Really capital-intensive efforts, such as public acquisition of a frequently flooded subdivision, relocating the residents, or constructing a levee, will almost certainly require outside funding from state and federal programs or other sources.



SECURING OUTSIDE RESOURCES Your community is more likely to be successful at obtaining outside assistance if it understands government regulations and the various funding programs and their access criteria. Most agencies have rules and conditions for securing assistance and funding. Keep in touch with governmental agencies and staffs to stay current on this information. Many regional planning commissions specialize in grant preparation and can be valuable resources for developing this understanding.

It will help greatly if you

- Are familiar with sources of assistance and their principal criteria.
- Understand how programs can be packaged to use local and outside cost-sharing.
- Maintain constant contact with outside organizations and agencies.

ASSISTANCE PROGRAMS

LOCAL FLOODPLAIN ACTIVITY

WHO COULD HELP

Planning

State natural resources agency; state emergency management agency; regional planning agency or special district; Federal Emergency Management Agency; U.S. Army Corps of Engineers; U.S. Department of Agriculture (USDA) Natural Resources Conservation Service; National Park Service; U.S. Environmental Protection Agency; private sector

Floodplain regulations

State natural resources agency; regional planning agency or special district; Federal Emergency Management Agency; U.S. Army Corps of Engineers

Development and redevelopment policies

State natural resources agency; regional planning agency or special district; Federal Emergency Management Agency

Information and education programs

State natural resources agency; regional planning agency or special district; Federal Emergency Management Agency; U.S. Army Corps of Engineers; USDA Natural Resources Conservation Service; private sector

Disaster preparedness

State emergency preparedness agency; state natural resources agency; Federal Emergency Management Agency; U.S. Army Corps of Engineers; private sector

Individual protective measures

State natural resources agency; Federal Emergency Management Agency; U.S. Army Corps of Engineers; USDA Natural Resources Conservation Service

Flood forecasting, warning, emergency preparedness

State emergency management agency; National Weather Service; Federal Emergency Management Agency; U.S. Army Corps of Engineers

Flood insurance

State natural resources agency; Federal Emergency Management Agency; flood insurance agents

ASSISTANCE PROGRAMS

LOCAL FLOODPLAIN ACTIVITY

WHO COULD HELP

Structural measures

U.S. Army Corps of Engineers; USDA
Natural Resources Conservation Service

Flood recovery

State emergency management agency;
Federal Emergency Management Agency;
U.S. Army Corps of Engineers; USDA
Natural Resources Conservation Service;
U.S. Department of Housing and Urban
Development; U.S. Department of Trans-
portation; Small Business Administration;
private sector

Protection of natural resources

State natural resources agency; regional
planning agency or special district; U.S.
Environmental Protection Agency; U.S.
Fish and Wildlife Service; National Park
Service; U.S. Army Corps of Engineers;
USDA Natural Resources Conservation
Service; private sector

Acquisition and relocation

State natural resources agency; state
emergency management agency; Federal
Emergency Management Agency; U.S.
Department of Housing and Urban
Development; U.S. Army Corps of
Engineers; U.S. Environmental Protection
Agency; U.S. Fish and Wildlife Service

See Appendix A for more details

- Understand your community's obligations and the long-term commitments of accepting assistance under certain programs. These rules and conditions should be thoroughly shared with the public, particularly the stakeholders.

USING THE EXPERIENCES OF OTHERS One of the best things you can do is to talk to officials from other communities to see what they did — both communities that did not wait for a flood to happen and communities that have already had floods. What types of assistance did they need and how did they get it?

Read the “Success Stories” of other communities in the center section of this guidebook. In it, local officials like you tell how they put together assistance and funding packages to reach their community goals.

ANNOTATED BIBLIOGRAPHY

USING MULTI-OBJECTIVE MANAGEMENT TO REDUCE FLOOD LOSSES IN YOUR WATERSHED *A guidebook that explains, in some detail, how to utilize the multi-objective management approach to reduce flood losses and address other community concerns. Coordination of flood loss reduction with other goals and needs of the community to develop a stronger, more comprehensive local program is demonstrated.* Prepared by the Association of State Floodplain Managers for the U.S. Environmental Protection Agency, Washington, D.C., 1996. 73 pp., including appendices. Available from the EPA, 1-800-832-7828.

PROTECTING FLOODPLAIN RESOURCES: A GUIDEBOOK FOR COMMUNITIES *A guidebook that provides relevant information for local officials, citizens, landowners, and groups interested in protecting and restoring the natural resources and functions of floodplains. It focuses on local "grass roots" efforts needed to effectively manage and protect the natural resources of the floodplain environment, including wetlands, riparian habitats, historic sites, and aesthetic amenities. Well illustrated.* Prepared by the Federal Interagency Floodplain Management Task Force, Washington, D.C., 1995. 41 pp. FEMA 268. Available from the Federal Emergency Management Agency, 1-800-480-2520.

FLOOD PROOFING TECHNIQUES, PROGRAMS, AND REFERENCES *A report intended to assist in understanding and using floodproofing techniques to reduce the likelihood of future flood damage to buildings and their contents. Such techniques are typically applied to existing structures located*

in flood hazard areas, but they can be incorporated into the design and construction of new buildings. It also provides information on government agencies that offer such assistance. Prepared by the U.S. Army Corps of Engineers, Washington, D.C., 1996. 25pp. Available from Corps division or district offices or telephone (202) 761-0169.

REPORT ON COSTS AND BENEFITS OF NATURAL HAZARD MITIGATION *Presents 16 case studies on various mitigation measures. For each, the mitigation measure is described and the anticipated, or realized, direct and indirect benefits are identified. The case studies demonstrate that mitigation is a cost-effective means of limiting the damage that can result from natural hazards and the costs individuals, businesses, and governments must pay in recovering from these events.* Prepared by the Federal Emergency Management Agency, Mitigation Directorate, Washington, D.C., 1997. 50 pp. FEMA 294. Available from FEMA, 1-800-480-2520.

APPENDIX A: OUTSIDE SOURCES OF ASSISTANCE

STATE Most states have floodplain management assistance programs consisting of services offered by different agencies and other entities within the state. The central agency is usually the one that has been designated by the governor to coordinate the National Flood Insurance Program for the state — probably the department for natural resources, water resources, or environmental protection, but it may be housed in an emergency preparedness agency or elsewhere. This agency is a good source of information not only about its own services, but also on the assistance that can be obtained from other state, federal, and regional entities. It may also be able to provide some contacts for assistance offered by the private sector. It should be the first point of contact for a community seeking outside assistance.

Alabama	(205) 242-5503
Alaska	(907) 269-4567
Arizona	(602) 417-2445
Arkansas	(501) 682-3982
California	(916) 653-4393
Colorado	(303) 866-3441
Connecticut	(203) 424-3706
Delaware	(302) 736-4411
District of Columbia	(202) 727-7577
Florida	(904) 413-9960
Georgia	(404) 656-3500
Guam	11-671-411-7567
Hawaii	(808) 587-0222
Idaho	(208) 327-7993
Illinois	(217) 782-3862
Indiana	(317) 232-4178
Iowa	(515) 281-8942
Kansas	(913) 296-2933

Kentucky	(502) 564-3410
Louisiana	(504) 379-1432
Maine	(207) 287-8063
Maryland	(301) 974-3825
Massachusetts	(617) 727-3267
Michigan	(517) 335-3182
Minnesota	(612) 296-9226
Mississippi	(601) 960-9980
Missouri	(314) 526-9103
Montana	(406) 444-6654
Nebraska	(402) 471-2081
Nevada	(702) 885-4240
New Hampshire	(603) 271-2231
New Jersey	(609) 292-2296
New Mexico	(505) 827-6140
New York	(518) 457-3157
North Carolina	(919) 733-3867
North Dakota	(701) 224-4898
Ohio	(614) 265-6755
Oklahoma	(405) 525-4747
Oregon	(503) 378-2332
Pennsylvania	(717) 787-7403
Puerto Rico	(809) 727-4444
Rhode Island	(401) 277-6478
South Carolina	(803) 734-9120
South Dakota	(605) 773-3231
Tennessee	(615) 741-2211
Texas	(512) 371-6317
Utah	(801) 538-3400
Vermont	(802) 244-6951
Virgin Islands	(809) 774-3320
Virginia	(804) 786-2064
Washington	(360) 407-6796
West Virginia	(304) 348-5380
Wisconsin	(608) 266-1926
Wyoming	(307) 777-7566

REGIONAL PLANNING AGENCIES, COUNTY OR
REGIONAL FLOOD CONTROL DISTRICTS, AND
OTHER SPECIAL DISTRICTS These agencies and

districts have been created by legislative bodies in many parts of the country to carry out specific responsibilities, typically to assist local governments in multi-jurisdiction planning and problem resolution. These organizations often have full-time staff who have developed considerable expertise and insight to assist localities in planning in a multi-jurisdictional environment, in the design of desired measures, and in securing or providing funds for their implementation.

PRIVATE The private sector is often overlooked as a source of assistance for planning and carrying out floodplain-related measures. Private organizations often can marshal needed community involvement and support, provide information and special expertise or insight, and help secure funding for certain activities.

- Nonprofit organizations like *The Nature Conservancy* and the *National Audubon Society*. They operate throughout the United States to acquire and preserve sensitive natural areas. Much of the land targeted by these groups is wetland or has some water access, including much floodplain land. Along these lines, *Ducks Unlimited* has programs to preserve wetlands as waterfowl breeding areas. The Nature Conservancy also has an extensive data base on local natural resources.
- Land trusts that operate at the municipal, regional, or state level. These organizations preserve land for its natural, recreational, scenic, historical, or productive value. Their numbers have increased over ten-fold in the past three decades. *The Trust for Public Land*, a national land trust, has assisted in the acquisition

of critical areas.

- Other conservation organizations like the *Sierra Club*, the *Izaak Walton League*, and the *National Wildlife Federation*. They are involved in a myriad of activities relating to land use and resource conservation.
- Foundations that provide financial support for projects or programs they deem worthwhile and within their area of interest.
- Organizations that provide flood relief and recovery assistance, such as the American Red Cross and a number of church-sponsored affiliates.
- Historical preservation societies whose members are interested in preserving community heritage.
- Kiwanis, Lions, Rotary, and other service clubs, which can help build community support, provide resources, and foster business involvement.
- Local groups, organizations, and those interested in a particular purpose or activity such as nature study, conservation, hunting, and fishing. Besides public involvement, they can also render expertise and resources.
- Boy and Girl Scout troops that can benefit from involvement in community projects like a stream or bank cleanup.
- Church groups that can adopt neighborhood or community projects.
- Businesses and corporations that can render support, provide resources, donate lands, materials and equipment, and adopt projects.

FEDERAL These descriptions of assistance were prepared by the respective agencies:

THE NATIONAL PARK SERVICE, U.S. DEPARTMENT OF THE INTERIOR The Rivers, Trails and Conservation

Assistance (RTCA) Program of the National Park Service is helping to bring quality nature-based recreation opportunities to people where they live and work. RTCA becomes involved when formally asked by landowners, local officials, and citizens who share the desire to conserve and enhance close-to-home rivers, trails, and open spaces in their communities. All projects are founded on cost-sharing, cooperation, and community initiative.

Technical assistance is offered to help plan greenways; turn abandoned rail lines into trails; establish organizations to protect rivers or other special places; mitigate the effects of hydroelectric dams through the federal dam licensing process; revitalize urban waterfronts; protect and promote local heritage; plan bikeways; promote "water trails" for canoes and other small boats; and reduce flood losses without damaging the natural functions of floodplains.

ASSISTANCE: Technical assistance for planning, public participation, and identifying funding.

WHO IS ELIGIBLE: State and local agencies and non-profit organizations.

PROVISIONS: All projects must involve cost-sharing, cooperation, community initiative, and conservation objectives. No grants or direct funding is provided through this program.

WHO TO CONTACT: Rivers, Trails and Conservation Assistance Program, National Park Service, P.O. Box 37127, Washington, D.C. 20013, (202) 565-1200.

U.S. ARMY CORPS OF ENGINEERS The Corps of Engineers has several programs that help communities deal with floods and flood-related problems before, during, and after a flood. The assistance is in the form of flood damage reduction and ecosystem restoration projects and

technical assistance before the flood and emergency support during and after the flood.

PROJECTS include structural measures such as dams, channel modifications, and levees, as well as nonstructural measures such as floodproofing, flood warning/preparedness, permanent evacuation, and preservation of open space. They must be justified, i.e., the benefits exceed the costs, and cost shared by a local sponsor (state and/or community). Cost sharing for all projects (structural, nonstructural, and hurricane/storm damage reduction) is 35% from local sponsors, including 5% cash. As a part of their share of the costs, the local sponsors must provide lands, easements, rights-of-way, relocation and disposal sites, and maintain the project after it is completed. Larger projects require Congressional approval while smaller projects are often implemented under the Corps' Continuing Authorities Program.

TECHNICAL ASSISTANCE is provided through the Flood Plain Management Services (FPMS) Program and the Planning Assistance to States (PAS) Program to help communities develop their own plans and initiate their own actions. Upon request and free of charge, the FPMS Program provides the full range of technical services and planning guidance needed for floodplain management. This can vary from site-specific data that can be furnished in one day or less to larger, community-wide comprehensive floodplain management plans that can take up to a year to complete. The PAS Program also, upon request, can provide similar assistance but it is cost-shared with the local sponsor paying 50% and limited to \$500,000 in a single state in any one year.

EMERGENCY SUPPORT is provided to augment state and community lifesaving or life protecting efforts during and after a major or catastrophic flood disaster. This sup-

port is provided only after the state and community have exhausted their resources. During the flood, it includes advice on flood emergency preparations, personnel and materials for flood fighting, search and rescue operations, emergency repairs to flood damage reduction projects, and emergency supply of clean drinking water where sources are contaminated. After the flood, it includes debris clearance and temporary construction of emergency access routes such as streets, roads, bridges, airfields, and any other facilities necessary for passage of rescue personnel; emergency restoration of critical public services and facilities for water supply, electric power, and fire-fighting; and technical assistance and damage assessment, including safety inspection and stabilization or demolition of damaged structures.

The Corps also, upon request, will rehabilitate publicly sponsored flood damage reduction projects. The rehabilitation is limited to repair or restoration to pre-disaster conditions and must be justified with the local sponsor providing 20% of the total costs.

WHO TO CONTACT: the Flood Plain Management Services Program Manager at your local Corps division or district office. If you do not know how to reach them, write to HQUSACE, ATTN: CECW-PF, Washington, D.C. 20314, or phone (202) 761-0169.

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FEMA administers two programs that can provide funds to local communities to implement measures to prevent future damage from natural hazards.

THE HAZARD MITIGATION GRANT PROGRAM provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the program is to

reduce future loss of life and property due to natural disasters and to enable mitigation measures to be implemented during immediate recovery from a disaster. A local government must apply for the HMGP through the state, because the state is responsible for administering the program. FEMA can fund up to 75% of the eligible costs of each project and the state or local match does not need to be cash; in-kind services or materials may be used. *Applicants should contact their State Hazard Mitigation Officers for specific details.*

THE FLOOD MITIGATION ASSISTANCE PROGRAM (FMA) will provide grants to state and local governments for planning assistance and projects that reduce the risk of future flood damages, such as elevating homes, conversion of property to open space, or minor drainage improvements. This program is available starting in 1997.

WHO TO CONTACT: Region I (Boston) (617) 223-9540; Region II (New York) (212) 225-7209; Region III (Philadelphia) (215) 931-5500; Region IV (Atlanta) (770) 220-4260; Region V (Chicago) (312) 408-5500; Region VI (Denton, TX) (940) 898-5399; Region VII (Kansas City, MO) (816) 283-7061; Region VIII (Denver) (303) 235-4800; Region IX (San Francisco) (415) 923-7100; Region X (Bothell, WA) (425) 487-8800.

U.S. DEPARTMENT OF AGRICULTURE The U.S. Department of Agriculture (USDA) offers landowners financial, technical, and educational assistance to implement conservation practices on privately owned land. With the help offered by USDA, farmers and ranchers can carry out land management practices that reduce soil erosion, improve water quality, and enhance forest land, wetlands, and wildlife habitat. Incentives offered by USDA agencies promote sustainable agricultural practices,

which protect and conserve valuable farmland for future generations. USDA assistance also helps individuals and communities restore natural resources after floods, fires, or other natural disasters.

The following cost-share programs are managed by USDA's Farm Service Agency and Natural Resources Conservation Service. For details, contact the local USDA Service Center.

EMERGENCY CONSERVATION PROGRAM (ECP)

provides financial assistance to farmers and ranchers for restoring farmland damaged seriously enough by natural disasters to impede normal farming operations. ECP also helps with funds for carrying out emergency water conservation measures during periods of severe drought. Emergency conservation assistance is available for removing debris and restoring permanent fences, dams, ponds, irrigation systems, and other installations. Conservation problems that existed before a disaster are not eligible.

EMERGENCY WATERSHED PROTECTION PROGRAM (EWP) is designed to reduce threats to life and property in communities ravaged by natural disasters. It provides technical assistance and cost sharing to restore watersheds. Assistance includes installing or repairing conservation measures that prevent flooding and soil erosion. Measures include establishing vegetative cover, gully control, and streambank protection devices; removal of debris and sediment from channels; and repairing existing water control structures. In subsequent storms, EWP projects protect homes, businesses, highways, and public works from further damage. In addition, the Secretary of Agriculture may purchase floodplain easements under EWP.

FLOOD RISK REDUCTION PROGRAM authorizes voluntary contracts that provide one lump-sum payment

to producers with contract acreage on a farm with land that is frequently flooded. The payment will equal 95% of 7-year market transition payments, and other payments to offset estimated federal outlays on frequently flooded land. In return, the producer agrees to comply with applicable wetlands and highly erodible land requirements and to forego commodity loans, crop insurance, conservation program payments, and disaster payments.

SMALL WATERSHED PROGRAM assists farmers and small communities by solving natural resource and related economic problems on a watershed basis. Participants must have a government sponsor. Projects include watershed protection, flood prevention, erosion and sediment control, water supply, fish and wildlife habitat enhancement, wetlands creation and restoration, and public recreation in watersheds of 250,000 or fewer acres. Cost sharing is paid to establish structural and management practices that protect watersheds, prevent floods, control erosion and sediment, improve water quality, and create or improve water supplies, wildlife habitat, wetlands, and public recreation.

SEVERAL OTHER AGENCIES also provide assistance to localities for flooding and floodplain management. They include:

- U.S. Department of Commerce, National Weather Service
- U.S. Environmental Protection Agency
- U.S. Department of Housing and Urban Development.

You may contact the local, state, or regional office of these agencies to determine the types of assistance they may be able to offer your community.

APPENDIX B: MEASURES THAT CAN BE EMPLOYED AT THE LOCAL LEVEL TO REDUCE FLOOD LOSSES

1. MEASURES TO PREVENT AN INCREASE IN FLOOD LOSSES BY MANAGING NEW DEVELOPMENT.

FLOODPLAIN REGULATIONS

- Zoning ordinances control further development in known flood hazard areas by preventing structures from obstructing flow in the floodway and requiring that construction permitted in other areas be protected from flood losses.
- Subdivision regulations require that flood hazards be overcome in the subdivision of land for sale or building development.
- Building codes establish specifications for construction in flood hazard areas to minimize flood damages.

DEVELOPMENT AND REDEVELOPMENT POLICIES

Other public actions can guide development to allow for the flood hazard and the natural characteristics of the floodplain. They may be applied through the design and location of utilities and services to serve low-risk or flood-free areas, through policies of open space acquisition and easement, and through redevelopment or permanent evacuation. Another essential policy is to require adequate detention of stormwater runoff in developing areas to prevent flooding from becoming worse.

INFORMATION AND EDUCATION Flood hazard information is vital if informed floodplain management decisions are to be made by officials, professional staffs, and affected individuals. It is important that all stakeholders understand the nature of the flood risk in terms of flood levels, hazards, and impacts in a specific area.

2. MEASURES TO REDUCE THE EXPOSURE OF EXISTING DEVELOPMENT TO FLOOD RISK.

DISASTER PREPAREDNESS Preparedness plans and programs provide for pre-disaster mitigation, warning, and emergency operations. The success of such planning depends largely on the degree to which individuals and local governments protect themselves by taking appropriate hazard mitigation measures to reduce their exposure to flood risk.

ACQUISITION AND RELOCATION These activities may be part of redevelopment or urban renewal or a separate project that provides for removal of structures and facilities, particularly from the floodway and perilous flood-prone areas, leaving them free for non-damaging open space uses. After a flood, the acquisition of heavily damaged structures is often practical.

FLOOD FORECASTING AND WARNING SYSTEMS AND EMERGENCY PLANS Flood forecasting systems provide information on the time of occurrence and magnitude of flooding expected along rivers and streams. Flood warnings can be issued and emergency protective measures undertaken by individuals and the community. The effectiveness of such systems depends both on the time available and on having a local emergency action plan in place before a flood occurs.

FLOOD INSURANCE Under the National Flood Insurance Program, flood insurance is available to property owners and renters in communities that participate in the program. To become and remain eligible to partici-

pate, communities must agree to enact and enforce floodplain management regulations consistent with the program requirements. Because of the benefits to its citizens, and the effects of non-participation, most flood-prone localities are participating in the program.

INFORMATION AND EDUCATION Flood hazard information may be used in addressing existing flood problems. It is vital in the formulation of alternative flood protective measures by both government and individual decisionmakers. Information on properties subject to flood risk and probabilities of various levels of loss can help translate the hazard into terms that stimulate appropriate local action.

INDIVIDUAL PROTECTIVE MEASURES A number of measures can be employed by individuals to keep flood damage within acceptable limits. Those most frequently used include:

- raising structures in place to above expected flood levels
- constructing small walls or levees around structures
- modifying structures to keep water out
- relocating some contents above expected flood levels to reduce the effects of water entering the building.

Such measures can be undertaken during repair, remodeling, or expansion of existing structures.

STRUCTURAL MEASURES TO CONTAIN OR CONFINE FLOOD WATERS The most commonly used flood protection structures include

- flood water detention dams and reservoirs
- levees, floodwalls, and dikes that protect areas behind them from certain levels of flooding
- channel alterations that confine more water to the channel and accelerate flood flows

- onsite detention measures that provide temporary storage of stormwater runoff.

3. MEASURES TO PRESERVE AND RESTORE THE NATURAL RESOURCES AND FUNCTIONS OF FLOODPLAINS.

The importance of working with, and effectively utilizing, the floodplain's natural functions and resources cannot be overstated. Through natural resource planning, a number of community goals, including flood loss reduction, often can be achieved at a substantially reduced overall cost. Retaining the natural resources and functions of floodplains can not only help communities to reduce the frequency and consequences of flooding, but also minimize stormwater management and nonpoint pollution problems, and for less money than building facilities to correct them.

Traditionally, although much attention has been focused on the hazards and inconveniences associated with floods, less attention has been directed toward the natural resources and functions of floodplains and their considerable value to the community. Among the benefits they provide are natural storage of flood waters, open space and recreation, water quality protection, erosion control, and preservation of natural habitats. But lack of attention and misunderstanding of their functions have led to their alteration and in many cases to the degradation and destruction of their natural resources.

Measures for preserving floodplain resources and functions involve preventing the alteration of the natural and beneficial resources or maintaining the floodplain environment as close to its natural state as possible. The measures that can be employed include:

- floodplain regulations to control or prohibit development that will significantly alter natural resources
- development and redevelopment policies focused on resource protection
- information and education for both community and individual decisionmakers
- review of community programs to identify opportunities for floodplain preservation.

Measures for restoring diminished or destroyed resources and functions provide for re-establishment of an environment in which these functions can again operate. Measures that can be used involve improving the natural condition of areas or restoring them to their previous natural state. These could include:

- land reuse policies focused on resource restoration
- information and education on needs and processes
- review of community programs to identify opportunities for floodplain restoration.

CHECKLIST FOR ADDRESSING YOUR COMMUNITY'S FLOOD PROBLEMS

ACTION ITEM	YOUR TIME FRAME FOR COMPLETION				
	3	6	12	24	36 MONTHS
Investigate your community's flood risk (read newspapers, review studies)	☐	☐	☐	☐	☐
Visit areas subject to flooding, talk to residents	☐	☐	☐	☐	☐
Learn about the natural functions and resources of your community's floodplains	☐	☐	☐	☐	☐
Investigate what your community has already done to minimize the consequences of future floods	☐	☐	☐	☐	☐
Take inventory of responsibilities of the various departments of your local government for flood-related tasks	☐	☐	☐	☐	☐
Identify which state, regional, and federal agencies have helped with flood-related activities	☐	☐	☐	☐	☐
Talk to officials in other communities to see what they did	☐	☐	☐	☐	☐
Investigate ways to meet other community interests, needs, and concerns while working on floodplain issues	☐	☐	☐	☐	☐
Lead consensus-building on setting community goals and objectives	☐	☐	☐	☐	☐
Lead consensus-building on ways to reach community goals and objectives while dealing with flooding	☐	☐	☐	☐	☐
Establish cooperative arrangements with adjoining communities to address contributing problems	☐	☐	☐	☐	☐
Investigate ways to obtain outside assistance	☐	☐	☐	☐	☐
Make a <i>personal</i> commitment to your community's floodplain management effort	☐	☐	☐	☐	☐

ACTION ITEM**YOUR TIME FRAME FOR COMPLETION****3 6 12 24 36**

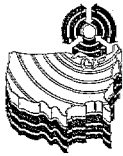
Take official action to adopt a program

☐ ☐ ☐ ☐ ☐Allocate sufficient resources to carry out
the adopted program or activity☐ ☐ ☐ ☐ ☐Ensure that the community's annual budget
includes funding for continuous implementation
of adopted long-term measures☐ ☐ ☐ ☐ ☐Identify an easy win-win project and do
it quickly☐ ☐ ☐ ☐ ☐

I CREDIT THE SUCCESS of our floodplain management program to the very capable Federal Emergency Management Agency's National Flood Insurance Program specialists at Region VIII in Denver, Colorado, for their expert guidance; the developers who showed a genuine concern for their future tenants and residents; and, most of all, the Board of Union County Commissioners, who stood behind their ordinance, often at very tenuous times, to the betterment of Union County. By adhering to their ordinance, not only did they save countless dollars in potential disaster response and recovery operations, but they also mitigated the threat to human safety during these operations. This is truly a success story. *John LaBrune, former Floodplain Manager, Union County, South Dakota*



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