

National Flood Policy in Review 1994

May 1994

This report was prepared in response to the White House Interagency Floodplain Management Review Committee's request for input from informed professionals to help the Committee examine the response to the 1993 Midwest flood, and to help formulate recommendations for changes in national policies, procedures, and programs. This report is also intended to guide the ASFPM and others as the debate on national flood policy continues.

PREFACE

The nation's response to the Midwest flood of 1993 was unlike any previous response. The severity of the flood galvanized national attention for nearly two months. Policy makers in WashingtonCmany still in their first year in officeCwere receptive to new direction and policy initiatives. In the upper Midwest, states with some of the most progressive floodplain management programs in the country were urging national change. And finally, the long-talked-about concept of mitigation became unquestionably central to an administration's approach to recovery.

This unprecedented response to a flood was in part a demonstration of how floodplain management concepts could be applied to national policy. The problem, however, is that much of what was attempted or accomplished after this flood was primarily the result of the efforts of a handful of committed individuals who had the insight and opportunity to make the recovery a vehicle for positive change. The challenge now is to develop the means to incorporate floodplain management initiatives and the lessons learned from this flood into a cognizant and productive national policy that will ensure similarCor even betterCresults after the next flood.

BACKGROUND

Like other domestic policies of the United States, the flood protection programs in place today were very much shaped by the events and policies of a previous era. But as citizen expectations, technology, and economics change, likewise our national policies require adjustment.

Today's flood policies were initially crafted in recognition of a federal role in flood protection in the mid to late 1800s. This policy was modified after devastating flooding in the late 1920s and early 1930s. The policy direction at that time was founded on the popular belief in human ability to control nature through technological advances and through the strength of the federal government. In the late 1950s and 1960s it was recognized that federal programs could not control all floods and that management of floodprone lands was necessary. With the establishment of the National Flood Insurance Program (NFIP) in 1968, the relationship between the federal government and state and local governments was altered. From this point forward it was recognized that flood protection was not simply the responsibility of the federal government. The NFIP also served as a mechanism to bring floodplain management to the states and communities of the nation. Now, in 1994, it appears that adjustments are needed once more to reflect societal changes.

The significant changes we are seeing today include a recognition of the importance of the natural environment, recognition of the inherent risk of living in floodprone areas (with or without flood control structures), a general impatience on the part of society to continuously bail out those that choose to live at risk, and reductions in government spendingCwhich translate into reductions in large, single-purpose programs and the need to integrate numerous smaller programs to reach a solution to flood problems.

The recommendations in this report reflect these societal realities and represent the cumulative experiences of floodplain managers nationwide. As the nation's leading voice in floodplain management, the Association of State Floodplain Managers offers this report as a partial vision of timely and important adjustments needed in national flood protection policy.

I. FLOOD INSURANCE

The passage of the National Flood Insurance Program in 1968 marked a significant shift in public policy. The NFIP was the vehicle that brought floodplain management to the nation. Although it is not perfect, the NFIP has provided the programmatic foundation that allows current debates on alternatives to flood control to take place. Two central components make the NFIP a strong program: (1) its localBstateBfederal partnership and (2) its "quid pro quo" arrangement, whereby minimum land use management and performance criteria must be adopted and implemented by localities in order to be eligible for flood insurance and other continuing federal benefits.

For the past several years overtures have been made in Washington toward modifying or reforming the NFIP. S. 1405 and H.R. 3191 are the most recent attempts to accomplish this. Appropriately, the changes outlined in those two bills have the best potential to make lasting and significant modifications to the program. S. 1405 addresses three critical issues: the establishment of a mitigation insurance fund, increased enforcement of mandatory flood insurance purchase provisions, and the inequity of continued insurance coverage for coastal erosion in the absence of building, zoning, or other standards that would mitigate its damaging impacts.

Over the past five years the NFIP has reached a plateau in its massive effort to map local floodplains and develop community-based floodplain management programs. As flood damages continue to mount, however, it is critical to recognize that this work represents a foundation for future activities and not the pinnacle of achievement. For the NFIP to be more effective, several additional efforts should be undertaken. They are discussed below under three headings: Repetitive Losses, Increasing the Number of Flood Insurance Policies, and Land ManagementBFlood Insurance Interaction.

Repetitive Losses

When insurance claims are filed again and again for flood damage to a single building, that building becomes known as a "repetitive loss structure." These structures represent a very low number of policies but account for a disproportionately large share of all the flood insurance claims filed and paid. While estimates vary, it appears that 2% of the policies have accounted for 25-50% of the claims and a similar proportion of dollars paid out from the National Flood Insurance Fund. Geographically, many of these losses appear to be concentrated in the Gulf Coast states. The current mitigation strategy for these structures relies on the structure being substantially damaged, at which time it would be reconstructed, elevated, or floodproofed to prevent future damage.

The repetitive loss problem would begin to be addressed by these specific modifications to current policy:

- Authorization of a provision for mitigation insurance that would include conditions to deal with repetitive loss structures.
- Redefining "substantial improvement" under the NFIP so that improvements to a structure over time are treated cumulatively, rather than each improvement being considered individually.
- Reversal of the recent trend by the Federal Emergency Management Agency (FEMA) of allowing the use of replacement cost value instead of market value when "substantial" damage is calculated. In the 1993 flood, this ruling caused problems and basically undercut the positions of communities that were prepared to aggressively enforce substantial damage provisions.

- Financially neutralize repetitive losses by raising premiums and/or deductibles and adjusting coverage for repetitive loss structures unless mitigation measures (including dry and wet floodproofing) are undertaken.

Increasing the Number of Flood Insurance Policies

After 25 years the number of flood insurance policies is still unacceptably low. This is partly due to a lack of understanding of both the flood risk and the insurance offered, and a lack of enforcement of the mandatory purchase provisions for flood insurance. Yet the basic premise of using an insurance pooling mechanism to shift the risk of flood damage from all taxpayers to those that have chosen to live at risk is good public policy. Unfortunately, at present there is little recognition of the exposure of individuals and the nation to catastrophic loss due to lack of coverage. As a point of comparison, an at-risk structure in a floodplain will have better than a 25% chance of being flooded by a 100-year flood at some time during the life of its 30-year mortgage, but there is only a 1% chance that this same structure would have a fire. Yet few, if any, homeowners or lenders would even consider foregoing fire insurance.

Mandatory Purchase

The mandatory purchase elements of the NFIP need to be revised to accomplish the following:

- Provide for the escrow of flood insurance premiums;
- Impose penalties on lenders for non-compliance;
- Withhold disaster relief from those who willingly drop coverage; and
- Provide authority for individuals and agencies to sue agents and lenders that fail to enforce the purchase requirements.

Waiting Period

Currently a flood insurance policy can be purchased as few as five days before a flood, thus encouraging individuals to hold off on purchase until the river is forecast to flood. The waiting period should be lengthened, perhaps to 30 days.

Procedures

The application and administration process should be reviewed by the insurance industry, with an eye toward simplification.

Working Relationships

Floodplain managers and the insurance industry need to improve working relationships, starting with cross education. Under current conditions, misinformation abounds, especially about flood insurance coverage. State and local floodplain managers are in a good position to advise citizens about the basics of insurance availability and to promote the wisdom of the land management/insurance interaction of the NFIP. Efforts to further educate floodplain managers about the insurance aspects of the program, and insurance agents about floodplain management, would be a significant first step.

Land Management & Flood Insurance Interaction

The premise of the NFIP is that the federal government will offer flood insurance if the local government enforces land use and construction practices that eliminate the threat of flooding. Two notable exceptions to this general rule are in coastal erosion zones and in areas that are subject to flood risks but lie outside of Special Flood Hazard Areas (mapped floodplains).

- A management and mitigation component for coastal erosion should be developed; if such a component is not incorporated into the NFIP, coverage of this peril should be dropped.
- Flood insurance is available at reduced rates for structures outside of mapped floodplains, but there are no management measures required of the community for these areas. Experience indicates that many who purchase insurance in these non-mapped floodplains recognize an inherent flood risk. This represents a potential drain on the flood insurance fund with no opportunity to modify existing construction or to regulate the construction of additional at-risk structures. It has been proposed that flood insurance be made available only in mapped floodplains—the idea being that citizens in unmapped but floodprone areas would demand the mapping of these areas in order to be eligible for flood insurance. An alternative would be requiring that, when a flood insurance damage claim is filed for a structure outside of a mapped floodplain, the area be designated as a floodplain and the community be notified of the need to manage this newly mapped area.

II. DISASTER ASSISTANCE

Historically, disaster programs in the United States have been directed at restoring people back to "normal" as quickly as possible. Unfortunately, in our rush to return people to normal, we have also restored them to their previous at-risk condition. Recently the concept of hazard mitigation has moved from floodplain management to the hazard management community. Recent administrative actions of FEMA and the modifications of the Hazard Mitigation Grant Program (Section 404 of the Stafford Act) have pushed mitigation initiatives far forward. However, there are still rewards in current policy for those who do no pre-disaster mitigation. In other cases, programmatic complexity or financial reality makes it more attractive to restore to an at-risk condition than to mitigate the danger.

Encouraging Pre-disaster Mitigation and Floodplain Management

- Assistance for individuals should consider whether they had a flood insurance policy before the disaster, even if their property lies outside of the 100-year floodplain. The total amount of assistance received by an individual should be reduced (or a portion of it converted to loans) to reflect the amount of damage that could have been covered by a flood insurance policy. Those who use their flood insurance claim payment for mitigation should be further rewarded by receiving an additional increment of support through a grant.
- Public assistance for communities should be withheld from the floodplain areas of communities not enrolled in the NFIP. Today there are few, if any, economic sanctions for local governments that fail to participate in the NFIP, even though such failure makes their citizens ineligible for individual assistance, federal home loans, and other services.

- National standards should be developed for the design and placement of infrastructure to avoid damage from flooding and other hazards. Communities that do not adopt these minimum standards should receive reduced public assistance.
- The non-federal share of disaster assistance costs should be reduced in communities where state and local efforts are resulting in pre-disaster mitigation. A current proposal before Congress would penalize communities that do not achieve a minimum standard, but an incentive program makes more sense both politically and from a public policy standpoint.

Using Disaster Assistance to Make Mitigation Work

Interim Support

Especially when no plan is in place, mitigation measures can take time to design, be approved, and be implemented. Individuals need to be provided with alternatives and concrete assurances that they will receive assistance if they opt to pursue a more time-consuming mitigation alternative. In the interim, they will need assistance for housing and other services with the assurance that this will be provided throughout the process. Without these assurances, individuals are apt to seek the rapid solution that puts them back to "normal" and back at risk.

Cost Sharing

Disaster assistance and mitigation programs should be based on the same cost-sharing formula, or should follow a formula that favors mitigation activities. State and local officials are more prone to consider lower-cost options, and to view mitigation as unobtainable if the cost share is less favorable. The Hazard Mitigation Grant Program was just modified to provide a 75%-25% cost share, in line with that for public assistance. However, in the past the cost share for public assistance has been reduced for catastrophic disasters. Linking the hazard mitigation cost share to that of the overall disaster program would enhance the advantages of this flexibility.

Improving Efficiency and Effectiveness

Coordinating Agency Programs

In most disasters numerous federal agencies direct funding and programs toward the declared area. It was frustrating during the 1993 flood that a coordinated strategy for agencies did not evolve, but rather each agency pursued its own priorities, implemented its own application procedures, and followed its own rules.

Considerable energy was spent trying to coordinate policy among agencies—for example, whether a house was valued by its pre-disaster market value or its damaged market value.

- A federal response plan should be developed that not only details standard response but also directs the use of disaster funds that are viewed as discretionary.
- A uniform set of application forms covering many or all programs would facilitate implementation.

- A set of emergency rules should be adopted that covers all programs so that issues of funding, cost sharing, priorities, and other issues are handled consistently.

Flood Fighting

During the 1993 flood, flood fighting either saved or damaged property, depending on one's perspective. This leads to the observation that leveed rivers like the Mississippi should have a flood fighting plan in place with federal oversight for implementation, and National Guard presence for enforcement.

Section 404 Program

The Hazard Mitigation Grant Program (Section 404) has a cumbersome review and approval process that consumes the energies of federal staff whose expertise is invaluable elsewhere. The process needs to be simplified.

Alternatives to Current Disaster Efforts

- Mutual assistance pacts between the states can improve national response by ensuring that trained professionals are available to supplement an already-taxed federal staff. Some issues need to be resolved before such pacts can be put into widespread use. Who authorizes and pays for those sent to another state? Will FEMA modify existing state contracts for the production of plans and products? Who will bear the liability, if any, for the advice and actions of state and federal staff operating pursuant to a mutual assistance pact?
- The extensive review and approval process of the Hazard Mitigation Grant Program is not only time consuming, but it also turns FEMA's highly professional mitigation staff into contract overseersCjust when some states need the additional assistance in planning and capability-building that FEMA could provide. The administration and oversight of the HMGP should eventually be turned over to qualified states. Even if states do not administer the program, they should have final approval of the projects that are funded.

III. MITIGATION

Although hazard mitigation has received much attention lately, it is important not to forget that floodplain managers have always practiced mitigation in the form of land use planning, using building codes, providing technical assistance, encouraging floodproofing or relocation, and numerous other techniques. The shortcoming of current federal mitigation strategies is that most are based on solving a problem after a property has been damaged. Using disaster assistance programs or flood insurance claim payments for mitigation is an important step, but it is only one opportunity. For mitigation to be cost effective and practical we must develop forms of mitigation that take place in non-disaster settings. Note that few of the recommendations below require new money, but rather can be implemented by reallocating what is already available.

Encouraging State and Local Capability

Floodplain management experience indicates that the best mitigation results in those states that have strong programs. Floodplain management is not unique, however. Environmental programs like those established pursuant to the Clean Water Act, the Coastal Zone Management Act, and others, demonstrate that using federal resources to build state and local resources is an efficient way to achieve public policy goals. These experiences indicate that state direction and initiative needs to be fostered. The top-down planning and implementation process of existing flood protection agencies does not build standing capability within a state, and will result in continuing reliance on the federal government to provide technical plans. To build and to support this capability the following ideas should be considered.

- FEMA's Comprehensive Cooperative Agreement funding should be reallocated to include pre-disaster mitigation planning.
- The U.S. Army Corps of Engineers, the U.S. Soil Conservation Service, the Tennessee Valley Authority, and others should develop grant programs that would fund state and local mitigation initiatives.
- Technical assistance programs like the Corps' Planning Assistance to States Program, which provides precise technical input into overall state mitigation strategies, should be expanded and receive continued support.

More Reliable Funding Mechanisms

Funding for mitigation implementation must extend beyond the post-disaster period, and beyond the federal planning process (which can last 20 years). An annual source of funding for mitigation planning and implementation is needed.

IV. NATURAL AND CULTURAL VALUES

Riparian areas are important to most species of plants and animals. In recent human history we were highly dependent on the proximity of rivers for drinking water, commerce, and other human needs. The legacy of our early river communities has helped define American history and is an important source of local pride. These same riparian zones continue to provide outstanding habitat for many animals, fish, and plants. Floodplain management policies need to recognize and incorporate these values both for the reduction in flood damage provided by open space in the floodplain and also for the basic resource value inherent to these natural areas. To fully integrate these values into flood policy will take time, but several steps will further the process..

- Charge natural resource economists with developing a method by which the economic benefits of natural and cultural resources can be quantified.
- Promote locally developed comprehensive watershed management plans that incorporate multiple resource values. Unfortunately, watershed management has not had this direction in past or current federal policy. To facilitate these plans, the federal government needs to adopt a

planning process, perhaps following the model of the National Park Service's Rivers and Trails Conservation Assistance Program.

- A national riparian zone policy is needed. A first step would be recognizing the multiple benefits of riparian zones for habitat, water quality, flood protection, recreation, cultural resource protection, and others. This would help to shape program interaction and clarify the need for holistic management of riparian zones.

V. MODIFICATIONS IN PROGRAM DIRECTION

Federal / State / Local Relationship

Traditional flood protection programs have resulted in a strong reliance on federal planning and implementation with little or no consideration given to building local and state capability. (An exception was the development of the National Flood Insurance Program.) This was effective when federal funds were abundant and the construction of flood control works was widespread. But future federal budgets will not support this approach on a wide scale. Flood protection in the future will be a state and local initiative, and federal policy needs to shift and recognize the need to support and build that capability. The federalBstateBlocal relationship needs to be modified to reflect current and future policy needs and budget realities.

Emphasizing the Unified National Program

The Unified National Program for Floodplain Management (UNP) has suffered from lack of high-level attention from past administrations. The UNP has recently been shaped by outstanding professionals with the ability to direct a limited number of meagerly funded programs, but without sufficient authority throughout government to bring about widespread policy change. To meet its goals, the UNP requires elevation within the administration. One alternative would be its inclusion in a process similar to that overseen by the former U.S. Water Resources Council. Another would be to assign responsibility for the UNP to the Office of Domestic Policy in the White House, where there could be executive management by senior administration officials, and agency staff to develop the work products.

Enforcing E.O. 11988

Executive Order 11988 directs federal agencies to comply with wise floodplain management practices. Although on its face it is a powerful mandate, E.O. 11988 unfortunately seems to be receiving only marginal compliance. Existing compliance with E.O. 11988 should be overseen and enforced by the administration.

Integrating Components of Stormwater Management

Stormwater management programs have significantly reduced localized flood damage, especially in the West. Current federal practices are transferring that capability from flood reduction strategies to non-point source pollution control strategies. This is best exhibited by the direction of the NPDES program, and the Environmental Protection Agency's "holistic watershed management process," whichCin spite of its nameCneglects all issues but water quality. At the local level where these programs are implemented, staffs are

being split or are having to juggle two distinct programs. This is not productive policy. There should be more emphasis on integrating the flood loss reduction and water quality components of stormwater management.

Improving Dam Safety

Dams and other flood control works historically have been dedicated rather haphazardly to local sponsors that may or may not have had the interest or ability to maintain the facilities. Often, easements were granted for access and inundation that in today's legal climate would be viewed as highly informal and even unenforceable. The Dam Safety Program facilitated by FEMA has been a voluntary program that urges the adoption of minimal standards for the inspection and maintenance of dams. There is a need for a similar program to oversee flood control works in total. These facilities in many cases have encouraged high hazard development in protected areas.

Refining NFIP Regulations

At the time they were developed, the NFIP and its regulations represented a political compromise. We now know that the current regulations are not providing long-term 100-year protection for new construction. Also, loopholes are leading to unintended results. To prevent future flood damage the following should be implemented:

- The NFIP regulations should be modified so that new construction is at least 1B3 feet above today's estimated base flood elevation.
- A zero-rise floodway should be developed such that only those areas of insignificant hydraulic conveyance could be filled. Allowing cumulative filling of the floodplain until a 1-foot increase in base flood height is achieved (the current standard) causes additional flood damage on properties in the floodplain, and promotes the filling of riparian zones.
- Under current policies, if an individual fills the floodplain to or above the base flood elevation, he or she is granted a Letter of Map Revision, removing the flood insurance purchase requirement and the need to follow floodplain regulations. But if an individual elevates on columns above the floodplain he or she still is required to purchase insurance and be governed by floodplain management regulations. This policy encourages additional filling of the floodplain, loss of flood storage and conveyance, and the destruction of riparian zones. Fill should be treated like any other engineered foundation and requirements for future regulation should be sustained. If there is a need to waive flood insurance, then FEMA should provide a letter of insurance waiver, but not remove the properties from the floodplain.

Determining Future Directions for the NFIP

- The modifications identified in S. 1405 should be implemented.
- The Community Rating System should achieve permanent authority, and the current progress should be evaluated by a task force of industry and federalBstateBlocal partners.
- The Community Assistance Program needs to be revisited because, although it has provided products for FEMA, it has tended to replace state capabilities rather than develop them. The CAP needs to be redesigned to encourage less oversight and more long-range planning and project development.

Modifying Project Funding Authorities

- Structural, nonstructural, and disaster assistance programs should all be based on the same cost-sharing formula. States and localities that are implementing strong mitigation programs should qualify for a reduced cost share.
- Explicit separate authorities for nonstructural flood protection projects should be developed. Although nonstructural projects can be implemented under current authorities, the inherent bias towards flood control in many agencies generally will skew a project away from nonstructural alternatives.
- For nonstructural projects, land and easements should be considered part of the total project cost, not a local sponsor requirement. Economics sometimes dictate that non-federal sponsors choose the alternative with the lowest non-federal cost. Due to the high cost of land in many areas, the large amount of land needed for some nonstructural projects, and the variations in how the cost of a project is shared, the alternative with the lowest non-federal cost is often not a nonstructural one.

Anticipating Flood Fighting

Flood fighting should be planned. Independent flood fighting activities on the levees during the 1993 flood led to sandbagging at the expense of others on the river, and to sabotage.

Strengthening Local Planning for Mitigation

Local mitigation planning needs to be better emphasized and supported. Localities that have taken the initiative to analyze alternatives and implement their best options should be recognized. Technical and financial support and other incentives need to be developed at the state and federal levels to encourage other communities to undertake their own projects.

Making Better Use of Flood Warning Data

Flood warning technology has advanced significantly in the last 10-15 years. However, the use of this technology requires certain corrections.

- River forecasts are increasingly being made available to the general public. These forecasts should explicitly state the variability of estimates so that individuals do not get a false sense of security and so that they do pursue appropriate actions.
- Many local governments are developing flood warning and monitoring systems. The National Weather Service needs to find ways to better integrate and utilize this data, as well as promote the development of additional systems.

VI. AGRICULTURAL POLICIES

Many floodplains in the United States are farmed. With extensive federal levees in the Midwest it has become customary to construct low-level agricultural levees that further confine the floodplain. There needs to be an examination of incentives and disincentives for farmers that will lead to leaving agricultural floodplains open. It must be recognized that these are costs the nation as a whole must consider and underwrite because we all benefit from these strategies.

Reformulate Crop Insurance Programs

Crop insurance should be redesigned to focus on reducing not only the independent losses of farmers, but also agricultural losses during disasters. Disaster assistance should be reduced or withheld if crop insurance is not carried by the farmer. Crop insurance needs to be made more affordable.

Better Use of Set-Aside Programs

Agricultural set-aside programs have been established as a means to control total production. Farmers are guaranteed a minimum price for their crop if they agree to keep a portion of their land out of production. Often, highly productive uplands are set aside, leading to a loss of total revenue for the farmer from that land. A system of banking these set asides should be established so that a transfer between farmers can be negotiated to keep the uplands in production and the floodplain lands out, and still keep both farmers enrolled in the program.

Coverage after Damage to Levees

After the 1993 flood there was a sense of urgency on the part of Congress to restore non-federal agricultural levees. The problem was that no one was sure whether that was the right solution for a river system. Rather than rush to rebuild levees, a program needs to be developed where farmers would be assured of coverage if they suffered flood losses before a new policy and plan were developed.

VII. DATA AND TECHNOLOGY

The Midwest flood of 1993 showed once again that we are technology rich but data poor.

Gathering and Maintaining Data

- Historically, the most reliable data has been the stream gage network of the U.S. Geological Survey. Unfortunately, this network has slowly been shrinking and we are lacking the basic data from which to develop hydrologic and flood estimates. Additional funding and cooperative efforts among agencies must be undertaken. Information collected by local governments through their flood warning systems should not be considered inferior data. We no longer have the luxury of collecting data as an exercise in pure science.

- There is no reliable nationwide estimate of the number of structures at risk from flooding. This basic data is critical for planning, and for determining program effectiveness over the long term.
- There is no systematic collection and archiving of the number of public and private dollars spent on disasters. This basic piece of information would provide a good long-term measure of public policy effectiveness.

Additional Engineering Models

Engineering models must be developed and incorporated that reflect unsteady state flow conditions, levee breaches, split flows, and hazards of unstable land forms and debris flows.

Improving Effectiveness of FIRMs

Flood Insurance Rate Maps are critical to the management and planning of floodplains. They serve as a key planning tool for communities and states, identify flood insurance rates to be charged, and provide for the demarcation of areas subject to floodplain regulation. However, to improve their utility and effectiveness, several changes should be considered.

- A significant number of stream miles have yet to be mapped and there are a large number of areas requiring restudy. The sole source of revenue for these efforts has been the National Flood Insurance Fund (non-tax dollars). As a point of equity, although the insureds are the primary beneficiaries of these products, society as a whole has also benefited from them. Additional funding for map programs is crucial.
- Both to reduce the cost of remapping and to reduce future damage, the maps should be based on future-conditions hydrology. As flooding worsens as a result of watershed development, floodplains need to be managed to these ultimate conditions.
- FIRMs are used to plan future development and help advise individuals about flood risks. The current practice of modifying a FIRM to reflect the presence of a levee, dam, channel, or other structural measure may foster a false sense of security to those living in the area protected by these structures. This practice also promotes constricting the channel, destroying floodplain characteristics that ultimately can lead to higher flood stages (and potentially increased damage) downstream and loss of riparian zones. Options need to be evaluated that reflect how FIRMs and resulting management tools should be modified to avoid communicating a false sense of security or indirectly encouraging stream modifications that both alter the floodplain's natural functions and encourage floodplain encroachment.
- States that are qualified to perform and administer floodplain mapping programs should administer and manage them for FEMA. This will develop skills and program presence in the states and also serve as a magnet to develop other sources of revenue for floodplain mapping.

Broaden the Scope of Design Manuals

Engineers and planners continue to rely heavily on the federal government's design manuals. At present these manuals do not address bio-engineering or other alternatives to structural design. The federal manuals should be expanded to include these methods and thereby foster their use by all engineers and planners.

VIII. ECONOMICS

The approaches in the *Principles and Guidelines* and other related manuals for determining project benefits and costs should be reviewed and modified as follows.

- Definition and guidance is needed on calculating environmental and cultural values.
- Project economics must somehow reflect the long-term catastrophic disaster costs associated with project-induced development.

IX. STRUCTURAL MEASURES

Anticipate Replacing Structures

A concerted effort must be made to estimate the useful life of existing flood control structures and to make plans for their replacement or removal as warranted.

Review Risk-Based Design Method

Engineering design has long used the concept of freeboard to account for uncertainty in design. But freeboard is being eliminated under the Corps of Engineers' risk-based design approach, which results in a design size optimized by project benefits. This means that a Corps structure estimated to provide 100-year-flood protection would be missing the three feet of freeboard now added to most designs. The project economics may dictate a structure larger or smaller than a 100-year standard as well, but considering that many proposed federal projects are not justified today because the cost exceeds the benefits, a reduction in cost would lead to construction of more projects. A multi-agency review of this method should be undertaken and the following points considered.

- If this method leads to a proliferation of smaller levees, are we increasing exposure for catastrophic disaster losses? In terms of the Midwest flood, for example, what would have happened if we had had smaller levees?
- The method tends to move away from the concept of designing to a minimum standard. The potential exists for the erosion of providing 100-year protection as a minimum. Guidelines reaffirming conformance with a minimum design standard should be explicit in the design method.

X. NONSTRUCTURAL PROJECTS

Nonstructural alternatives have been insufficiently utilized. There has been a general and not wholly inaccurate perception that local sponsors have only wanted structural solutions. But now many local sponsors are beginning to understand that there are alternatives to structures. Floodplain managers are confident that local support for nonstructural programs, especially those packaged to address multiple local issues, will be successful. The best evidence of this was the way Midwest communities and states flocked to the idea of community relocations from the floodplain after the 1993 flood. Nonstructural projects, however, still lack clear authorities and direction.

- The methods utilized in the Midwest floods for program delivery should serve as a basis for review and development of permanent institutional arrangements to deliver post-disaster nonstructural programs.
- Permanent project authorities for nonstructural projects should be established. Although nonstructural alternatives are theoretically feasible under current authorities, it is clear that those projects brought to fruition were pushed by knowledgeable individuals fully committed to nonstructural implementation. Internal biases need to be removed so that nonstructural alternatives can move forward on their own merit.
- States are in the best position to identify and to develop partnerships with local governments for small nonstructural mitigation initiatives. There is a need to develop a small project authority administered as a cost-share grant with state and local governments.

ACKNOWLEDGEMENTS

This paper is the culmination of years of collective state and local experience in managing flood problems and floodplains both before and after floods. To obtain the specific observations presented here, the Association conducted a nationwide survey of state and local floodplain managers after the 1993 Midwest flood. The survey results were augmented with input provided by participants at "Post-Flood Recovery in the Mississippi Basin," a meeting held in St. Louis, Missouri, August 30B31, 1993; at "Flood Recovery Workshop," held in Davenport, Iowa, January 24B27, 1994; and at various other meetings co-sponsored by the Association since the flood. This report also embodies and enlarges upon recommendations made and positions taken by the Association as expressed in previous papers, testimony, and other public forums.

This paper was approved by the Association's Board of Directors after review and discussion of a draft prepared by a group of Association volunteers. The Association thanks the following individuals for their assistance in drafting this report: George Hosek, Michigan Department of Natural Resources (ASFPM Vice Chair); Larry Larson, Wisconsin Department of Natural Resources (ASFPM Executive Director); Jerry Louthain, Washington Department of Ecology (ASFPM Natural Resource Liaison); Mary Fran Myers, Natural Hazards Research and Applications Information Center, Boulder, Colorado, (Member, ASFPM); Doug Plasencia, Virginia Department of Conservation and Recreation (ASFPM Chair); and French Wetmore, French & Associates, Park Forest, Illinois (ASFPM Administrative Liaison).