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## Action agenda for managing the nation's floodplains: A review of floodplain management in the United States

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ACTION AGENDA  
FOR MANAGING THE NATION'S FLOODPLAINS

A Review of  
*Floodplain Management in the United States:  
An Assessment Report*

National Review Committee

Raymond J. Burby  
Gerald E. Galloway  
James E. Goddard  
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Special Publication 25  
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# ACTION AGENDA FOR MANAGING THE NATION'S FLOODPLAINS

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## FOREWORD

When preparations began for *An Assessment Report on Floodplain Management in the United States*, the federal agencies more directly involved invited critical appraisal by a group of persons outside of the federal government. A National Review Committee was selected to represent a wide variety of experience and outlook in floodplain matters.

The National Review Committee was supplied with the draft *Assessment* and then with the comments on the draft that had been submitted by more than 50 individuals and nonfederal organizations. After reviewing the full set of materials the National Review Committee prepared two documents. One was a detailed set of comments and suggestions on the entire draft *Assessment*. This incorporated or referred to, as seemed appropriate to the committee, the comments by other reviewers. All of this material—ranging from corrections of data to observations on broad conclusions—was transmitted to the Federal Interagency Floodplain Management Task Force and to the staff revising the draft report. Insofar as the comments seemed relevant to the task force and the staff, they were incorporated into the final *Assessment*.

The second document was a brief statement from the National Review Committee, an *Action Agenda for Managing the Nation's Floodplains*. That statement is presented here. It outlines concisely what the committee regarded as the present situation, how federal aims and activities have evolved, and desirable next steps. It is not, therefore, a commentary on the final *Assessment*. Rather, it offers the considered judgment of one set of reviewers on the problems addressed in the *Assessment*. In that fashion it invites examination by all who seek improvement in the use and protection of the nation's floodplains. It assumes the reader

will either be familiar with the *Assessment* or will be moved to consult the longer document. The *Action Agenda* was prepared in 1989—long before the full *Assessment* and summary document were completed.

If the conclusions in the National Review Committee report and the Interagency Task Force's *Assessment* are to be translated into action, an unprecedented effort will be required on the part of interested nongovernment groups and local and state agencies. New federal legislation and executive initiatives are unlikely to take shape without strong encouragement from that direction. In any event, the most forward-looking federal actions could not be implemented fully without cooperation with state, local, and nongovernment groups.

Gilbert F. White, Chair  
National Review Committee

## ACTION AGENDA FOR MANAGING THE NATION'S FLOODPLAINS

A report on the status of floodplain management in the United States provides a timely occasion to examine the effectiveness of those activities in recent years and the extent to which they are likely to meet the nation's needs in the years ahead. We have reviewed the interim *Status Report on the Nation's Floodplain Management Activity* (subsequently titled *Floodplain Management in the United States: An Assessment Report*) and have offered a detailed set of comments on the data and analysis it contains. These comments have been transmitted to the Federal Interagency Floodplain Management Task Force, the organization responsible for the report, and to L.R. Johnston Associates, the principal contractor.

Based on review of that report and our experience with diverse aspects of floodplain problems, in this paper we call attention to implications of the report for future public and private policy affecting the use of floodplains. We sum up the present situation, observe how the national aims of floodplain management have evolved and how federal activities have moved toward them, and recommend further action required in light of current conditions and trends.

The test of how well the management activities are being carried out is in what happens at the level of individual farms, households, and local communities. We have assessed the wide-ranging efforts of federal, state, and local agencies to support or guide actions at that level, and have sought to appraise the outcomes of those efforts as reflected in the natural and social environment of the nation's floodplains and related areas. This report sums up the committee's assessment and recommends a series of actions



that should be taken as soon as practicable at the federal level.

At the outset it is important to recognize that in practice there is no truly unified national program for floodplain management. This stems in part from ambiguity in national goals. If the limited resources of money and people are to be effectively deployed, it will be necessary to clarify and harmonize the two major goals outlined below—the reduction of vulnerability to flooding and the preservation of natural values—as they have come to be defined on the national scene and as they are discussed in the following pages.

In numerous instances the evidence provided by the *Status Report* is insufficient to warrant a firm judgment as to the progress of floodplain management. In those cases we suggest steps that should be taken to provide a basis for sound evaluation. Lacking fully satisfactory data, we nevertheless have ventured provisional judgments regarding what has been happening and what accounts for conspicuous successes and failures. Further data collection and analysis thereby may be spurred.

The present status of floodplain management does not encourage complacency. The record is mixed. There are encouraging trends, as with the number of communities having some form of floodplain regulations, but the rising toll of average annual flood losses has not been reversed or even halted. Some activities appear more productive on paper than in reality, and in some cases the reduction in the real vulnerability of people is questionable. On balance, progress has been far short of what is desirable or possible, or what was envisaged when the current policies and activities were initiated.

## THE SITUATION IN BRIEF

When the first federal commitment to alleviating flood problems on a national scale took shape in 1936, the program relied heavily on protection of hazardous areas by

flood control works in the floodplain or upstream. In 1966 an Executive Order increased the options to a broader array of measures that could be practiced by federal, state, and local agencies to manage flood losses. During the late 60s and early 70s, with increasing environmental awareness and the passage of national environmental protection and clean water legislation, additional attention was focused on protection of the natural values of floodplains. The possible federal approaches were refined and expanded in *A Unified National Program for Flood Plain Management* in 1976, and further revised in 1979 and 1986, as described in the *Status Report*.

Despite massive public and private efforts to reduce flood vulnerability, losses to the nation due to occupancy of riverine and coastal areas subject to inundation are continuing to escalate in constant dollars. Some of the losses can be attributed to failure to complete protection works. Most can be attributed to increased property at risk; vulnerable property clearly is expanding in both extent and value. Losses include damages to properties and public infrastructure, disruption of local economies, disruption of traffic flows, and death and suffering for people living or caught in flooded areas. Average annual damages for the country as a whole are on the order of \$2-6 billion (in 1985 dollars). However, the statistics are notoriously incomplete and inaccurate. There has been little careful appraisal of benefits derived from the use of floodplains.

When floodplains are developed for urban and agricultural purposes, the resources they provide in their natural state may be reduced. Data on the rate and quality of loss of these environmental assets are also poor. Again, the continuing flood damages and losses stem from the ways floodplains are used. Private interests, in many instances, develop land to maximize the owners' economic return but in a fashion that degrades natural values and increases public expenditure for relief, rehabilitation, and corrective action. Government programs, however well intentioned, often encourage such adverse development. The exceptions,

however, where development enhances and preserves natural values, provide encouragement that this approach may be achieved more widely.

The current system for managing floodplains and protecting the nation from impacts of unwise use is piecemeal. It is dispersed among a variety of agencies at federal, state, and local levels. The Unified National Program was intended to correct this. In order to address why that program has not succeeded and what now should be done, it is important to step back, and recognize and clarify the goals that have evolved.

#### TWO GOALS OF NATIONAL FLOODPLAIN MANAGEMENT

The floodplain management goals now being pursued by the nation are two-fold and interrelated, and often not easily harmonized.

1. *To reduce the vulnerability of all Americans to the danger and damage of floods.*

The dangers of flooding include threats to life, safety, public health, and mental well-being, as well as damage to properties and infrastructure, and disruption of the economy. Protection from these hazards should be provided, by whatever measures are suitable, for floods of the 1% frequency level ("100-year floods") as a minimum. Protection from the effects of greater, less frequent flooding is still needed in those places where such flooding would cause unacceptable or catastrophic damages.

2. *To preserve and enhance the natural values of the nation's floodplains.*

Natural floodplains serve society by providing flood-water storage, groundwater recharge, water quality enhancement, aesthetic pleasure, and habitat for plants and

animals. Many floodplains also have cultural and historical significance. Urban and agricultural development in floodplains may reduce these benefits with resulting costs to society, either in degraded quality of life or in the expense of replacement. It is in the public interest to avoid development that destroys these values or, in instances where the public good requires development, to assure that measures are taken to mitigate the loss through replacement or other means.

These two goals are reconcilable and achievable through appropriate management shared by the agencies involved in ways that can be measured.

## ASSESSMENT

The National Review Committee believes that:

- While considerable progress has been made over the past two decades, the Unified National Program is neither unified nor national. In several respects it falls short of achieving the goals set out for it by the Congress and previous administrations. It does not integrate adequately either the numerous program aims that have been set forth or the efforts of those charged with implementing them.
- Federal agencies have, in general, made efforts to focus on the immediate goals of their specific missions defined in legislation and administrative guidance, as outlined in Table 1. They have, for the most part, been diligent and forward looking within the bounds of their statutory charters. At the technical level, they have made major contributions to the nation's ability to cope with flood hazards. However, Table 1 does not show the vast differences among agencies in how they foster local efforts. It does suggest the complexity faced by a local agency when trying to deal with diverse federal programs.

FLOODPLAIN MANAGEMENT PROGRAMS	AGENCY													
	Department of Agriculture	Army Corps of Engineers	National Oceanic and Atmospheric Administration	Department of Health and Human Services	Environmental Protection Agency	Federal Emergency Management Agency	Department of Housing and Urban Development	Department of the Interior	Department of Transportation	Tennessee Valley Authority	Small Business Administration	National Science Foundation		
Flood Hazard Studies/Reports	X	X			X		X		X					
Technical/Planning Assistance	X	X	X		X	X	X	X	X					
Structural Flood Control	X	X					X	X	X					
Warning and Forecasting			X						X					
Emergency Preparedness and Recovery	X	X		X		X	X	X		X				
Research	X	X	X		X	X	X				X			
Nonstructural Flood Control	X	X			X		X			X				
Environmental Protection	X				X									
Water Quality Protection and Wetlands	X	X	X		X		X			X				
Protection of Endangered Species							X							

TABLE 1  
FEDERAL AGENCIES AND FLOODPLAIN MANAGEMENT PROGRAMS

- There is no central direction for the Unified National Program. No agency has the charter or capability to carry out the program in its entirety, and no agency has authority for assuring coordination of the numerous programs targeted on its objectives. There are serious overlaps, gaps, and conflicts among programs aimed at solving the same problem.
- Federal agencies, partly in response to budget reductions, have made significant advances in shifting operational responsibility for selected programs, involving either funding or regulations, to the state and local level. Generally, the response of state and local governments has been constructive, although the quality of the response varies by state and region.
- Several indicators point to progress in floodplain management programs:

Participation in the National Flood Insurance Program (NFIP) has increased. Initial identification of flood hazards has been completed for over 18,200 communities now in the program; 16,400 have adopted some kind of management measures.

The NFIP no longer subsidizes insurance for new construction in the floodplain.

The new technologies and techniques associated with hydrologic forecasting, modeling, and flood warning have substantially improved the quality of these activities.

Considerable effort has been made to identify and protect wetlands both within and outside floodplains.

- Federal agencies have been inconsistent in assimilating the concept of the natural value of floodplains. Accordingly, their mission statements are inconsistent. Full implementation of natural value protection is less widespread.

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- Agency competition, duplication, and resulting inefficiency are fostered by the patchwork of federal legislation that establishes multiple authorities and provides diverse directives.
- Responsibility at the federal level for data collection is scattered among many agencies, so that none take the lead in collecting, analyzing, and reporting the full range of floodplain characteristics and management activities. As a result, it is impossible to accurately appraise the current status of floodplain management across the nation.
- The many federal programs lack a common focus and create conflicts and limitations that act as impediments to local jurisdictions when implementing floodplain management.
- States and communities have had varying success in accepting and balancing the disparate elements of the federal programs. Some states and most communities appear to lack the full resources necessary to bring about comprehensive local action without federal support.
- Considerable infrastructure and many important federal and local structures remain in the floodplain and, although protected to a degree, remain vulnerable to large-scale damage. Little information is available on the actual degree of this vulnerability.
- While some states and communities have taken a comprehensive approach to floodplain management, others have not. This failure to integrate flood loss reduction, protection of natural values, and federal and community development goals, hinders achievement of floodplain management objectives. In addition, because many problems may encompass larger hydrologic regions and may extend across several local jurisdictions and perhaps states, development of broad state and interstate plans may be necessary.

The detailed support for these assessments is to be found in the *Status Report* or in its lack of necessary information.

### FACTORS AFFECTING FURTHER ACTIVITY

As background for our recommendations, we note significant factors that may be expected to shape the ability of government and private sectors to improve floodplain management.

Much public action is constrained by prevailing perceptions, sometimes incorrect, of floods and their consequences. Flooding is rare in many areas, and generally is not regarded as an important issue in community policy making. People believe floods will not happen in their community, or that they will not happen again. Although communities may enact some kind of regulation of flood-prone land, flood problems in most locales have low salience in the public budget. Local governments misjudge their ability to deal with severe overflows, and, moreover, many people believe the best way to deal with a flood problem when it does become crucial is to commit public funds to construction of a project to store or control floodwaters. These approaches are reflected in budgets and in the interaction of public agencies and private developers.

Even when the public is well informed, the effort to manage a flood hazard typically is difficult and complicated. Floodplain managers have to deal with conflicting technical viewpoints in mapping the precise areas to be inundated by an event defined by a statistical probability, in making the results lucid for lay people, and in identifying and evaluating the whole set of natural features affected. There are difficulties in approaching a flood problem in the context of an entire drainage area and in anticipating the consequences of a mitigation measure upon an area's economy and welfare.

Whenever a large number of agencies, each with its own statutory mission, seek their own ends, the barriers to



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smooth implementation of a management effort are considerable. This is clearly the case with floodplain management. Administrative staffs defend their own turf and prefer sole responsibility for a project or program.

Floodplain managers at all levels of government have an uneven degree of knowledge about the diverse strategies and measures (both structural and nonstructural) that constitute floodplain management. Therefore, a variety of disciplines must be called into play, but there is no well-established institution to train floodplain managers. Often, lack of familiarity with all of the available techniques biases the investigation and selection of solutions for specific flood problems, hinders the development of comprehensive floodplain management, and impedes balancing of the dual objectives of flood vulnerability reduction and natural values protection.

Beyond such direct constraints, there are a number of trends on the national scale that complicate floodplain management and require managers to use flexible methods:

- Aging public infrastructure (bridges, roads, water and sewer lines) will require replacement or upgrading during the coming decades. The strengthening or expansion of existing services in riverine and coastal flood hazard areas will require tough decisions at the local level regarding whether and how further growth in these areas can be managed without increasing flood vulnerability.
- Existing small-scale development in numerous hazard areas is gradually being replaced by new forms and patterns. In coastal areas, for example, traditional seashore cottages are being replaced by higher density condominiums and commercial structures; whether this can be done while achieving the twin goals of reducing vulnerability to flood and erosion losses and protecting natural values remains to be seen. Some other areas where property is deteriorating due to repeated flooding are being resettled by low-income people.

- Improved water quality in some river reaches is attracting more recreational use of adjacent lands.
- Floodplain management will increasingly be seen as an element in overall environmental protection and improvement. Floodplains will be viewed as integral landscape elements requiring special attention.
- The increasing scale and sophistication of urban development increase the potential for integrating floodplain considerations in the planning process but also enlarge the possibility for dramatic changes in vulnerability.
- The recent decades of regulatory efforts, along with urban growth, have resulted in and will continue to encourage dense development adjacent to regulatory boundaries. Such concentration of development may increase vulnerability to catastrophic losses from large floods.

Other technological and social trends are provided in the *Status Report*. The ones noted above are enough to suggest that the national program as a whole must be alert and flexible in dealing with new conditions as they arise.

## RECOMMENDED ACTION

We recommend six groups of actions that should be taken by the Federal Interagency Floodplain Management Task Force or by other federal agencies in close collaboration with state and local organizations.

1. *Integrate flood loss vulnerability and protection of floodplain natural values into broader state and community development and resource management processes.*
  - 1.1 To promote integrated planning and management of appropriate hydrologic units, many of which encompass multiple local and state jurisdictions, the Interagency Floodplain Management Task Force should vigorously foster the preparation of state

floodplain management plans involving both public and private interests and, where appropriate, interstate agreements for preparation of basin plans. Such plans should consider and balance measures to preserve and enhance the ecological integrity of hydrologic units with measures to meet social needs.

- 1.2 Because comprehensive floodplain management programs provide a means for balancing economic development, flood loss reduction, environmental protection, and other community goals, along with means for integrating stormwater quality and quantity objectives with upland and floodplain land uses, sections 1361 and 1315 of the National Flood Insurance Act should be administered so as to require preparation of comprehensive floodplain management plans that complement the two national goals as a condition for continued participation in the National Flood Insurance Program. (Several of the members of this review committee regard this requirement as impractical because many local governments lack the resources necessary to meet it.)
- 1.3 As a further incentive for the preparation of such plans, the Interagency Task Force should draft and recommend an Executive Order requiring that new federal investments, regulations, grants-in-aid, and other floodplain actions be consistent with state and local floodplain management plans insofar as they conform to federal standards.
- 1.4 To assist the preparation of comprehensive floodplain management plans, the Interagency Task Force should coordinate federal programs and foster model plans, demonstration projects, and research to improve planning methods and techniques.

2. *Improve the data base for floodplain management.*

2.1 For jurisdictions expected to experience rapid rates of urban growth in upstream drainage areas, floodplains should be remapped in order to take into account hydrologic conditions associated with full development of the drainage areas under existing land-use plans and policies of the relevant jurisdictions, with a view to curbing increased stormwater runoff.

2.2 A cooperative, jointly funded program should be established by the National Science Foundation and the interested federal agencies to develop methods for mapping, regulating, and identifying natural values in areas with special flood hazards including 1) alluvial fans, 2) fluctuating lake levels, 3) ice jams, 4) moveable stream channels, 5) land subsidence, 6) storm drainage overflow and backup, and 7) mud flows. The program should also develop methods for measuring the flood storage capacity of river reaches.

2.3 The Interagency Task Force should formulate an accurate, affordable national system for gathering flood loss data that meets the needs of policy makers and floodplain managers.

2.4 The National Science Foundation should consider funding research to examine, in a selected sample of communities, the full benefits and costs, both public and private, of floodplain occupancy and associated floodplain management measures, having due regard for national productivity, impacts on natural values, and the equitable distribution of costs and benefits.

3. *Give weight to local conditions.*

3.1 Because uniform national prescription standards for the preservation, use, and development of flood-

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plains and other hazard areas sometimes create the potential for inefficient allocation of resources and for social inequities, the relevant federal agencies should examine the practicability of using performance standards, implemented through local watershed and floodplain management programs, but should not promote any slackening of limits on permissible vulnerability.

- 3.2 The Federal Insurance Administration should adopt and implement a community rating system to encourage communities to adopt flood hazard mitigation measures particularly suited to their local circumstance. Such a system should recognize the need to reconcile loss reduction, public safety, and environmental objectives.
4. *Minimize conflicts among federal programs.*
  - 4.1 The Office of Management and Budget should establish an independent task force to further review the findings of the *Status Report* and recommend those changes in the federal structure and delegated legislative authority needed to insure execution of a sound Unified National Program for Floodplain Management.
5. *Reduce the vulnerability of existing buildings.*
  - 5.1 Because the vast majority of buildings and infrastructure presently exposed to flood damage will not be protected fully from floodwaters by structural projects or nonstructural programs, other approaches are needed at both federal and state levels. As a first step in addressing that problem, the Interagency Task Force should draft and recommend an Executive Order charging all federal agencies with the preparation of assessments of the vulnerability to flooding of a sample of federal facilities and those state and local facilities constructed wholly or in part with federal aid. The

report should identify the facilities' expected average annual damages, estimate the costs of various protection measures, and extrapolate conclusions on the total federal investment subject to flood damage. The report should be submitted to the President and the Congress with recommendations on appropriate programs to protect federal facilities.

- 5.2 As an aid to coordination of these activities, the Interagency Task Force should report which agencies are undertaking nonstructural damage reduction activities and identify their funding levels.
  - 5.3 Two approaches, in particular, deserve greater attention as viable damage reduction measures: flood preparedness and retrofitting (floodproofing). The National Science Foundation should fund research on the techniques, benefits, and costs of these approaches in order to identify their utility and impediments to their implementation.
6. *Improve professional skills and public education.*
- 6.1 Inasmuch as, among federal, state, and local government, the lack of personnel trained in the interdisciplinary field of floodplain management is an important constraint to the implementation of comprehensive floodplain management, the Interagency Task Force should develop training programs and conduct regional training, at an affordable rate, for appropriate government personnel.
  - 6.2 Recognizing that floodplain management programs will be implemented more successfully if they are understood and supported by the general public, the Interagency Task Force and its member agencies should continue, expand, and evaluate efforts to inform and educate the public about the nature of flood hazards, the natural values of floodplains, and the various strategies and tools available for comprehensive floodplain management.

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