FLOODPLAIN MANAGEMENT: A PRESENT AND A 21st CENTURY IMPERATIVE

Gerald E. Galloway, Jr.
United States Military Academy

Introduction

The principal rivers of the United States and their tributaries have played major roles in the nation's history. Their existence was critical to the growth of the country and fostered the development of major cities and transportation networks that today link inland regions with the rest of the world. The floodplains of these rivers provide some of the most productive farmland in the country, as well as offering diverse recreational opportunities and containing important ecological systems. While development has produced significant benefits, it has not always been conducted in an appropriate manner. As a result, today, the nation faces three major problems:

First, as the Midwest Flood of 1993 and the 1994 floods in Georgia, Florida and Texas have shown, people and property remain at risk, not only in the floodplains of major rivers, but also throughout many other areas in the nation. Many of those at risk do not fully understand the nature and the potential consequences of that risk nor do they share fully in the fiscal implications of bearing that risk. Second, only in recent years has the nation come to appreciate fully the significance of the fragile ecosystems of our riverine areas. Given the tremendous loss of habitat over the last two centuries, many suggest that many regions now face severe ecological consequences. Third, the division of responsibilities for floodplain management among federal, state, tribal, and local governments and the citizenry at large lacks clear definition. Attention to floodplain management varies widely among and within federal, state, tribal, and local governments.

Throughout the spring, summer, and fall of 1993, the people of the United States were faced each night with pictures of the devastation wrought on the midwestern United States by the Great Flood of 1993. For nearly six decades, the nation has labored to reduce the impacts of floods, yet the toll in lives lost, homes damaged, and property destroyed was enormous. Why had this happened? What caused the flood? Had human intervention over time exacerbated the situation? What should the nation be doing to prevent a repetition?

In January 1994, the Clinton Administration chartered an Interagency Floodplain Management Review Committee to answer these questions. The Review Committee, a group of 31 professionals assigned to various federal agencies with responsibilities in the water resources arena, worked with the offices of the governors of the nine flood-affected states, met with state and local officials and visited over 60 communities. It also made extensive contacts with federal agencies, interest groups, members of Congress and their staffs, and numerous private citizens who expressed an interest in the flood and its impacts. A part of the Review Committee, the Scientific Assessment and Strategy Team, chartered in November 1993 by the White House, conducted its activities at the EROS Data Center in Sioux Falls, South Dakota, where it developed a major data base of flood and general basin information and analyzed the data (see Kelmelis in this volume). In late June 1994, the Committee submitted its report *Sharing the Challenge* to the White House.

In *Sharing the Challenge*, the Review Committee proposed a better way to manage the nation's floodplains. From an organizational standpoint it suggested that government, business, and private citizens should share responsibilities and accountability. It recommended a balance among the many competing uses of the rivers and their floodplains; it recognized, however, that all existing activities in the floodplain simply cannot be discarded as inappropriate. It called for implementation of an approach to flood damage reduction that would make use of all available tools, both structural and non-structural. This approach, the Review Committee believed, would bring about changes necessary to reduce flood vulnerability to both the infrequent major flood events and the more frequent smaller ones. Implementation also would reduce the environmental, social, and economic burdens imposed by current conditions on both public and private sectors.

Background

Since passage of the Flood Control Act of 1936, the federal government has dominated the nation's flood damage reduction efforts and, as a result, the nation's floodplain management activity. Structural programs were deemed important and were also the principal sources of funds for any efforts to stem the rising tide of flood losses. In recent years, the federal government has begun to support nonstructural approaches. Many states, tribes, and local governments have developed and carried out floodplain management efforts that both reduced flood damages and enhanced the natural functions of floodplains. In carrying out these programs, however, they have been hampered by

uncoordinated and conflicting federal programs, policies, regulations, and guidelines that have hindered efficient floodplain management. Some state and local governments have not been as active in floodplain management. With the federal government assuming the dominant role and funding most ecosystem restoration, flood damage reduction, and flood recovery activities, the incentive has been limited for many state, tribal and local governments, businesses, and private citizens to share responsibility for making wise decisions concerning floodplain activity.

The Midwest Flood of 1993

The Review Committee's examination of the Midwest Flood of 1993 provided several important insights into the causes of the flood and the region's and the nation's reactions to it. The Committee found that:

- The floodplains of the upper Mississippi Basin have been used to support a wide variety of human and natural activities. They provide locations for large and small communities, industry, agriculture and river related operations. They also are the homes for highly productive ecosystems.

- The Midwest Flood of 1993 was a hydrometeorological event unprecedented in recent times and was caused by excessive rainfall that occurred throughout a significant section of the upper Mississippi River Basin. The damaging impacts of this rainfall and related runoff were felt both in upland areas and in the floodplains. The recurrence interval of the flood ranged from less than 100 years at many locations to near 500 years on segments of the Mississippi and Missouri Rivers.

- Rainfall and floods like the 1993 event will continue to occur. Floods are natural repetitive phenomena. Considering the nation's short history of hydrologic record-keeping, as well as the limited knowledge of long-term weather patterns, flood recurrence intervals are difficult to predict. Activities in the floodplain, even with levee protection, will continue to remain at risk.

- The loss of wetland and upland cover and the modification of the landscape throughout the basin over the last century and a half significantly increased runoff. Most wetland losses occurred prior to 1930, but some are related to more recent drainage, flood damage reduction, and navigation development. Although upland watershed treatment and restoration of upland and bottomland wetlands can reduce flood stages in more frequent floods (25 years and less), it is questionable whether they would have significantly altered the 1993 flood conditions.

- Human activity throughout the basin caused significant loss of habitat and ecosystem diversity. Flood damage reduction and navigation works and land use practices have altered bottomland habitat adversely.

- The costs to the nation from the flood were extensive. Thirty-eight deaths were attributed directly to the flood and estimates of fiscal damages ranged from $12 billion to $16 billion. Agriculture accounted for over half of the damages. More than 70 percent of the crop disaster assistance payments were made to counties in upland areas where ground saturation prevented planting or killed the crop. Nearly 50 percent of the approximately 100,000 homes damaged, suffered losses due to groundwater or sewer backup as opposed to riverine flooding. Flood response and recovery operations cost the nation more than $6 billion. In addition, many costs were not quantified: impacts on businesses in and out of the basin; tax losses to governments; and impacts of the flood on the population's physical and mental well-being.

- Flood damage reduction projects and floodplain management programs, where implemented, worked essentially as designed and significantly reduced the damages to population centers, agriculture, and industry. It is estimated that reservoirs and levees built by the US

Army Corps of Engineers (USACE) prevented more than $19 billion in potential damages. Watershed projects built by the Soil Conservation Service saved an estimated additional $400 million. Land use controls required by the National Flood Insurance Program (NFIP) and state floodplain management programs reduced the number of structures at risk throughout the basin.

- Many locally constructed levees breached and/or overtopped. Frequently, these events resulted in considerable damage to the land behind the levees through scour and deposition.

- Flooding during the 1993 event would have covered much of the floodplains of the main stem lower Missouri and upper Mississippi rivers whether or not levees were there. Levees can cause problems in some critical reaches by backing water up on other levees or lowlands. Locks and dams and other navigation related structures did not raise flood heights.

While the cause and effect relationship among floodplain activities are difficult to define, it is clear that any human use of the floodplain carries with it some vulnerability to damage and has some impact on natural functions of the floodplain.

Federal, State, Tribal, and Local Floodplain Management

Given the large number of organizations involved in floodplain management, the Review Committee examined the structure of current federal programs, relationships among federal, state, tribal, and local governments, the performance of various programs during and after the flood, and concluded that:

- The division of responsibilities for floodplain management activities among and between federal, state, tribal, and local governments is not clear. Within the federal system, water resources activities in general and floodplain management in particular need better coordination. State and local governments must have a fiscal stake in floodplain management. The federal government must set the example in floodplain management activities.

- The National Flood Insurance Program (NFIP) needs improvement. Penetration of flood insurance into the target market -- floodplain occupants -- is very low. Communities and individuals choosing not to participate in the NFIP continue to receive substantial disaster assistance, creating a perception with many floodplain residents that program participation is not a worthwhile investment.

- The principal federal water resources planning document, *Principles and Guidelines,* is outdated and does not reflect a balance among the economic, social, and environmental goals of the nation. Many critics of *Principles and Guidelines* see it as biased against nonstructural approaches.

- Existing federal programs designed to protect and enhance the floodplain and watershed environment are not as effective as they should be. They lack support, flexibility and funding, and are not well coordinated. As a result, progress in habitat improvement is slow.

- The nation is not using science and technology to full advantage in gathering and disseminating critical water resources management information. Opportunities exist to provide information needed to better plan the use of the floodplain and to operate during crisis conditions.

The Review Committee also concluded, with respect to the upper Mississippi River Basin, that there is no coordinated strategy for effective management of the water resources of the upper Mississippi River Basin. Responsibility for integrated navigation, flood damage reduction and ecosystem management is divided among several federal programs. It also found that the current flood damage reduction system in the upper Mississippi River Basin represents a loose aggregation of federal, local, and individual levees and reservoirs.

Committee Recommendations

To address the above findings, the Review Committee suggested to the Administration 85 areas for consideration. It recommended that, as a first priority, the President should:

- Propose enactment of a Floodplain Management Act, establishing a national model for floodplain management, clearly delineating federal, state, tribal, and local responsibilities, providing fiscal support for state and local floodplain management activities, and recognizing states as the nation's principal floodplain managers;

- Issue a revised Executive Order clearly defining the responsibility of federal agencies to exercise sound judgment in floodplain activities.

- Activate the federal Water Resources Council to coordinate federal and federal-state-tribal activities in water resources.

- As requested by states, establish basin commissions to provide a forum for federal-state-tribal coordination on regional issues.

- To ensure full consideration of nonstructural alternatives, establish environmental quality and national economic development as co-equal objectives of planning conducted under the *Principles and Guidelines.*

- Support collaborative efforts among federal agencies and across state, tribal, and local governments and provide for federal, state, tribal, and/or local cost-sharing in pre-disaster, recovery, response, and mitigation activities. Increase coordination of the multiple federal programs dealing with watershed management.

- To enhance the floodplain environment and provide for increased natural storage in bottomlands and uplands, seek legislative authority to increase post-disaster flexibility in the execution of the land acquisition programs; increase environmental attention in federal operation and maintenance and disaster recovery activities; better coordinate the environmentally-related land interest acquisition activities of the federal government; and fund, through existing authorities, programmatic acquisition of needed lands from willing sellers.

- To enhance the efficiency and effectiveness of the National Flood Insurance Program, take steps to improve the marketing of flood insurance, enforce lender compliance rules, and seek state support of insurance marketing; reduce the amount of post-disaster support to those who were eligible to buy insurance but did not; reduce repetitive loss outlays by adding a surcharge to flood insurance policies following each claim under a policy; require those who are behind levees that provide protection against less than the standard project flood discharge to purchase actuarially based insurance; increase the waiting period for activation of flood insurance policies from 5 to 15 days to avoid purchases when flooding is imminent; leverage technology to improve the timeliness, coverage, and accuracy of flood insurance maps; support map development from appropriated funds; and, provide for the purchase of mitigation insurance to cover the cost of elevating, demolishing, or relocating substantially damaged buildings.

To reduce the vulnerability to flood damages of those in the floodplain, the Review Committee recommended that the Administration should support a strategy that as a first priority, avoids unnecessary human use of the floodplain. Next, damages to those currently in the floodplain would be minimized by permanent evacuation of floodprone areas, floodproofing of structures remaining in the floodplain, creation of additional natural and artificial storage, and provision of adequately sized and maintained levees and other structures, where such structures make sense. As a third step, to mitigate damages when they do occur, the Review Committee recommended greater participation by floodplain residents in the NFIP. The

Committee also proposed that, where appropriate, vulnerability reduction for population centers and critical infrastructure should be targeted against the standard project flood discharge.

To provide timely gathering and dissemination of the critical water resources information needed for floodplain management and disaster operations, the Review Committee recommended that the Administration establish an information clearing house at USGS to provide federal agencies and state and local activities the information already gathered by the federal government during and following the 1993 flood and to build on the pioneering nature of this effort. It also recommended that the Administration better exploit science and technology to support monitoring, analysis, modeling, and the development of decision support systems and geographic information systems for floodplain activities.

Since significant vulnerability continues to exist in many locations in the Midwest, the Committee recommended that the Administration foster an integrated, hydrologic, hydraulic, and ecosystems approach for the upper Mississippi River basin. To accomplish this goal, it should establish upper Mississippi River Basin and Missouri River Basin commissions to deal with basin-level program coordination, and assign responsibility, in consultation with the Congress, to the Mississippi River Commission (MRC), for integrated management of flood damage reduction, ecosystem management, and navigation effort on the upper Mississippi and the Missouri rivers and their tributaries.

Since the Report

Since June 1994, the Administration has implemented a number of recommendations contained in the report and has chartered special studies to examine several others. The Georgia/Florida and Texas floods of 1994 added considerable interest to the reviews and confirmed that flood damage reduction is more than a midwest issue. During Fall 1994, both the Senate Environment and Public Works Committee and a House Disaster Task Force held hearings on the report. The report was also the subject of discussion in numerous other fora. An October attempt to include a Floodplain Management Act within a proposed 1994 Water Resources Development Act resulted in the tabling of the latter bill for consideration this spring. Several report recommendations concerning flood insurance were incorporated in the National Flood Insurance Reform Act of 1994 which was signed into law by President Clinton in late September. This new law extends the waiting period for flood insurance to 30 days, increases emphasis on lender compliance, authorizes mitigation insurance, establishes a mitigation assistance grant program, increases emphasis on floodplain mapping, and codifies a community rating system. It did not address insurance for those behind levees or restricting support to those who do not buy insurance.

The Administration expected to complete its review of the Review Committee's report by early January and be in a position to both direct further actions within the Executive Branch and to propose any legislative initiatives that would be appropriate. The restructuring of Congressional committees, occasioned by the establishment of a Republican majority, may alter this process.

Brigadier General Gerald E. Galloway, Jr. is Dean of the Academic Board at the United States Military Academy. From December 1993 to July 1994, he served as Executive Director of the Interagency Floodplain Management Review Committee, operating in the Executive Office of the President. This article is based on the Executive Summary of the Review Committee's Report. The Committee's Report, "Sharing the Challenge: Floodplain Management into the 21st Century," is available through the Government Printing Office (ISBN 0-16-045078-0).