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Governor

Missouri Department of Labor and Industrial Relations

David D. Mitcham, Deputy Director

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TO: Marc S. Farinella, Chief of Staff
FROM: David D. Mitcham *DDM*
DATE: September 23, 1993
SUBJECT: Flood Response

While our public servants have shown their dedication to Missouri's citizens by laboring long and hard to help those affected by the flood, they are often stymied by a maze of bureaucratic regulations. The following information is provided in response to your memo dated September 20, 1993 and may assist you in your efforts to improve services.

1. Does the agency/department have any requests for financial or technical assistance pending with the federal government?

Unemployment Benefits:

On September 10, 1993, we requested an additional \$2M to pay Disaster Unemployment Assistance (DUA) benefits. We have not received these funds as of this date. In the past, it has taken up to four weeks from the date of request to receipt of funds. Any further delay may cause problems in the payment of benefits.

2. Have you experienced any difficulty on an administrative level in receiving definitive answers from federal agencies?

Unemployment Benefits:

Below are listed several impediments to the effective administration of the Disaster Unemployment Assistance (DUA) program at the Division of Employment Security. This is just a summary, and we have more detailed information that speaks to specific U.S. Department of Labor operating instructions.

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- There is a requirement that a self-employed individual must project income for the current tax year. This amount is to be prorated, and treated as earnings which can cause the reduction or denial of benefits, even though they are unemployed as a result of the disaster.
- When a husband and wife work on the family farm, we often must deny benefits to one, almost always the wife, because they do not have separate self-employment tax schedules. The realities of farm life are that both spouses work to produce income and both should therefore be entitled to benefits when they suffer a loss due to a disaster.
- Operating instructions for the Disaster Unemployment Assistance program are contained in many different documents. Without a consolidated set of operating instructions, it is extremely difficult to find the proper information necessary to administer the program.
- The federal handbook regarding the implementation of the Disaster Unemployment Assistance program has not been updated to include statutory amendments made in 1988.
- The federal forms associated with the program have not been updated to include changes made in 1988. In addition, they are extremely difficult to comprehend.
- The regulations (20 CFR Part 625) are unnecessarily complex. They are virtually unintelligible and we have received different interpretations from the U.S. Department of Labor, often on items which should be matters of fact.

We recognize that the U.S. Department of Labor cannot by executive fiat change the law. However, we believe that most, if not all, of the above problems can be addressed by modifications to existing regulations.

3. Have you experienced any inconsistencies in the application of federal policies and/or regulations?

Unemployment Benefits:

Yes. We have received different and new interpretations of the regulations from the U.S. Department of Labor, making it extremely difficult to administer the program. This has forced us to have to change procedures midstream, often requiring reviews of

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all of our files to find cases to which a new or different interpretation applies. The regulations are complex and therefore subject to varying interpretations. Questions posed to the U.S. Department of Labor often lead to lengthy, incomprehensible answers.

4. What are your most pressing needs and concerns related to flood recovery?
-

Unemployment Benefits:

We need comprehensive, coherent, clear, and concise instructions on administering the Disaster Unemployment Assistance (DUA) program. If the program is meant to provide benefits quickly to individuals unemployed as the result of a disaster, it needs to be simplified.

Prevailing Wage:

FEMA has distributed information stating that because of the emergency, the payment of prevailing wages on public construction projects has been waived. Our understanding is that such a waiver has not been issued. The misinformation has created serious problems where prevailing wage projects did not have determinations issued, and the appropriate wage rates have not been paid. The use of the FEMA information by public bodies, especially school boards, has resulted in the circumventing of the law. The problem is now escalating and complaints are being filed with the Missouri Division of Labor Standards.

If you need additional information regarding these matters, please contact me at 751-4091.

DDM/laj

DEC 8 '93 13:29 FROM USGS

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Mike Espy
Secretary of
Agriculture

MIDWEST FLOOD RECOVERY

INTERAGENCY TASK FORCE

James L. Witt
Director, Federal
Emergency Management
Agency



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and Conservation Service
Department of Agriculture

For release: UPON RECEIPT (Mailed Dec. 6, 1993)

(Note to Editors: During the Mississippi River floods, hundreds of water quantity and quality measurements were made by U.S. Geological Survey engineers, scientists and technicians in the nine-state flood region. Some of these results will be described Monday, Dec. 6, at 8:30 a.m., in a symposium and a poster session at 1:30 p.m., both in the San Francisco Civic Auditorium at the upcoming meeting of the American Geophysical Union in San Francisco, Calif., Dec. 6-10, 1993. The following fact sheet summarizes the investigations.)

MISSISSIPPI RIVER FLOOD OF 1993:

WATER FACTS

* As the nation's principal water-information agency, the USGS works with more than 1,000 cooperators to conduct scientific studies, and collects surface- and ground-water data at more than 45,000 sites across the nation, including 796 surface-water stations in the nine states that were affected by the flood.

* New all-time-high streamflow records were set at 42 USGS stream-gaging stations on 33 streams in 7 states. However, water levels would have been higher in many locations if not for the large volume of runoff retained in flood-control reservoirs. For example, analyses of flood flow in the Kansas River and the lower Missouri River indicate that reservoirs in those basins significantly reduced flooding. In fact, the peak flood discharges associated with a similar flood that occurred in 1951, before many of the reservoirs were built, were higher than the peak flows measured on these streams during the 1993 flood.

* Some of the new flow records on other streams are twice, or more than twice, the previous record. For example, the new record on the Raccoon River at Van Meter, Iowa, is 45.3 billion gallons per day (bgd), and breaks the previous record of 26.6 bgd, set in 1947. And the Des Moines River below the Raccoon River at Des Moines set a new flow record of 45.3 bgd, breaking the previous record of 37.7 bgd set in 1984.

* New all-time-high streamflow records were measured on streams in Minnesota, Iowa, South Dakota, Nebraska, Kansas, Missouri and Wisconsin, with many sites experiencing flows that exceeded the 100-year recurrence interval. (A flow with a 100-year recurrence interval is one that would only be exceeded on the long-term average of one year out of every 100. If a location has a 100-year flood it does not mean that it is safe from another flood for 99 years.)

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* Six new streamflow records were set on the main stem of the Mississippi River and seven were set on the Missouri River. Flow of the Mississippi at St. Louis was above flood stage for more than 10 weeks, exceeding all previous records set at the USGS stream gaging station during the last 59 years of streamflow monitoring.

* At Miller City, Ill., USGS hydrologists collected flow, depth, and related hydrological data at the site of a failed agricultural levee. The levee failure resulted in the cutting of a side channel that bypassed 20 miles of a meander bend in the Mississippi River.

* Hydrologists at the USGS found surprisingly high concentrations of agricultural chemicals in the Mississippi River and some of its major tributaries, during and in the aftermath of the flooding. Despite the much larger volumes of flood water, concentrations of herbicides at sampling sites on the Mississippi, Illinois, Missouri, and Ohio Rivers were at, or near, the maximum levels detected in a previous study of the river during lower flows in 1991 and 1992.

* Loads, or volumes, of chemicals carried by the Mississippi River and some of its major tributaries were also high, with daily loads of some chemicals up by almost 50 percent over previous measurements. On several days when the flooding was at its peak, the USGS estimated that the Mississippi River at Thebes, Ill., was carrying more than 12,000 pounds of atrazine per day.

* Nitrate concentrations were similar to levels measured in previous years. Concentrations were less than 4 parts per million (ppm), well below the nitrate drinking water standard of 10 ppm.

* Channel erosion at bridge crossings is the leading cause of bridge failures in the United States. As a result of the flood, many bridges in the midwestern states are threatened. In cooperation with state transportation departments in Iowa, Illinois and Missouri, USGS hydrologists and engineers measured channel erosion at several bridges on the Mississippi River during and after the flood.

* Bridge scour is measured to determine the impact of channel erosion on bridge safety and to predict the impact of future scouring. Underwater channel changes, flow velocities, sediment characteristics and bridge geometry are measured to develop models of channel responses to scouring at bridges.

* Flooding at the Highway 51 bridge over the Mississippi at Chester, Ill., deepened the channel, or caused it to be scoured out more than 25 feet, at the peak of the flood.

* The USGS worked with the National Weather Service to compile precipitation data from 10 NWS weather stations in the flood-affected states. The data indicate that a wet spring followed by record-breaking rains in June and July produced more than a year's worth of precipitation in seven months.

* The USGS is preparing a series of reports that document significant characteristics of the 1993 floods in the upper Mississippi River basin. The series includes flood discharges, precipitation, transport of agricultural chemicals, scour at selected bridges, suspended-sediment loads and concentrations at many sites, and effects of reservoirs on flood magnitude.

* * * USGS * * *

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ST. LOUIS POST DISPATCH

DEC 2 0 1993

Only 19 Of 500 Levees Fixed

By Robert L. Koenig
Post-Dispatch Washington Bureau
• 1993, St. Louis Post-Dispatch

Four months after the Flood of '93 peaked at St. Louis, the Army Corps of Engineers has completed emergency repairs on only 19 of the more than 500 flood-gouged levees in the Midwest that asked for aid.

Even so, corps officials said last week that they expect to spend all \$180 million that Congress approved to fix levees and other flood-damaged river works. The corps may even ask for \$70 million more.

With some experts warning of spring flooding, corps officials say they are extending the construction season — normally cut short by cold weather — to try to complete some of the other 67 levee-repair jobs now under way and the other repairs they hope to start soon.

"Given the potential for spring floods, the levee-repair work has got to go forward," said Scott Saunders, a corps spokesman in Washington. "Typically, Midwest levee work stops with cold weather in mid-December. We're not stopping."

In the corps' St. Louis district — stretching from Hannibal, south to Cape Girardeau — contractors have completed "initial repairs" on five of the 24 damaged levees in the district that are eligible for corps aid. Work is under way on 17 other damaged levees, officials said Friday.

"The water stayed so high for so long that we got a late start" on fixing levees, said Jim Zerega, the corps' levee-repair project manager in St. Louis. "We won't get to the permanent repairs until spring or summer."

See LEVEES, Page 5

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NEWS EXPRESS

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Facing the specter of losing cropland to spring floods, some bottomland farmers in the Midwest are complaining that the corps has dragged its feet in repairing levees eligible for aid — not to mention the more than 800 rural levees in the Midwest that are ineligible for help from the corps.

In a survey released last week, the agricultural division of Monsanto Co. said that 45 percent of the bottomland farmers questioned in Missouri, western Illinois and eastern Kansas said their biggest need was for more help to repair levees. Many of their farms are protected by levees that are ineligible for aid from the corps but can get limited help from federal farm programs.

Corps officials say that the soggy fall — and a second round of flooding in some areas — delayed the start of levee work, as did the paperwork requirements needed before letting contractors.

Saunders said that sponsors of 543 damaged levees in the Midwest applied to the corps for emergency-repair help. Of those, the corps rejected 270 levees as ineligible for corps aid. He said that most of those levees were rural and did not meet corps standards or file the proper forms.

Of the 273 levees eligible for corps aid, Saunders said the corps has:

- Completed repair work on 19 levees, including five in the corps' St. Louis district and seven in the Kansas City district.

- Let contracts for fixing 67 other levees, including 17 in the St. Louis district and 10 in the Kansas City district.

- Approved 39 more levee-repair jobs. The corps has not yet hired a contractor to begin them.

- Not yet approved repairs on 148 eligible levees.

While Sen. Christopher S. Bond, R-Mo., and farm

groups have accused the corps of moving too slowly to repair levees, some environmental groups say the corps has been moving too fast. Complicating matters, the White House has advised the corps to consider alternatives to levee repair in cases where alternatives are feasible and have local support.

R. Roger Pryor, director of the Missouri Coalition for the Environment, says the corps "should not be rushing to repair all of these levees. The process should be very careful."

In the St. Louis district, Zerega said the corps has finished the \$1.3 million job of patching the Harrisonville, Ill., levee — near Valmeyer — as well as in the Nutwood and Hartwell levees along the Illinois River. The corps also repaired two small levees along the Mississippi River south of Clarksville, Mo.

Meanwhile, contractors are continuing work on repairing 11 breaches in the Columbia, Ill., levee that was topped when the Mississippi River crested at St. Louis on Aug. 1. Zerega said preliminary repairs on the Columbia levee alone will cost about \$8.8 million. In all, Zerega said, the corps' St. Louis district estimates that it will spend about \$41 million on initial levee work and \$30 million more on permanent levee repairs related to the flood.

The corps' Kansas City district, which is responsible for eligible levees along the Missouri River from the Nebraska border to St. Louis, has completed seven permanent and two initial levee repairs. Contractors are also working on ten other levees, including the Monarch levee in Chesterfield.

But spokesman Henry Munoz said the Kansas City district has not yet started work on 100 eligible levees. And 355 rural levees along the Missouri are not eligible for corps-repair aid.

"We plan to work through the winter to get as many repairs done as we can," said Munoz. "If we're lucky, the water will be low in the spring."

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NEWS EXPRESS

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NATURAL HAZARDS CENTER

THE CHALLENGE OF THE MISSISSIPPI FLOOD

By Mary Fran Myers and Gilbert F. White

To appear in
ENVIRONMENT, December 1993, volume 35, number 10, page 6.

Uncorrected proofs

ENVIRONMENT is published by the Helen Dwight Reid Educational Foundation
in cooperation with the Scientists' Institute for Public Information.
Editorial offices: 1319 Eighteenth Street, N.W., Washington, DC 20036-1802 (202-296-8287)

Massive flooding in the upper Mississippi River and lower Missouri River basins last summer caused widespread human distress and provoked sober public questioning of the wisdom of the policies and programs that had contributed to that disaster. The slowly rising muddy water floated a cluster of tough issues into the national arena.

As the waters recede and recovery efforts pass their peak, it is appropriate to ask how the United States came to mount its long, giant struggle to master the flows of the Mississippi. What were the dimensions of the 1993 floods in terms of rainfall, streamflow, and control works—both surviving and damaged? Why did so many levees fail? What were the consequences for people, buildings, and the natural landscape? How effective has the prevailing patchwork of federal, state, and local efforts been in dealing with flood losses? Did the Mississippi overflow waters carry significant messages for citizens and administrators who have

sought and still seek lasting harmony with extreme forces in nature? Can these messages motivate fundamental changes in policies on disaster response, recovery, and mitigation and on long-term management of the nation's waters and associated lands?

Central Issues

Frequently in U.S. history, one dramatic event that stirs public concern and shakes up legislators and administrators has led to basic changes in the course of action on natural resources. The record of flood policy illustrates this reaction handsomely. The immediate window of opportunity for change is likely to last a few months or as much as a year or two. Then, the opening may be expected to contract.

It seems possible that, within the current window of opportunity, the nation could resolve three major issues. First and most pressing, decisions must be made about whether to rebuild, strengthen, raise, lower, or abandon the levees

along the upper Mississippi and lower Missouri rivers. How those decisions are to be made is now the subject of searching and testing by concerned citizens and public officials. Will that review and further study result in leaving the rivers very much as they were last June, or will the debate trigger radical revisions?

Second, it remains to be seen what effect these early decisions, in focusing on the emergency, will have on the long-term quality of natural landscapes and human communities in the region. They could optimize the distinctive floodplain values without degrad-

MARY FRAN MYERS is project manager of the Natural Hazards Research and Applications Information Center at the University of Colorado in Boulder. From 1980 to 1988, she worked as a floodplain manager for the state water resource agencies of North Dakota and Illinois. GILBERT F. WHITE is Gustavson Distinguished Professor Emeritus of Geography at the University of Colorado in Boulder. He was chair of the Task Force on Federal Flood Control Policy from 1965 to 1966 and of the National Review Committee established in 1989 to review *Floodplain Management in the United States: An Assessment Report*.

ing basic resources, or they could exacerbate problems in the long run. Of course, both the problems and the solutions are likely to differ greatly from place to place within the basin. Can the knowledge and skills of the region be mobilized to achieve optimal solutions?

Third, it is apparent that the actions taken to cope with the floods may stimulate measures that could have large significance for water management in the entire nation. Some of these possible measures are improving methods for comparative evaluation of levees with other adjustments to floods; reshaping policy for dealing with substantially damaged structures after flooding; revising the strategy for protecting vulnerable public facilities, such as water treatment plants; changing the policy for extension of federal assistance to property owners who have not elected to purchase flood insurance; increasing the degree to which the availability of federal crop or flood insurance is tied to mitigation of flood, erosion, or drought vulnerability; and expanding the federal government's capacity to assist local communities in drawing up and carrying out plans to address jointly residential, commercial, recreational, agricultural, and wildlife aims in adjusting to the flood hazard. Certain of these measures, such as improvements in flood insurance practice, might have been undertaken in any case, but most are currently receiving attention because of the summer's floods.

How We Arrived Here

The federal government's involvement in coping with flood hazards has grown in sporadic jumps ever since 1825, when a unit of the Army Corps of Engineers was authorized to make waterway improvements (see the box on this page). Although navigation initially was the principal aim, the channel works had incidental benefits for flood management. Floods were then considered by all concerned to be the province of local and state

levee districts. By the major flood of 1850, however, it was recognized in the lower Mississippi basin that some broader kind of program was needed to cope with recurrent flood losses, even though the primary cost was to be nonfederal.¹

After discussions of various possible approaches, a report by two Army engineers, Andrew A. Humphreys and Henry L. Abbott, was received in 1861 as a basis for guiding investment, chiefly by local agencies, in further protection works.² The ap-

SIGNIFICANT EVENTS IN THE DEVELOPMENT OF U.S. FLOOD CONTROL POLICY

- 1825 Board of Engineers for Internal Improvements is authorized to undertake waterway improvements; levees are incidental. Early settlers already active in building local levees.
- 1850 Because of destructive flooding in the Mississippi basin, Congress authorizes surveys of the Mississippi Delta's flood problems.
- 1853 C. S. Ellet, Jr., an engineer, proposes comprehensive flood control for the Mississippi, including levees below Cairo, Illinois, and reservoirs in the Ohio River basin.
- 1861 Two army engineers, Albert A. Humphreys and Henry L. Abbott, propose reliance on levees only, and their proposal is adopted.
- 1862 — Flooding in the Mississippi River basin.
- 1865 —
- 1869 —
- 1874 —
- 1879 The Mississippi River Commission is created.
- 1913 The Ohio Valley floods. The Board of Officers on River Flooding is created.
- 1917 Federal Flood Control Act of 1917 is passed and establishes a policy of federal funding in restricted areas.
- 1927 The great flood of 1927 overwhelms the lower Mississippi basin. Comprehensive "308" basin surveys are authorized by the Rivers and Harbors Act.
- 1928 The Flood Control Act of 1928 is passed, ending the "levees only" policy.
- 1935-36 Heavy flooding in New England.
- 1936 The Ohio Valley floods. The Flood Control Act of 1936 establishes a national structural program with local cost sharing, including soil conservation and watershed protection.
- 1937 The Ohio Valley floods.
- 1938 The Flood Control Act of 1938 reduces local cost sharing for reservoirs.
- 1951 The Missouri Valley floods.
- 1961 The Senate Select Committee on Water Resources recommends expanding the scope of water planning and confirms recreational benefits as appropriate for federal funding.
- 1966 The Bureau of the Budget Task Force on Federal Flood Control Policy recommends a Unified National Program for Managing Flood Losses, including flood insurance, to reduce flood losses.
- 1968 The National Flood Insurance Act establishes the Federal Insurance Administration.
- 1979 The Federal Emergency Management Agency is established.
- 1988 The Stafford Act guides flood recovery and mitigation practices in damaged areas.
- 1992 The Federal Interagency Floodplain Management Task Force publishes *Floodplain Management in the United States: An Assessment Report*.
- 1993 The Mississippi-Missouri Valley floods.

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proach was limited to levees only. Farmers and town dwellers who had invaded the alluvial lands of the Mississippi called for control by levees. They also wanted assurance that the great barriers of earth being erected along the stream courses would not cause undue damage to areas across the channel or downstream or to the essential maintenance of a navigable channel.

As the levee system was extended and strengthened and as the channel was improved, the river flow was greatly confined. Flood stages (the heights of water in the channels) for given discharges (volumes of water) were increased. Meander belts were curbed as a levee system was completed from Cairo, Illinois, to the delta. When the great floods of 1927 poured into the valley below Cairo, they exceeded the designed channel capacity, levees ruptured, and the river breached its confined course. It spread over about 20,000 square miles, displaced more than 700,000 people, damaged at least 135,000 buildings, and took at least 200 lives.¹ As the waters receded, it was clear that the strategy of "levees only" was no longer sufficient. Attention extended to other, supplemental structural measures, such as reservoirs, fuse-plug levees, floodways, and channel improvements. Upstream forest land improvement was discussed but did not figure in plans adopted by Congress in the Flood Control Act of 1928.

Support for the other types of structures was fully incorporated into the policies set in 1936 and 1938 through which the federal government took on a larger burden of the cost and full responsibility for reservoir projects. Parallel support was authorized for soil conservation and watershed protection. This policy did not again change significantly until after a 1966 report from a Bureau of the Budget Task Force on Federal Flood Control Policy recommended an expanded approach to floodplain management, comprising a variety of measures, including flood insurance.² As a result, the Federal Insurance Ad-

ministration and its National Flood Insurance Program were instituted in 1968, providing a basis for communities to examine how a wider range of activities, including land-use planning, flood-proofing of buildings, and integration of warning systems, might be encouraged. Progress along these lines was slow, however.

In 1991 and 1992, the Federal Interagency Floodplain Management Task Force reviewed the status of floodplain management throughout the country and published an assessment report that provided a comprehensive view of where the nation stood as of 1990.³ That report did not lead to any immediate changes in policy or practice. The Reagan administration had abolished the Water Resources Council as a coordinating agency; there was little subsequent interest on the part of the Executive Office of the President in the assessment report. Congressional attention at the time was focused on correcting deficiencies in the emergency response program that were revealed by Hurricane Andrew and on the failure of the flood insurance program to deal adequately with mitigation. Then, the flood of 1993 gave new impetus for criticism and change.

The Flood of '93

The flooding in the upper Mississippi and lower Missouri basins from mid June through early August 1993 was caused by intense rainstorms in late June and July that came on the heels of six months of heavy and persistent rainfall. Precipitation between January and July in the affected area was 1.5 to 2 times the normal for that period.⁴ In June, a stalled weather pattern caused by a strong low pressure system in the western U.S. and a large high pressure system in the southeast resulted in large amounts of rain in the upper Midwest (see Figure 1 on page 25).⁵ By late June, flood storage reservoirs were at or near capacity and soils throughout the area were saturated.

Flood peak discharges exceeding

the estimated 10-year recurrence interval were recorded at 154 gaging stations in the upper Mississippi River basin, and the maximum known peak discharge was exceeded at 56 gaging stations.⁶ Peak discharges occurred as late as the first week in August and flooding in some areas continued into October.

Peak flood stages were higher than the previously recorded maximum stages at 73 of these 154 sites (see Figure 2 on page 26).⁷ The fact that previous maximum peak discharges were not exceeded at 22 of these 73 sites is often attributable to changes in landscape, such as those imposed by the construction of levees and control structures, that allow a smaller volume of water to produce a higher flood stage. This effect is illustrated by historical discharge and stage data at selected points (see Figure 3 on page 28). Because of the short data record and changing observation methods, however, it is difficult to assign precise recurrence intervals and elevations to past flows.⁸

The flooding caused significant damage in nine states: Illinois, Iowa, Kansas, Minnesota, Missouri, North and South Dakota, Nebraska, and Wisconsin. More than 1,000 levees stretching nearly 6,000 miles in length were breached or overtopped (see Table 1 on page 29). Many others were significantly damaged. Taking into account the excessive soil moisture as well as surface overflow, a total of 487 counties (including all 99 in Iowa) were included in a Presidential Disaster Declaration.⁹

The number of people affected by this event is not certain. The American Red Cross has estimated that 56,295 family dwellings were affected in some way. Alone, it spent more than \$30 million in flood relief efforts, sheltered 14,502 people in 145 shelters in the region, and served more than 2.5 million meals.¹²

Property damages from the flood have been estimated at \$12 billion.¹³ Disaster relief from the Federal Emergency Management Agency (FEMA) will cover about \$650 million, including

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NATURAL HAZARDS CENTER

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\$250 million for individual assistance and \$400 million for public assistance.¹⁴ By 27 September, the Small Business Administration (SBA) had received more than 16,200 applications for low-interest disaster-assistance loans from individuals and business owners and had approved \$277 million worth. SBA continues to process the applications and will accept applications to provide working capital to make up for economic hardship caused by the flood for up to nine months after the peak of the disaster in July.¹⁵

The Federal Insurance Administration estimates that there are 88,400 policies in force in the nine states, but it is difficult to ascertain how many of these are on structures damaged by the flood. As of 30 September, the administration had received more than 10,500 claims and had processed about one-third of them for more than \$72.4 million.¹⁶

The Federal Crop Insurance Corporation estimates that, of 122.9 million insurable acres in the affected

states (statewide, not just the flooded areas), 69.7 million acres, or 56.7 percent, were insured. As of September, payments of claims for crop damages resulting from flooding and excess moisture in the upper Mississippi basin exceeded \$51.7 million. More than \$600 million in additional claims are expected.¹⁷ Some losses resulted from heavy rainfall rather than flooding, and many farmers could not purchase crop insurance because they were unable to plant a crop.

Comprehensive data on the number of bridges, roads, water and wastewater treatment facilities, and other public infrastructure that were destroyed or damaged by the flood are not available. The suspension of the Des Moines, Iowa, water treatment plant received major media attention, but many smaller operations were also seriously affected.

The Impact on Individuals

In looking at these aggregate numbers, it is important to remember that

the flood did not affect the Midwest, per se; rather, it affected thousands of individuals. Even though television news no longer brings news of the flood into people's homes every night, it is still a very big story. Take, for example, the plight of an individual family of townspeople who were victims of this flood. How were they affected?

An Urban Family

When the levee broke, the family's house was inundated up to eight feet deep. Initially, the family went to a public shelter, although others went to stay with a luckier neighbor whose house sat on dry land. When the flood receded, the family returned to discover their home a sodden, uninhabitable mess. They had no potable water because the community's water treatment plant was put out of service by the flood. The local health inspector issued notices that flooded buildings had to be tested for molds and fungus and alerted residents to be aware that the waters that had swept through their town carried pesticides and other toxic substances in concentrations that approached permissible contaminant levels.

The local building official told the family that their house was "substantially damaged" and that, before they moved back in, it would have to be elevated. The family had not purchased flood insurance (none of their neighbors had ever thought the levee would break), so they looked to disaster assistance to help them recover. They were interested in moving out of the area, but, for the time being, the only assistance was a check from FEMA for temporary housing to stay in a hotel for a while and an Individual and Family Grant for \$11,900. They were told they could use the grant to flood-proof some items in their house—for example, they could put the furnace and water heater on the second floor—but this was not enough money to elevate the structure plus clean or replace the siding, furniture, and carpeting. So, they cleaned up as well as they could and received permission to move back into their house

TABLE 1
PRELIMINARY ESTIMATES OF DAMAGE TO LEVEES IN THE
MISSISSIPPI RIVER BASIN IN 1993

Designation	Eligible for federal assistance ^a	Total number of levees	Number of levees damaged ^b	Percentage of levees damaged
Federally constructed and maintained	Yes	15	3	20
Federally constructed and locally maintained	Yes	214	38	16.8
Subtotal for federally constructed		229	39	17
Not federally constructed and locally maintained	Yes	265 ^c	184	61.2
	No	1,079 ^d	879	81.5
Subtotal for not federally constructed		1,347	1,043	77.4
Total		1,576	1,082	68.7

^aEligible levees meet the requirements for assistance under Public Law 84-99. Ineligible levees either do not meet those requirements or did not have an application for assistance submitted for their repair. However, some levees that are ineligible under Public Law 84-99 may be eligible for assistance from the Soil Conservation Service.

^bDamaged means that the levees were breached or overtopped. There may be other levees that were damaged without being breached or overtopped.

^cThese levees together stretch for some 1,800 miles.

^dThese levees together stretch for some 4,000 miles.

SOURCE: Department of the Army, U.S. Army Corps of Engineers, Civil Works, "Tabulation of Levees" (Washington, D.C., 12 August 1993).

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on a temporary basis until the city decides whether it will buy out the properties in this neighborhood.

The city is puzzling about how to do this. City officials do not know if the levee will be repaired. The city does not have funds to match the federal grant that might be available for a buy-out. Even if it found the money, however, it likely would not be enough to compensate the family adequately to find a new home; property values in other parts of town are higher. Equally important, the city lacks an employee with the expertise to carry out a program to acquire and relocate flood-damaged properties.

The full, traumatic effects of the fight against the levee break, the evacuation, and the tiring search for recovery are impossible to calculate in the short run. Some consequences will only be recognized as solutions of some kind evolve over months of searching.

It is possible that, at some point in the future, a review of alternative flood protection strategies may make adequate funds and expertise available to the community to buy out this family's house and move them to a new area. That could be months or, more likely, years from now. By that time, the family probably will be re-established in its former location and may have little desire to uproot and move. It will be tempted to argue that a flood like the one in 1993 probably will not happen for another 100 years.

Alongside the experience of towns that were flooded by levee breaks must be placed the arguments of officials in Davenport, Iowa. They believe their city wisely refused to build large levees, in contrast to Rock Island, Illinois, across the river. Davenport had adjusted its land use with a riverside park and waterfront gambling boats and had designed buildings to minimize potential flood losses. Thus, the flood's costs to the city were lower than what the city would have paid for levee construction and for restricted riverfront access.

A Rural Family

Now, consider the situation of a farm family that, for decades, cultivated 250 to 300 acres of rich alluvial soil in bottoms along the lower Missouri and now operates a consolidated farm several times that size. The waters overtopped a levee and flooded the land for the first time since the embankment was strengthened 50 years ago.

The increased high-velocity flow washed soil out of some land, deposited coarse material across one low area, and left a further layer of fertile silt in another stretch. The corn crop was ruined. Drainage ditches were clogged. Debris was deposited in a few low places and along fence and tree rows. The family had worked night and day to strengthen levees as the waters had risen in the stream channel and then to evacuate livestock, people, and especially valuable equipment and goods when it seemed likely that their defenses would fail. The dwelling and major barns were inundated to depths of 3 to 10 feet, and it was 30 days before they again were accessible by trucks on muddy roads.

The family collected \$70 per acre in crop insurance for which it paid an annual premium of \$10 per acre. The neighbor's claims varied according to the duration of and damage done by the flood. The initial costs of flood fighting, evacuation, temporary shelter elsewhere, restoring operations, repairing damaged facilities, replacing lost property, and applying for indemnification or assistance were painfully apparent and difficult to estimate precisely.

Deciding what the family should do beyond recovery raises troublesome questions. Should they seek, with other members of the levee district, to have the levee rebuilt at the previous height and accept the risk of its failing again after another unusual precipitation event? That judgment would be affected by whether levees across the channel or up- or downstream are being raised, lowered, or

abandoned. Whatever the levee protection, the family must decide whether it would be desirable to elevate or otherwise flood-proof any of the farm structures to make them less vulnerable to damage in the next flood. Could some or all of the area be left unprotected from floods and dedicated to hunting and fishing in the natural habitat, thereby increasing to some unspecified degree the flow capacity of the channel?

There are no easy, general answers to these questions. The floodplain differs in soils, vegetation, flood vulnerability, and drainage from one reach to the next. It is affected by improvements to the navigation channel and by the height and configuration of the levees. Stream discharge is influenced in a number of ways by upstream precipitation, land use, and reservoir storage. Farm management in the floodplain also varies greatly.

The Repair/Rebuild Dilemma

When response activities to any disaster turn to long-term recovery operations, conventional wisdom suggests that people should go about rebuilding and reconstructing in a way that reduces the likelihood of significant damage from future similar events. In this case, two major dilemmas have arisen that serve as poignant examples of why conventional wisdom is not always followed: how to deal with the reconstruction of thousands of damaged buildings and what to do with all of the broken levees that have left hundreds of square miles of floodplain without structural flood control protection.

In regard to damaged buildings, many local codes require structures damaged beyond 50 percent of their value to be rebuilt in compliance with the minimum standards of the National Flood Insurance Program, which state that the lowest floor must be at or above the level of the 1-percent chance flood. This requirement often presents an overwhelming economic burden on victims who must struggle just to replace what

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they had prior to a flood, much less to absorb the cost of elevation or relocation.

As for the more than 1,000 damaged levees, many of them were locally owned and operated and are not eligible for federal reconstruction assistance. Many were designed and built to provide protection only from frequent flood events. That they were overtopped or failed last summer should have surprised no one.

The Opportunities

There are opportunities, however, to rebuild in a safer manner. For example, reports from postdisaster mitigation teams indicate that as many as 200 communities may be interested in acquiring and relocating or demolishing their structures that were substantially damaged.¹⁸ FEMA is focusing the use of its Section 404 Hazard Mitigation Program grant funds—an estimated \$45 million, which must be matched by the recipients on a 50/50 cost-sharing basis—on acquisition and relocation projects and also has funds available to provide technical expertise to communities wishing to undertake such projects.¹⁹ Lessons from past experience with acquisition and relocation projects for substantially damaged structures provide much guidance on how to ensure the success of such efforts. If these lessons are applied, the wheel does not have to be reinvented.²⁰ Several other financial assistance programs exist that can be used to help fund mitigation projects for substantially damaged structures, including SBA disaster assistance loans, various FEMA disaster assistance programs, Housing and Urban Development grant and loan programs, and state housing and development finance authorities.

Opportunities for changing "business as usual" for levee reconstruction also exist. To facilitate the search for appropriate alternatives, the Office of Management and Budget (OMB) issued guidance on 23 August for the establishment of an unprecedented review procedure to assess strategies for levee reconstruction.²¹ The agencies in-

involved in this review include FEMA, the Army Corps of Engineers, the Soil Conservation Service, the Fish and Wildlife Service, and the Environmental Protection Agency as well as state and local government agencies and other interested organizations. OMB's short-term policy guidance calls for the agencies' representatives to consider nonstructural alternatives to levee repair that would benefit both flood control and natural resource protection. The implication for FEMA's disaster field offices is that the interagency team is reviewing each application for levee repair and trying to determine whether a nonstructural alternative is appropriate for that levee.

The White House has called for a broader review of alternatives—one that looks at the entire upper Mississippi and lower Missouri watershed.²² In late August, the White House and the Office of Management and Budget established a new task force to evaluate and review the procedures for repairing and restoring levees. The same offices are taking steps to prepare, by February 1994, recommendations for further action.

The Association of State Floodplain managers and the Association of State Wetland Managers have also furthered the debate by sponsoring two major conferences among interested citizens and government officials in August and September in St. Louis, Missouri.²³ On 30 and 31 August, representatives of the nine states affected by the flood, federal agencies, environmental organizations, the White House, and Congress gathered to share information on post-flood recovery activities as well as to identify opportunities to help communities and states recover in a way that would prevent a future similar event from causing such extensive damage. The three key issues addressed at this meeting were substantially damaged structures, levee reconstruction, and community recovery planning. The second, follow-up meeting was held on 27 through 29 September. Discussions at this meet-

ing focused primarily on agricultural concerns related to the flood and on opportunities for the restoration of wetlands. Although much of the background information and issues discussed during the conferences had already been appraised by the leaders of the associations in the year before the floods,²⁴ the body politic had adopted no plan or policy as to what to do next.

Overcoming the Dilemma

Although interest in the acquisition and relocation of flood-damaged structures is unprecedented and the consideration of alternatives to levee reconstruction—under the leadership of the White House—is a pioneering effort, problems do remain. For instance, there is a continuing, critical need for better public awareness, training, and education about disaster relief programs and mitigation options. Local officials who are caught up in day-to-day immediate response and recovery activities are often unfamiliar with long-term mitigation assistance programs. These programs take considerable planning effort, and most communities have not learned a lesson from other communities hit by disaster—the lesson that pre-event planning for recovery clearly pays off afterwards.

Mitigation work is also hampered by the conflicting goals of the short- and long-term disaster assistance programs. Initial disaster assistance enables people to get back on their feet and thus makes them less likely to support more comprehensive programs, such as acquisition or relocation, at a later date. If interest does exist, slow processing of applications for projects eligible for hazard mitigation funds from FEMA often causes people to lose interest and become unwilling to participate.

As for the levees, the interagency teams considering their reconstruction or repair are having difficulty striking a balance between the need to restore flood protection quickly and the need for long-term planning for alternative flood protection that incorporates the concerns of sound eco-

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system management. This is particularly problematic because the review procedure outlined in the Office of Management and Budget's directive²⁵ on levee repair does not match well with existing statutes and regulations under which the Army Corps of Engineers and the Department of Agriculture carry out such efforts. Because the current flood control strategy in the country is biased toward structural solutions, programs for viable alternatives and guidance on how to finance and implement them are not well formulated. Policy options suggested by federal agency headquarters or other executive offices may not be carried out in the field simply because adequate information to do so does not exist. Nor is the appropriate level of rigor for the cost-benefit analyses of alternatives clear. How are downstream impacts considered; how is future loss accounted for; how are other government expenditures, such as subsidies to farmers to forgo planting crops, incorporated into the equation; and how are environmental benefits quantified?

Recognizing Floodplain Values

Over the past three decades, several streams of thought have converged to shift both popular and technical views of floodplains. The limitations of engineering measures to restrict and channel river flow have been recognized more clearly. The uncertainties inherent in water engineering have been demonstrated along the Mississippi by the ways in which levees have increased flood stages. Levee failures have begun to be viewed as the river reclaiming its natural terrain.

During the same period, the significance of wetlands and floodplains in providing distinctive habitat, soil conditions, water storage, and ground- and surface-water quality was established in the scientific and political arenas. This significance was appraised in *Restoration of Aquatic Systems: Science, Technology, and Public Policy*, a 1992 report by a committee of the National Research Council.²⁶ That

document summed up the state of knowledge of the interrelations of physical, biological, and social factors in wetlands, including floodplains. The overall opportunities for wetland restoration had already been brought to national attention by the controversy over the federal policy of ~~restoration~~ "no net loss" of wetlands and the accompanying issue of how to define what is a wetland.²⁷ For the first time, questions of habitat diversity and function came to be widely considered in association with questions of watershed hydrology and sedimentation, multiobjective river management, and land-use plans along stream channels.

These various aims now are reflected in an uncoordinated set of federal and loosely related state and local initiatives. The National Park Service assists in planning rivers and trails projects. The Environmental Protection Agency supports a Watershed Planning Program and seeks to link it with provisions of the Clean Water Act. Under the Soil Conservation Service, there is a Wetlands Reserve Program. Within the Department of the Interior, there are several programs dealing, at least in part, with waterfowl management, including Partners for Wildlife, the Waterbank Program, and the Land and Water Conservation Fund. The Army Corps of Engineers also has authority to support environmental improvements and is undertaking major studies in that direction.²⁸ Some of these agencies work closely with nongovernmental organizations such as The Nature Conservancy. The program's effectiveness would be greatly enhanced by early prioritization, in terms of location and timing of wetlands for restoration. Such prioritization would facilitate attainment of the programs' goals and eliminate much of the ambiguity as to which wetlands—mainstream floodplains, tributary floodplains, upland marsh areas, potholes, and the like—would be targeted for early treatment.

These deepened scientific understandings and broadened views of the

ecological linkages have fostered an unprecedented growth of concerned citizen organizations at the local, state, interstate, and national levels. Appeals for action have been strong and pointed from a variety of traditional environmental organizations: American Farmland Trust, American Rivers, Environmental Defense Fund, Environmental Law Institute, Inak Walton League, National Fish and Wildlife Federation, Sierra Club, and World Wildlife Fund. Newer groups, such as the Coalition for the Restoration of Coastal Louisiana and the Coalition to Restore Urban Waters,²⁹ are addressing related problems of wetlands' values in less conventional ways.

A call for action along broader lines, incorporating agricultural and conservation goals, was issued in August by the Upper Mississippi River Conservation Committee.³⁰ Its call, representing the states in the upper basin, was for an unprecedented level of environmental restoration. Many other citizen groups are also becoming involved. The major significance of these multiple initiatives is that they are moving in roughly converging directions and, for the first time, show signs of harmonious action with urban and rural groups involved in addressing other values in floodplain management. Thus, the alternative of wetland management has emerged as practicable.

The Need for Mitigation

In a similar vein, the concept of mitigating damages from disasters has gained full currency over the past few decades. There is now a well-established consensus that the disaster cycle of preparedness, response, and recovery must include the fourth component of mitigation. This component ensures that damaged facilities are not automatically repaired and replaced to their pre-event status; rather, they are removed, so far as is practicable, from harm's way or reconstructed in such a way as to avoid future damages.

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Federal policy has done much to promote the concept of mitigation, especially immediately after a disaster, when awareness of the problems that hazards present is high and political support to correct deficiencies in existing programs is strong. For example, since 1988 when the Stafford Act³¹ was passed, the federal disaster relief assistance available to communities has included funds needed to repair or replace damaged public structures in a safer (and often more expensive) manner. Since the early 1980s, there has been a concerted effort made by federal interagency hazard mitigation teams to identify opportunities for mitigation in communities that have just experienced a major disaster.³²

Unfortunately, no systematic assessment has been made to track the effectiveness of the teams or to determine the outcome of the recommendations they make immediately after disasters. Also unfortunately, the push for mitigation seems to be at its peak only when disasters occur. Although some agencies such as FEMA work consistently during both disaster and nondisaster times to promote mitigation (and James Lee Witt, the new director of FEMA, has announced that mitigation would be his central concern),³³ other local, state, and federal agencies, many citizens, and Congress appear content to let hazards and the need for mitigation fade into the background soon after an event occurs.

Marshaling Government

In light of the decisions that have been made regarding the human occupation and development of the Mississippi watershed that led to the summer's flood and the dilemmas it has presented, the challenge that lies ahead is clear. Disasters such as the flood of '93 cannot be considered impossible or highly unlikely; rather, they must be viewed as a reality.

Although the early studies by Humphreys and Abbott looked to a system of levees for which the local

landowners would carry the financial burden, the evolution of commitments and activities has blurred public concepts of what is an effective national strategy for dealing with floods and where responsibilities should rest among property owners, local governments, states, and the federal agencies. The "levees only" policy has been demonstrated to have severe limitations. Some floodways and reservoirs have also proven inadequate in coping with great floods. Although the concept of unified floodplain management has received endorsement in theory,³⁴ it is far from being realized in practice. One striking example of this problem may be seen in how FEMA's National Flood Insurance Program, which was intended to promote such management, has instead encouraged uneconomic reconstruction and new building in the floodplain with insurance coverage and how disaster assistance has in some instances abetted it. Another example is how the federal government has provided grants for building public facilities, such as water treatment plants, in flood-prone areas. Natural values of floodplain environments are given lip service but little concrete support. For example, landowners receive little technical advice about how they can use wetlands instead of engineered protection.

A key consideration in the near future is timing. Can the concern to recover promptly be reconciled with the need for further scientific and technical studies and with the need to forge stronger private and government instruments to carry out the desired actions at the community level? One possible strategy relies on the recognition that the next potentially damaging flood might come next year or might not occur for decades. Its recurrence is certain, but its timing is uncertain. Under these circumstances, the federal government might institute new provisions of crop and flood insurance to indemnify property owners behind unrepaired levees against any damage they might suffer from a flood until such time as a deci-

sion is made whether to rebuild the levees to previous levels. Thus, the breathing space required for developing alternative programs could be supplied at little or no cost to the taxpayer and at little or no financial risk to the floodplain occupant.

The Months Ahead

If the work of the White House's new task force is to lead to truly constructive action, its appraisal of options to use and preserve the natural resources of the area must be supplemented with a set of hard-headed suggestions as to how current procedures and programs can be revised to reach those aims. In developing these suggestions, the task force must also address the interrelationship between hazards and the myriad decisions made on a daily basis at the individual, local, regional, and national levels. The nation's strategy for mitigating damages from disasters should not be driven by its disaster relief policy.

In the next year or two, the national approach to coping with the flooding may not change at all; disaster assistance, insurance offerings, and the current practices of federal agencies may have altered little. That is one extreme. At the other, a vision of a new harmony in the aspirations for the Mississippi basin and for other basins around the country might emerge. In addition to sharing that vision, the task force might find practical ways to help put it into effect. Such a vision might regard hazards not as single, rare events but, rather, as part of a continuum wherein the resiliency of natural and social resources is tested.

In between these two extremes, there might well be a few major improvements that fall short of a full reorientation of policy and programs. The current congressional review of legislation affecting property insurance is likely to lead to helpful changes in procedures affecting requirements for federal financial assistance. For example, if lending institutions were penalized for not requiring property buyers to purchase

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Flood insurance for flood-prone property as a condition for receiving a mortgage, more properties would be insured. Also, more buyers would be forewarned of the risk of flooding and so could choose not to buy. In either case, the need for federal disaster relief assistance would likely decrease. In addition, FEMA's commitment to mitigation may be expressed in operating rules that will reduce vulnerability before the next disaster strikes.

Other steps outlined in the Federal Interagency Floodplain Management Task Force's assessment report and its companion, *Action Agenda for Managing the Nation's Floodplains*,¹³ might be adopted (see the box on page 02). Those several actions would together mark a significant advance.

It is not unduly sanguine to expect that scientific and public support may be marshaled for a series of executive orders or administrative agreements

that would promote comprehensive state floodplain management planning; steer federal activities in harmony with that planning; establish broad priorities for wetland restoration; strengthen coordination of federal agencies' efforts to assess the vulnerability of public facilities and preparedness and flood-proofing measures; and step up education and training relating to the nature of flood hazards and natural values of flood-

RECOMMENDATIONS FOR FLOODPLAIN MANAGEMENT

In 1992, the Federal Interagency Floodplain Management Task Force published an assessment report on the status of the United States' floodplain management. Before the report was published, the task force invited a panel of independent experts to review the report. The following is a list of recommendations put forward by the task force and the panel.

To integrate flood loss vulnerability and protection of floodplain natural values into broader state and community development and resource management processes,

- vigorously foster the preparation of state floodplain management plans, involving both public and private interests and, where appropriate, interstate agreements;

- require preparation of state comprehensive floodplain management plans as a condition for continued participation in the National Flood Insurance Program;

- prepare an executive order requiring that new federal investments, regulations, and grants-in-aid be consistent with state and local floodplain management plans that conform to federal standards; and

- adjust tax codes to discourage building in flood prone areas.

To improve the database for floodplain management,

- remap the nation's floodplains, where appropriate, to take into account potential changes in hydraulic conditions associated with full development of the drainage areas under existing land-use plans;

- establish a cooperative, jointly funded program by the National Science Foundation and interested federal agencies to develop methods for mapping,

regulating, and identifying natural values in areas with special flood hazards;

- develop an accurate, affordable, national system for gathering flood loss data; and

- fund research to examine, in a selected sample of communities, the full benefits and costs of floodplain management measures.

To give weight to local conditions,

- without loosening the limits on permissible vulnerability, examine the practicability of using performance standards for the preservation, use, and development of floodplains;

- further experiment with the National Flood Insurance Program's community-rating system to encourage communities to adopt a variety of flood hazard mitigation measures, such as zoning, particularly suited to their local circumstances; and

- redesign local zoning and subdivision regulations and building codes to contribute to the management of floodplains' natural resources.

To minimize conflicts and gaps among federal programs,

- establish an independent task force to continue to review and recommend changes in the current Unified National Program for Floodplain Management.

To reduce vulnerabilities,

- prepare assessments of the vulnerability to flooding of a sample of facilities built with federal aid;

- fund research on techniques for estimating benefits and costs to encourage local agencies to improve flood preparedness and retrofitting;

- assess existing aging flood control structures and make recommendations for sustainable improvements or replacements;

- improve land-use regulations to re-

duce encroachment onto floodplains downstream of dams;

- assess alternative designs to channel modification that include less straightening of channels, employ more gradual slopes, and use natural vegetation or riprap rather than concrete-lined channels;

- assess pre-existing storm water networks and make suggestions for alternatives such as on-site retention, natural drainage systems, and zero-increment runoff for new development;

- establish positive tax incentives for the preservation and restoration of floodplain resources; and

- provide incentives and technical and financial assistance for land treatment measures, such as maintaining trees, shrubbery, and vegetative cover; terracing; slope stabilization; grass waterways; contour plowing; conservation tillage; and strip farming.

To improve professional skills and public education,

- develop training programs and conduct regional training, at an affordable rate, for appropriate government personnel;

- expand and evaluate efforts to inform and educate the public about flood hazards and flood management; and

- improve documentation and quantification of the values of natural floodplains to improve public understanding of possible needs for protecting those values.

SOURCES: Federal Interagency Floodplain Management Task Force, *Floodplain Management in the United States: An Assessment Report* (Washington, D.C.: FEMA, 1992); and Natural Hazards Research and Applications Information Center, *Action Agenda for Managing the Nation's Floodplains*, special publication no. 25 (Boulder, Colo.: Natural Hazards Research and Applications Information Center, 1992).

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plains. These goals could be achieved without major new legislation, but their achievement would be accelerated if federal agencies were allowed more flexibility in how they allocate available disaster relief funds. The long-term benefits would extend far beyond the Mississippi basin.

In less than two centuries, the nation has moved slowly, often by trial and error, from a belief that levees could surely protect humans and their built environment to a recognition that the built and managed environment must be more open to accommodating its natural components. The need to integrate the nation's disaster response and relief policies more closely with broader environmental and economic policies is now accepted. Events like the flood of '93 offer an opportunity to speed the formation of sounder policy. This opportunity should not be squandered.

ACKNOWLEDGMENTS

The authors are indebted to Sharon Gabel, David Monon, and Eve Passerini for their assistance in preparing this article.

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The figures discussed in this article and commentary on the article will appear in the December 1993 issue of ENVIRONMENT.

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overview

THE MISSISSIPPI FLOOD

COMMENTARY

If we have learned one lesson this summer, it is that the United States can no longer allow decisions about flood control and sound floodplain management to fall victim to the tyranny of small decisions. When the flood waters rose this summer, no single piece of legislation or other authority outlined a comprehensive set of measurable goals for the nation's flood control policies. At the federal level alone, at least 23 subdivisions of 12 departments and agencies control some piece of the puzzle. A mishmash of laws, executive orders and directives, administrative regulations, interagency actions, and agency policies and programs ostensibly thread together all of these flood control efforts.

By the time the flood waters recede, Mary Fran Myers and Gilbert F. White hope, a new vision that promotes comprehensive floodplain management and wetlands restoration will emerge (see Myers's and White's article beginning on page 4). The good news, they report, is that this society is moving, albeit slowly, from trying to tame the river to learning to make peace with it. Unprecedented demand exists for nonstructural alternatives such as relocation. Perhaps 200 communities may decide partially or totally to move out of harm's way.

What seems clear is that the United States cannot afford to maintain the status quo. The tragedy of this summer's destruction is that it was entirely predictable. Thousands of seemingly separate decisions—to drain a few acres of wetlands in Iowa, to build an agricultural levee outside Chesterfield—set the stage. The Mississippi has sent a powerful message: Short-sighted structural solutions coupled with unwise land management practices have put people and property at risk. Instead of allowing the river to fan out and take advantage of the natural flood control function of

floodplains, the United States has spent billions of dollars to force the river into ever-tighter channels, which raises flood crests and creates a false sense of security that has encouraged floodplain development.

The bad news is that the meager funds for relocation and other nonstructural solutions, such as wetlands restoration, are hamstrung by conflicting rules and regulations. The Clinton administration has issued guidance ordering the consideration of nonstructural alternatives to rebuilding levees. But the resources and expertise needed for these options—not to mention the dollars—are scarce. Disaster assistance is still skewed in favor of relief and against long-term flood loss reduction. Most people are deciding to rebuild in harm's way, and once again, flood control policy is falling victim to small decisions.

Unless the people of the Midwest are given viable alternatives to merely rebuilding the levees, there is little chance of any change. The United States needs to use its limited resources to help people voluntarily move away from the river, to get them out of flood-prone areas, to restore wetlands, and to take advantage of the natural flood control provided by the floodplain. In a watershed where lakes and wetlands are preserved, water is released at different rates and reaches the channel at different times. In contrast, a watershed engineered to move water off the land quickly through drains and channels will release most of the water simultaneously, increasing flood crests.

An August 1992 report prepared by the Illinois State Water Survey once again confirmed that wetlands act as natural sponges, storing water and releasing it over time.¹ For every 1-percent increase in the area of a watershed's wetlands, the authors found, a flood's peak flow in the streams that drain the watershed is reduced by 3.7 percent, on average. Consider, then, what might have happened if more than 19 million acres of

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wetlands had not been eliminated from the drainage basins of the Mississippi and Missouri rivers north of St. Louis since the late 1700s. Illinois, Iowa, and Missouri—the states that suffered the most damage this summer—have lost 85 percent or more of their marshes, bogs, and fens.

The conventional wisdom is that this summer's flooding was a product of a wet spring followed by persistent weather patterns from early June through July created by the convergence of warm, moist air from the Gulf of Mexico and much cooler, drier air from Canada. But to figure out when the flooding really started, one would have to go further back than last spring, back to the first farmer who "reclaimed" a prairie pothole. Now is our chance to reverse the practices that will cost the taxpayer at least \$6 billion this year and countless billions in the future. People in the Midwest tend to measure the Federal Emergency Management Agency, the Army Corps of Engineers, and other agencies by how quickly checks are cut and levees are rebuilt. But the true measure of their performance will be how well the Midwest withstands the next flood.

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1. M. Demissie and A. Khan, *Influence of Wetlands on Streamflow in Illinois* (Springfield, Ill.: Illinois Department of Conservation, 1993).

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AS MARY FRAN MYERS and Gilbert F. White point out in their thoughtful article about the floods of 1993 in the upper Mississippi and Missouri river basins, natural catastrophes provide both the incentive to reconsider policy and a social climate anxious to return to normalcy. The vignettes describing the loss and suffering that the flood visited upon individuals and families demonstrate the need for immediate support to alleviate such misery, but time is needed to develop sound policy and plans for the future.

With the waters still high, speculative views about the precise impact of levees on flood stages at various locations and about the mitigating role that bottomlands and wetlands would play in the absence of levees are conflicting. Because of the hydraulic and hydrologic continuity of flood flows along the river, flood-routing models based on appropriate topographic and other information must be developed to inform the policy debate. Although these models may exist for some locations, other locations may require new field surveys and development. Such surveys may take time, but the resolution of many policy issues and local decisions depends upon some level of agreement about the fundamental relationships between flows, stages, and frequency. Such agreement may exist, but I have not heard it in the public arena.

As White and many others have pointed out in the past, people use flood-prone areas

for a variety of reasons, some of them good and even rational. Although it is proper to focus on the mitigation of damages, this may also be a good time to renew investigation of the real and presumed benefits to society of the varied and apparently growing occupancy of flood-prone lands. These benefits are often assumed to be greater than the costs of providing a host of mitigative actions, but they are difficult to spell out. It would be useful to reiterate the economic and other benefits, beyond the damages averted, of uses of flood-prone lands. Wetlands, of course, are among such uses and are currently seen as having considerably more value than was attributed to them 150 years ago, when wetlands were considered to be "malarial swamps." Conversion of much of this wetland to very productive farmland has been a triumph of human endeavor. Myers and White indicate that there are many ways to reduce the risk to farming while enhancing wetland values.

The interesting historical record of response to catastrophe provides both encouragement and caution: encouragement at the broadening of approaches to mitigation and caution because many of the actions on the agenda proposed by the state representatives have a familiar ring. Their familiarity—born of frequent repetition—suggests the need for priorities. In this period of scarce government resources, a first priority might be sharpening the sticks that accompany the carrots of support for land

use and planning in many federal subsidies, from insurance to shared costs for structures and planning. Certainly of equal priority is applying pressure on states and local jurisdictions to require federal agencies to abide by legislation and regulations restricting uses of flood-prone lands. That federal agencies flaunt the rules is evident in some post offices and federal highway sites.

At least since the 1960s (and probably in the 1930s), the call has gone out for consistent measures of flood damages. Until these measures have been achieved, it is hard to see how sensible policy choices that are based, even to a modest degree, on comparisons of benefits and costs can be made. Basic information about the distribution of areas subject to flooding, the values of "natural" areas, and the benefits and costs of floodplain use and mitigation of damages constitute the fundamentals on which sound policy decisions can be based. The driving force to obtain such information is often the passage of laws and regulations that demand its use. The 1992 assessment and report of the Federal Interagency Floodplain Management Task Force and the accompanying *Action Agenda* provide a full menu of recommended activities, but a clarification of the interrelationships among the proposed activities is needed. Moreover, there is good reason to believe that the hot iron of the 1993 catastrophe will cool before much policy deliberation and decisionmaking can be achieved. The agenda, of course, is designed to meet the demands of the future, but its launching depends on the dimming memory of the catastrophe.

The success or failure of the course precipitated by catastrophes in the 1920s and 1930s, and even earlier, remains a subject of debate. It is probably impossible to make such an evaluation. I have the impression that succeeding years have shown incremental improvements in policy that have resulted in mitigation of damages. Yet the total bill is apparently rising. Perhaps some inquiry is needed to evaluate what has worked, where, and why—as difficult and uncertain as such evaluations must be.

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EDDING FLOOD WATERS are invariably followed by fading memories. The attention of individuals, communities, and government agencies quickly turns to other concerns, and the intense experiences and powerful images of the flood recede into the past. Those driven out by rising waters often venture back, believing that they have witnessed the worst nature has to offer. However, the Mississippi floods of 1993

may have been different. As Mary Fran Myers and Gilbert F. White point out, the duration, extent, and intensity of this flood have left an impression that will not easily be eroded by time.

It is clear from the statistics the authors present that the flood was an extreme event and that the weather patterns that produced it were unusual, as well. Although it is true that a natural event as complex and widespread as this flood cannot be captured in a single statistic like a recurrence interval (the average number of years within which a given event will be equalled or exceeded), the data indicates that the flood—as measured by stage if not by runoff—was more extreme than was the rainfall.¹

Unquestionably, the flood was exacerbated by control structures and land-use changes in the upper Mississippi and lower Missouri basins. Just as clearly, the widespread property damage was the result of increased encroachment into the floodplain, a phenomenon that was encouraged by investments in structural protection—behavior that has been well-documented elsewhere.²

One important measure of land-use change is the loss of wetlands in the upper Mississippi. Draining, dredging, and filling activities in the watershed above St. Louis have eliminated an estimated 19 million acres of wetlands. In Missouri, Illinois, and Iowa—three of the states hardest hit by the floods—85 percent of the wetlands have been lost over time.³ Agriculture accounts for the largest single land-use change—which does not entirely destroy the land's usefulness as a flood buffer—but it is evident, nonetheless, that the conversion contributed to both the severity of the flood and the damage it inflicted.

Given the influence of land forms and use patterns in attenuating or aggravating the effects of intense weather, it is interesting to note that, in some quarters at least, the rush to transform natural systems to something more "useful" may be on the wane. Over the past several years, public agencies responsible for natural resources protection and environmental quality assurance have gradually become more receptive to proposals for habitat restoration and the use of these rehabilitated systems in managing water quality protection, ensuring biological diversity, and providing for flood control. Evidence of this change can be seen in such activities as the endangered fish recovery program in the Colorado River and the review of mainstem dam operations on the Missouri.

This new attitude toward nature will be helpful in picking up the pieces in the aftermath of the flood. The restoration and use of natural systems like wetlands, both for flood protection and habitat value, in conjunction with manmade systems such as

levees and dams, must now be part of protection plans.⁴ Any serious programmatic review of the Mississippi-Missouri system will surely have to look at habitat restoration facilitated through easements and land purchases as an environmentally sound and, quite possibly, lower-cost alternative.

Reintroducing the use of natural systems as part of the solution will require time for planning and execution. During that time, those who have experienced loss must be protected, but not in a manner that locks in old solutions. Myers and White suggest a variety of ways to buy time, such as providing insurance protection rather than levee repair. A similar approach would be the purchase, by the appropriate public agency, of a conservation and flood easement on private land.

No matter what is done, funding will be required. One place to look for a portion of the needed money is in existing programs that are now designated for other, not unrelated purposes. One example is the Conservation Reserve Program, a title in the Food Security Act of 1985 designed to reduce water pollution from agricultural land by paying farmers to take highly erodible land out of production for a 10-year period as a bridge to its permanent retirement. This program will be up for consideration in the 1995 Farm Bill, and it could be expanded or redesigned to accommodate provisions for nonstructural flood protection.

Rare events often prompt new ideas. The magnitude of the Mississippi flood and its impetus to re-examine protection strategies, in conjunction with emerging attitudes on habitat restoration in public agencies, may rouse us to modify the way we have chosen to fend off the caprice of nature.

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1. Richard Gorton, U.S. Army Corps of Engineers, Omaha District, personal communication with the author, October 1993; and U.S. Geological Survey, *Floods in the Upper Mississippi Basin 1993*, circular no. 1120 (Washington, D.C., USGS, 1993).

2. R. H. Platt, "Floods and Man: A Geographer's Agenda," in R. W. Kates and I. Burton, eds., *Themes from the Work of Gilbert F. White*, vol. 2 of *Geography, Resources, and Environment* (Chicago, Ill.: University of Chicago Press, 1986).

3. National Wetlands Inventory, "Wetlands That Have Been Lost in the Flooded Area of the Mississippi/Missouri Basins North of St. Louis—As Amended" (St. Petersburg, Fla., August 1993).

4. J. L. Rasmussen and J. Milligan, *The River Floodway Concept: A Reasonable and Common Sense Alternative for Flood Control* (Columbia, Mo.: U.S. Fish and Wildlife Service, September 1993).

MARY FRAN MYERS and Gilbert F. White have thoroughly outlined the issues presented by the 1993 floods, the history of

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flood management in the Midwest, and the options the nation now faces. They ask, will the United States use the attention and lessons of this flood to correct some of the past errors in national flood damage reduction policy, or will the government once again help landowners and communities to rebuild in the path of the next flood?

While strongly concurring with their article, I would like to add some thoughts that should foster positive results. First, the flood recovery should not be a we/they situation. Many people, especially farmers behind agricultural levees, feel that rebuilding the levee is an all or none proposition. Not true. Farmers have historically accepted a certain risk of their crops being lost to the occasional flood in return for the high productivity of the rich floodplain lands. Many farmers have no levee protection or levees that overtop every 10 to 20 years and protect crops during the years in between.

From the farmers' standpoint, the risk has two parts: the occasional loss of crops in high floods and damage to houses and other buildings if levees are overtopped.

Farmers are also concerned that environmental groups want to change their farmland to protected wetlands. However, most of the opportunities for wetland restoration are not on the mainstems of the Mississippi and Missouri rivers, but along their tributaries. Therefore, prime agricultural land will probably remain so. All groups—urban, rural, and environmental—must commit to open communication to eliminate misunderstanding and work together to protect all parts of the region.

Second, the appropriate institution does not exist to address basin-wide issues and tradeoffs. There is still a need for information about floodplains, including systemic data on the impacts of levees, wetlands loss, and encroachments. And even if this information were available, no mechanism, short of federal legislation, exists to put the results into use in the most cost-effective and environmentally sound manner. I would argue that the federal government should not make the decisions or row the boat. In the best manner of "reinventing government," it should steer the boat by setting some broad goals and helping establish

the Federal Emergency Management Agency. Some believe that the National Flood Insurance Program, which takes in more premiums than it pays in claims, indicates that the federal program must be strong enough. This conclusion ignores the added money that the federal government pays out in disaster relief. For example, in this flood, less than \$100 million will be paid in flood insurance, but the disaster aid approved by Congress will exceed \$6 billion.

The Unified National Floodplain Management Program referred to by Myers and White is one step toward integrating the various floodplain and disaster-relief policies. It must be encouraged at the highest level of the administration and Congress.

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Should the federal government continue to subsidize heavily levees and other structural flood-control works when nonstructural floodplain management techniques may, in some circumstances, be more cost-effective?

MARY FRANKLIN'S AND Gilbert F. White's excellent article concerning the challenge of the 1993 Mississippi floods effectively captures and summarizes the discussion in two workshops that the Association of State Wetland Managers and the Association of State Floodplain Managers conducted in St. Louis, Missouri, on 30 and 31 August 1993 and 27 to 29 September 1993. More than 300 participants representing 60 organizations from throughout the upper Mississippi and Missouri river basins attended these workshops.

Much of the discussion focused on the rebuilding of an estimated 6,000 miles of overtopped or breached levees. In many respects, however, the focus on rebuilding the levees brought several broader issues into play. For example, should the federal government continue to subsidize heavily levees and other structural flood-control works when nonstructural floodplain management techniques—such as the creation of greenways and floodplain parks, the relocation of flood-damaged structures, and flood-proofing—may, in some circumstances, be more cost-effective not only in reducing flood losses but also in meeting a broad range of other societal needs, such as pollution control, recreation, waterfront renewal, and restoration of fisheries and wildlife and waterfowl habitat? Should post-flood response and recovery efforts focus only on the severely damaged areas behind the breached or overtopped levees, or should these efforts also take into account a long-term view of the river basin as a whole, including the many tributary areas? The source of the flood waters for the summer's floods was in the tributary areas, and much of the flood damage occurred along these tributaries. Thus, the

These risks can be addressed by compensating farmers when levees designed to overtop at a 20-year event are overtopped. The compensation could probably come from the urban areas, where the flood storage on farmland saves residents the costs of building and maintaining bigger levees. Also, farmers need help in protecting farm buildings from higher floods by relocating buildings out of the risk zone, if feasible; by elevating the key structures on fill; or by constructing ring levees like those used on the Red River in North Dakota.

The farmers and nearby urban dwellers must view these changes as a win/win situation. Each group needs the other, and a balance must be struck for the groups to live in harmony. Third-party brokers may well be necessary to facilitate the payment of compensation, and it would seem appropriate that the brokers be the states.

lish an institution to address basin-wide issues. That institution should be led by the states, through creating compacts or strengthening the state-run Upper Mississippi River Basin Association and the Missouri River Basin Association, which may well require federal incentives and disincentives.

We have seen the results of about 100 years of federal government decisionmaking about these mighty rivers. It is time the states stepped in to assume responsibility for managing these valuable resources.

Finally, the federal government also must integrate its disaster policy and flood-damage reduction policy. As long as Congress continues to provide generous disaster relief, it cannot allow other policies and programs that result in more at-risk development to continue. Not only is there a conflict in goals among agencies, but there is conflict within the lead emergency agency,

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key to controlling further increases in flood discharges and improving water quality lies also in the tributary areas. The issue is not whether the levees will be rebuilt (many will be) or whether past practices were right or wrong but whether costly, structural approaches to floodplain management should continue to be applied not only to the mainstem but also to these tributary areas.

For two centuries, the Mississippi and its tributaries have been viewed as the nation's work and transportation river. Use of the floodplain was of concern only to the floodplain's occupants. U.S. citizens are just beginning to realize that it is also the nation's greatest river, with vast, damaged, but restorable recreational, ecological, and historical resources that are important to the nation as a whole.

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The Association of State Floodplain Managers and the Association of State Wetland Managers have sent recommendations to the White House, to federal agencies, and to congressional committees based upon the two conferences. The associations recommend that federal agencies and Congress provide floodplain occupants and local governments with real alternatives for responding to flood damage and reducing future damages. Providing such alternatives would involve allowing more flexibility in the use of disaster assistance funds; allocating new funds to broaden the range of options; and providing additional technical assistance to help occupants take advantage of the full menu of options for reducing future flood losses. In addition, federal agencies should quickly gather important information concerning the costs of levee repair and the location of possible restoration sites to aid floodplain occupants, federal agencies, Congress, and the White House in their decisionmaking. The associations also recommend that additional planning and technical assistance be provided to states to help them develop comprehensive, multiobjective floodplain management programs (see the article by Jon Kusler and Larry Larson, "Beyond the Ark: A New Approach to Floodplain Management," in the June 1993 issue). Finally, the White House and Congress should treat this summer's flood as a prototype or case study that could suggest possible future directions for floodplain management and the restoration of aquatic ecosystems in other areas of the nation.

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Editorial

For the many tens of thousands of people whose lives were profoundly disrupted by muddy waters, free floating propane tanks, silent communications, and the stench of flooded sewage works, not to mention the pesticide-rich muds that devoured their living rooms, the great Mississippi floods of June 1993 were a nightmare. Yet in a powerful way the river was simply seeking its rightful channels to the sea as it had always done before levees canalized its flow and properties impeded its natural meandering ways. From time to time, hard as it might seem to those in the firing line, nature has to assert its authority.

The thoughtful article by Gilbert White and ^{Many Fran Myers} recaptures history. Fifty years ago, as a young geographer on one of his first missions, Gilbert White warned of the folly of building levees on the basis of the property development that filled up the floodplain to justify the investment. No-body listened to a wise head on youthful shoulders. Nowadays the head is no less wise, but the shoulders bear the burden of experience. Yet the floods were as bad as any Mississippi floods, largely because the valleys are filled with economic activity unsuited to levee failure. And fail the levees must because no mighty river can, or should, be wholly canalized.

The Mississippi experience sets out a new agenda for floodplain management. A whole host of interconnecting policies and institutions are involved. These include the design and location of hazardous facilities such as chemical stores and compressed gas containers, the emergency backup arrangements for sewage treatment works and local generators for hospitals and schools, the restriction on toxic chemical build up in soils and groundwater, and the strict control of development in floodplains around natural channels as well as artificially incised canals. This involves a staggering degree of coordination at federal, state and local level involving an awesome variety of regulatory and developmental agencies covering the whole array of human occupation and economy. Managing big floodplains could lead to organizational entropy - being so complex in administration as to gridlock economic advance.

Meanwhile the insurance industry will begin to look again at hazards in a world where climate perturbation is becoming more commonplace. The traditional role for insurance as a lifeline in times of unanticipated emergency may have to be re-evaluated. Insurance may become the device for forcing compliance with building codes, forming programs and cooperative ventures on landuse planning and health and safety protection at community level. For generations the insurance industry has shied away from a governmental role. If organizational entropy is a serious impediment, the local cooperative ventures linking private initiative to collective action may emerge as a feasible alternative. Meanwhile, all rivers should be given some room to flow naturally. After all that is what they were designed to do.

---TIMOTHY O'RIORDAN

WINGSPREAD



THE JOHNSON FOUNDATION
RACINE, WISCONSIN 53401

SUSTAINABLE COMMUNITY RELOCATION: A DESIGN CONFERENCE

sponsored by

The Alliance to Save Energy

Working Group on Sustainable Redevelopment

U.S. Department of Energy

Federal Emergency Management Agency

and

The Keland Endowment Fund of The Johnson Foundation

January 22-25, 1994

Statement of Purpose

To develop planning guidelines and strategies to rebuild and relocate, in a sustainable fashion, Mississippi Valley towns devastated by the spring floods. The conference will focus on state-of-the-art processes, procedures, and guidelines to assist communities that wish to or need to relocate. It is anticipated that this conference may very well influence worldwide land and resource planning.

"A mind, once stretched by a new idea,
never regains its original shape."

Oliver Wendell Holmes

WINGSPREAD SUSTAINABLE REDEVELOPMENT CONFERENCE

January 22nd - 25th, 1994

Ongoing efforts in sustainable development took a turning point in January 1994. A conference/working session to develop guidelines for sustainably redeveloping communities and buildings destroyed by disaster was held at Wingspread, the Johnson Foundation's conference center near Racine, Wisconsin. The conference was funded by the Department of Energy (DOE) and co-sponsored by DOE and the Federal Emergency Management Agency (FEMA).

While its focus was on rebuilding after disaster, the conference was a turning point, the natural culmination of interdisciplinary efforts that have spanned the last few years, in which theory was developed into a plan of action for working with communities to rebuild themselves in a sustainable way. Various significant contributions were made including:

- a) the evolution of a facilitated participatory process that will assist communities in developing their own visions and values relative to immediate crisis (the disaster), medium and long term needs
- b) the evolution of a tool kit of sustainable options to assist communities in making choices about their future. The toolbox will address repair, relocation and redevelopment in the context of promoting resource conservation and integrated resource use relative to energy, materials, water, waste and communications while providing critically needed life support in the near term. Economic development was treated as an integral element of technologies to be included in the tool box.
- c) the realization that, from a technical viewpoint, that the knowledge and tools to implement sustainable development are available now; it is now time to begin working with communities, working with them to rebuild in a sustainable way and bringing them into the process of further developing the tool kit.

A multi-disciplinary team of forty experts in various fields, ranging from urban planning and architecture to economic development and renewable energy resources, participated in brainstorming and development of preliminary planning guidelines. The conference was facilitated by a team of experts on sustainable development, many of whom were involved in organizing the "Greening of the White House" design charrette. The facilitators included Bob Berkebile, founding chairman of the AIA's Committee on the Environment and one of two representatives from the U.S. to the International *Road to Rio's* ongoing Working Group. Other facilitators included Pliny Fisk, Robert Gilman, Bob Simmons, Helen Kessler, Craig Sieben and Nancy Skinner. Representatives from DOE, FEMA, the Department of the Interior and the President's Council on Sustainable Development also participated.

The conference was broken into five work groups: 1) Site Development, 2) Infrastructure, 3) Buildings, 4) Economic Development and 5) Community Process. The conference structure allowed each group to review the work of the other groups and incorporate comments from the

other groups. This provided a mechanism for integrating the work of all conference participants using a whole systems approach.

The results of the conference will have varied and immediate applications.

- a) The Mayor of Valmeyer, Illinois, Dennis Knobloch, attended the conference and played an integral part in helping the experts understand the community process. Valmeyer is one of several towns relocating off the floodplain. Initially, the mayor had been reluctant to attend. However, the conference opened his eyes to opportunities which he had never before been aware of. He has now made a commitment to work on developing a framework for empowering communities to make important choices about their immediate and long-term future.
- b) The results of the conference will be of immediate assistance to the rebuilding effort in Los Angeles. One of the invited experts, Sim Van der Ryn, an architecture professor at the University of California, Berkeley and former California state architect, was obliged to cancel at the last moment because he was called by California's governor to assist on a working group to examine L.A.'s post earthquake infrastructure options. Sim has requested that our information be made available to his group as soon as possible.
- c) It was agreed that we would convey our findings and experiences to the Communities Task Force of the President's Council on Sustainable Development, which is exploring and developing policies that encourage economic development, job creation, and protection of our natural resources.
- d) It is anticipated that the results of the conference will become the basis for an electronic conference, which will be available to community leaders as well as to others in the sustainable development community. The electronic conference will eventually become the home for the tool box of sustainable development technologies.

The consensus of conference participants is that the spark ignited at Wingspread should not be extinguished. The facilitators are continuing to examine ways in which the tool box will be useful to communities and to building a sustainable America.

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