

Committee on Resources

Witness Testimony

**TESTIMONY OF SHANNON E. CUNNIFF
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FLOODPLAIN MANAGEMENT REVIEW COMMITTEE BEFORE
THE HOUSE RESOURCES COMMITTEE
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Thank you Chairman Young and Committee members for giving me the opportunity to testify before the House Resources Committee on the findings of the Interagency Floodplain Management Review Committee on the 1993 Floods. I would like to submit a copy of my written testimony into the Records. I have provided a copy of the Committee's report as an exhibit.

In 1993 the Midwest was hit by disastrous flooding. That flooding caused approximately \$12 - 16 billion in damages and the loss of at least 38 lives. It was a flood of record and one of the most costly natural disasters in our nation's history and it led many to question how the nation manages its floodplains.

As one of the responses to the flood, the Administration's Floodplain Management Task Force, chartered the Interagency Floodplain Management Review Committee to undertake an extensive independent review. Our charge included:

Determining the major causes and consequences of the Midwest floods of 1993;

Evaluating the performance of existing floodplain management and related watershed management programs; and,

Recommending changes in current policies, programs, and activities that would most effectively achieve risk reduction, economic efficiency and environmental enhancement in the floodplain and related watershed.

The US Army Corps of Engineers, Federal Emergency Management Agency, Environmental Protection Agency, US Fish and Wildlife Service, and the US Department of Agriculture provided experts to participate on the Review Committee. The Review Committee was supported by staffs of the Council on Environmental Quality, the Council of Economic Advisors, the Department of Commerce, the Department of Justice, and the Tennessee Valley Authority. The Review Committee was also supported by the Scientific Assessment and Strategy Team, which also was established by the Administration's Task Force. The SAST, as it became known, was directed by Dr. John Kelmelis of the US Geological Survey and was comprised of scientists and engineers, from the above mentioned and other agencies, with a broad range of expertise in flood control, river basin and ecosystem management. The SAST developed information and provided scientific advice on approaches to flood damage reduction in the Midwest.

While numerous federal agencies provided staff to these committees, the Committee was given broad discretion to operate independently from the agencies. Accordingly, the recommendations in the Committee's report, entitled, *Sharing the Challenge: Floodplain Management into the 21st Century*, are those of the Committee's and not the agencies' staffing the Committee. I am here today to report in my role as the Deputy Executive Director of the Review Committee. I have brought with me copies of the report

which I encourage anyone interested in these issues to read. I would like to submit the report into the record.

The Review Committee conducted its activities from January through June 1994. Working through the offices of the governors of the nine flood-affected states, the Review Committee met with state and local officials and visited over 60 locations. We also made extensive contacts with federal agencies, interest groups, members of Congress and their staffs, and numerous private citizens who expressed an interest in the flood. The Review Committee's Report is based on research and interviews with agency personnel, Governors, state and community representatives, non-governmental organizations, businesses, farmers, and residents of the floodplains.

The Midwest Floods of 1993 and 1995, and floods that have occurred in nearly every region of the nation since 1993, demonstrate that people and property located in floodplains remain at risk. Floods are natural repetitive phenomena. Considering the nation's short history of hydrologic record-keeping as well as the limited knowledge of long-term weather patterns, flood recurrence intervals are difficult to predict.

Activities in floodplains, even with levee protection, continue to remain at risk. Measures to avoid the risks of flooding and measures to reduce the risks of flooding are very compatible with environmental protection and vice versa. In fact, protection and restoration of the natural and beneficial functions and values of floodplains is a crucial element of any plan to reduce risk and damage from floods.

Findings of the Review Committee Pertaining to Flood Causes and Levee Maintenance

The Review Committee found that, where implemented, flood damage reduction projects and floodplain management programs worked essentially as designed and significantly reduced the damages to population centers, agriculture, and industry in the Midwest.

Reservoirs and levees built by the Corps prevented more than an estimated \$19 billion in potential damages in 1993. Large areas of Kansas City and St. Louis were spared the ravages of the flood, although several suburbs suffered heavy damages.

Watershed projects built by the Natural Resources Conservation Service saved an estimated additional \$400 Million.

Land use controls required by the National Flood Insurance Program (NFIP) and state floodplain management programs reduced the number of structures at risk throughout the basin.

The current flood damage reduction system in the upper Mississippi River Basin represents a loose aggregation of federal, local, and private levees and reservoirs. This aggregation does not ensure the desired reduction in the vulnerability of floodplain activities to damages. Simply put: Many levees are poorly sited and will fail again in the future and the levee system lacks coordinated planning and management.

Federal Levees

The Review Committee found that most of the Corps levees performed as designed and prevented significant damage. A subsequent 1995 report by the General Accounting Office GAO, 1995 Midwest Flood: Information on the Performance, Effects, and Control of Levees (GAO/RCED-95-125) found that of the 181 Corps levees reviewed, 177 levees clearly performed up to their design capacity and sometimes exceeded it during the 1993 flood. Many levees withstood flows that, in some cases, were greater than those

for which the levees had been designed because flood fight efforts extended their performance by raising their height. In addition many experienced saturation far longer than they were designed to do. Of those 177 levees which performed as expected, the flood eventually exceeded the design capacity of 32 levees and overtopped them. Only 4 Corps levees allowed floodwater to enter the protected floodplain, but this occurred after flood waters rose above and remained at levels beyond the duration for which the levees had been designed. Under seepage and the use of river sand in previous repairs were causative factors.

Non-Federal Levees

Many locally constructed levees breached and/or overtopped. Frequently, these events resulted in considerable damage to the land behind the levees through scour and deposition. Most of these levees were smaller than Corps levees and not designed, if they were designed at all, to withstand the magnitude and duration of flooding that occurred.

The present system of agricultural flood damage reduction levees along the lower Missouri River floodplain is an aggregate of levees constructed by different agencies and individuals at various times and under various programs. Missouri River Basin Commission, 1982 Their physical composition, elevation above the river channel and locations vary from area to area. Similarly, their degree of maintenance varied. Some levees are on or near the channel bank and extend across old river-channel deposits. Others are setback of the landward margin of the high-energy flood plain. In some areas, multiple levees have been built successively toward the river during the past four decades. Many levees have a river side fringe of riparian forest on the active floodplain. Many districts with levees designed for high magnitude floods have been flooded between 5 and 10 times during the past 50 years. This history reflects on the location and the design capacity of these levees.

The majority of levee breaks resulting from the 1993 flood were associated with one or more of the following floodplain settings:

- 1) areas occupied by one or more active channel within the past 120 years (72%) The percentage indicates relative abundance within the 225 mile reach between Glasgow and St Louis, Missouri.
- 2) channel banks at the downstream end of tight meander loops (17%)
- 3) areas along tributary channels subjected to significant cross flow conditions during flooding (17%)
- 4) areas along chutes (i.e., minor subsidiary channels) (8%)

Part V of the Review Committee's report, prepared by the SAST, notes that eyewitness accounts indicated that the majority of levee breaches were caused by overtopping, subsequent incision by gullies, and rapid flood-flow erosion. However, levee failures may have also been caused by underflow and piping beneath the levee (as manifested by sand boils along the landward base of the levee), and by interflow and piping within the levee structure itself (resulting in levee failure by either gullying or slumping of the levee face). The levee districts and individuals, in responding to a SAST questionnaire, attributed levee damage to all of these erosional processes.

Factors thought to contribute to levee breaks along the Missouri and Mississippi Rivers include:

- 1) channel banks subject to high energy flows conditions at

- a) downstream banks of meanders between points of initiation and inflection and
 - b) channel banks opposite deflecting cross flows on tributary, chute or flood channels
- 2) levee irregularities and or discontinuities at
- a) high angle junctions between levee segments, and
 - b) repaired levees that ring old leveed scour holes
- 3) inadequate levee design, construction and repair;
- 4) highly permeable substrata composed of channel sand deposits with or without a thin silt-clay cap; and,
- 5) inadequate levee maintenance.

We did not find, nor were we told of, any situations where environmental protection statutes were the reason for inadequate maintenance.

We encountered some individuals who complained that they felt that time to receive approvals for repair of levees was excessive. However, many others specifically noted their satisfaction with the speed of approval and repair work.

Some thought that the conditions involved with obtaining approvals were irrational. For example, I personally recall a farmer that complained about having to get fill material from two miles away instead of from the riparian habitat adjacent to the levee. Such a condition, in my opinion, has both an engineering and floodplain management rationale. The more remote site for borrow contained material that needed minimal processing before placement in the levee (i.e., removal of tree roots was not necessary). The use of the remote site also avoided impacts to valuable floodplain habitat.

On the Upper Mississippi protection and recovery of federally listed endangered species has not thwarted levee repair or maintenance. The endangered species that might come into play are two endangered freshwater mussels, a flower, the Indiana bat, pallid sturgeon, and the bald eagle. The mussels beds are well known and hydraulic dredging (to obtain fill material for the levee repair) was not proposed in these areas or the areas were simply avoided. The flower, a decurrent false aster, was also present in several areas requiring repair, but avoidance was possible and resulted in no delay or impact to repair schedules. In the case of the Indiana bat, which nests in trees along the river, levee repairs could be scheduled around the sensitive brooding period or did not involve the type of forested habitat used by the bats. The pallid sturgeon is present in areas where earth filled levees exist, so therefore the removal of borrow material from aquatic habitats was not necessary and presented no delay or hardship to levee sponsors. With respect to our nation's symbol, the bald eagle, there were also no conflicts. Either the eagles' preferred nesting habitat was unsuitable location from which to obtain material for the levee repairs or the eagles' winter distribution did not significantly overlap the construction season.

The Review Committee proposed authorization and funding of a federal program for major maintenance and major rehabilitation of levees to ensure the integrity of levees in the basin. This program would address both federally built/locally maintained levees and locally built/locally maintained levees. In summary, we proposed that for a levee to become eligible for participation in the program, state and local sponsors would

agree to participate in the National Flood and Crop Insurance Programs, share in the costs of repair or realignment of levees, and agree to coordinate flood fight actions with the Corps. The proposal was developed to provide assistance that would ensure the integrity of non-federal levees, encourage state-led floodplain management activities and better coordinate activities in floodplains, reduce the risk of flood damages should an event occur in excess of the design capacity of the non-federal levees, and over the long-term reduce federal costs stemming from flood response and recovery activities.

Overview of the Recommendations of the Review Committee

The Interagency Floodplain Management Review Committee proposed a number of ways to improve management of the nation's floodplains. A dominant theme in the Review Committee's report is that all levels of government, all businesses, and all citizens interested in the floodplain should have a stake in properly managing this resource. All of those whose activities are at risk or create risk, either directly or indirectly, must share in the management and the cost of reducing the risk.

The federal government must lead by example. State and local governments must manage the floodplains. Individual citizens must adjust their choices and actions to the risk they face.

The Review Committee supported an approach to flood damage reduction through floodplain management that would replace the historic focus primarily on structural "flood control" solutions with a sequential strategy of avoidance, minimization and mitigation.

In many cases, by controlling runoff, managing ecosystems for all their benefits, planning the use of land, and identifying those areas at risk, the hazard can be avoided. Where the risk cannot be avoided, damage minimization approaches, such as elevation and relocation of buildings, and construction of reservoirs or flood protection structures. However this should be done only when they are integrated into an overall, basin-wide systems approach to flood damage reduction.

A systems approach necessitates the development, use and sharing of scientific data in the alternatives analysis and decision-making process. Floodplain managers require easy access to current and historical information about natural and constructed features, cultural resources, ecological resources, geography, climatology and hydrology of the basins in which they operate. Recent advances in computer modeling, high resolution remote sensing and geographic information systems offer important means to analyze and share information about options and risks. These scientific and technical tools need to become commonly applied by floodplain managers across the nation.

Over the last 30 years the nation has learned that effective floodplain management can reduce vulnerability to damages and create a balance among natural and human uses of floodplains and their related watersheds to meet the social, economic and environmental goals of the nation. The nation, however, has not taken advantage of this capability. Floods will happen. The goal of the nation should be to minimize the risk of damage from floods.

The needed tools, authorities and programs are available at the federal, state, tribal, and local level to move toward accomplishments of these goals. Many of the nation's past activities related to floodplain and disaster recovery make sense, produce desirable results, and should be continued. Others do not and should be stopped.

While many aspects of the nation's programs are in need of modification, the problem is not one of lack of

understanding of how to manage floodplains and their associated watersheds. It is a problem of will and organization. As the Director of the Review Committee, Dr. Gerry Galloway, would often say, "There are no silver bullets in the floodplain management business". No single action will suddenly reduce the vulnerability of those who are currently at risk or stave off placing others in the same position.

If the nation is to move ahead in reducing flood damages and reducing the costs to the federal, state, and tribal governments, and the communities and individuals stemming from flooding, it must do so in a manner that recognizes the many stakeholders in the floodplain management effort and appropriately divides the responsibilities among them. Responsibility for navigation, flood-damage reduction, floodplain management and ecosystem management is divided among several programs at both the state and federal level. As was demonstrated clearly in 1993 and in so many other floods before and after that, the fragmented approach is not sufficiently effective in reducing risks. A more coordinated strategy for effective management of the water and related land is needed.

To take full advantage of existing federal programs which enhance the floodplain environment and provide for natural storage in bottom lands and uplands, the Review Committee recommended:

Legislative authority to increase post-disaster flexibility in the execution of the land acquisition programs;

Increased attention to the environment -- the natural beneficial functions and values of floodplains -- in federal operation and maintenance and disaster recovery activities including land acquisition; and

Funding and expansion of existing authorities to acquire lands, from willing sellers, needed to reduce the risk of flood damage.

To reduce the vulnerability to flood damages by those in the floodplain, the Review Committee recommended that:

Full consideration be given to all possible alternatives for vulnerability reduction, including permanent evacuation of flood prone areas, flood proofing of structures remaining in the floodplain, creation of additional natural and artificial storage, and adequately sized and maintained levees and other structures.

Where appropriate and economically justified, the vulnerability of population centers and critical infrastructure can be reduced through use of floodplain management activities and programs to provide protection to the standard project flood discharge.

To ensure the integrity of levees and the environmental and hydraulic efficiencies of the floodplain, states and tribes should ensure proper siting, construction, and maintenance of non-federal levees.

I would like to end with this thought. The flood of 1993 was an unprecedented hydro-meteorological event, but that doesn't mean that it can't happen again. Floods will continue to occur. Although we can't predict or stop floods, we can adopt a new approach to floodplain management that will lessen the vulnerability of our nation to the costly damages and expenses that occur during and following floods.

I am now prepared to answer any questions that the committee may have.

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