Floodplain Management: The Gap Between Policy & Implementation or Principle & Practice

Larry A. Larson
Wisconsin Department of Natural Resources

Over the past 25 years, Congress has made a number of policy changes in how federal, state and local governments use various approaches and programs to reduce flood losses. These changes were brought about by the increasing recognition that past policies were culminating in higher flood losses and increased numbers of people and structures at risk from flooding. It was also recognized that past federal efforts at flood loss reduction which focused on federally funded and implemented structural approaches like dams, levees and channelization were not achieving flood loss objectives and were being slowed or stalled due to high costs and adverse environmental impacts. Finally, it was recognized that a "unified" approach by all levels of government and the private sector would be needed to reduce the nation's flood losses.

A number of goals can be identified that would move the nation toward overcoming perceived problems and achieving a unified approach. The goals are generally recognized, although not all are specifically identified by Congress, and include:

* Reduce costs of flood losses to taxpayers
  a) from direct flood losses
  b) from associated government costs for disaster relief and infrastructure losses.

* Pass along more of the cost of living in flood hazard areas to those people who insist on building there.

* Increase the national effort on non-structural approaches (guiding development to less hazardous areas) so the number of structures at risk of flooding should decrease over time.

* Change the focus of federal programs from federal projects to oversight of local and state implementation of programs.

* Reduce the risk to life and property caused by the nation's aging dams and other structural works.

* Reduce the loss of natural and cultural resources in the nation's floodplains.

* Encourage a "bottom-up" approach to flood mitigation at the local level which addresses flood loss reduction as one part of a multiple objective plan where many local problems and needs are addressed in a comprehensive community approach.

A partial list of some of the federal policies and actions undertaken to achieve these goals includes:

* The adoption in 1968 of the National Flood Insurance Program, now administered by the Federal Emergency Management Agency (FEMA). This program requires local regulation of development in flood hazard areas in exchange for federally backed flood insurance. The purchase of flood insurance by those in flood hazard areas would increase their share of the cost of floodplain development.

* Improved forecast and warning capabilities within the National Weather Service for storm events.

* Improved forecasts, warning and evacuation planning for hurricanes provided by the NOAA and the U.S. Army Corps of Engineers.

* Local and state capability to respond to disasters, including flood, has been improved with facilitation by the Federal Emergency Management Agency through programs to implement the Disaster Relief Act.

* The Soil Conservation Service is providing increased attention to measures that will reduce both water runoff and soil loss on agricultural land.

* Mitigation treatment of individual structures, through elevation, relocation and floodproofing, is recognized as desirable by all federal agencies; yet a broad approach to such measures which can be implemented by local communities has not been developed.

* Preparation of a "Unified National Program for Floodplain Management" by the federal agencies involved in floodplain management, establishing a framework, management strategies and tools for use by federal, state and local decision makers.

* A requirement that agencies with authority to plan and build flood control "projects" must give equal weight to non-structural and structural approaches.

* Benefit/cost ratios to justify flood control projects

should not include the benefits to undeveloped land (higher land value).

* Mitigation funding is now an allowable part of the Disaster Relief Act costs so that structures are not merely rebuilt as they were, making them vulnerable to the next flood.

* Assessing the risk from unsafe large dams in the nation and encouraging states to develop dam inspection and safety programs.

* Protection of wetlands, which are largely found in floodplains, as part of the federal Clean Water Act. This Act also has provisions for addressing stormwater runoff, but from a water quality, not a water quantity, perspective.

* Facilitating multi-objective planning at the local level has been attempted by the National Park Service, Rivers and Trails Program. These plans incorporate flood loss reduction.

How much progress have these and other actions made in achieving these generally recognized goals? To determine that, one first needs to assess the nation's floodplain management activities over the past years. Secondly, with the information gathered from an assessment, a series of questions could then be asked in the context of these goals to determine, to the extent possible, how effective programs and actions have been in achieving those broad principles or policies. This gap might give an indication whether to restructure the policies or whether to restructure the programs which implement the policies.

Assessing Floodplain Management

An assessment of the nation's floodplain management activities, an attempt to determine what has been accomplished, was completed in 1992 by the Federal Interagency Floodplain Management Task Force. Copies of the 600 page report and 70 page summary *Floodplain Management in the U.S.: An Assessment Report* are available from FEMA, Publications Office, 500 C Street S.W., Washington, D.C. 20472.

The Assessment Report is an excellent, landmark document and a must reading for floodplain managers, government officials, and others interested in the environment. The Assessment Report is well written and makes easy reading despite the technical subject. The Assessment Report consists of three separate parts: a brief executive summary, a summary report, and a detailed full report. This report is the first assessment of the status of the nation's floodplains in 25 years and the most comprehensive assessment and description of floodplain management policies ever undertaken.

Chapters in the Assessment Report address background information on floods and floodplains, the resources and values of floodplains, floodplain development and losses, the history of floodplain management, the unified national program for floodplain management, the knowledge and information base, the management framework, regulatory and design standards, perception, awareness and response, legal interpretation by the courts, modifying susceptibility to flood damage and disruption, modifying flooding, modifying the impact of flooding, managing natural and cultural resources, the effectiveness of floodplain management in the United States, and opportunities for increasing the effectiveness of floodplain management.

In order to provide, for the sake of this paper's discussion, the necessary assessment of the nation's floodplain management activities, particular relevant information from the above report will be summarized here:

1. Nature and extent of flood losses. Flood losses continue to increase. Per capita damages have increased 2.5 times, after accounting for inflation, despite measures to reduce such losses, although the increase has slowed. A 1987 study for FEMA estimated 9.6 million households at risk from flooding in 17,466 communities with $390 billion in property at risk (page 3-2). From 1916 to 1985, flood related deaths average 104.4 per year. Per capita flood losses were 2.5 times as great from 1951 to 1985 as from 1916 through 1050, after adjustment for inflation.

Major gaps in approaches to reduce losses exist, including:

1) Unregulated areas (most because they are unmapped);
2) High risk areas; and
3) Substandard structures.

2. Effectiveness of floodplain management measures. Structural approaches were at one time the primary approach for addressing flood losses. Since 1968, considerable progress has been made in implementing nonstructural loss reduction measures - regulations, warning systems, evacuation. Of the 22,000 flood prone communities, 18,200 or 82% have adopted floodplain regulations and are now in the National Flood Insurance Program (NFIP). Over 2.39 million flood insurance policies have been issued. 12,000 communities have been mapped by FEMA at a cost of $873 million; 1,700 remapped.

The Assessment Report concluded that it was difficult to evaluate the effectiveness of floodplain management due to lack to specified goals, base-line data, and monitoring.

With this background information, let's ask a series of questions pertinent to determining effectiveness of programs in achieving our previously stated goals:

Has the Number of Structures at Risk From the 100 Year Flood Decreased in 25 Years?

We don't know for sure, but they appear to have increased because disaster costs have increased, even in real dollars. WHY?

1) Urbanization
- -has caused an increase in the 100 year flood level due to change from open land to concrete
- -structures are only required to build with the first floor at the 100-year flood level, so any flood increase now puts them at risk
- -no requirement for communities to prevent or contain increased runoff from upstream development in the watershed

2) No Avoidance of Flood Hazard Areas

The national minimum regulation does not require development to avoid flood hazard areas, even in high hazard areas like the floodway or coastal erosion areas. Structures can be placed in velocity floodways if elevated above flood levels on stilts. This approach ignores the risk of evacuation access during flooding for emergency vehicles and the cost to rebuild flooded roads, utilities and other infrastructure serving that high risk development. The minimum regulations tell people how to build in flood hazard areas to be partially protected, but still at risk. The end result is a mentality that we can overcome natural hazards even if we build in high risk areas.

3) Lack of Identification (mapping) of Flood Hazard Areas

The policy in the flood insurance program legislation is to have communities guide new development so it is not at risk of flooding during the 1% chance (100 year) flood. Not all 100-year floodplains are mapped, consequently people build in risk areas. Up until now, priorities for mapping have been based heavily on factors like the number of flood insurance policies. That results in mapping and detailed studies in already-developed areas. Local regulations are most effective in guiding new development. Very seldom is an existing structure improved beyond 50%, which is the only time regulations would require it to be protected from flood. Fewer new structures would be at risk if mapping were done in undeveloped areas before new development occurs.

Mapping also does not account for future runoff conditions, but is based solely on runoff caused by existing development. When upstream development occurs, flood levels are increased because forests, fields and ground are covered with houses, roads, parking lots and other non-pervious materials which increases the runoff from the same storm event. What used to be the 100-year flood event may now be the 50-year, 10-year or even the annual event and the 100-year event places what were once low risk structures at higher risk subject to flooding.

4) Additionally, high risk special flood hazard areas require special engineering and mapping approaches to accurately depict flood hazard areas. These areas include alluvial fans, floodplains adjacent to streams with movable (erodible) channels, coastal erosion areas, fluctuating lake levels in closed basins, ice jam flooding, and subsidence areas. Due to high costs and limited budgets, mapping approaches nationwide have been quite uniform to date, thus resulting in inadequate mapping in many of these high risk special hazard areas.

5) Increased risk in areas "protected" by flood control structures.

Flood control structures have been built for decades in this nation, with thousands of dams, levees, channels, and bypasses existing today. These structures can and do prevent large amounts of flood damage.

However, dams and levees deteriorate, whether through aging of concrete or the decomposition, sloughing or increased permeability of earthen embankments. Channels that were engineered to carry flood flows fill with debris or deteriorate. Operation and maintenance costs, usually a responsibility of local units of government, escalate and must compete with other local funding priorities.

In the meantime, development occurs in the area "protected" by the structural projects - areas that probably would not have been built if no flood control structure existed. This development is usually built at grade, unprotected in itself from any flooding, because of the expectation the flood control structure will always be there, or that the structure will protect us from *all* magnitudes of floods.

However, two things can cause disasters to be worse than if no structure existed. First, floods can exceed design standards, then dams or levees will be overtapped or channels will overflow their banks. Secondly, the structures fail during events they were designed to contain because of inadequate operation and maintenance of structures or channels full of sediment and debris. Such failures can cause more damage than if the structure were not there due to the unprotected development below, behind or adjacent to them.

The programs to build flood control structures to reduce flood damage have numerous success stories to date. However, the programs which implement this policy fail to prevent at risk construction in the "protected" area and often don't ensure adequate operations and maintenance of these structures, leading to future failures and increased risk and flood losses.

Have We Reduced Total Federal Costs Related to Floods?

No. The Floodplain Management Assessment Report estimates that flood losses are increasing, such losses may now average $5 billion per year. WHY?

1) Lack of mitigation. Disaster costs and flood insurance claims are paid for damages to rebuild after a disaster, but until only the last couple of years those payments were capped at the amount needed to rebuild the structure as it existed before the disaster. Thus, the structure is subject to damage again in the next flood. Some structures have been damaged many times, with total payout for disaster relief and/or flood insurance claims sometimes exceeding the value of the structure. A small amount of added dollars after the disaster could mitigate from future floods. Even though the Disaster Relief Act now allows added mitigation funds, administration of disaster programs lags behind the intent of the law, frequently ignoring or refusing to fund adequate mitigation measures.

2) The flood insurance program only relates its cost to flood insurance claims, not disaster costs. In 1968, Congress seemed to view all federal costs as contributing to taxpayer costs for flood disasters. The flood insurance and disaster programs are being run as two separate programs in many instances. The goal to make the Flood Insurance Program self-supporting (premiums pay for claims and cost of administering the program without tax dollars) does not consider the impact of its program changes on increases or decreases in total federal disaster costs. For example, in order to meet the self-supporting goal, flood insurance premiums were more than doubled and coverage was dramatically reduced to reduce claims. Many people did not purchase a flood insurance policy because it was a poor bargain. When their structure is flooded, they are not paid a flood insurance claim but receive disaster relief, which IS federal tax dollars.

Even within the same institution, cross-program coordination sometimes fails. While the Congressional policy is that under the law everyone must buy flood insurance in order to get disaster relief, the Public Assistance Program in FEMA does not always require recipients of Individual Family Grants to purchase flood insurance in order to get the grant. This indicates that agencies and Congress often let "human passion" override good public policy, even if the long term effect on citizens may be to put them at greater risk in the next flood.

3) Actions by numerous federal, state and local programs may build, fund or provide technical assistance to development subject to flooding. While Executive Order 11988 (1977) was intended to reduce such federal action, and most states have similar Governor's Executive Orders, not all federal or state agencies comply with the requirements.

Have We Passed the Cost of Living in Flood Hazard Areas on to Those Who Insist on Living There, Hence Causing Increased Flood Levels?

Only to some. WHY?

1) Some, but not all, people in flood hazard areas purchase flood insurance. It seems those who do are not getting good value for their cost. Developers of property which cause an increase in flood levels to property owners either upstream or downstream almost never pay the cost of those increased damages. In floodways (those portions of riverine floodplains which must convey the floodwaters downstream in order to prevent increased flood levels), development is allowed to increase flood levels by one foot under national standards. The cost of flood damages caused by that one foot increase is not borne by the developer, but by the property owners affected, the disaster programs, and the flood insurance program; the latter two can impact ALL taxpayers.

Similarly, upstream development can cause increases in flood levels downstream due to the urbanization effect explained above. Such developers do not pay the cost of those increased flood losses unless local ordinances require stormwater detention, retention or some other means to reduce runoff from such development to pre-development conditions. Such stormwater requirements do not exist at the federal level, are rarely seen in state regulation and only occasionally are seen at the local level.

2) FEMA estimated there are 8 to 11 million structures in flood hazard areas, but less than 2 million have flood insurance, even though flood insurance is mandatory with almost all mortgages for structures in flood hazard areas.

It's been estimated that 400,000 structures in the flood hazard areas change ownership each year, almost all with a mortgage where the lender should require flood insurance by law. That mandatory insurance purchase was the policy established by Congress in 1973; but the number of flood insurance policies has remained essentially constant for over ten years at about two million.

There can be two reasons for this: 1) lenders are not requiring flood insurance at the time the loan is issued, as the law requires; 2) many people who were required to buy flood insurance at the time of the loan drop their policy at annual renewal time because they don't feel its good value. They can do this because the lender does not require them to maintain the flood policy, even though the law requires it. Experience indicates the second scenario is now more common than the first. Strangely, lenders do require owners to maintain fire insurance, even though the chance of a flood far exceeds that of having a fire (for structures in flood hazard areas).

Adding to the problem in enforcing the law's policy is the institutional relationship. The Flood Insurance Act is managed by FEMA, but control of lending institutions is done by other agencies, such as FDIC.

Have We Reduced the Loss of the Natural and Cultural Resources of the Nation's Floodplains?

No, the programs to do this have not yet arrested that deterioration. WHY?

1) Little integration of flood loss reduction programs with natural and cultural resource programs.

Different agencies implement these programs, and those programs often have specific authorities without any mandates to integrate these elements. The Environmental Protection Agency, Corps of Engineers, Department of Interior and other agencies deal with natural and cultural resources, while FEMA, the Soil Conservation Service, Corps of Engineers, Tennessee Valley Authority, National Weather Service, and a host of others deal with flood losses. That same divergence exists in state programs. Only at the local level do these programs get serious consideration for integration, and locals get little help from federal or state agencies to foster that integration.

2) Federal and state programs lack the flexibility to allow or encourage local projects or programs that integrate these efforts (see below).

An exception to that is the start made by the Community Rating System, under the NFIP, that gives credit on flood insurance premiums to everyone in a community that adopts programs beyond national standards, such as protection of wetlands, greenways, etc. that will also reduce flood losses.

Has Changing the Focus of Federal Programs From "Top Down Delivery" to "Local Implementation" Been Successful in Flood Loss Reduction Programs?

Not very successful, and surely not consistent. WHY?

1) Federal agencies have little experience or expertise in running programs delegated to the local level. The more successful models may be those which delegate to states, which in turn delegate to locals. This provides flexibility to incorporate state authorities and legal structure into local implementation. For example, the authority and restraints on local community zoning flow from state law and may vary from state to state. The National Flood Insurance Program started out being implemented as a program delegated from the federal government directly to locals.

Any delegated program needs these components:
- standards
- assistance
- training and tools
- oversight and monitoring
- enforcement

The only federal program for floodplain management that is implemented at the local level is the National Flood Insurance Program. The federal agency running the National Flood Insurance Program has never had the staff or resources to adequately provide these program elements to 21,000 communities in the nation. At its peak, it had 200 staff positions nationwide, and now has less than 150. An effective program of developing state capability to fill this gap, through mandates, incentives or other approaches, has never been developed or funded. While states probably have double the federal staff, the resources needed to make the above components work are woefully lacking.

As a result, communities cry out for training of local staff, who don't have the training and tools to effectively administer these programs, and for training and guidance for local appeals boards, who grant improper zoning variances which place people and structures at risk because Board members don't understand their role. Assistance to that local staff needs to be as close as the phone, and the person at the other end of the line needs to be someone they see often enough to trust and feel they can call. We know from experience that locals will not call someone three states away or in Washington, D.C. to get help. In fact, states are finding it necessary to provide assistance through sub-state offices closer to locals.

Monitoring of implementation of the NFIP has been meager and has probably not measured the things that would demonstrate if the program has been effective. Little monitoring was done by FEMA until the 1980's. The monitoring that does occur examines some permits and the ability of locals to understand their ordinance. No systematic, reliable data collection has occurred which will allow us to determine if the number of structures at risk in the nation is increasing or decreasing, which may be the bottom line in measuring the effectiveness of these nationwide efforts.

2) Flood mitigation, or water resources projects for flood loss reduction, are still largely "top down" planning and implementation efforts. Federal agencies express the need to involve locals and acknowledge that most successful non-structural projects were local bottom-up efforts. Federal agencies speak of their desire to encourage such efforts. In the end, however, they plead that their authority from Congress requires them to take the lead in planning such projects, using long, tedious and complex federal guidelines which seldom, if ever, allow consideration of broader local concerns and needs. If locals develop a multi-objective plan of their own, federal agencies almost never feel they can help implement even the flood loss reduction element, usually because it didn't follow the above-mentioned complex guidelines. Even those federal projects that are imple-

mented often take 15-25 years from original planning to project completion.

3) Integrated Land and Water Resources Management

To facilitate local implementation of any federal or state mandated program, agencies must understand the context under which local governments operate. Locals see a myriad of federal and state programs coming at them with mandates to implement, many that may conflict with each other. Local governments must integrate these various public safety, environmental, social and economic programs in a way that makes sense, meets all federal and state requirements, and yet gathers support at the local level because it makes sense and the end justifies the means. Such integrated programs address the "quality of life" issue so important to long term interests of our citizens.

Despite this need, few federal or state programs provide the framework, flexibility or funding that help local communities integrate all these programs.

The federal and state roles must change from doing to facilitating local solutions. A logical institutional framework would incorporate planning and implementation by one entity in order to integrate these non-separable land and water use issues; however this seldom exists, in fact it is rarely even encouraged. Some entity aligned with watersheds may be the most logical. Federal and state programs must be viewed and implemented as one piece of total land and water use management with the goal of improving our quality of life. A focal point is needed at the local level to amass citizen energies and efforts, which will incorporate flood loss reduction as a part of addressing all local problems and needs. A few examples of success exist in the nation. Most were total local efforts that pulled together various programs to meet comprehensive needs. The National Park service program mentioned above has successfully facilitated a few examples. A standard approach, however, that can be used by all communities with the will to implement it simply does not exist.

Conclusion

The nation has started a major shift in our strategy to reduce flood losses - from total reliance on federally funded structural approaches to less intrusive non-structural approaches that integrate problems and needs at the local level. This shift is coming slowly, like turning a large ship with hundreds of oars. First, we must make sure everyone with an oar knows which way we want the ship to turn. Then we must get all the oars in the water and moving in a productive direction. To turn the ship, some of those oars (programs) move forward while others move backward. Once turned, all programs need to go in the direction.

National policy often establishes laudable goals and good public policy. That policy can veer off course from the intent, not because agencies intentionally subvert the intent, but for numerous other reasons. These vary from piecemeal implementations to lack of coordination, oversight, monitoring, training or poor standards. Major impediments are presented by a) the lack of federal resources to ensure adequate implementation of an effective program or b) the lack of a strategy to encourage, enable or fund states to assist locals in effective ways to implement delegated programs is a major impediment.

There are encouraging trends in our nation's efforts to achieve our floodplain management objectives. The participation of 18,000 communities in the National Flood Insurance Program has increased awareness and established the principle of local responsibility for providing some protection for development in flood hazard areas. Some programs look more productive in concept than when viewed on the ground. When we explore the bottom line the number of people and structures at risk from flooding may not have improved. If the National Flood Insurance Program is to be used as a prototype for addressing other natural hazards as some have suggested, then a full appraisal of the effectiveness of the National Flood Insurance Program is necessary.

It would seem that the policies or goals we stated at the beginning of this article are still valid. Implementation of the policies, through practice and programs, demonstrates a considerable gap. Some but not a vast amount of additional legislation would seem to be required. Current laws seem to provide the framework for closing many of the gaps and achieving our policies. Often however, legislation is needed simply to overcome the inertia or tradition of the way we deal with or perceive certain programs and to give agencies the will and direction to overcome the inertia.

We must make it a priority to determine how to provide program flexibility to assist locals in meeting and exceeding already stated national objectives within a framework which addresses local needs and problems while achieving national floodplain management goals. This flexibility of programs, focused on end results combined with adequate incentives, can encourage the best mix of floodplain management measures for each community, hence fostering a quality of life that citizens will support. This would represent a major move closer to successful floodplain management as envisioned in our national policies. It may be the only way to effectively integrate flood loss reduction and arrest the loss of natural and cultural resources in the nation's floodplains.

Larry A. Larson manages the Floodplain Management and Dam Safety Programs for the Wisconsin Department of Natural Resources. He is also the volunteer Executive Director of the Association of State Floodplain Managers, an organization representing the interests of over 1,500 local, state, federal and private floodplain managers.