Floodplain Management 2003

State and Local Programs

The Association of State Floodplain Managers

www.floods.org

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Foreword

What is the state of floodplain management as we begin the 21st century? More specifically, how does your floodplain management program fare? Most states do more than just Community Assistance Visits and National Flood Insurance Program coordination. Communities are moving beyond simply administering floodplain management regulations and managing floodplains based on principles of sustainability and multi-objective management. In fact, *effective* floodplain management demands that states and communities be creative in their approaches, efficient in their performance, and comprehensive in their efforts.

The Association of State Floodplain Managers is pleased to present *Floodplain Management 2003: State and Local Programs.* This report updates and supplements previous reports issued in 1989, 1992, and 1995, and is the most complete national summary of the practice of floodplain management at the state and local levels. We hope the material contained in this report will be a useful reference for those in the floodplain management community interested in comparing state and local programs throughout the United States. By seeing what others are doing, we all can make improvements in our programs.

Not surprisingly, this report demonstrates how the scope of state-level programs has grown even more over the past seven years, how the activities states undertake have multiplied, and how different approaches to perennial problems are emerging. States play a vital role in reducing flood losses by providing direct technical assistance to local governments; enforcing regulatory requirements; training local floodplain managers, insurance agents, engineers, surveyors, and others; managing or assisting with hazard mitigation activities; mapping flood hazards; managing protection and restoration projects and programs for floodplain resources and functions; and fostering state and regional floodplain management organizations. Over the past seven years, states have accepted the challenge of doing more with less, and this report is one way of sharing the creativity that they have demonstrated.

Also this year the ASFPM is releasing *Effective State Programs,* a report that sets out our best professional judgments about what makes some state-level floodplain management techniques more successful at protecting floodplain resources and minimizing flood losses. That report and this one complement each other, and frequent cross-references to the other report can help readers get a fuller picture of state floodplain management—both concepts and practice.

So familiarize yourself with these publications and get a feel for what others are doing. Then, go ahead and take the next step working towards improving your local and state floodplain management programs. Yes, there are budget limitations, decisionmakers to convince, and scores of other hurdles. Yet with a little ingenuity and savvy, I'll bet that you can succeed!

Additional information, advice, and encouragement are always available through the ASFPM. Phone or email the Executive Office to get started.

Chad Berginnis
Chair
Association of State Floodplain Managers

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The ASFPM's project team consisted of Larry Larson, Mark Riebau, and Alan Lulloff of the ASFPM Executive Office; George Hosek, Hosek Floodplain Management Consulting; Jacquelyn Monday, JLM Associates, Inc., Rebecca Quinn, RCQuinn Consulting, Inc.; and Wally Wilson, W.A. Wilson Consulting Services.

Insightful review and helpful comments were provided by a team of technical reviewers, including Chad Berginnis, Todd Davison, Lois Forster, Mike Grimm, Bill Lesser, Paul Osman, Pam Pogue, Ross Richardson, Michael Robinson, and Ed Thomas.

This report draws heavily upon the ASFPM's 1995 report (*Floodplain Management 1995: State and Local Programs*), other past reports, and the *Effective State Programs* document and its background materials. Thanks go to Rebecca Quinn, principal author of *Effective State Programs*, whose prose has been adopted in many of the explanatory sections here.

The Association is deeply grateful for the time and effort contributed by all the state personnel who provided pages and pages of data about their state programs along with materials illustrating their activities, and then responded to questions and to pleas for even more information. This report could not have been produced without them.

Contents

List of Tables

Introduction

A cooperative, integrated effort by federal, state, and local governments and the private sector is needed to minimize flood damage in the United States, to prevent future damage, and to protect the natural resources of the nation's floodplain lands. The Association of State Floodplain Managers, a national group of professional floodplain managers from all levels of government and the private sector, has for the past 30 years been working to improve the ability of the nation to confront its flood hazards and protect its floodplain resources, with particular emphasis on what can and is being done at the state and local levels of government. This report is one of a series that periodically documents the capability of state and local floodplain management programs. This edition covers activities undertaken during calendar years 1995 through 2002, with emphasis on the last three years of that period.

Recently, the ASFPM embarked on an effort to describe a model, effective state floodplain management program—what its goals, components, support, and activities would be. Those ideas are described in detail in the ASFPM's publication, *Effective State Floodplain Management Programs* (available online at http://www.floods.org). Even though there is no single "perfect" model for a state floodplain management program, because every state has its own unique combination of factors that shape its approach to managing its flood risk, all effective state floodplain management programs nevertheless embody 10 guiding principles:

1. State floodplain management programs need strong, clear authority.
2. State floodplain management programs should be comprehensive and integrated with other state functions.
3. Flood hazards within each state must be identified and the flood risks assessed.
4. Natural floodplain functions and resources throughout each state need to be respected.
5. Development within a state must be guided away from flood-prone areas; adverse impacts of development both within and outside the floodplain must be minimized.
6. Flood mitigation and recovery strategies should be in place throughout each state.
7. The state's people need to be informed about flood hazards and mitigation options.
8. Training and technical assistance in floodplain management need to be available to the state's communities.
9. The levels of funding and staffing for floodplain management should meet the demand within each state.
10. States' floodplain management programs should be evaluated and their successes documented.

This report examines how these principles are furthered at the state and local levels throughout the United States.

Most of the information presented here was obtained through a questionnaire mailed to the National Flood Insurance Program Coordinator in each of the 50 states, the District of Columbia, and Puerto Rico. The questionnaire consisted of 38 pages of queries about many aspects of state and local floodplain management, budget and staffing levels, coordination techniques, and assessments of the status and future trends in floodplain management each state's jurisdiction. Responses were received from 49 states, the District of Columbia, and Puerto Rico (a response

rate of 98%). No response was received from Iowa. Supplemental information was obtained from various federal, state, local, and private sources, and other published material.

The report begins with a discussion of the roles played by the state and local levels of government. The second main section describes the underlying structures of state floodplain management: state and local authority, budgets, staffing, and details about program management and coordination. Each of the next five sections examines one of the actual activities the state (and local) programs carry out in their efforts to minimize flood losses: managing development; protecting natural functions and resources of floodplains; mitigation; providing information; and mapping. This corresponds roughly to the 10 principles of state floodplain management listed above (some are grouped together for ease of discussion). The concluding chapter summarizes some changes in the field over the last seven years (or more, when earlier comparable data are available) and notes both statewide and national trends.

Division of Responsibility in Floodplain Management

Although each level of government is called upon to do its share in a nationwide effort to reduce flood losses and protect floodplain resources, some levels are better suited to certain activities. For example, regulating development can best be done by local governments, following the standards and procedures of state enabling authority. Flood insurance is best handled at the federal level because of the need for a large policy base and because of the infrequency of disasters in any one city or state. Coordination and liaison roles, among others, fall naturally upon state-level agencies.

Past analyses of the practice of floodplain management in the United States have illustrated that governments, organizations, and individuals often work to utilize whatever measures are necessary and feasible in a given situation to reduce flood losses or preserve resources, whether or not it is regarded as their "proper" role or responsibility (see, for example, Association of State Floodplain Managers, 1989; Burby and French, 1985; L.R. Johnston Associates, 1992; and Platt 1987). Thus, what is handled by states in one part of the country is handled by localities in another; functions that are separate in one state are intertwined in another; federal criteria sometimes are the maximum achieved and at other times are only stepping stones to more exacting standards.

About State Floodplain Management

State governments derive their authority to plan and implement floodplain management actions from the police power that is vested in them by the U.S. Constitution. States have a responsibility to do floodplain management—floods are inevitable; damage will occur; and there will be adverse impacts on the citizens and disaster costs in that state. The principal roles played by states in floodplain management today include planning and implementing programs and projects for managing their own floodplains, including state-level regulations; providing technical expertise of all kinds to individuals and to other levels of government, especially localities; coordinating local, state, regional, and federal programs within their jurisdictions; coordinating the National Flood Insurance Program (NFIP) activities within their jurisdictions; entering into agreements with other states to cope with multi-jurisdictional flood problems; and acting as liaisons with the federal government.

Some states directly regulate certain aspects of land use, selected types of lands, and specific kinds of activities. This is done for a variety of reasons: perhaps the state has much more technical expertise on staff and thus can better evaluate certain kinds of development; perhaps

circumstances dictate that a broader approach be used than that possible at the local level; and in some cases states regulate directly to compensate for the inability or unwillingness of local governments to take steps to reduce their flood risk or preserve the natural functions of their floodplains. Some states emphasize public outreach and direct technical assistance to local governments. Others focus on enforcement. Still others focus on training local partners through state offices and state and regional floodplain management organizations.

The many activities and programs that contribute to floodplain management—emergency preparedness and response, natural resources protection, environmental quality, structural control measures, planning, economic development, etc.—along with the wide variety in local and regional efforts, makes the floodplain management picture of each state unique.

About Local Floodplain Management

Local government is the foundation of comprehensive floodplain management because localities usually plan for, determine, and supervise the use of land within their jurisdictions (under the authority of the police power delegated by the state) and because the impetus for obtaining financial and technical assistance from the state and federal levels originates with the local community. The willingness and ability to take steps to manage floodplains and reduce flood losses are not automatic on the part of local governments, however. Localities are limited by their legal authority, by financial considerations, by the amount of technical expertise available to them, and by the fact that flooding and natural resource depletion must take their places among numerous other local concerns.

Local floodplain management programs vary according to the size of the community; the policy, political structure, and economic status of the state in which the locality lies, the type of flooding it faces; and the amount of development pressure existing in the community as a whole and in its floodprone areas. Typical small communities have no floodplain management program *per se*, and may have only one official, usually a floodplain administrator or building inspector, who monitors and enforces compliance with the local flood hazard reduction ordinance along with other unrelated duties. In general, the larger the community, the more sophisticated and comprehensive the floodplain management-related technical expertise available to it, including planning, engineering, additional inspection and enforcement capabilities, emergency management, maintenance, parks and recreation support, water treatment facilities, and the like.

Throughout the United States there are an estimated 50,000 people working on flood-related issues in communities, counties, and other sub-state entities like flood control districts and regional planning councils.

In addition to the community officials and staff, there is a range of sub-state entities that also contribute to floodplain management. These vary from state to state, but can include regional water districts, flood control districts, levee boards, watershed conservancy districts, planning commissions, natural resources districts, river authorities, county conservation districts, councils of government, stormwater management authorities, and others. Floodplain management personnel from these entities and from the localities themselves account for an estimated 50,000 people working on flood-related issues at the sub-state level throughout the country. All national programs need to recognize that this large group needs to be reached with awareness efforts and information and training in program goals, details, technical matters, procedures, and policy—and that such outreach must be ongoing because of staff growth and turnover.

Program Structure, State Authority, Funding & Staffing

The Structure of State Programs

Most states-level floodplain management "programs" are a composite of varied activities undertaken by different agencies and other entities within the state. The central office is usually the one that also coordinates the National Flood Insurance Program for that state. In 31 states or territories that function is housed in a department or agency for natural resources, water resources, or environmental protection (one fewer than in 1995); in 11 states it lies with an emergency preparedness agency (three more than in 1995); in eight with a department of planning or community affairs; and in one state is housed within a transportation department.

State floodplain management programs devote time to at least nine categories of activities. The average percentage of staff time spent on each of these categories is listed below. Additional details can be found in Table A2 in the Appendix.

Floodplain management activities conducted by state staff	Average percentage of state staff's time
Technical assistance to local governments	21%
Monitoring local floodplain management programs	16%
Educating and training of local officials and other professionals	14%
Administering grant programs (state or federal)	9%
Mapping flood hazards or conducting engineering activities or support	8%
Providing technical assistance to property owners	7%
Helping with enforcement of local floodplain management ordinances	6%
State-level enforcement	3%
Promoting the sale of flood insurance	2%

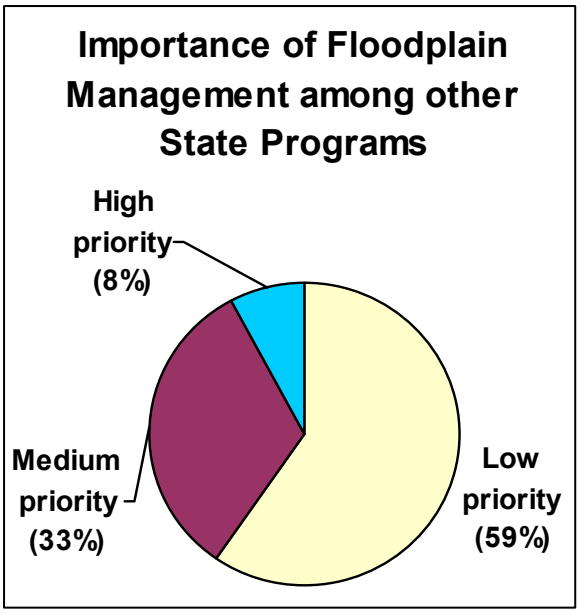
(Note that the percentages do not total 100 because of rounding and the addition by some states of additional categories of activities (see below).)

State staff also spend time

- Coordinating with other state programs, such as a coastal zone management program;
- Supporting the state's floodplain management association;
- Coordinating planning and construction of flood protection projects with the Corps of Engineers, Natural Resources Conservation Service, U.S. Geological Survey, and other federal agencies;
- Emergency management activities;

- Working on legislation, regulations, and policies to strengthen floodplain management;
- Helping communities plan for and solicit potential Flood Mitigation Assistance and Hazard Mitigation Grant Program projects;
- Participating in meetings and conferences; and
- Doing administrative paperwork.

These functions of a state program are examined separately in the rest of this report.



According to the state staff queried for this report, floodplain management too often is considered of low importance compared to other state priorities. The opinion of 30 state respondents was that floodplain management has a "low" priority in their state; 18 said it lies in the middle; and only four respondents thought it enjoys a high level of priority in state government (Alabama, Florida, Minnesota, and Pennsylvania). Additional details can be found in Table A1 in the Appendix.

State & Local Authority for Floodplain Management

States have different forms of government, and that affects the way they manage their floodplains and flood hazards. Some states strictly limit the authority of local jurisdictions to only those authorities explicitly granted by the state legislature (referred to as "Dillon rule"). Others allow local jurisdictions broad authority to adopt rules and regulations that each jurisdiction finds appropriate to its circumstances (commonly known as "home rule"). In a number of states, counties are creatures of the state, with only the authority it gives them, while cities and villages have home rule. Consequently, state authority for floodplain management varies from state to state, although the most effective programs incorporate strong elements at both state and local levels. More details are displayed in Table A3 in the Appendix. Some characteristics of stronger programs are described in the introduction to Part 1 and section 1.2 of *Effective State Programs*.

State Oversight and Monitoring

- 24 states have laws setting state oversight and/or monitoring for floodplain management; and
- 10 of the states with oversight/monitoring authority also have authority to overrule local floodplain management decisions if warranted (see section on Monitoring, below, for a thorough discussion of state monitoring).

Review and Approval

- 25 states have laws requiring review and approval of activities that alter floodplain lands;
- 17 of those states have laws requiring direct state review;

- 11 states require that the review be done at the local level; and
- some states require review at both levels; some state laws do not specify which level must perform the review.

Executive Orders

- 33 governors have issued executive orders that set policies for state action with regard to floodplains and flood hazards;
- 19 governors have issued executive orders that set policies for state action with regard to wetlands; and
- 19 governors have issued executive orders that set policies for state hazard mitigation activities (of which flood-related work is the most frequent).

Local Authority

Local regulation of flood hazard areas is almost universal. Every state has granted its localities enough authority to meet the regulatory requirements of the NFIP. Most communities have zoning ordinances that restrict floodplain development, building standards that govern floodplain construction, and subdivision regulations for residential areas under development. Local sanitary and well codes often have specific provisions for flood hazard areas. In larger communities and urban areas, stormwater management is used to help prevent surface runoff from exacerbating flooding of water bodies or from causing localized street flooding. Depending on the state, local governments are required or authorized to enact provisions for setbacks, planning, mitigation, building codes, resource protection, and other floodplain management-related techniques.

Consistency and Coordination throughout the State

Although most land development decisions and land use management take place at the local level, some localities do not have the authority to regulate activities on federal or state property or development by other local governments. Such gaps in authority can result in detrimental changes to the floodplain.

- 21 states exempt state property from local floodplain management authority.
- 25 states consider federal property exempt (either by virtue of federal or state law).
- 2 states (Connecticut and Rhode Island) consider the development of other local governments exempt.
- Many states have statutorily exempted certain non-governmental activities (not buildings) from local regulation, usually those important to the state's economy, such as
    - □ some or all agricultural uses (15 states);
    - □ public or private utilities (13 states);
    - □ forestry (7 states);
    - □ transportation facilities (7 states);
    - □ projects in small drainage basins (less than 2 square miles) (6 states);
    - □ small projects (under $ 50,000 project cost) (4 states);

- mining (3 states);
- hazardous waste facilities (Ohio); and
- some recreational uses (Puerto Rico).

There are several ways in which states have attempted to address the regulatory gaps that these exemptions produce.

- **27 states** (up from 21 in 1995) **require their state agencies to obtain local development permits** for proposed activities within a locality's jurisdiction. In the absence of local regulatory authority, these activities are governed by executive order or by other state or federal statutes.
- **35 states require** their agencies to obtain appropriate **permits from other state agencies** before proceeding with an agency project.
- **All states regulate their own development activities** in one way or another. For example, 19 states (up from 12 in 1995) prohibit their state agencies from engaging in floodway construction.
- **23 states require** that their state bridge, culvert, and road projects pass the 100-year flood with **no rise** in water surface elevation (down from 29 in 1995). Fourteen states allow a one-foot rise; the rest of the states determine the allowable rise by other means on a case-by-case basis.

More details about these exemptions are available in Tables A4 and A5 in the Appendix.

In general, exemptions to local regulatory authority appear to be having a somewhat negative impact on flooding, flood damage, and the loss of floodplain resources.

- **17 states reported** that the **exemptions have no effect either way** (the same as in 1995) on either floodplain resources or flood damage, usually because such activities have been captured in state regulatory authority.
- **20 states** think that the **exemptions contribute "somewhat" to flood damage** (up from 9 in 1995); and
- **20 states** think that the **exemptions contribute to floodplain resource loss or degradation** (up from 9 in 1995).

In addition, 16 states (up from 10 in 1995) thought that federal actions are contributing to flooding or to the loss of natural floodplain resources. Examples are the U.S. Fish and Wildlife Service's building fish ponds in floodways; the Corps of Engineers' leasing cabins in the floodway; and federal road construction that seems to overlook state requirements. A comprehensive review of federal agency compliance with Executive Order 11988, which requires federal agencies to take flood hazards into account, does not exist, but would be helpful is shedding light on these sorts of regulatory problems.

State Adherence to NFIP Standards

Under the NFIP, a state meets the definition of a "community" and thus FEMA expects that state construction projects in mapped flood hazard areas comply with the minimum floodplain management criteria set forth in 44 *CFR* §60.3. Like a community, a state cannot obtain federal flood insurance on state buildings if it is not properly fulfilling its responsibilities as a participating "community." States can take different approaches to meet or exceed the minimum

requirements of the NFIP for state projects, such as requiring them to comply with local ordinances; adopting floodplain management regulations and permit requirements that apply to all state agencies and their construction activities; issuing a governor's executive order; or incorporating standards into individual agency procedures and requiring review by the state's floodplain management program. Ideal state compliance and "example-setting" are described in section 2.1 of *Effective State Programs*.

Although no state has been cited as being noncompliant with the NFIP criteria, 26 state respondents to the survey were aware of instances of their states' failure to meet minimum NFIP requirements, although several states mentioned that they are fairly rare. Specific examples were

- □ transportation projects,
- □ state-owned airport facilities,
- □ dumping fill,
- □ school district projects, and
- □ adoption of rehabilitation codes without substantial improvement requirements.

Five states cited specific parts of 44 *CFR* 60.25 that have not been met, including, among others

- □ setting standards for mudslide and erosion hazards;
- □ setting standards for environmental and water pollution prevention during floods; and
- □ ensuring consistency with other state agencies.

- 1 state mentioned that there is a trend toward state-assisted water redevelopment projects, which tend to run against the floodplain management requirements.
- Some state agencies want to set their own risk thresholds for certain activities and projects, either above or below the NFIP-mandated 100-year standard, depending on the situation.

More details are shown in Table A6 in the Appendix.

Interagency Coordination

A vital function performed by states is that of coordinating the myriad state, local, and federal programs that directly or indirectly affect floodplains. Sometimes the state floodplain management office is the lead agency in such coordination; sometimes it is a participant in a broader process.

Within a given state, there are several types of programs (state, regional, or local) with which the state floodplain management program coordinates its activities. The agencies that typically have an impact on floodplain management within a state are listed in section 2.2 of *Effective State Programs*, along with an explanation of how their actions are critical to floodplain resources and minimizing flood losses.

- **State dam safety program: 24 states** say their floodplain management program is in "ongoing" or "frequent" coordination (only two states say they "never" coordinate with the state dam safety programs).

- **State stormwater management programs: 21 states** in ongoing or frequent coordination (2 states say they never coordinate).
- **State coastal management programs: 19 states** in ongoing or frequent coordination;
- **State wetlands protection programs: 17 states** in ongoing or frequent coordination (3 states never coordinate);
- **State shoreland management: 17 states** in ongoing or frequent coordination);
- **State building code entities: 14 states** in ongoing or frequent coordination; (**16 states never coordinate**);
- **State soil erosion programs: 12 states** in ongoing or frequent coordination (**10 states never coordinate**); and
- State programs to manage **high-risk erosion areas: 11 states** in ongoing or frequent coordination.

See Table A7 in the Appendix for a detailed breakdown of the coordination levels among agencies.

The programs, policies, and activities of state and local jurisdictions also overlap with federal efforts. States work to ensure that these functions are well integrated among the levels of government involved. Of the federal agencies involved in floodplain management (excluding FEMA), the U.S. Army Corps is the one with which most state coordinate activities (all states but Maine and Nevada). The levels of state and federal agency coordination are listed below and details are displayed in Table A8 in the appendix.

- U.S. Army Corps of engineers (47 states plus the District of Columbia and Puerto Rico in coordination);
- Natural Resources Conservation Service (37 states in coordination);
- U.S. Geological Survey (36 states in coordination);
- National Weather Service (25 states in coordination);
- National Oceanic and Atmospheric Administration (14 states in coordination);
- Environmental Protection Agency (12 states in coordination); and
- National Park Service (only the District of Columbia in coordination).

Other agencies that were mentioned by at least one state were the U.S. Forest Service, the Department of Transportation, the Federal Highway Administration. the U.S. Fish and Wildlife Service, the Department of Housing and Urban Development and the Bureau of Indian Affairs (both for Native American lands), the Bureau of Land Management (for mining operations), the Economic Development Administration, the Rural Development Administration, and the Federal Depositors Insurance Corporation.

Staffing and Budgets

Adequate budgets and sufficient, experienced personnel are absolutely crucial to state and local floodplain management. Local communities have more effective programs in states that have floodplain programs with experienced staff that come from a variety of disciplines. A discussion of the factors that should be considered in determining the optimal number and type of floodplain management staff and accompanying funding levels can be found in Part 9 of

Effective State Programs. Because there is so much variety among state programs, caution should be used in making state-to-state comparisons of staff and budgets. For example, some states included dam safety personnel and funding in the floodplain management program details they provided for this report. Other initiatives, such as riparian areas protection, mitigation planning, and structural projects, are considered part of "floodplain management" in some states but not in others. Recognizing that limitation, however, some observations can be made.

States vary in the number and type of staff support they have for floodplain management. The total number of people working at state-level floodplain management nationwide is about 300. All of these except North Dakota's two people and Wyoming's 1.5 are annual full-time equivalency state positions (FTEs). About half of those people work directly within the floodplain management program; the other personnel are housed in other agencies or departments, although they perform floodplain management functions. Nationwide, about

- **42%** of the state FTEs in floodplain management are **engineers**;
- **17%** are **planners**;
- **15%** are **technicians**;
- **14%** are **clerical and administrative** staff; and
- **12%** are in **other fields** or classifications, including environmental scientists, hydrologists, geographers, surveyors, and managers.

Details are shown in Table A9 in the Appendix.

Likewise, the level of education, certification, and experience of state personnel varies nationwide. Of all the state-level people working in floodplain management throughout the nation,

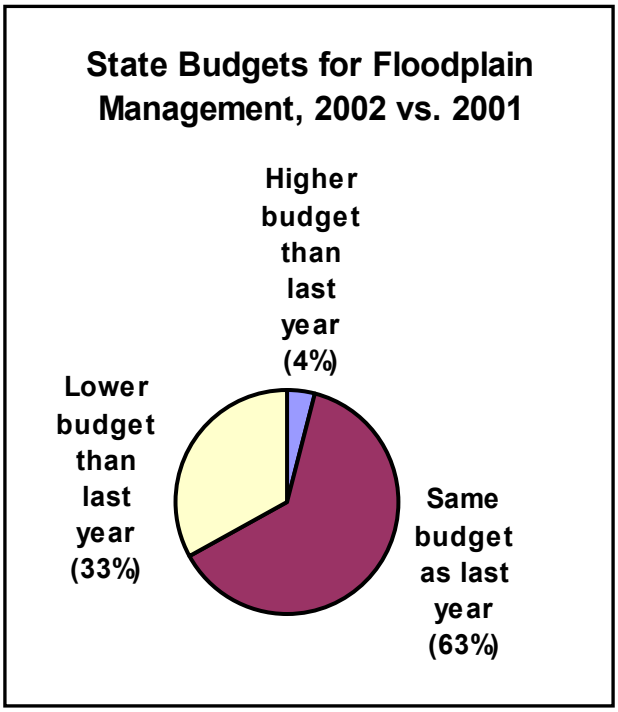
- **58%** have **college degrees**; and
- **22%** have post-**graduate degrees**.

The collective experience of the people working at state-level floodplain management throughout the country is about 2,700 years. This is an average of about 9 years experience per staff person, possibly indicating that there are significant numbers of state floodplain management personnel reaching the point of turning responsibility over to the next generation. There are 64 state-employed Certified Floodplain Managers nationwide. More details are displayed in Table A10 in the Appendix.

Table 1 shows the 2002 budget for each state's floodplain management program, the total Community Assistance Program (CAP) funds from FEMA, and other funds that address floodplain management in each state. State budgets amount to about $12.5 million and CAP funds another $5 million. (Note that since these data were collected, annual CAP funding has gone up to $7 million). When grant programs and funds for structural projects are included, the total of state budgets approaches $81 million, but it should be noted that funds for structural flood control (feasibility studies, planning, and construction) account for about $60 million of that total. Thus, a working figure for state-level floodplain management operations, local assistance, and grant programs in 2002 is about $23 million. The budget figures are not necessarily comparable from one state to another, however. For example, funds for flood disaster preparedness and relief, acquisition, and floodplain resource protection are separate from

floodplain management in many states, even though they all help alleviate flood-related problems. Therefore, the amount noted may cover only a portion of a state's floodplain management activities (in most cases the regulatory and technical assistance functions) and omit various other floodplain-related projects and programs.

Another caution in interpreting these figures is that there is the prospect of enhanced funding on the horizon. As noted above, since these data were collected CAP funding has gone up, and funds have been provided for fiscal year 2004 for Map Modernization Management Support, which likely will be a significant source of funds for state activities to support federal programs in the future.



Besides operating budgets, state floodplain management programs receive other kinds of state support. These can include vehicles for field work and travel; supplies, office equipment, and other overhead; clerical support; legal, engineering, hydrological, planning, geographic information system (GIS), and other technical support; special-purpose grants; and facilities and staff for field offices.

Only two states, Alabama and West Virginia, had larger budgets for floodplain management in 2002 (the last full year before the survey was done) than in the previous year. All the rest of the states reported budgets the same or lower than in the previous year. It is important to note that these figures are not adjusted for inflation, so the effective size of virtually all state floodplain management budgets has diminished in the last couple of years (although the longer-term trend is toward increasing budgets; see Table 9). See also the discussions of economic influences and other budget issues on pages 58 and 65.

A different breakdown of the states' budgets is presented in Table 2. For example, the agencies' indirect costs rates (overhead) vary widely, from zero in some states to almost 50% in several others. Note also that some states receive almost all their travel funds through FEMA's CAP program, while others provide most of it themselves.

State Funding for Local Floodplain Management

Some states have regularly budgeted funds to share the cost of certain floodplain management activities with the appropriate local governments. These funds come from a variety of sources, from the state general fund, to loans, to bonds. Nineteen states will share in the cost of flood loss reduction projects undertaken at the local level. Only two states—Colorado and Pennsylvania—cost share with localities for administration of their ongoing local programs. Pennsylvania's $ 250,000 budget for this purpose comes from an annual appropriation of $150,000 supplemented by $100,000 from the Community Conservation Partnerships program. More detail is available in Table A11 in the Appendix.

Table 1. State budgets for floodplain management (for FY2002).

State	Annual Budget				Total Annual Budget*
	State Funding	FEMA funding (CAP)	Grant Programs	Other	
AK	$ 35,720	$ 61,400	$ 10,440	$ 0	$ 107,560
AL	$ 400,000	$ 110,000	$ 0	$ 0	$ 510,000
AR	$ 0	$ 110,000	$ 0	$ 0	$ 110,000
AZ	$ 0	$ 90,000	$ 0	$ 0	$ 90,000
CA	$ 580,000	$ 250,000	$ 0	$ 575,000	$ 1,405,000
CO	$ 500,000	$ 120,000	$ 136,000	$ 300,000	$ 1,056,000
CT	$ 50,000	$ 114,000	$ 476,500	$ 0	$ 640,500
DC	$ 58,616	$ 0	$ 0	$ 0	$ 58,616
DE	$ 125,000	$ 50,000	$ 125,000	$ 0	$ 300,000
FL	$ 100,340	$ 250,000	$ 0	$ 0	$ 350,340
GA	$ 42,000	$ 80,000	$ 0	$ 0	$ 122,000
HI	$ 150,000	$ 50,000	$ 0	$ 0	$ 200,000
ID	$ 23,096	$ 69,289	$ 0	$ 0	$ 92,385
IL	$ 3,177,000	$ 200,000	$ 0	$51,000,000**	$ 3,377,000
IN	$ 2,451,947	$ 122,858	$ 0	$ 0	$ 2,574,805
KS	$ 78,000	$ 68,000	$ 100,000	$ 0	$ 246,000
KY	$ 26,667	$ 80,000	$ 0	$ 0	$ 106,667
LA	$ 45,680	$ 137,041	$ 0	$ 0	$ 182,721
MA	$ 60,000	$ 154,000	$ 0	$ 0	$ 214,000
MD	$ 40,000	$ 70,000	$ 1,167,000	$ 0	$ 1,277,000
ME	$ 43,944	$ 131,832	$ 10,000	$ 0	$ 185,776
MI	$ 652,000	$ 211,000	$ 0	$ 0	$ 863,000
MN	$ 812,500	$ 108,100	$ 0	$ 0	$ 920,600
MO	$ 255,000	$ 120,000	$ 0	$ 25,000	$ 400,000
MS	$ 18,333	$ 55,000	$ 0	$ 0	$ 73,333
MT	$ 4,700	$ 63,000	$ 3,000	$ 20,000	$ 90,700
NC	$ 54,167	$ 162,500	$ 0	$ 75,167	$ 304,000
ND	$ 25,000	$ 75,000	$ 0	$ 0	$ 100,000
NE	$ 250,000	$ 50,000	$ 135,000	$ 0	$ 435,000
NH	$ 25,000	$ 68,500	$ 0	$ 0	$ 93,500
NJ	$ 383,000	$ 142,000	$ 0	$ 8,650,000**	$ 525,000
NM	$ 16,754	$ 77,019	$ 0	$ 0	$ 93,773
NV	$ 58,030	$ 63,000	$ 11,760	$ 0	$ 132,790
NY	$ 275,603	$ 228,500	$ 0	$ 0	$ 504,103
OH	$ 540,000	$ 162,500	$ 120,000	$ 80,000	$ 902,500
OK	$ 50,000	$ 150,000	$ 0	$ 10,000	$ 210,000
OR	$ 28,000	$ 79,000	$ 0	$ 0	$ 107,000
PA	$ 80,000	$ 60,000	$ 0	$ 60,000	$ 200,000
PR	$ 0	$ 35,000	$ 0	$ 0	$ 35,000
RI	$ 10,000	$ 40,000	$ 138,000	$ 248,000	$ 436,000
SC	$ 87,172	$ 154,000	$ 0	$ 0	$ 241,172
SD	$ 15,500	$ 45,000	$ 120,000	$ 0	$ 180,500
TN	$ 20,000	$ 55,000	$ 0	$ 0	$ 75,000
TX	$ 44,820	$ 134,460	$ 0	$ 0	$ 179,280
UT	$ 23,174	$ 71,142	$ 0	$ 0	$ 94,316
VA	$ 70,000	$ 90,000	$ 40,000	$ 0	$ 200,000
VT	$ 25,000	$ 75,000	$ 0	$ 0	$ 100,000
WA	$ 30,200	$ 90,200	$ 2,000,000	$ 0	$ 2,120,400
WI	$ 600,000	$ 140,000	$ 0	$ 0	$ 740,000
WV	$ 10,000	$ 30,000	$ 0	$ 0	$ 40,000
WY	$ 24,500	$ 73,000	$ 0	$ 0	$ 97,500
Total	**$ 12,476,463**	**$ 5,226,341**	**$ 4,592,700**	**$ 61,043,167**	**$ 23,700,837**

*Without flood control funds

** Funds for feasibility studies, planning, and construction of flood control projects.

Table 2. Details of state floodplain management program annual budgets.

State	Salary & Fringe Budget	Salary & Fringe % from CAP	Salary & Fringe % from state	Travel Budget	% of travel from CAP	% of travel from state	Agency indirect rate (%)
AK	$ 100,400	61	39	$ 6,420	0	100	0
AL	$ 0	0	0	$ 0	0	0	38.900
AR	$ 55,000	90	10	$ 10,000	0	0	26.000
AZ	$ 0	100	0	$ 0	100	0	19.000
CA	$ 1,305,000	40	60	$ 100,000	40	60	0
CO	$ 500,000	15	85	$ 15,000	65	35	36.800
CT	$ 153,000	75	25	$ 10,000			
DC	$ 42,395	0	0	$ 1,800	0	0	39.800
DE	$ 0	50	50	$ 0	50	50	0
FL	$ 214,851	75	25	$ 4,420	75	25	13.670
GA	$ 119,100	65	35	$ 3,700	65	35	0
HI	$ 45,000	75	25	$ 10,000	100	0	23.400
ID	$ 58,000	75	25	$ 8,224	100	0	38.300
IL	$ 2,765,385	4.8	95.2	$ 74,475	20	80	24.500
IN	$ 2,396,360	75	25	$ 22,526	75	25	12.800
KS	$ 68,000	75	25	$ 2,000	75	25	25.000
KY	$ 74,260	75	25	$ 0	0	0	30.000
LA	$ 171,559	75	25	$ 9,102	75	25	21.000
MA	$ 209,000	72	28	$ 5,000	72	28	20.000
MD	$ 108,000	65	35	$ 2,000	50	50	29.000
ME	$ 135,531	79	21	$ 2,208	0	100	23.740
MI	$ 858,000	25	75	$ 5,000	25	75	18.590
MN	$ 890,600	90	10	$ 30,000	50	50	12.400
MO	$ 255,000	0	100	$ 35,000	100	0	1.900
MS	$ 46,080	75	25	$ 3,300	75	25	3.000
MT	$ 52,000	100	0	$ 9,000	100	0	0
NC	$ 0	75	25	$ 0		100	0
ND	$ 75,000	75	25	$ 9,000	75	25	30.000
NE	$ 400,000	50	50	$ 18,000	44	56	
NH	$ 48,000	75	25	$ 2,000	75	25	2.200
NJ	$ 525,000	25	75	$ 0	0	0	26.190
NM	$ 31,320	75	25	$ 5,623	75	25	26.410
NV	$ 110,676	58	42	$ 7,545	75	25	
NY	$ 361,926	42	58	$ 20,000	45	55	31.530
OH	$ 702,000	22	74	$ 105,300	20	60	32.000
OK	$ 102,877	75	25	$ 4,751	75	25	45.090
OR	$ 75,000	75	25	$ 10,000	75	25	30.000
PA	$ 0	30	70	$ 5,000	95	5	50.000
PR	$ 0	0	0	$ 0	0	0	0
RI	$ 0	75	25	$ 5,000	60	40	20.000
SC	$ 150,000	75	25	$ 8,000	75	25	23.000
SD	$ 49,200	81	19	$ 3,500	95	5	2.900
TN	$ 90	75	25	$ 10	75	25	44.310
TX	$ 60,912	75	25	$ 12,000	75	25	28.910
UT	$ 56,443	75	25	$ 6,981	75	25	0
VA	$ 137,500	62	38	$ 6,000	40	60	8.300
VT	$ 93,000	75	25	$ 7,000	75	25	27.000
WA	$ 625,000	15	85	$ 7,000	10	90	31.200
WI	$ 700,000	10	90	$ 40,000	10	90	22.000
WV	$ 35,000	75	25	$ 8,000	62	38	0
WY	$ 0	0	0	$ 0	0	0	0.044
Total	**$ 14,961,465**			**$ 659,885**			

Evaluation of State and Local Floodplain Management

Achieving and maintaining an effective state floodplain management program is an ongoing effort. It is not easy to tell when management techniques are being effective, because success in floodplain management is measured, in part, by events that do *not* occur. States can find ways to tally and keep records on different aspects of the status of floodplain management within their jurisdictions, such as inventorying flood-prone property, taking advantage of the post-disaster period to document damage that was avoided and the success of mitigation projects, taking an accounting of acreage of floodplain lands preserved in a natural state or otherwise protected, monitoring community program administration, and tracking the progress of mitigation projects.

Very few states have ever conducted a comprehensive assessment of their floodplain management efforts, no doubt because of the enormity of the task. In the mid 1980s Wisconsin conducted an "effectiveness study" of its program, reviewing state authority, agency activities and responsibilities, local programs, ways to measure progress, and a number of other factors. The final report concluded, not surprisingly, that continual and meaningful evaluation of progress would take more accurate measures of "progress," much more data than was available, ways of quickly and conveniently storing and accessing that data, meaningful typologies of localities and flood risks; and uniform techniques for interviewing officials, monitoring programs, and accounting for the numerous variables among situations and localities (Wisconsin Department of Natural Resources, 1984; 1983). A few years later the Tennessee Valley Authority made an analogous attempt to assess community floodplain management within its jurisdiction, again without finding any easy answers (Tennessee Valley Authority, 1985).

In the years since then many states have developed methods for monitoring and keeping records on various aspects of their or their localities' program administration that are useful and appropriate for their purposes. However, ensuring that activities are accurately recorded and measured and then linking them meaningfully to actual on-the-ground conditions statewide (floodplain acreage, number of floodprone structures, status of endangered species in riparian habitat, average dollar damage from floods over time, etc.) remains problematic.

Two distinct components need to be assessed when evaluating floodplain management: first, the overall impact the state and local efforts have on the floodplains and on the level of damage and disruption caused by the inevitable floods. These are called program "outcomes." The second aspect is the operation of the program itself—how efficient it is, what needs to be changed, whether its activities are making progress towards its goals.

Assessing Outcomes of Floodplain Management

The two overarching purposes of floodplain management at all levels are (1) to avoid or at least minimize the damage and disruption caused by floods, and (2) to protect natural floodplain resources and functions as much as possible. The outcomes of state floodplain management are the extent to which the program is making progress toward minimizing flood damage and disruption and protecting floodplain resources (see *Effective State Programs* section 10.1).

Identifying Losses and Costs

Gathering information after floods is one of the easiest ways to find out what the losses and costs of flooding are, and whether they are being diminished within a given state. Solid documentation is preferable, but the extent to which states maintain records on these items is not known. The state respondents to this survey were able to estimate the number of floods per year

their states had experienced over the last several years, how many did not result in Presidential disaster declarations, and how many of them involved building damage. This suggests that expert opinion, if nothing else, is available to estimate trends in damage and disruption.

Identifying Benefits and Successes

Tracking mitigation plans and projects—their success and how they perform under flood conditions— is one way to bring notice to the benefits of floodplain management. All the states doubtless keep records of the mitigation projects they fund, for example, but how accessible those records are or how that information is used is not known.

Evaluating Program Operations

When the effectiveness of a program is measured through regular evaluations, it is easier to identify opportunities to make adjustments or to add new program elements (see section 10.2 in *Effective State Programs*). It is clear from the data presented in this report that most states have some methods of keeping track of how the communities in their jurisdictions are performing. (see sections on monitoring and enforcement, community assistance, etc.). It is less clear what uses the states are able to make of this knowledge, nor is it known how much effort goes into examining the state programs themselves.

Success Stories

Over the last several years, states and others have made efforts to publicize "success stories" on various aspects of floodplain management—mitigation being perhaps the most notable. One well-known example is the case of Grafton, Illinois, where there was an extensive buyout program after the seriously damaging 1993 flood. Subsequent flooding at the town site in 1995 produced little or no damage.

States have learned that such illustrations are valuable in educating the public, the news media, and elected officials. Even if all the costs and benefits of such a mitigation measure cannot be documented, the message is still clear that it was worthwhile.

Compilations of successes have been made by several states and by FEMA, and links to them can be found at http://www.floods.org/Publications/mit%20succ%20stories/mssiii1.htm.

Documentation

As noted in *Effective State Programs* (section 10.3) it is important for states and localities to keep track of changes in floodplain management and in their activities and programs that seek to further it. Establishing baselines is a first step, and could include inventories of floodprone lands, buildings, habitat, open space, and other at-risk activities or other floodplain functions and resources (see section 2.1.3 for some ideal baseline measurements). It is not known the extent to which states have conducted such assessments. From a baseline, changes in the form of either progress or regression should be recorded, in quantifiable form, if possible.

Managing Development

In large measure, flood damage and adverse impacts to floodplains can be avoided or minimized, if states and communities have the authority, tools, and political will to guide development to less-hazard-prone areas and also to examine the full extent of impacts when floodplain development is proposed. To accomplish this, states can apply various land use management tools directly through state regulation, or authorize and foster application of those tools at the local level. States use a two-pronged approach to manage development in this way: broad tools for overall planning and coping with growth; and more specific tools for addressing individual developments and even buildings. Underlying both approaches is the provision of assistance to localities to enable them to undertake the measures that are appropriate at that level.

Planning

Planning is a crucial tool in minimizing future flood damage, because only by looking ahead and finding ways to avoid floodprone areas, protect existing floodplain resources, or build in flood-resistant ways can development be managed to reduce losses. The elements of effective planning for floodprone areas are detailed in section 5.1 of *Effective State Programs*. As with other elements of floodplain management, the approach taken by each state varies: some states have a full-fledged planning agency that handles a wide range of tasks statewide; some state require localities to conduct planning; some states do a mixture of both; and there are many variations on these themes.

- **22 states require their localities to conduct land use planning** as part of their local development review process;
    - 16 of those require that that planning include consideration of flood hazards, floodplains, watersheds, or coastal areas, as appropriate.
- 14 states have oversight responsibility for local land use planning.

More details are displayed in Table A12 in the Appendix. Planning for mitigation is discussed in the section on mitigation, below.

Growth Management / Sustainable Development / NAI

Growth management and sustainable development policies are a broad vehicle by which states and localities can ensure that development and redevelopment take place in desired locations (free from flood risk), that floodplain resources are protected as much as possible, and that development that does occur is done with the flood hazard and resources in mind. Sections 5.3 and 5.4 of *Effective State Programs* present land management and growth management techniques that can be effective for floodplain areas. Seventeen states have growth management policies; in 31 states localities have authority to institute their own growth management policies (either there is state enabling legislation giving them that authority, or such legislation is not required under the state constitution).

At least some localities in 30 states (or the state itself) use multi-objective planning that accounts for floodplain resources and the flood hazard.

- The North Carolina Division of Coastal Management mandates such local planning in some parts of the state; other communities do it on their own.

- Oregon has statewide planning requirements, with a natural hazards component.
- The Chagrin River Watershed Partners and the Mill Creek Restoration project are two multi-objective initiatives undertaken in Ohio.
- Florida's growth management legislation is based on a multi-objective planning approach.
- Many Arizona communities require new development to manage floodwaters with multiple purposes in mind: preventing increases in flows off the property, preserving open space, and providing recreation.

No Adverse Impact Floodplain Management

The **Milwaukee Metropolitan Sewerage District** has several regulations aimed at preventing adverse effects possible with new development. All new development with more than one-half acre impervious surface must include onsite detention of stormwater, preventing it from running off onto other property. Other rules require "overdetention" of stormwater, making it less likely that the capacity of the infrastructure for handling stormwater will be exceeded and cause flood damage to otherwise protected areas.

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Fort Collins, Colorado, considers adverse impacts to include actions that "degrade the visual character of or obstruct the scenic view of natural features," which includes floodplains and watercourses. The City Code requires that proposed construction be evaluated for its potential effects on typical floodplain characteristics (elevation, velocity, rate of rise, etc.) and also requires consideration of environmental effects on the watercourse, its streambanks, streamside trees, other vegetation, and wildlife habitat.

A useful overall framework for managing the floodplain aspects of growth is the "no adverse impact" approach to floodplain management (Association of State Floodplain Managers, 2004). This concept means that any proposed development within a watershed should be analyzed in advance to determine if it will have any negative impacts on other residents or property owners. If it will, then those impacts must be mitigated in some way, preferably as provided for in the community's or watershed's overall plan. All 50 state floodplain management programs report that their staffs are familiar with the NAI concept, and most could cite examples of at least a few local communities that have policies, plans, regulations, or procedures that implement it.

Building Codes

Adoption and implementation of building codes—statewide or community-by-community—that establish flood-related design and construction criteria for buildings and other structures is one way states work to manage their local development in ways that can reduce flood damage and conserve floodplain resources. Although the primary purpose of building codes is public safety and protecting building occupants, a related objective is reducing damage associated with hazards. Section 2.2.3 of *Effective State Programs* describes optimal ways in which codes can be used to further floodplain management goals.

States handle building codes in a number of ways. Some states adopt the code at the state level and delegate implementation and enforcement to the communities; some states specify which code must be adopted by communities; some states are silent on which code to adopt; some states authorize communities to adopt higher standards to address local needs.

- **35 states have adopted a building code**;
  - 16 of those state codes comply with the state's floodplain management statutes;

- 27 of them comply with local floodplain management ordinances (including NFIP criteria);
- In 28 of the state codes, flood-resistant materials are required to be used below the base flood elevation;
- In 22 states, the state building code is required to be administered by all local jurisdictions;
- In 4 states it is only required in incorporated towns, villages, and townships; and
- 1 state (Alaska) requires administration of the statewide building code only in unincorporated parts of counties.

Seven states administer the state building code themselves for certain occupancies. Often there is a state agency solely devoted to the building code, but in many states the code is administered through a public safety department, the fire marshal's office, a consumer services office, a labor or commerce department, or the state engineer. In about half the states (23) the administering agency for the state building code also has oversight authority for local administration of building codes.

- **32 states report that at least some of their localities have adopted building codes that meet minimum NFIP criteria** for flood-resistant buildings. According to state estimates, about 3,500 localities nationwide have building codes with such provisions.

Types of Building Codes

States have adopted different types of building codes.

- 19 states have adopted statewide codes based on the I-Codes (the International Series of Codes), which meet the minimum flood-resistant design and construction requirements of the NFIP for buildings;
- 13 states have adopted the Uniform Building Code of the ICBO;
- 11 states have adopted the National Building Code (BOCA);
- 6 states have adopted the Standard Building Code (SBCCI);
- 1 state has adopted the NFPA 5000 code (National Fire Protection Association), which meets the minimum flood-resistant design and construction requirements of the NFIP for buildings;
- 2 states, Wisconsin and Indiana, have written their own state building codes.

In 19 states where local jurisdictions are not required to administer a building code, the localities are free to adopt the building code of their choice, but in 13 states the code for local adoption is prescribed. Localities in 23 states can amend the building code without state approval. It should be noted that, among those states that have adopted the NFIP-inclusive codes (NFPA 5000 and I-Codes), some can amend (or allow their localities to amend) those codes to omit flood-resistant criteria. This acts to weaken floodplain management in the state, by leaving the sole burden of flood-resistant construction on the local floodplain management ordinance. Eighteen states have a state or local requirement for updating their building code, some on a two- or three-year cycle and others "as needed."

Support for Building Codes

Only three states (Vermont, Virginia, and Wyoming) indicate that there is "no local interest" in adopting building codes, while in most states (36) there is "strong" or "growing" interest in codes. Thirty-three states have at least some localities whose building codes include all of the minimum NFIP floodplain management criteria for materials and construction methods. Judging from those states' rough estimates, over 3,500 floodprone communities in the nation have building codes that require minimal flood-resistant construction.

In 14 states the floodplain management program is in "ongoing " or "frequent" coordination with the state building code agency or department; 16 state floodplain management programs say they never coordinate with building code agencies.

Details about building codes are shown in Tables A13 and A14 in the Appendix.

Regulations

Local regulation of flood hazard areas is the cornerstone of floodplain management. In the decades since flood insurance became available in exchange for local management of areas prone to flooding, vast progress has been made in getting a grip on the kinds and quality of development that ought to be allowed in those hazardous areas. Nevertheless, some local jurisdictions are less than enthusiastic about adopting and enforcing regulations. More details are shown in Table A15 in the Appendix. The more effective types of regulations are listed in sections 5.2, 5.5, and 5.6 of *Effective State Programs*.

- 16 states reported that their local officials are, in general, still "very reluctant" to adopt and enforce regulations to restrict development in floodprone areas.
- 30 states say that local officials are "somewhat reluctant" in this matter.
- 10 states consider the local officials within their boundaries to be "not at all reluctant" to adopt and enforce regulations.

Some states report that local officials are receptive to local regulations, even ones more stringent than required, as long as it is clear that the "safety and well being of the population" is being protected. A few states noted that interest in regulations is increasing because of communities' desires to address multiple goals, such as improving water quality, having aesthetically pleasing development, and reducing flood risk. In some states, the sense is that localities subject to higher rates of growth, at least, would adopt strict regulatory standards for floodplains if they were allowed to do so by state law. Some of the reasons given for reluctance to adopt regulations were political pressure from the state legislature not to stand in the way of proposed development, resistance to "federal government" intervention, property rights issues, and concern about the higher cost of construction if more limitations are imposed. Details are displayed in Table A16 in the Appendix.

States do not leave regulation wholly up to localities.

- **21 states have laws that require review and approval of activities that modify or alter the floodplain**.
  - 18 of those state laws require that review to take place at the state level;
  - 12 states require the review to be done by the locality; and
  - 6 states make both levels of government responsible.

Similarly, certain portions of the flood hazard area (or certain hazards) are regulated directly by the state.

- 17 states directly regulate the floodway;
- 12 states regulate the flood fringe;
- 12 states regulate velocity zones; and
- 4 states regulate alluvial fans.

Note that there is not always a clear distinction between state or local regulation of a certain area; in many instances regulatory authority is shared between the state and locality by one means or another.

In many states some activities are statutorily exempt from local regulation, and often the state itself takes regulatory authority over them. These vary from state to state. Examples include public and private utilities; state property and facilities; agriculture; mining; forestry; transportation facilities; infectious waste facilities; and small drainage basins.

Substantial Improvement Regulations

One of the ways in which the number of at-risk buildings can be diminished over time is by their gradual removal (or replacement with flood-resistant construction) as they become damaged in floods or other events. This can only take place, however, if states and localities do not permit them to be repeatedly repaired and rebuilt to their pre-damaged condition. Regulatory authorities therefore establish a threshold of damage (or improvement, in the case of additions or renovations) beyond which the building must meet existing standards for flood-resistant construction. The lower the threshold, the more strictly it is enforced, the way it is measured, and whether or not repeated small improvements or repairs are counted as one all affect how quickly the building stock is brought up to standards. Some details of effective use of this technique are given in section 6.7.1 of *Effective State Programs*.

- **21 states have a statewide standard for substantial improvements** to at-risk structures.
  - 18 states use the 50% level; and
  - 2 states (Arizona and Rhode Island) use a 49% standard.

In all of these states except Indiana, the statewide substantial improvement threshold applies in both the floodway and the flood fringe. (Indiana applies it to the floodway but not the fringe). Twelve of those states also apply their substantial improvement threshold to velocity zones; one state (Arizona) applies it to alluvial fans.

In 17 states the substantial improvement is calculated separately for each instance of improvement or repair. Six states (Alabama, Arizona, Indiana, Kentucky, Mississippi, and Ohio) keep records of repairs and improvements and when the cumulative percentage exceeds the state's threshold, the regulation is applied. Alabama, Mississippi, and Ohio state that the accumulation of improvements must take place within 10 years for the regulation to be invoked; Kentucky's standard is 5 years. No state calculates its substantial improvement requirements over the course of a certain number of floods. Twenty states measure substantial improvement by the market value of the structure in question; six states use the pre-flood value. Two states (Hawaii and Texas) use replacement cost. Details are shown in Table A17 in the Appendix.

Special Hazard Regulations

Special hazards are dangers that accompany flooding and cause damage greater than that caused by typical flood waters. Acknowledgement of these risks is vital to floodplain management in many parts of the country, as described in section 3.2.4 of *Effective State Programs*. Nine states have special hazard regulations. Four states regulate alluvial fans (compared to two in 1995) and 15 have coastal erosion protection regulations (one fewer than in 1995).

Other Regulations

There are a variety of other state-level regulations that help to reduce flood losses and protect floodplain resources.

- **32 states have stormwater management** or detention requirements (compared to 25 in 1995);
- 25 states have statewide requirements for setbacks from one or more type of floodprone area or feature (up from 22 in 1995); they apply to erosion areas, greenbelts, floodplains, wetlands, coastal areas, sand dunes, and "natural" rivers. In addition, 23 states have enabling legislation giving localities authority to establish such setbacks. Construction or development setbacks are used by states and localities for a variety of reasons, including reducing damage in marginally floodprone areas, preventing or minimizing erosion, and preserving habitat or other valuable natural features, such as dunes.
- **19 states have statewide floodway encroachment** regulations;
- **22 states use freeboard** standards—requiring new buildings to be elevated higher than the base (100-year) flood level. Fifteen of those states (up from 12 in 1995) have statewide regulations establishing the freeboard, plus Maine has state regulations requiring freeboard only in its shoreland zones. The other 6 states implement freeboard in other ways. Ohio, for example, reports that many of its localities apply freeboard of one to two feet. One foot of freeboard is the most common standard, being used in 16 states. Montana's standard is 0.5 foot, Pennsylvania and the District of Columbia use 1.5 feet; Indiana and Wisconsin use 2 feet.
- **9 states** have regulations requiring **compensatory storage**;
- **9 states** have regulatory standards for the protection of **critical facilities** such as power plants, water treatment facilities, emergency services, hospitals, etc. Six of these states keep critical facilities out of the 500-year floodplain; two use the 100-year floodplain; and one (Kentucky) uses the 25-year floodplain.
- **8 states** have regulations requiring the maintenance of **drainage systems**; and
- **1 state** has drainage and/or protection regulations for **X Zones**.

More detail on these regulations is displayed in Tables A18 and A19 in the Appendix.

Community Assistance

Because such a large part of managing floodplains takes place at the local level, a significant portion of a state's program is devoted to helping local governments in various ways. The specifics of the state role vary, depending on how authority is divided between the two levels

according to the law in that state, but every state has an extensive community assistance effort, and in every state for the past several years it has been accompanied by participation in the Community Assistance Program, through which FEMA provides funds to states specifically for the purpose of encouraging, guiding, monitoring, and advising communities in managing their floodplains according to NFIP minimum standards.

Most states have integrated their own initiatives, techniques, standards, and goals with their function as coordinating bodies for the NFIP. Almost all states view their relationship with communities as one of providing technical assistance and guidance; only two states (Alabama and California) indicate that their staff spends more than half its time on "monitoring" community programs; and only one state (Utah) indicated that its staff spends more than half of its time on enforcement activities. All the other states spend the bulk of their community assistance time contributing technical information, training, advice, and guidance to localities. Unfortunately, 36 states say that there are community assistance needs in their states that simply are not being met. Besides a desire for more personnel and funds to enable them to have closer and more frequent contact with localities (expressed by more than half the states), states also mentioned a need for increased promotion of flood insurance information, training for code enforcement officials, mitigation planning, engineering support, and others.

NFIP and CRS Participation

The vast majority of floodprone communities in the United States participate in the National Flood Insurance Program (Table 3). Only five states have less than 75% participation: Alaska with 42%, Georgia with 63%, Colorado with 70%, Kansas with 72%, and Alabama with 73%. Participation in the NFIP's Community Rating System, a program that encourages localities to go beyond the minimum NFIP floodplain management criteria and rewards them with reduced premiums for policyholders, is shown in the second column in Table 3. Arizona leads in CRS involvement, with half of its communities participating, followed by Florida with 49%, South Carolina with 40%, Colorado and Hawaii with 25%, and Nevada with 23%.

NFIP Coordination

Coordination within the state of various aspects of the NFIP is a core component of a state's floodplain management program. This "coordination" encompasses a variety of functions, which vary from state to state according to the agreement reached between the state and FEMA, and some funding is provided by FEMA for certain activities. The most effective techniques for state coordination of the NFIP are described in Section 1.1.1 of *Effective State Programs*.

As noted above, states engage in numerous activities to provide assistance to floodprone communities, whether or not NFIP requirements are involved. For those activities integral to the NFIP, however, the state and the FEMA Regional Office typically divide the duties pertaining to localities for 12 key functions:

- General technical assistance
- Engineering assistance
- Planning assistance
- Outreach on the NFIP
- Ordinance review

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Table 3. Level of National Flood Insurance Program participation, by state.

State	Percentage of state's floodprone communities participating in the National Flood Insurance Program	Percentage of state's NFIP communities in the Community Rating System
AZ	100	50
CT	100	4
DC	100	0
HI	100	25
OR	100	10
PR	100	0
RI	100	15
IL	99	3
NJ	99	10
VT	99	1
NY	98	2
WA	98	8
WV	97	1
FL	96	49
ID	96	10
MD	96	5
PA	96	1
CA	95	10
DE	95	10
NC	95	16
ND	95	0
NH	95	1
SD	95	1
VA	95	6
MA	94	3
NV	94	23
AR	93	5
OH	93	2
IN	90	3
KY	90	10
LA	90	12
NE	90	1
SC	90	40
MO	88	1
MS	88	6
MN	80	1
OK	80	3
TN	80	1
WI	80	2
TX	79	4
WY	76	4
MI	75	1
MT	75	10
NM	75	12
UT	75	7
AL	73	4
KS	72	4
CO	70	25
GA	63	5
AK	42	8

- Community assistance visits
- Community assistance contacts
- NFIP workshops
- Flood insurance-related assistance
- Submit-for-rate applications
- Pre-disaster mitigation assistance
- Repetitive loss activities.

Of these, planning assistance, outreach, ordinance review, NFIP workshops, help on pre-disaster mitigation, community assistance visits, community assistance contacts, and general technical assistance are more likely to be provided by states. Submit-for-rate insurance applications, and insurance-related activities are more likely to be handled by the Regional Office staff. The states and the Regional Offices tend to split the engineering assistance and repetitive loss activities fairly evenly. More details are displayed in Table A20 in the Appendix.

Under the Community Assistance Program agreements that all states have with FEMA, funds are provided to the states to conduct certain NFIP-related activities. Which activities are done with CAP funds and which with state funds varies from state to state. CAP funds are used by

- **50 states** to conduct **workshops** for communities;
- **50 states** to conduct general **outreach** activities about the NFIP;
- **49 states** to **review local flood ordinances**;
- **49 states** to conduct community assistance visits (**CAVs**);
- **47 states** to conduct community assistance contacts **(CACs**);
- **45 states** to participate in **coordination meetings** between the state and the FEMA Regional Office ;
- **45 states** to maintain a **list of the local floodplain management administrators** in the state (up from 39 in 1995);
- **44 states** to maintain or update the computerized **Community Information System** established by FEMA;
- **39 states** to provide assistance on the **Community Rating System**;
- **30 states** to provide general **technical assistance**; and
- **21 states** to provide flood **map assistance.**

States also perform other tasks under the CAP that help local floodplain management, including providing technical assistance and guidance after flood disasters; allowing state staff to participate in activities of the state- and national-level professional associations for floodplain management; have an active role in directing flood mitigation projects in the state; educate state policymakers about the importance of floodplain management; make special outreach efforts toward tribes; and produce publications, among others. More detail is shown in Table A21 in the Appendix.

Monitoring

States strive for a certain level of contact with each floodprone community within their jurisdictions, on a regular basis, as much as possible. This is the best way to be sure that questions get answered, technical assistance is given, and problems are resolved before they become serious. Whether this is called "monitoring" or some other term is used, states spend a good deal of time making contact with communities, as noted above. Although site visits are the best way of finding out whether the community is managing its floodplain successfully, staff limits and budgetary considerations make it impossible for states to visit every community frequently. Therefore, states use a combination of techniques for keeping track of activity within their communities:

- All states make actual visits to the community;
- 40 states use telephone contact;
- 38 states respond to complaints;
- 20 states consider the number and type of submit-to-rate requests from a community;
- 15 states review information drawn from the NFIP biennial report; and
- 9 states use mail surveys.

In addition,

- Alaska reviews the Corps of Engineers Public Notices of Applications for Permits;
- Pennsylvania looks at its own annual reports mandated by its Floodplain Management Act; and
- Virginia reviews the documentation provided through its state joint permit application process.

Most state respondents indicated that a community visit every two, three, or five years would be a reasonable rate for monitoring community floodplain management—more frequently if there is a history of floodplain management problems or development pressure and less frequently if the community is not growing much.

On average, however, states actually conduct monitoring contacts of their communities about every seven years. Insufficient numbers of personnel and limited budgets are the reasons states in general cannot be in closer or more frequent contact with communities. Several states noted that in a perfect world local programs would not need state monitoring, but all recognized the importance of this activity today.

Because state staff must be selective about which communities receive attention in any given year, they have developed methods for setting priorities for scheduling community visits. The most compelling reason for scheduling a visit occurs when state staff have had telephone contact with the community official and believe a visit is warranted for one reason or another. Forty states use this criterion. Localities with significant development activity are more likely to be visited than those without it (37 states use this criterion). Often communities request a visit by state staff, to examine a site, participate in a meeting, or engage in other assistance or give advice (36 states reported scheduling a visit in response to such requests). Sometimes complaints about activity in floodprone areas are received by the state, and that frequently occasions a visit (34 states report responding to complaints in this way if necessary). About half the states follow

FEMA guidelines in deciding which communities to visit, and 15 states use submission of submit-to-rate applications as a trigger for a visit. Other ways to set priorities include

- Mississippi gives priority for community visits to those with declared federal disasters;
- New York, Vermont, and Wyoming consider the length of time that has passed since the last visit;
- Communities indicating an interest in the Community Rating System get a higher priority on the site visit list in Oklahoma;
- Illinois maintains a 5-year cycle for visiting all floodprone communities;
- Louisiana visits communities with new local floodplain administrators first;
- Georgia takes into consideration population growth of the community and increases in building permits issued there when deciding which communities to contact;
- Ohio has begun a routine of conducting a visit to a community after it has been flooded; the state also tries to schedule visits with communities doing projects with funding from the Hazard Mitigation Grant Program or Flood Mitigation Assistance program.

More details are displayed in Table A22 and Table A23 in the Appendix.

Enforcement

Although most localities administer their floodplain management programs effectively, problems do arise. When violations of the local ordinance are suspected, or when it becomes evident that communities are not adequately resolving technical and administrative deficiencies in the management of their floodplains, states try to take action to get the situation remedied. An overview of this enforcement function is provided in section 1.3.3 of *Effective State Programs*. The first step in virtually every state is to provide additional technical assistance to the community to help it resolve its difficulties. This can include many telephone calls, letters, meetings among various local and agency personnel and private parties, providing advice about the compliance methods available to the community itself and about the sanctions that can be imposed on the community by the state and/or the federal government, helping find ways to mitigate the violations, and others. During this phase, some states take a fairly active and directive role, others act as coordinators, while some refer the situation to FEMA and participate in a supportive role thereafter.

If technical assistance and consultation do not meet with success, sanctions can be applied to the community or to property owners and developers, depending on the situation. Some states have direct authority to apply enforcement mechanisms themselves (separate from enforcement of state regulations and permit conditions) or ask a court to order a remedy. FEMA can put a community on probation (which adds a surcharge to the flood insurance premium payments for residents of the community) or eventually suspend the community from the NFIP (at which point all the residents lose eligibility to purchase or renew flood insurance, as well as federal individual assistance after a federally declared disaster).

Twenty-five states have a law that gives them oversight or monitoring responsibility for floodplain management. This responsibility varies from state to state—in some, it applies only to certain areas, such as permitting authority for the floodway or unincorporated areas; in others

responsibility is assigned to a state agency, but no mechanism for legal enforcement is provided. Ten states actually have the legal authority to overrule a local floodplain management decision.

- Illinois and Indiana have legal authority to enforce any floodway violations.
- Maryland can enforce its floodplain permits with court orders for compliance with the conditions of the permit or restoring the floodplain, including removal of a structure.
- Michigan's law provides for civil and criminal misdemeanor penalties, although the state does not actively pursue these as a rule.
- Ohio can withhold state disaster assistance from communities with program deficiencies or violations.
- Puerto Rico can issue a cease and desist order to stop a project in violation of floodplain regulations.
- Wisconsin's law provides for issuing injunctions, taking remedial action, and assessing monetary damages for violations in the floodplain.

When NFIP violations are discovered in the course of visiting or contacting a community, two-thirds of the states (37) consider it the joint responsibility of FEMA and state to do followup work to remedy the violations—usually the state does the initial followup, calling on FEMA in later stages if necessary. Twelve states take this followup responsibility on themselves, and seven states say it lies with FEMA alone. Some states without any enforcement authority of their own prefer that FEMA take the lead.

Half the states consider the support they receive from FEMA during enforcement actions appropriate; half the states believe that they get the FEMA support they need only "sometimes." Some states perceive a reluctance by FEMA to actually impose federal sanctions (probation and suspension), thus depriving them of their effectiveness. Some states perceive FEMA's response to state requests for probation action as proceeding too slowly, and duplicating too much of the effort the state has already expended. Some states commented that there are not enough FEMA Regional Staff to handle the enforcement actions adequately. More details are shown in Table A24 in the Appendix.

Natural Resources of Floodplains

Although at one time most state and local floodplain management programs were designed and operated mainly to protect property and public health and safety, today it is recognized that a more holistic approach is recognized as being most effective, because human activity and natural processes are intertwined within every watershed. Today state floodplain management programs recognize that the natural floodplain functions and resources throughout the state need to be respected. They know that protecting and restoring floodplains will not only reduce flood damage, but also contribute to a community's social and economic well-being. Significant floodplain resources and functions are listed in Part 4 of *Effective State Programs*.

Functions and Resources Addressed

If protected from too much human alteration, floodplain lands perform their natural function, to store and convey floodwaters, and also reduce flow velocities and flood peaks. Beyond this they also have crucial roles in maintaining biodiversity and ecosystem integrity: they filter nutrients and impurities, process organic wastes, moderate water temperature fluctuations, absorb coastal wave energy, reduce sedimentation, and promote infiltration and aquifer recharge. Even more visible human benefits are the open space, aesthetic pleasure, wildlife habitat, plant growth, and recreational opportunities floodplains provide. Periodic flooding also is responsible for the continued fertility of agricultural lands.

Many of these resources are managed or preserved through state programs of various kinds. For every floodplain resource listed below, roughly two-thirds of the states have programs that give it special attention (with the exception of estuaries and dunes, which are not found in all states). Ohio's Greenways Program, for example, is a multi-objective initiative that operates to enhance several of the floodplain resources noted. Ohio's program to protect "prime agricultural land" also protects floodplains.

- Wetlands
- Aquatic habitat
- Estuaries
- Dunes
- Riparian areas
- Open space
- Water access
- Recreation.

More details can be found in Table A25 in the Appendix.

State and Local Activities

States and localities engage in many types of resource protection projects and programs. These activities take many forms, from providing technical assistance about floodplain management to full-scale funding and implementation. Many are carried out in cooperation with other public and private entities. The most effective state and local techniques for resource protection are described in section 4.1 of *Effective State Programs*.

Growth Management and Multi-objective Management

The goal of reducing future flood damage fits in well with the goals of growth management and sustainable development and redevelopment—strategies to encourage planned growth in ways that minimize costs and adverse impacts. Sustainable development maintains or enhances economic opportunity and community well-being while respecting, protecting, and restoring the natural environment upon which people and economies depend. Making efficient use of flood-prone and environmentally sensitive lands can be readily integrated into larger, often region-wide, efforts to improve economic conditions, maintain environmental quality, manage growth, and handle other issues of importance to local residents. Preservation of floodplains, wetlands, and coastal areas can be emphasized, along with low-impact recreational uses such as greenways, hiking-biking paths, parks and wetlands, or forestry conservation. State programs use these techniques themselves, and authorize and encourage communities to do so, through a range of planning and regulatory tools.

Some states use a formal growth management policy to protect floodplain resources and/or minimize floodplain development.

- **17 states have growth management policies** (up from 15 in 1995);
- In 31 states, localities have the authority to institute growth management policies on their own, either because the state has specifically authorized them to do so, or because the state's constitution does not require formal delegation of such authority.

Multi-objective management of watersheds or river corridors is another process by which the functions, resources, and benefits of rivers and streams are managed as whole systems.

- **31 states encourage the use of multi-objective management for rivers**, watersheds, coastal areas, or similar features.
- 30 states say that the state or its localities use multi-objective planning that includes floodplain management or floodplain resource protection (down from 32 states in 1995).

Multi-objective watershed management also is supported by federal agencies including the U.S. Environmental Protection Agency, the Federal Emergency Management Agency, and the National Park Service.

Some recent (and ongoing) multi-objective management projects are listed below.

- The proposed development of the Anacostia Waterfront in the District of Columbia encompasses multi-objective planning elements for protection of the Anacostia River watershed.
- The Colorado Water Conservation Board began in 1998 a program to conduct multi-objective stream planning.
- Florida's Growth Management Law is based upon a multi-objective planning approach.
- A multi-objective planning and management program for the Lake Superior shorelines is administered by the Northshore Management Board in Minnesota.
- Virginia has developed strategies for all major watersheds that address management of pollutants, riparian resources, best management practices for agricultural operations,

stormwater controls, erosion and sediment control, coastal zone enhancement, and preservation.

More details are displayed in Table A26 in the Appendix.

Non-regulatory Programs and Projects

States use non-regulatory programs to protect the natural resources and functions of floodplains.

- Public information programs about the natural resources of floodplains are used by 36 states (up from 10 in 1995);
- Habitat preservation is used by 32 states;
- Watershed councils to help plan for and protect resources are employed by 30 states;
- Preservation of floodplain open space is done by 27 states; and
- Easements are used in 25 states.

More information is shown in Table A27 in the Appendix.

Regulatory Approaches

Virtually all states use regulatory approaches to manage some natural resources and functions that also affect floodplains, such as

- **Water quality standards: 36 states**;
- **Regulations to protect watersheds** or sensitive areas: **18 states**;
- **Coastal erosion areas** are protected by regulation in **15 states**; and
- **Setbacks**:
  - from **wetlands: 13 states**;
  - from **greenbelts and riparian zones: 11 states**; and
  - from **floodplains: 5 states**.
  - In addition, 23 states have enabling legislation that allows localities to establish riparian setbacks.

Other setback regulations include

- Alabama's Coastal Construction Line, behind which all structures must be placed;
- Delaware's required building setback from sand dunes;
- Maine's Shoreland Zoning Ordinance, which establishes varying setback standards around all water bodies; and
- Setbacks from sensitive areas that have been established by many Ohio communities.

Nineteen states' governors have issued executive orders to protect wetlands, a substantial increase from the five states that had such orders in effect in 1995. Regulatory measures to protect floodplain resources are shown in Table 4.

Whether the state exerts directly regulatory control over a floodplain resource or directs the localities to do so, absolute protection is not guaranteed by the presence of regulations. Twenty state respondents reported that exemptions to the local regulatory authority are resulting in some loss of or degradation to floodplain resources (see Table A28 in the Appendix).

Coordination and Cooperation

Most of the regulatory programs to protect resources are not under the purview of the state floodplain management office. The state office does, however, have a difficult and important role to play in maintaining continuous coordination—both formal and informal—with the regulatory programs that are housed in different state agencies (often with additional layers of federal and local participation and oversight). For example, state wetlands management programs are usually in a department for natural resources or environmental quality, but in some states they are under a water commission or an agency for marine resources. State programs to protect rare and endangered species are found in departments for environmental conservation or quality, under the fish and wildlife department, within a biological survey at a state university, in parks and recreation, or even under a department for economic and community development. This situation makes intrastate coordination vital to make sure that their activities, policies, and regulations are compatible with floodplain management. In some states, this coordination takes the form of mutual review of permits, proposed actions, and other documents; in others, floodplain management personnel contact or are contacted by other state personnel on an *ad hoc* basis when a specific resource is involved or a concern is raised. Coastal zone management programs appear to have the highest level of coordination with floodplain management programs, followed by wetlands protection, shoreland management, and soil erosion. More details are displayed in Table A29 in the Appendix.

Federal activities and policies also can affect floodplain resources within a state. As noted above, state floodplain management programs cooperate and coordinate with federal agencies with resource-related activities, such as the National Park Service, Natural Resources Conservation Service, Fish and Wildlife Service, and others. Unfortunately, that cooperation does not always work both ways. Seventeen states (up from 10 in 1995) report that some federal activities are contributing to the loss of certain floodplain resources, or even that the federal entities involved seem to ignore state standards (refer again to Table A28 in the Appendix).

Incentives for Preservation of Floodplains

Floodplain functions and resources are preserved when land is left undeveloped. Some state and/or local tax codes have provisions whereby property owners pay reduced property or income taxes if their land is kept as open space or donated for public use. Such tax relief is available in 12 states (up from 9 in 1995): California, Connecticut, Florida, Georgia, Illinois, Louisiana, Maryland, Michigan, New Mexico, North Carolina, South Carolina, and Virginia. No state reported that reduced inheritance taxes are offered as an incentive for preserving land.

Table 4. State regulatory approaches to protecting floodplain resources and functions.

State	Water quality standards required by regulation	Sensitive areas/ watershed protection required by regulation	Coastal erosion protection required by regulation	Setbacks from wetlands	Setbacks from greenbelt/ riparian zones	Open space preservation required by regulation	Setbacks from floodplains
AK							
AL							
AR				X	X		
AZ						X	
CA	X	X					
CO							
CT	X	X					
DC	X					X	
DE	X		X				
FL	X	X	X	X	X		
GA	X		X				X
HI			X			X	
ID							
IL	X	X					
IN	X						
KS	X			X	X		
KY	X	X					
LA	X						
MA							
MD	X	X		X	X	X	X
ME	X					X	
MI	X		X		X		
MN	X	X	X	X	X	X	
MO	X					X	
MS	X						
MT	X					X	
NC	X	X	X		X		
ND							
NE	X						
NH							
NJ	X	X		X			
NM	X	X		X		X	X
NV	X						
NY	X		X	X			
OH	X	X	X				
OK							
OR	X	X	X	X	X		
PA	X	X					
PR	X	X	X	X	X		X
RI	X	X	X	X	X	X	X
SC	X		X				
SD							
TN							
TX	X		X				
UT							
VA	X	X		X	X		
VT	X			X			
WA	X	X					
WI	X		X				
WV							
WY	X	X					
Total	**36**	**18**	**15**	**13**	**11**	**10**	**5**

In several states there are other kinds of incentives that operate to protect floodplain lands and functions. Most of these are funding mechanisms designed to make it more financially attractive to localities to include preservation, open space, recreation, and other compatible floodplain uses in their development, redevelopment, mitigation, and capital improvement projects.

- In Illinois, preserving forest lands or wildlife habitat can qualify a landowner for tax breaks, although the provisions are not specifically directed towards floodplains.
- The state of Washington offers funding incentives for local capital improvements projects that meet certain natural resource regulatory criteria.
- West Virginia's farmland preservation legislation authorizes counties to bank open space, which often is floodplain land.
- Pennsylvania provides grants and technical assistance to make it easier for localities to protect floodplain resources.

Details are displayed in Table A30 in the Appendix.

Flood Mitigation and Recovery

Mitigation Programs

Ideally, state floodplain management includes a program to provide technical assistance and financial support for local mitigation planning and projects to reduce the costs of flooding over the long term. The significance of mitigation to floodplain management is outlined in Part 6 of *Effective State Programs*. In practice, flood mitigation plans and projects often are intertwined with recovery from a flood, because state hazard mitigation teams are active then, federal financial assistance is available to implement projects, and public interest in avoiding a repeat of the disaster is high.

- **19 state governors have issued executive orders on hazard mitigation**, setting policies for the state's handling of mitigation activities (up from 4 states in 1995).

Mitigation Planning

Making plans for mitigation projects and programs must take place at both state and local levels. For state-level mitigation planning:

- **34 states conduct state-level planning** themselves;
- 18 states use a combination of state expertise and private consultants; and
- 1 state (Delaware) relies on private consultants to prepare such plans.

For local mitigation planning:

- 44 states use a combination of state, local, and private parties;
- In 4 states (Idaho, Montana, Nevada, and South Carolina) the local mitigation planning is done by the localities themselves;
- 2 states (the District of Columbia and Hawaii) reported that the "state" does all the local mitigation planning; and
- 1 state (Utah) reported that local planning is done mainly by private consultants.

The prospect of obtaining local mitigation grants from the federal government, contingent in part upon a locality's having a hazard mitigation plan in place, has provided a new incentive for mitigation planning. States were asked what, if anything, they were doing to encourage localities to prepare all-hazard mitigation plans.

- 35 states reported various types of activities by which all-hazard mitigation plans for localities were already in place or in process.
  - In Arkansas, local all-hazard plans are done through the state's Department of Emergency Management in coordination with the Soil and Water Conservation Commission, which houses the floodplain management program.
  - In Connecticut, the state works through regional planning agencies to develop all-hazard plans that the communities then adopt.
  - Maryland's floodplain management program has prepared and presented to all counties a planning element on flooding to be incorporated into local all-hazard plans.

- Rhode Island has been incorporating floodplain management into local hazard mitigation plans since 1995. Communities are required to write their plans in a format that yields the maximum NFIP Community Rating System points. The state's policy is that no community is eligible for pre-disaster funds until the plan is done.
- Tennessee has made a concentrated effort to conduct training and outreach on all-hazard mitigation plans. All local plans must be reviewed by the state.

- 11 state respondents indicated that no specific strategy had been developed for the state or, if it had, the floodplain management program was not centrally involved in it. Some stated merely that the state emergency services staff was handling multi-hazard mitigation planning.

Mitigation Projects

State support for local mitigation initiatives can be provided either directly or as part of the non-federal cost share for federal grants.

- **15 states have a dedicated state fund for mitigation**. These funds come from a number of sources.
  - Arizona has a Governor's Emergency Fund of $4 million annually, from which a panel of state agency and state legislative representatives make decisions about disbursements.
  - Missouri has allocated $ 100,000 of general revenue for the non-federal match for FMA projects.
  - Virginia collects a 1% surcharge on flood insurance policies and places it in the state's Flood Prevention and Protection Assistance Fund.
  - Washington's Flood Control Assistance Account Program is a separate account funded by the state at $4 million every two years.
- In 22 states the floodplain management program is closely involved with the review of applications for projects to be supported through the state's mitigation fund.
- In 21 states the role of the floodplain management program is limited. Often these funds are disbursed through the state's emergency management agency, which, as noted above, is not the agency that houses the flood programs in most states.
- In 7 states, the flood program is not involved in decisions about mitigation funding.

Details are displayed in Table A31 in the Appendix.

Mitigation Coordination

In view of the fact that much mitigation planning and other work goes on in state offices outside the floodplain management program, coordination at the state level—and between the state and local levels—is essential.

- **30 state respondents reported "extensive" coordination** taking place **between the state floodplain management** office **and the state hazard mitigation** officer.
- 19 states reported "some" coordination; and

- 4 states (Idaho, Maryland, Maine, and Vermont) said coordination between the two is minimal or non-existent.

Thirty-five states have a formal hazard mitigation council or similar coordinating body. Of these, 12 were established by governor's executive order, five by legislation, and the rest by some other means—either an administrative measure, or voluntary cooperation. A few states indicated that their coordinating bodies had been established pursuant to flood disasters some years ago but had fallen from visibility as the urgency of recovery faded and administrations changed.

For coordination of flood hazard mitigation planning in particular, 15 states report that they have mandatory provisions for such coordination; 34 states said it took place only voluntarily. Alabama, Connecticut, and West Virginia indicated that legislation and/or formal procedures are pending to establish channels of coordination.

- Ohio does much of its flood mitigation planning coordination informally with divisions of the Department of Natural Resources (parks, forestry, etc.) and also during post-flood periods through the state hazard mitigation team.
- In the District of Columbia, coordination routinely takes place among such agencies as the Water and Sewer Authority, the Department of Transportation, and the Office of Planning.
- Mississippi relies, in part, on its state association of floodplain managers to facilitate coordination.
- Minnesota's interagency group, "Minnesota Recovers," has been successfully coordinating flood mitigation efforts since the Red River of the North flood in 1997.
- Massachusetts has recently established a Commonwealth Development Council to coordinate state environmental and development functions, including flood mitigation planning.

More detail is shown in Table A32 in the Appendix.

Administration of Federal Mitigation Programs

In addition to their own state programs for flood mitigation, all states play some role in administering two FEMA mitigation programs: the Hazard Mitigation Grant Program and the Flood Mitigation Assistance program. Both of these programs are designed to funnel federal funds into the state and its localities in furtherance of activities that will reduce future flood losses. The programs authorize cost-shared funding support for specifically identified types of projects. Eligible projects must solve a hazard/risk problem, be cost effective, conform with environmental regulations, meet all applicable codes and standards, and be supported by state and local mitigation plans. State floodplain management offices play varying roles in the handling of these funds; in some states the primary administration is done through an agency separate from floodplain management; in some states FMA is handled in one agency and HMGP in another.

- **27 state** floodplain management agencies **administer the FMA**.
- **23** of those that do not administer it say that they nevertheless do **have input** into decisions about FMA projects in their states.

- **16 state** floodplain management agencies **administer the HMGP**, but **31** of the others consider themselves to **have input** into decisions about the program within the state.

State floodplain management offices perform similar functions for both the HMGP and FMA, and with about the same frequency, although in general slightly more states participate in the FMA processes than in HMGP. Well over two-thirds of the state floodplain management offices review project applications to both the HMGP and the FMA. Almost as many prioritize the list of projects, and help in plan development, again for both programs. For the HMGP, slightly less than half the state floodplain management offices actually select the projects to be funded; for the FMA, more than half do so. Outreach efforts for the FMA are a task for over half the states, but for only about one-third for the HMGP. Doing final project inspections, conducting environmental review for proposed projects, and performing benefit/cost analyses are the three activities least-frequently undertaken by state floodplain management offices, for both the HMGP and the FMA.

Details are displayed in Tables A33 and A34 in the Appendix.

It should be noted that FEMA's new Pre-Disaster Mitigation Program (funded at $150 million for fiscal years 2003 and 2004) will provide another source of support for state and local efforts in the future.

Dam Safety

State programs to ensure the safety of public and private dams arise from the extraordinary public safety risks posed by unsafe dams, the often-false sense of security that arises from the presence of an upstream dam (no matter its function), and the tendency of localities and private landowners to want to develop the area that seems protected but in reality could be inundated if the dam fails or is breached.

State programs can include a variety of functions to ensure the safety of dams, including regulating their construction (including modifications and removals), inspection, maintenance, operation, and emergency planning; taking appropriate action to protect life and property if the dam owner fails to do so (including dam removal); or regulating (or requiring local regulation of) the dam failure area. States also coordinate with the U.S. Army Corps of Engineers, the Federal Energy Regulatory Commission, and FEMA for other dam safety matters, including maintaining the National Dam Inventory.

All but two states (Alabama and Delaware) and the District of Columbia have state dam safety programs. In general, there is a high level of contact between state floodplain management programs and state dam safety programs:

- **24 state floodplain management programs engage in "ongoing" or "frequent" coordination with dam safety**; and
- 18 more occasionally coordinate with the state dam safety program (see Table A7).
- In 25 states there are regulations requiring dam failure warning response systems and plans.

Table 5 shows the aspects of state dam safety programs that closely affect floodplain management.

- **In 39 states, the dam-break inundation zones are delineated** by the state dam safety program,

- In 25 of those states the information is shared with the floodplain management program.
- In 14 states the dam break inundation zones are delineated on local maps.

- **4 states** (Hawaii, Kentucky, New Mexico, and Wisconsin) require their localities to **regulate the occupance of the dam inundation zone**;
  - 9 states have no such requirement but report that some localities do so voluntarily.

Some communities use warning systems and emergency action plans to ensure public safety in the inundation zone; some communities in Minnesota require elevation of buildings in that zone.

Levee Safety

Many levees and floodwalls have been constructed to provide protection against only low-level and frequent flooding, yet occupants in the protected area may not fully understand the likelihood of overtopping and inundation. This is particularly true where small levees that were built many years ago to reduce the frequency of damage to agricultural areas are now inaccurately perceived to protect encroaching development, leading to a false sense of security. States have taken special steps to help ensure that existing levees are safe and that future levees are built with a level of protection that is reasonable for the circumstances. Table 6 shows state actions with regard to levees. State regulation of levee construction has been growing steadily through the years. Today,

- **29 states directly regulate levee construction** through permit programs (up from 22 with levee construction regulations in 1995, 17 states in 1992, and 13 in 1988).
- In 14 of those states, the permitting authority lies within the same parent department or agency as the floodplain management program, though not necessarily within the same subdivision.

Engineering of Levees

Responsibility for the review and approval of the engineering of levees is spread among varying authorities. In 21 states the state has final engineering approval; in 13 of these states the engineering is reviewed or approved within the same department as floodplain management—sometimes by the floodplain management program itself. In 13 other states, the Corps is responsible for approving the engineering, sometimes in conjunction with the state or a local entity. Eight states leave the engineering review to the localities, often with advice from the state or a federal agency; and two say the engineering is the responsibility of the designer or owner of the levee.

Table 5. State dam safety programs.

State	State Dam Safety Program	Program identifies dam-break inundation zones	Inundation zone information is shared with floodplain management program	Inundation zones delineated on local maps	Communities required to regulate occupance of inundation zone	Communities voluntarily regulate occupance of inundation zone
AK	X	X				
AL						
AR	X	X	X	X		
AZ	X	X	X	X		
CA	X	X	X	X		
CO	X	X				
CT	X	X	X			
DC						
DE						
FL	X	X	X			
GA	X					
HI	X	X	X	X	X	
ID	X	X	X			
IL	X	X	X	X		
IN	X	X	X			
KS	X					X
KY	X	X	X		X	
LA	X					
MA	X					
MD	X	X	X			X
ME	X	X		X		
MI	X	X		X		
MN	X	X	X			X
MO	X					
MS	X	X	X	X		
MT	X	X				
NC	X					
ND	X					
NE	X	X	X			
NH	X	X	X			
NJ	X	X	X			
NM	X	X	X	X	X	
NV	X	X	X	X		X
NY	X	X	X			
OH	X	X				
OK	X	X				
OR	X	X	X			X
PA	X	X		X		X
PR	X	X				
RI	X					
SC	X	X				
SD	X	X				
TN	X					
TX	X	X				X
UT	X	X	X			
VA	X	X				
VT	X	X	X			
WA	X	X	X	X		X
WI	X	X	X	X	X	
WV	X	X				
WY	X	X	X	X		X
total	**48**	**39**	**25**	**14**	**4**	**9**

Table 6. State levee policies.

	State issues permit for levee construction	Levee allowed to raise flood heights on other property	Regulations for levee maintenance/ failure emergency response	Levee operation and maintenance plan required	Emergency action plan for the levee required	Residual risk behind levee must be delineated on floodplain map
AK	X					
AL				X	X	
AR						
AZ	X		X	X		
CA	X		X	X	X	X
CO		X		X		X
CT	X	X		X	X	X
DC						
DE	X	X				X
FL	X			X	X	
GA						
HI	X	X	X	X	X	X
ID		X				
IL	X			X		X
IN	X			X		
KS	X	X	X	X	X	
KY	X					X
LA	X			X		X
MA	X					
MD	X		X	X		
ME	X			X	X	
MI	X	X				X
MN	X		X	X	X	X
MO		X				
MS	X		X	X	X	
MT				X	X	X
NC			X	X	X	X
ND	X	X		X		
NE		X				
NH						
NJ	X					X
NM						
NV	X					
NY				X	X	
OH	X	X	X	X	X	
OK						
OR	X		X			X
PA	X	X	X	X		
PR	X		X	X	X	
RI	X					X
SC		X				
SD	X					
TN		X				
TX		X		X		
UT						
VA	X			X	X	
VT						
WA				X	X	
WI	X	X	X	X	X	X
WV		X				
WY	X					X
total	**29**	**17**	**13**	**26**	**17**	**17**

Impact of Levees on other Property

Seventeen states report that levees are allowed even if they raise flood heights on other properties. However, restrictions are imposed in the height of levees and the amount of freeboard that is required, sometimes depending on the intended use of the levee.

- Arizona limits levees to a height of 25 feet and requires 3 feet of freeboard.
- California regulates to FEMA's minimum levee standards and "sound engineering principles."
- In Florida, levee heights are set individually, based upon maximum water levels and freeboard is based on wind action and highest sustained wind gust.
- Hawaii and Minnesota have no restriction on the height of levees, but apply a 3-foot freeboard requirement.
- Levees in urbanized, developed areas of Texas must have 3 feet of freeboard above the 100-year flood elevation; in agricultural areas, 2 feet of freeboard is required.
- In Kansas, a levee protecting up to the 10-year flood must have freeboard of 1 foot; the 25-year flood requires 2 feet of freeboard; and levees protecting to the 50-year or more flood must have 3 feet.

Maintenance of Levees

Twenty-six states require an operation and maintenance plan as a condition of obtaining a state permit to construct a levee. In five of those states, an inspection report is required annually; four states require inspections on an "as needed" basis. Five states go by the Corps' standards for frequency of inspection. One state inspects every two years, and Connecticut has different standards depending on the hazard classification of the levee. High hazard levees are inspected every two years; significant hazard, every five years.

An **emergency action plan is required for levees in 17 states**; four states (Colorado, Connecticut, Maine, and Mississippi) require that the emergency procedures be tested annually. Hawaii requires a biennial test. Four states go by the Corps' requirements for testing, and in three states the frequency of the testing varies.

Only Puerto Rico, which requires stormwater management in areas behind levees, and California, whose Reclamation Board has certain requirements, impose regulations beyond those required by the NFIP or the Corps for the lands protected by levees.

Information Provision

Citizens, property owners, the private sector, public officials, and various government agencies should have ready access to information about the location of flood hazards within a state, the associated risks, and how to incorporate that information into decisions. The better informed everyone is about risks, the more likely it is that they will make sound decisions based on that knowledge—including how to act in face of an imminent threat, whether and how to develop property, how to manage post-disaster reconstruction, and how to make sound purchases of land and homes.

States have numerous informational tools at their disposal for keeping the public and flood professionals advised about floodplain management. Compared to seven years ago, people have at their fingertips, via the internet, large amounts of information, including flood maps, stream gage readings and records, forecasts, and other technical information. Some tools for informing the public are most effective if required by state statute or regulation, such as disclosure during property transactions, recording flood history on property deeds, and continuing education for professionals. A discussion of the importance of public awareness and educational efforts to floodplain management can be found in Part 8 of *Effective State Programs*.

Public Awareness

Flood Forecasting and Warning

In 41 states there are state or local flood warning systems in place; 11 states have regulations that require such systems in certain situations. Details are displayed in Table A35 in the Appendix.

- The City and Borough of Juneau, Alaska, has a warning system downstream of a high hazard dam.
- The City of Valdez, Alaska, has a tsunami warning system.
- The Alabama Power Company maintains an extensive network of warning systems on rivers it controls.
- Many Kentucky communities have implemented sirens and ring-down systems for impending flooding.
- Connecticut has a statewide flood warning system of 10 interconnected local basin systems; the state maintains the entire network.
- Communities in Washington have a variety of techniques, including NOAA WeatherRadios, automated telephone systems, sirens, upland gages, and flood warnings incorporated with other hazard warnings such as volcano eruption and tsunami.
- The Virginia Department of Emergency Management works with the National Weather Service to manage the Integrated Flood Observing and Warning System (IFLOWS), which is also used by several local governments in the Roanoke, New, and Shenandoah River watersheds.

Operational stream gaging networks are vital to the prediction of flooding.

- **39 states contribute funds to the U.S. Geological Survey's nationwide stream gaging** program.
- 19 states have a stream gaging operation separate from the USGS system.
  - □ Of these, 17 states install and maintain gages, including updating the rating curves;
  - □ 13 collect gage data, regardless of who owns the gage;
  - □ 7 require gages as part of permit requirements; and 5 provide funds to gage networks owned by other entities.
  - □ 15 of the state gaging programs either fund or provide flood data.
- Stream gage information is available online in 23 states.
  - □ 16 states make stream gage information available in response to telephone requests;
  - □ 15 states provide it in response to requests by mail; and
  - □ 10 to walk-in inquirers.
  - □ Some states make the data available in all four ways.

More detail is shown in Table A36 in the Appendix.

Awareness Initiatives

Keeping flood risk and floodplain resources constantly on the minds of people within the state, whether they be residents, state or local policy makers, community staff, state personnel, students, or others, is one goal shared by all state floodplain management programs. Some of the specific goals of awareness efforts are described in Part 7 and section 8.7 of *Effective State Programs*. There are several ways of spreading floodplain awareness and ensuring that it stays keen.

Newsletters

Newsletters are one means by which floodplain management information can be communicated.

- **35 states have statewide newsletters** (up from 29 in 1995).
- 24 state newsletters are primarily about floodplain management.
- 22 state newsletters are published directly by the state floodplain management office. In other states there is a floodplain management column or section in a newsletter with a broader focus, or the newsletter is published as a joint endeavor with another natural resources program or agency.
- 31 are printed in hard copy format.
- 23 states post the newsletter on an agency website.
- 18 are issued electronically (note that some are distributed in both formats).

About half of the floodplain management-related newsletters are published quarterly, and the rest two or three times a year. The newsletters are distributed to local officials within the state (local floodplain managers, emergency management personnel, elected officials, CEOs, county

commissioners, engineers, and planners), to state and federal agencies, to private engineering, environmental, or other consulting firms, and to other interested floodplain management professionals, such as members of the state's association. Some states distribute their floodplain management newsletters to insurance agents, lenders, appraisers, public interest groups, and others. The number of issues distributed varies from state to state, from a few hundred issues to a few thousand; the total readership nationwide of these state-level floodplain management newsletters is about 28,000 people.

More detail is displayed in Table A37 in the Appendix.

Websites

State websites with floodplain management information are produced by 39 states. Some of these function as databases, listing the floodplain administrator in each community, and how he or she can be contacted, or keeping track of community assistance information or repetitive loss properties. Some have general information about flood hazards in the state and what is being done about them, and some have a mixture of types of information.

- West Virginia's website includes a catalog of information about localities, including contact persons, type of ordinance, date of Flood Insurance Study, building permit numbers, and other information. See http://www.state.wv.us/wvoes.
- Maine's website opens with an overview of flooding within the state, including photographs, and continues with descriptions of various components of the state's approach to coping with flooding. Relevant publications are online, including the state's floodplain management handbook. See http://www.state.me.us/spo/flood.
- Colorado's website displays recent activities and projects, ongoing flood protection programs, information about flood insurance and floodplain mapping, flood outlooks for the state, press releases, and much more. See http://www.cwcb.state.co.us.

More details and web addresses are displayed in Table A38 in the Appendix.

Public Disclosure and Outreach

Twenty-seven states require that the flood hazard be disclosed to potential buyers of property, but only 16 states say that the disclosure is implemented. Two states have no statewide requirement for such disclosure, but believe it routinely takes place nevertheless.

Twenty-one states have required outreach or public awareness programs, but only in only five states is the requirement implemented. One state (New Mexico) carries out an outreach program even though there is no statewide requirement for it. Details are shown in Table A39 in the Appendix. Some preferred methods by which states can achieve adequate public disclosure of flood risk are described in section 7.2 of *Effective State Programs*.

Professional Development of Floodplain Managers

One of the ways in which states contribute to the growth and influence of floodplain management is by undertaking activities that contribute to the level of professionalism in the field. Three ways of doing this are (1) state and/or regional associations of floodplain managers, (2) participating in and sponsoring training and education, and (3) certification and licensing programs for professionals involved in floodplain management.

Associations

There are now **26 state- or regional-level floodplain management associations** (compared to 20 in 1995), encompassing 34 states. Their combined membership is over 6,700. Nineteen of these state- or regional-level associations also have become chapters of the national group, the Association of State Floodplain Managers. These groups provide opportunities for professional interaction, training and education on special issues, building pride and identity, and fostering communication among people engaged in many different aspects of floodplain management. The importance of state and regional associations to floodplain management is described in section 8.6 of *Effective State Programs*. Many of the state groups issue newsletters on floodplain management not just to members but to other interested parties statewide (see above).

- The Texas Floodplain Management Association now has over 500 members. Recently, TFMA has begun assisting the state with educational efforts by providing instructors for the NFIP 101 Training Course.
- The Mississippi Association has formed "mitigation strike teams," members who travel to flooded areas within the state to help local officials make substantial damage determinations.

Training and Education

Training for State Staff

All but one state (Texas) encourages its state floodplain management staff to take advantage of training opportunities to improve its understanding of and capabilities in floodplain management. FEMA-sponsored classes and workshops, state agency conferences and workshops, and the ASFPM annual meeting were the three categories of training most encouraged (by 48, 44, and 44, states, respectively). Attendance at state floodplain management association training and workshops is encouraged by 30 states (note that not all states have state associations). Three states (Montana, North Dakota, and Texas) indicated that their staff do not receive encouragement to attend FEMA-sponsored training. One state (North Dakota) indicated that staff are only encouraged to attend the ASFPM national conference. Details are shown in Table A40 in the Appendix.

Three states (Hawaii, Montana, and Texas) do not pay for (or reimburse) training expenses; all the others do so. Two states (New Mexico and Puerto Rico) do not consider the time spent in training as "work hours" for their staff; all the others do. Several states noted that staff attendance at training sessions is dependent upon the budgetary situation: if travel funds have been built into the annual budget, then training and workshops can be attended, but sometimes only by one or two people.

One way to alleviate the constraints on training posed by travel budgets is to offer the training closer to the staff who need it. Most states indicated that their FEMA Regional Office supports the "field deployment" of classes normally offered at the Emergency Management Institute in Emmitsburg, Maryland. Details are shown in Table A41 in the Appendix.

Training provided to others by State Staff

An important activity carried out by most states is the provision of workshops or training session about the NFIP (see section on NFIP coordination, above). These usually are targeted to local officials and local staff responsible for administering the local flood hazard reduction ordinance. Only five states (the District of Columbia, North Carolina, North Dakota, Puerto

Rico, and Vermont) reported that they had not conducted such training during 2002. Attendance at the workshops and training provided by the other states ranged from two people from two communities (in sparsely populated South Dakota) to over a thousand attendees from 300 communities (in Missouri). The total number of **people reached through state-sponsored NFIP-related training during 2002 was almost 9,000**, representing over 3,500 floodprone communities.

Local officials are not the only recipients of state efforts to provide floodplain-related information and training. Twenty-nine states conduct training for insurance agents and 26 for mortgage lenders, up from 13 states providing either or both in 1995. Thirty-nine state offer training for emergency managers; 27 for the public in general, and 33 to the personnel of other state agencies. Among the other recipients of the state training are real estate agents, coastal management staff, surveyors, consultants, surveyors, architects, engineers, developers, code enforcement officers, contractors, building officials, and attorneys. One state respondent noted, "We'll talk with anybody who will listen." Details are shown in Table A42 in the Appendix.

Other Educational Efforts

Besides training opportunities, states have produced a plethora of publications designed to be technical assistance tools for community officials who deal with floodplain management.

- *Floodplain Management in Colorado: Quick Guide*
- *All Hazards Mitigation Planning: A Community Guide* (Massachusetts)
- *Retrofitting for Flood Mitigation in Florida*
- *Maryland Floodplain Management Handbook*
- *Missouri's Quick Guide to Floodplain Management for Local Officials*
- "Building Safer Communities in Rhode Island" (video)
- *Managing South Carolina Floodplains through the NFIP.*

Certification and Licensing

A big change in the professional landscape of floodplain management over the last several years has been the certification of floodplain managers. Whereas in 1995 only two states had programs through which floodplain managers could become certified in their field, now there is a thriving national program sponsored by the ASFPM as well as correlated state-based programs. The significance of this development to the profession of floodplain management is described in section 8.3 of *Effective State Programs*. Eleven states have a certification programs of some sort for floodplain managers today, 8 of which are accredited by the ASFPM. Thirty states have at least one Certified Floodplain Manager® on their state staffs; there are a total of 60 CFMs on state staffs nationwide. (The total number of CFMs awarded to date nationally is 1,604.)

Thirty states license their building officials and building inspectors (up from 18 in 1995), and almost all of those require the licensed inspector to obtain continuing education credits to maintain his or her license. In 32 states, floodplain management training provides continuing education credits for licensed professionals in one or more fields, such as insurance, engineering, surveying, building inspection, floodplain management, architecture, appraising, code enforcement, and law. More details are shown in Table A43 in the Appendix.

Mapping and Risk Assessment

It is fundamental to floodplain management that flood hazard areas and floodplain resources within the state be identified and delineated. Only in this way can future flood damage be avoided, by applying regulatory criteria, informing property owners and the public, protecting natural functions, and assessing risks and deciding upon appropriate mitigation measures for existing and future development. Floodprone areas can change over time, through deliberate modification or as a result of changes in the watershed (upland development or wildfire) or the body of water itself (coastal erosion or river migration). State floodplain management programs are concerned with ensuring that the flood risks are known and that changing conditions are accounted for.

Some states have long been involved in mapping flood hazards, and a small number of state mapping programs have been operating for many decades. Recently, a number of states have created new initiatives or reinvigorated existing programs to conduct engineering studies of flood hazards and to produce flood maps. Larger local governments also conduct their own mapping efforts. In part this recent activity has been prompted by the growing awareness of the importance of defensible, up-to-date maps and the advent of new technologies and tools. And, in part, it is due to the long-term trend of ever-increasing flood losses. The best kinds of state mapping and risk assessment are outlined in section 3.2 of *Effective State Programs*.

The most common flood hazard maps, however, are those produced by FEMA's mapping program in support of the National Flood Insurance Program. Under this federal program alone, over 100,000 flood map panels have been published for nearly 20,000 communities. Other federal agencies also conduct flood studies to produce flood hazard maps, including the Corps of Engineers, the Natural Resources Conservation Service, the Tennessee Valley Authority, and the U.S. Geological Survey.

State and local governments seek to improve upon the basic FEMA flood hazard maps for their own purposes, incorporating new development or obstructions, adding other hazards or state or local standards that exceed the minimums of the NFIP, showing more detail than that depicted on the FIRMs, using a more appropriate scale, or other improvements. Sometimes communities undertake or contract for a separate flood study to take the place of or supplement the one performed by FEMA.

State Programs for Mapping

Programs to map natural resources and/or human-made features (such as transportation corridors, land cover, infrastructure, water resources, geology, population) exist in 43 states.

- In 24 of those states, floodplain mapping is included in the statewide mapping effort (about the same number as in 1995).
- In 18 of those states, the state mapping program is housed within the same agency as the floodplain management program.

The budgets for the flood mapping programs range from zero in 13 of the states whose maps show floodplains or flood hazards to North Carolina's $ 32 million commitment from its general fund as part of statewide recovery from Hurricane Floyd. For several states, additional amounts are provided through FEMA, the Corps, USGS and, in West Virginia, a private corporation.

- 25 states conduct the engineering studies that underlie the floodplain mapping, however the maps are ultimately produced.
- 15 states go beyond that to actually produce their own floodplain maps, most through contracts with private firms for at least some of the work.

More details are shown in Table A44 in the Appendix.

Format, Coverage, and Availability of Flood Maps

States are using different formats now for their flood and other maps.

- **25 states have their flood maps in a GIS**;
- 20 states have their flood maps in hard copy;
- 7 states use CADD; and
- 3 states have flood maps available on the web.

Thirty-three states have an agency that maintains an inventory of topographic data in digital format. These inventories are spread among resources agencies. Some are within the agency that houses the floodplain management program, but others are in administrative agencies, geological surveys, state universities, GIS entities, and others. Five states (Minnesota, Ohio, Oklahoma, Rhode Island, and Texas) and the District of Columbia and Puerto Rico have 100% of their land area covered by digital terrain models adequate to support floodplain mapping. North Carolina and Nebraska both have most of their area covered, and 22 states have at least some portion covered.

States have a variety of different base maps available to the public.

- 40 states have orthophoto maps (34 states with them in GIS format).
- 40 states have road maps (30 in GIS format).
- 30 states have hydrographic maps (24 on a GIS);
- 28 have land cover maps (21 in GIS);
- 27 states have digital terrain model coverage (21 in GIS);
- 25 states have geodetic control maps (16 in GIS);
- 18 states have maps of structures (13 on GIS); and
- 9 states have other types of base maps on GIS, such as maps of water rights, watershed boundaries, utilities, and wetlands.

Details are displayed in Table A45 in the Appendix.

The use of most of these maps is unrestricted; in some cases there are security concerns (about the details of a bridge, or an archaeological site, for example) or there is a small fee for their use.

- 18 states have an archive system for flood hazard mapping data.
- 13 states have a flood map retrieval system that is accessible to the public.
- All states provide floodplain maps for public inspection on a walk-in basis.
- 22 states make flood hazard zone determinations from the maps for property owners.

Details are shown in Table A46 in the Appendix.

Special flood-related hazards are included on some states' floodplain maps (Table 7). Dam failure zones are the most frequently displayed special hazard area, followed by high-risk erosion areas, coastal erosion, barrier islands, closed basin lakes, alluvial fans, riverine erosion, areas prone to residual risk from levees, mud flows, and ice jams.

New Mapping Technology

Digital technologies and tools have made a dramatic change in the way that maps are prepared. Geographic information systems (GISs), which combine digitized geographic data with computer imagery capabilities have become widely available at the state and local levels. The uses to which this technology can be put are detailed in section 3.3 of *Effective State Programs*.

- **45 states have GIS capability** (up from 19 in 1995).
  - 34 have floodplain and coastal data mapped on their GISs.
  - 30 states have GIS data that meets NFIP standards (up from 5 in 1995).
  - 25 states share the state-generated floodplain/coastal GIS data with localities that have GIS capability (up from 7 in 1995).

State respondents were asked to estimate the proportion of localities within their jurisdictions that have GIS capability. The results below show a significant increase from 1995, when GIS capability was still novel.

Percentage of localities with GIS capability	Number of states
90% of localities	1 (Ohio)
87%	1 (Virginia)
75%	3 (Maryland, Minnesota, Oklahoma)
67%	1 (Oregon)
60%	1 (Alabama)
50%	1 (Wisconsin)
35%	1 (Puerto Rico)
16-30%	12 states
less than 15%	23 states

Thirty-seven states have staff trained in the use of GIS, and 35 state floodplain management programs say they have ready access to the GIS data their states produce and maintain.

States use their GIS capabilities in a number of ways. Several states indicated that they are still finding ways to apply these new technologies and incorporate their use into routine activities.

- Rhode Island uses the GIS system as a tool for multi-hazard local and state mitigation strategies and for all land use decisions.

Table 7. Special flood-related hazards on state-generated floodplain maps.

	Maps show ice jams	Maps include high risk erosion	Maps include dam failure	Maps include alluvial fans	Maps include closed basin lakes	Maps include coastal erosion	Maps include riverine erosion	Maps include levee residual risk	Maps include mud flows	Maps include barrier islands
AK		Yes				Yes	Yes			
AL										
AR										
AZ										
CA			Yes	Yes	Yes			Yes	Yes	
CO										
CT										
DC										
DE		Yes				Yes				Yes
FL		Yes	Yes		Yes	Yes				Yes
GA										
HI			Yes							
ID										
IL										
IN										
KS										
KY		Yes								
LA										
MA										
MD			Yes							Yes
ME										
MI		Yes	Yes							
MN										
MO										
MS										
MT			Yes							
NC						Yes				
ND										
NE										
NH										
NJ								Yes		
NM										
NV										
NY	Yes					Yes				
OH										
OK										
OR				Yes		Yes			Yes	
PA										
PR			Yes							
RI		Yes								Yes
RI										
SC										Yes
SD										
TN										
TX										
UT				Yes						
VA										
VT										
WA		Yes			Yes					
WI			Yes		Yes					
WV										
WY										
Total	**1**	**7**	**8**	**3**	**4**	**6**	**1**	**2**	**2**	**5**

- The Mississippi Digital Earth Model has been in use for several years, and the state is working to incorporate modernized floodplain maps into it.
- In Michigan, the floodplain and floodway boundaries are overlaid on digital orthophoto quadrangles, with contouring based on LiDAR elevation data.
- Delaware uses its system primarily to do flood zone determinations and for educational activities.
- Nebraska's floodplain management staff has complete access to all the GIS data and uses it on a daily basis.

More details are shown in Table A47 in the Appendix.

State Involvement in NFIP Mapping

Besides the independent mapping programs, some states also carry out activities related to mapping done for the NFIP. Two major FEMA initiatives with significant state involvement are the Cooperating Technical Partners Program and the overall Map Modernization Program.

Cooperating Technical Partners Program

The Cooperating Technical Partners (CTP) Program creates partnerships between FEMA and participating NFIP communities, regional agencies, and state agencies that have the interest and capability to become more active participants in the FEMA Flood Hazard Mapping Program. Twenty-six states are CTPs with FEMA; seven additional states have localities that are CTPs. Most of the partner states and communities receive some funds from FEMA under the program. The roles played by the states and localities range widely. The most common state activities under the CTP are listed below.

- 31 states set priorities for mapping;
- 29 states participate in final meetings;
- 26 states participate in mapping meetings; 15 states review the engineering or floodplain delineation carried out in preparation for mapping;
- 16 states review the engineering or floodplain delineation carried out in preparation to mapping;
- 13 states approve the hydraulic and hydrological analysis, and
- 13 states conduct approximate studies for digital FIRMs.

North Carolina's Flood Mapping Program

After Hurricane Floyd in 1999 revealed the limitations of North Carolina's flood hazard data and maps, the North Carolina General Assembly allocated $32 million for a statewide mapping program, which is being conducted under a Cooperating Technical Partnership agreement among North Carolina, FEMA, and 16 other federal agencies. Under the agreement, North Carolina has assumed primary ownership of, and responsibility for, the Flood Insurance Rate Maps for all North Carolina communities.

The mapping program entails the acquisition of high-resolution topographic data and development of accurate digital elevation models, which will then be used for engineering studies to develop accurate flood hazard data and floodplain mapping. Digital FIRMs will be produced on a county-wide basis, showing the county and its incorporated municipalities on the same set of maps. Besides the digital FIRMs, the North Carolina program is developing an electronic information system that will allow online access to the digital maps 24 hours a day.

(Curtis and Sparks, 2002)

Other state roles include helping acquire base maps, processing LOMAs and LOMRs, conducting detailed studies for D-FIRMS, quality control for preliminary D-FIRMs, and actually producing D-FIRMs.

- The Maricopa County [Arizona] Flood Control District, as a CTP, does all of the activities listed.
- Massachusetts delineates the primary frontal dune as part of its contribution to flood mapping under the CTP program.
- Washington develops topographic data using LiDAR tools.

Details are shown in Table A48 in Appendix.

Map Modernization Program

In 1997, FEMA made a long-term plan to modernize the nation's flood hazard maps, many of which have become out of date. In addition, new technology has made it desirable and even imperative that the flood hazard maps be digitized, and benefit from the higher level of accuracy now possible. States assisted in an early step of the map modernization, and will play increasing roles as the effort progresses. Congress provided sufficient funding for fiscal years 2003 and 2004 to begin implementing map modernization, including funds to support states in this effort through separate cooperative agreements as a component of the Cooperating Technical Partners initiative. Map Modernization is likely to have cost over $1 billion by the time it is finished.

In 2002, FEMA made Community Assistance Program funds available to states for map modernization.

- **37 states used funding made available by DHS/FEMA through the CAP to prepare mapping plans** in 2002.
- 15 states did not use CAP funds for map modernization in 2002.
    - □ 4 states had experienced administrative problems (funds arrived too late, negotiations proceeding with private contractors, etc.);
    - □ 2 reported that they did not have sufficient funds under the CAP to add additional activities; and
    - □ 3 did not have state staff available for any map modernization activities.
- **43 states would use future CAP funding for map modernization**, if it continued to be available.
    - □ 3 states said such participation would hinge upon the availability of the state match;
    - □ 25 states said they would have adequate resources to provide the proposed 20% match for map modernization, either in staff time; data, funding, other in-kind contributions, or a combination of of those types of contributions; and
    - □ 1 state respondent thought that the CTP (see above) was a preferable vehicle for map modernization funding.

Details are displayed in Table A49 in the Appendix.

Updating Maps and Interagency Cooperation

Forty-three states maintain a mapping priority list that notes which communities need their floodprone areas restudied and possibly remapped (up from 22 states in 1995). Besides looking to FEMA to help them meet these restudy needs, those states reported that help may be forthcoming from other sources. The Corps of Engineers was the agency most frequently mentioned as a potential source of this remapping assistance, followed by the Natural Resources Conservation Service, the U.S. Geological Survey, the National Oceanic and Atmospheric Administration, the Tennessee Valley Authority, and the Bureau of Reclamation. These same agencies were noted as ongoing cooperating entities with the state (along with FEMA) in producing flood maps. Twenty-two states mentioned that they have data not already in FEMA's possession that would be useful for foodplain mapping. Details are shown in Table A50 in the Appendix. Section 3.1 of *Effective State Programs* explains why cooperation in mapping is essential to effective floodplain management.

Review of Maps and Data

Even if a state is not producing the floodplain maps itself, the state floodplain management program has other roles in ensuring that flood maps are accurate and accord with the appropriate standards.

- **24 state floodplain management programs review and approve floodplain maps** before they are adopted in local zoning ordinances;
    - □ In 7 of these states such review is required by law;
    - □ 8 states issue a formal approval letter when the map is found to be satisfactory; and
    - □ 13 states indicate that they believe their review duplicates FEMA's review to some extent, but most thought there were good reasons for both entities to review the proposed maps.
- In **21 states the floodplain management program performs an engineering review of the models** developed to establish the 1% chance flood elevations depicted on flood maps.
    - □ 14 of those states issue a formal approval letter as a result of that review; and
    - □ 16 states either review or produce the floodplain models that are used to establish the regulatory flood elevations in the state.

States have different ways of handling these review processes. More details are displayed in Table A51 in the Appendix.

- The Colorado Water Conservation Board must review and designate all 100-year floodplain maps that are used for local government zoning within the state.
- Any floodplain maps developed for the District of Columbia must be review by a number of agencies for consistency with zoning and building codes and other relevant regulations.
- Minnesota has an Interagency Hydrology Review Committee headed by the state's Department of Natural Resources and including representatives from the Corps, Natural Resources Conservation Service, and the U.S. Geological Survey. The

committee reviews the data after the Flood Insurance Study is done, and resolves differences.

- Indiana's Division of Water performs an engineering review of the of the models as part of the state permit process.
- In Virginia, the Floodplain Engineer or Floodplain Program Manager uses HEC-RAS and Check-RAS to review the data.

Conclusion

By taking charge of managing floodplains within their jurisdictions, states vastly improve the opportunity to avoid flood disasters and reduce flood losses and disaster costs nationwide. States are in a position to tailor solutions to their own specific situations, which nationwide standards and norms simply cannot do. States, furthermore, are uniquely positioned between the overarching national perspective and the more limited focus of local concerns. Their liaison, coordination, and standard-setting roles are undeniable. Research has shown that state mandates for planning, land use management, and other techniques act as a spur to localities in assuming responsibility for and actively implementing measures that result in wiser use of floodprone lands and preservation of their resources (Berke and French, 1994; Burby et al., 1997). With a strong state floodplain management program, a state can carefully manage (and help its localities manage) its floodplains, thereby protecting the health and safety of citizens, improving quality of life, enhancing the environment, and ultimately minimizing the cost to all levels of government and taxpayers of flood disasters and damage.

The information presented in this report shows, above all, that every state or local floodplain management program is unique: each varies according to numerous factors, including the financial status of the state government and the condition of the regional economy, the types of flooding common to the area, the political situation, prevailing attitudes toward regulation and resource preservation, the extent of financial and other support available, and many others. Two or more states may have taken the same approach to a floodplain problem but for entirely different reasons. At the same time, it should be remembered that states and localities also vary widely in their susceptibility to flood risk. A rapidly urbanizing area has a more challenging floodplain management problem than does a region with little development pressure. Although arid regions have less frequent flooding, they have the accompanying challenge of bringing consistent public and official attention to the flood risk.

Keeping this diversity in mind, this final chapter pulls together an overall picture of state and local floodplain management today. First discussed are the principal changes and developments noted over the past seven years. That is followed by a summary of the status of state and local floodplain management today. The report concludes with some speculation about where current and looming trends may take us, and recommendations about how states can work with the federal and other partners to make state programs stronger so that nationwide flood losses can be reduced.

Summary of the Past Seven Years

Our understanding of state and local floodplain management today can be roughly divided into three categories. First, there is information about the fundamental components of state and local programs: financial and other support, legal authority under which they operate, and their organizational frameworks. The second category includes the specific floodplain management activities that states and localities undertake to cope with their flood risk and try to protect their floodplain resources. The third category consists of external factors that influence the practice of floodplain management. The changes in these components over the last seven years are discussed below.

Changes in the Fundamental Components of State and Local Floodplain Management

The ease or difficulty with which states and localities carry out their floodplain management activities obviously depends upon the quality of the underlying components of their programs. The important changes in these components over the past seven years are summarized below.

Changes to Statutory Authority

Over the past seven years, several states made changes to the basic legislation that authorizes floodplain management activities of one kind or another. Some of these changes strengthened the state's position with regard to managing its floodplains effectively; some of them weakened it. For example,

- Arizona has a new "Growing Smarter" law that requires communities to consider all natural resources during the planning process.
- Florida repealed its cumulative substantial improvement provisions.
- Illinois passed a real estate disclosure act that required inclusion of the floodplain location and flood history of a property.
- Amendments to state law have weakened Indiana's authority to regulate the floodway of the Ohio River.
- The adoption of a statewide building codes in Maryland and New York increases local enforcement authority.
- Minnesota reinstated its 1-foot freeboard requirement.
- A new Arkansas law requires all local floodplain administrators to obtain continuing education.
- New Mexico has a new law requiring all participating NFIP communities to have a Certified Floodplain Manager® as their designated floodplain administrator.
- Oregon passed legislation strengthening the protection of riparian areas.
- The adoption of growth management legislation in Tennessee has expanded recognition of floodplains as natural limitations on development.

Loss of State Agencies or Functions

Eight states reported that, in the years since 1995, some floodplain management-related state functions or agencies were lost.

- Alaska's Department of Natural Resources drastically limited its stream gaging network.
- Arizona's floodplain management program was transferred from its water resources agency to the emergency management agency, so that participation in the CAP was interrupted.
- Montana's state mapping was discontinued because its state funding was eliminated.
- New Jersey's Floodplain Management Section was combined with the Dam Safety program and redesignated the "Flood Control Section."

- Nevada's planned floodplain mapping under the CTP agreement was never implemented.
- In West Virginia, the NFIP Coordinator's position was left vacant for 10 years; it has since been filled.

In addition, Massachusetts, Pennsylvania, and Washington are facing proposed program and budgets cuts, not in effect for the period covered by the other data.

Changes to Staffing and Funding

As noted in Part 9 of *Effective State Programs*, adequate funds, staff, and expertise are absolutely essential if state floodplain management is to be effective. Although some comparisons can be made to gain an overall impression of the level of activity, it should be kept in mind that each state keeps its tally differently and thus reporting was not entirely consistent. Also, the differences in state programs, goals, and situations make strict comparisons over time problematic.

Having said that, it can be observed that overall staff levels rose about 15% from 1995 to 2002 (when comparing only the 42 states for which data were available for both 1995 and 2002) (Table 8). The large increase in Illinois' staff since 1995, accompanied by fairly significant increases in Maryland, Minnesota, Missouri, Nebraska, and Ohio, more than made up for notable decreases in staff in Kentucky, Michigan, and Wisconsin. The rest of the states' staffs shifted up or down by only a few FTEs. Note that this increase corresponds to the increase in state budgets (non-grant funds) from 1995 to 2002.

A rough comparison of current (2002) state floodplain management budgets with those reported in 1995 (Table 8) shows that state budgets for floodplain management have risen in the last seven years. Comparing only those states for which budget figures for both 1995 and 2002 are available, and adjusting for inflation, shows that the real increase in overall funding has been just under $3.8 million, or about 21% more than in 1995 (Table 9). Two-thirds of this increase was a result of the greater availability to state programs of grants—from federal programs, special state funds (such as for mitigation or mapping), or other sources. The rest of the increase came from state budgets which, as noted above, is in turn reflected in an increase in state staff. Federal CAP funds provided to the states were flat over the seven years, although they have gone up since then. (Note that funds for structural flood control—a very large number—have been removed from the totals for both years.)

This situation developed over a seven-year period (1996-2002) during which overall state fiscal health was better than in earlier years (1992–1995, covered by the 1995 report). As discussed below, however, it is difficult to determine precisely how levels of spending on floodplain management are related to the economic situation.

Changes in State and Local Floodplain Management Activities

Information about state activities collected over the last two decades shows that the range of floodplain management activities that states are undertaking is becoming wider and also that, in general, more states are participating in each of them.

Mapping

A dramatic change has come about in the way states produce, improve upon, and in general handle maps, because since 1995 the use of GIS technology has spread far and wide. Significant increases in state involvement in mapping have been early results of FEMA's new Map

Modernization Program and accompanying Cooperating Technical Partners program. A few states have experienced enormous progress in mapping as a result of these programs (especially in conjunction with flood or hurricane disasters). There has been a large increase in the number of states that maintain priority lists for map updates and re-studies (43 states, up from 22 in 1995).

Although about the same number of states (24) actually produce their own flood maps as in 1995, the sophistication with which they do so has grown, and those that receive flood maps produced by federal agencies handle, store, and use them digitally to a much greater extent than before.

Almost all states (45) now have some GIS capability (more than double the number in 1995); 35 state floodplain management offices have ready access to the GIS data their states produce ;34 have floodplain and/or coastal data mapped on their GISs; and 25 states have their flood maps in a GIS. Thirty states have GIS data that meets NFIP standards (up from 5 in 1995).

Almost half the states (22) have some portion of their land area covered by digital terrain models adequate to support floodplain mapping, and seven states have all or most of it covered.

Technology

The advent of GISs, light detection and ranging techniques, global positioning systems, and the like, have influenced floodplain management for the better over the last several years, making it far easier and more accurate to conduct damage assessments, post-disaster mapping and audits, check building elevations, and other activities.

Natural Resources of Floodplains

The last seven years have seen a trend toward use of the broader tools for resource protection, including growth management, NAI floodplain management, and sustainability initiatives—through all of which the resources and risks of hazardous areas can be integrated with wider community concerns. More than 2/3 of the states now use public information programs about the natural resources of floodplains (up from 10 states in 1995). There has been a slight increase in the number of states offering tax incentives for preservation of natural areas, including floodplains (from 9 states in 1995 to 12).

Regulations

In general, a few more states have adopted floodplain management regulations of various types, but there is still precious little evidence of their efficacy in the field, or the extent to which they are enforced. Statewide requirements for setbacks of different sorts and for stormwater management and regulations are more prevalent now (25 states had setback requirements in 2002 vs. 22 in 1995, and 32 have stormwater regulations in 2002 vs. 25 in 1995). Regulations for alluvial fans are up to 4 states (from 2 in 1995). The other information on regulations collected for this report is not directly comparable to the 1995 data.

Mitigation

In the last seven years 15 more state governors issued executive orders for hazard mitigation (the total is now 19); and there are now 15 states with dedicated funds for mitigation. All-hazard mitigation planning is being done at state and local levels in more than 2/3 of all states, and almost all (45) state floodplain management offices either administer or have input on the two

Table 8. Change in state floodplain management staffs and budgets, 1995 and 2002.

State	No. of floodplain management staff statewide 1995	No. of floodplain management staff statewide 2002	Total Budget 1995	Total Budget 2002
AK	1	1.25	$ 80,000	$ 107,560
AL	3	4.5	$ 90,227	$ 510,000
AR	3	3	$ 128,000	$ 110,000
AZ	3.5	0.5	$ 183,000	$ 90,000
CA	9	10	$ 931,000	$ 1,405,000
CO	3	5	$ 278,838	$ 1,056,000
CT	5	3	$ 277,000	$ 640,500
DC	0	1.85	0	$ 58,616
DE	2.4	3	$ 76,200	$ 300,000
FL	5	7	$ 341,876	$ 350,340
GA	2	3	$ 107,000	$ 122,000
HI	0.5	1.5	$ 60,000	$ 200,000
ID	1.2	1	$ 87,159	$ 92,385
IL	16	36	$ 855,000	$ 3,377,000
IN	48	53	$ 2,688,219	$ 2,574,805
KS	0	14	0	$ 246,000
KY	25	11	$ 1,185,000	$ 106,667
LA	4	4	0	$ 182,721
MA	3	3	$ 200,000	$ 214,000
MD	16	24	$ 942,000	$ 1,277,000
ME	2.5	3	$ 156,000	$ 185,776
MI	16	11	$ 1,084,400	$ 863,000
MN	7.5	15	$ 491,400	$ 920,600
MO	1	6	$ 111,000	$ 400,000
MS	1	1	0	$ 73,333
MT	1.25	2	$ 62,000	$ 90,700
NC	0	4.5	0	$ 304,000
ND	2.5	2	$ 120,000	$ 100,000
NE	2.5	6.5	$ 109,400	$ 435,000
NH	2	0.75	$ 80,000	$ 93,500
NJ	5	6	$ 121,000	$ 525,000
NM	0	1	0	$ 93,773
NV	0	1.3	0	$ 132,790
NY	6	4.75	$ 464,400	$ 504,103
OH	8	11	$ 305,000	$ 902,500
OK	1	1.5	$ 153,000	$ 210,000
OR	0	1	0	$ 107,000
PA	0	2	$ 55,000	$ 200,000
PR	0	2	0	$ 35,000
RI	0.5	1	$ 26,400	$ 436,000
SC	3.25	3	0	$ 241,172
SD	0.25	1	$ 00	$ 180,500
TN	0	1	$ 65,000	$ 75,000
TX	3	2.5	$ 200,000	$ 179,280
UT	1	1	$ 65,000	$ 94,316
VA	3	3	$ 190,000	$ 200,000
VT	1	1	$ 80,000	$ 100,000
WA	6	7.5	$ 2,200,000	$ 2,120,400
WI	14	9	$ 808,000	$ 740,000
WV	0	1	0	$ 40,000
WY	0.25	1.5	$ 00	$ 97,500
totals	**239.10**	**304.40**	**$ 15,457,519**	**$ 23,700,837**

Table 9. Comparison of state floodplain management budgets, 1995 and 2002.

	1995 Budget				2002 Budget			
	State Funds	FEMA funds (CAP)	Grant programs & other funds	Total	State Funds	FEMA funds (CAP)	Grant programs & other funds	Total
AK	$30,000	$50,000		$ 80,000	$ 35,720	$ 61,400	$ 10,440	$ 107,560
AL	$22,557	$67,670		$ 90,227	$ 400,000	$ 110,000	$ 0	$ 510,000
AR	$32,000	$96,000		$ 128,000	$ 0	$ 110,000	$ 0	$ 110,000
AZ	$50,000	$83,000	$50,000	$ 183,000	$ 0	$ 90,000	$ 0	$ 90,000
CA	$691,000	$240,000		$ 931,000	$ 580,000	$ 250,000	$ 575,000	$ 1,405,000
CO	$200,000	$78,838		$ 278,838	$ 500,000	$ 120,000	$ 436,000	$ 1,056,000
CT	$141,000	$136,000		$ 277,000	$ 50,000	$ 114,000	$ 476,500	$ 640,500
DC	0	0		0	($ 58,616)	$ 0	$ 0	($ 58,616)
DE	$17,000	$50,000	$ 9,200	$ 76,200	$ 125,000	$ 50,000	$ 125,000	$ 300,000
FL	$ 89,219	$252,657		$336,876	$ 100,340	$ 250,000	$ 0	$ 350,340
GA	$27,000	$80,000		$ 107,000	$ 42,000	$ 80,000	$ 0	$ 122,000
HI	0	$60,000		$ 60,000	$ 150,000	$ 50,000	$ 0	$ 200,000
IA	($320,000)	0		($320,000)				0
ID	$21,790	$65,369		$ 87,159	$ 23,096	$ 69,289	$ 0	$ 92,385
IL	$725,000	$130,000		$ 855,000	$ 3,177,000	$ 200,000	$0	$ 3,377,000
IN	$2,298,080	$90,139	$300,000	$ 2,688,219	$2,451,947	$ 122,,858	$ 0	$ 2,574,805
KS	0	0		0	($ 78,000)	($ 68,000)	($ 100,000)	($ 246,000)
KY	$1,100,000	$85,000		$ 1,185,000	$ 26,667	$ 80,000	$ 0	$ 106,667
LA	0	0		0	($ 45,680)	($ 137,041)	$ 0	($ 182,721)
MA	$50,000	$150,000		$ 200,000	$ 60,000	$ 154,000	$ 0	$ 214,000
MD	$875,000	$67,000		$ 942,000	$ 40,000	$ 70,000	$ 1,167,000	$ 1,277,000
ME	$39,000	$117,000		$ 156,000	$ 43,944	$ 131,832	$ 10,000	$ 185,776
MI	$618,000	$150,000	$316,000	$ 1,084,400	$ 652,000	$ 211,000	$ 0	$ 863,000
MN	$405,400	$86,000		$ 491,400	$ 812,500	$ 108,100	$ 0	$ 920,600
MO	$32,000	$79,000		$ 111,000	$ 255,000	$ 120,000	$ 25,000	$ 400,000
MS	0	0		0	($ 18,333)	($ 55,000)	$ 0	($ 73,333)
MT	$5,000	$57,000		$ 62,000	$ 4,700	$ 63,000	$ 23,000	$ 90,700
NC	0	0		0	($ 54,167)	($ 162,500)	($ 75,167)	($ 304,000)
ND	$52,000	$68,000		$ 120,000	$ 25,000	$ 75,000	$ 0	$ 100,000
NE	$109,400			$ 109,400	$ 250,000	$ 50,000	$ 135,000	$ 435,000
NH	$20,000	$60,000		$ 80,000	$ 25,000	$ 68,500	$ 0	$ 93,500
NJ	0	$121,000		$ 121,000	$ 383,000	$ 142,000	$ 0	$ 525,000
NM	0	0		0	($ 16,754)	($ 77,019)	$ 0	($ 93,773)
NV	0	0		0	($ 58,030)	($ 63,000)	($ 11,760)	($ 132,790)
NY	$278,700	$185,700		$ 464,400	$ 275,603	$ 228,500	$ 0	$ 504,103
OH	$155,000	$150,000		$ 305,000	$ 540,000	$ 162,500	$ 200,000	$ 902,500
OK	$28,000	$110,000	$15,000	$ 153,000	$ 50,000	$ 150,000	$ 10,000	$ 210,000
OR	0	0		0	$ 28,000	$ 79,000	$ 0	$ 107,000
PA	0	$55,000		$ 55,000	$ 80,000	$ 60,000	$ 60,000	$ 200,000
PR	0	0		0	$ 0	($ 35,000)	$ 0	($ 35,000)
RI	$6,600	$19,800		$ 26,400	$ 10,000	$ 40,000	$ 386,000	$ 436,000
SC	0	0		0	($ 81,172)	($ 154,000)	$ 0	($ 241,172)
SD	$0	0		$ 00	($ 15,500)	($ 45,000)	($ 120,000)	($ 180,500)
TN	$15,000	$50,000		$ 65,000	$ 20,000	$ 55,000	$ 0	$ 75,000
TX	$50,000	$150,000		$ 200,000	$ 44,820	$ 134,460	$ 0	$ 179,280
UT	0	$65,000		$ 65,000	$ 23,174	$ 71,142	$ 0	$ 94,316
VA	$60,000	$100,000	$30,000	$ 190,000	$ 70,000	$ 90,000	$ 40,000	$ 200,000
VT	$20,000	$60,000		$ 80,000	$ 25,000	$ 75,000	$ 0	$ 100,000
WA	$100,000	$100,000	$2,000,000	$ 2,200,000	$ 30,200	$ 90,200	$ 2,000,000	$ 2,120,400
WI	$700,000	$108,000		$ 808,000	$ 600,000	$ 140,000	$ 0	$ 740,000
WV	0	0		0	($ 10,000)	($ 30,000)	$ 0	($ 40,000)
WY	0	0		$ 00	($ 24,500)	($ 73,000)	$ 0	($ 97,500)
Tot	**$ 9,063,746**	**$ 3,673,173**	**$ 2,720,200**	**$ 15,457,519**	**$ 12,015,711**	**$ 4,326,781**	**$ 5,672,940**	**$ 22,015,422**
Change from 1995 to 2002					**+$ 2,951,995**	**+ $ 653,608**	**+ $ 2,952,740**	**+$6,557,903**
Change from 1995 to 2002, after inflation adjustment					**+$ 1,314,712**	**-$ 9,905**	**+ $ 2,461,370**	**+$3,765,695**
Percentage change from 1995 to 2002, inflation adjusted					**+ 12%**	**- .02%**	**+77%**	**+21%**

( ) means deleted from totals because data not available for both years

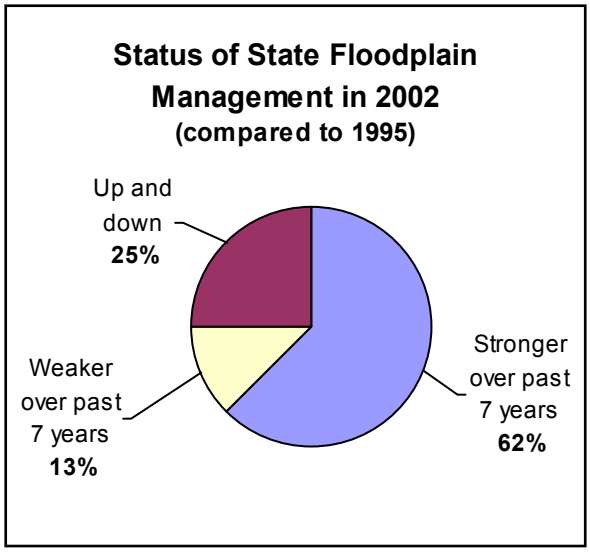
main federal mitigation programs (HMGP and FMA). The number of states working on levee safety (including either state permitting, maintenance requirements, emergency action plans, or other standards) has been rising steadily for more than a decade and now stands at 29.

Information Provision

Statewide newsletters and websites that address floodplains and flood hazards are much more in evidence now than seven years ago, and contain a wider variety of information and links. Likewise, the professional development of floodplain managers has been on a strong upswing. There are now 34 states with their own floodplain management associations (up from 20 in 1995) (in some areas the association covers more than one state). Certification programs for floodplain managers now number 12, including a nationwide program, up from 2 in 1995 (see discussion below). All the states continue to produce and distribute written information (brochures, reports, manuals); conduct training; manage warning systems; and provide information and technical assistance as needed.

Status of State and Local Floodplain Management in 2002

In general, floodplain management at the state and local levels in the United States today continues to gain momentum. In response to the survey used for this report, fully half of the states (25) reported that floodplain management within their jurisdictions had grown steadily stronger over the past six years; 10 states said that it had stayed about the same; and only five states (Arizona, Hawaii, Indiana, New Jersey, and Washington) said that it is weaker now than in 1995. The remaining 10 states indicated mixed changes—either floodplain management is stronger now than six years ago but weaker than it was before that, or vice versa.



The reasons given for long-term trends toward weaker state floodplain management included transfers of functions to other agencies without corresponding transfers of personnel; discontinuation of important functions such as hydrological reviews of flood maps and stream gaging; a political climate resulting in weakened regulations; and budget cuts.

Contributors to the long-term strengthening of state floodplain management cited by the states were investments in integrating GIS technology throughout state functions; and improved coordination among state agencies, between the floodplain management office and the governor's office and the congressional representatives' offices, and between the floodplain management office and other partners public and private.

Professional Development

A major contributor to the strengthening of state and local floodplain management over the last seven years—and one whose importance is not adequately reflected in descriptions of state activities—is the consolidation of a "profession" of floodplain management. There are large (and continually increasing) numbers of participants in the annual ASFPM conference every year (over 700 in 2002 and more since then). More and more requests are received from policymakers

and others for input from floodplain management experts. And, as discussed below, there has been rapid progress in the number and vitality of state-level professional associations as well as in the establishment and award of credentials to floodplain managers. These are indicators that floodplain management is becoming a recognized field of practice, a reasonable goal and priority at varied levels of the public sector, and that more state and local staff and other floodplain management professionals are giving serious attention to developing and improving their skill and abilities. In short, capability is being built from the ground up, throughout the nation.

Floodplain Management Professionals

Nationwide, there are now

- Over 6,700 floodplain managers belonging to the national association (the ASFPM), including 19 local chapters.
- 26 state- or multi-state floodplain management associations (covering 34 states).
- 1,604 Certified Floodplain Managers.

Floodplain Management Associations

Arkansas, New Mexico, Oklahoma, and Virginia all attributed continual improvement in their state programs in part to their state floodplain management associations and the new certification program for floodplain managers.

Besides providing training and networking opportunities and other services for their members, several associations have succeeded in getting state legislation passed to strengthen floodplain management. A number of state associations have assumed major responsibility for the certification of floodplain managers within their states. This is an encouraging sign of capability being built at state and local levels.

Certification of Floodplain Managers

Whereas in 1995 only two states had some sort of licensing for floodplain managers and there was no national program, now there is a thriving Certified Floodplain Manager® program of the ASFPM, which has certified 1,604 floodplain managers nationwide so far. Eleven states have a certification programs of their own, six of which are accredited by the ASFPM. This emphasis on specialized knowledge and abilities and recognition of those who achieve it, is a huge step in building support for and capability in floodplain management from the grass-roots level upward. In addition, because maintaining certified status requires a floodplain manager to participate in continuing education, the demand for training opportunities is being increased, making it possible for more and more people to become acquainted with the floodplain management field.

Factors Influencing State and Local Floodplain Management

State floodplain management programs do not exist in vacuums. They are influenced—sometimes profoundly—by numerous external circumstances, including the unpredictability of the weather and human perceptions. Flooding—or the lack of it—is probably the single most influential factor in all of floodplain management, and that is borne out by the data and observations collected for this report. When damaging floods occur, public and private attention is riveted on the issue of floodplains, making it possible to get broader participation, more funding, and, often, stricter standards for the future. Conversely, when years pass without a serious flood, floodplain management gradually moves lower down the list of public priorities, and gains made in prior years can even be lost.

Flooding

When asked what external factors influenced floodplain management in their states over the past seven years, 16 states answered "flooding." Twelve states had experienced several serious floods during that period, resulting in enhanced awareness of the hazard, an influx of federal funds, and an accompanying rise in the availability of state funding. Four states said that the absence of flooding (including two Western states enduring drought conditions) had caused public, political, and financial support for their floodplain management programs to erode.

It is widely recognized that national flood losses are increasing—to about $6 billion annually at the last estimate. However, it is difficult to say whether the frequency or severity of flooding had a greater or lesser effect on state floodplain management over the last seven years that it did in earlier periods. Figures on numbers of floods, flood insurance claims paid, disasters declared, dollar damage, and other measures that could help explain changes in state programs as a result of flooding all have their drawbacks for this purpose. The NFIP policy base has nearly doubled since 1995, making comparisons to prior years unreliable. Dollar damage from floods goes up continually, but so do expenditures and economic productivity. Numbers of floods are not a good indicator, because their sizes and impacts vary so much. Dollar damage is not estimated in a consistent fashion across the country or over time.

One rough indicator of the nationwide extent of damaging flooding nationwide both before and after 1995 is NFIP borrowing. During 1995 and 1996 the NFIP had to exercise its borrowing authority as a result of heavy flood losses that were twice the historical average. The borrowing peaked at $922 million in fiscal year 1998. But by the end of fiscal year 2003, The National Flood Insurance Fund had a positive balance of just over $660 million, despite paying over $1 billion in claims from Tropical Storm Allison. This suggests that the last several years have been a period of lessened flood activity, compared to the early 1990s, which included the Midwest floods of 1993 and the above-average flood damage of the two to three years that followed.

There is ample anecdotal evidence of the impact of individual floods on individual states, independent of the extent of flooding nationwide. Several of the large (about $100 million or more) floods of the last decade generated advancements in state programs. Florida made changes to its mitigation program after Hurricane Opal in 1995. Hurricanes Fran and Floyd (1996 and 1999) combined to lead North Carolina into concentrated redevelopment efforts and a massive mapping program. Tropical Storm Allison (2001) helped bring about the Harris County, Texas, flood mapping program and the state legislature established a Floodplain Management Task Force. The California Floodplain Management Task Force, which reviewed state laws and policies, was a result of three floods in 1996 and 1998.

- North Carolina notes that extensive flood damage from storms in the past several years and the related disaster assistance enabled the state to institute extensive training, mitigation planning, and mapping programs.
- In Ohio, a strengthening of the program is due in part to several flood disasters in the last decade, accompanied by disaster assistance and heightened visibility of flood hazard issues. The program was able to translate this into increased budgets.
- Similarly, Illinois reports that a recent increase in flooding has forced the education and awareness of local officials, who are now doing a much better job of administering local programs.

Positive External Influences

Besides flooding, other positive external influences on state floodplain management have been

- The formation and operation of state associations of floodplain management professionals (cited by 3 states) (see discussion above);
- Certification of floodplain managers (see discussion above);
- The advent of new technologies, particularly for mapping (cited by 2 states);
- Increased awareness in localities of the wisdom of self-regulation (1 state); and
- State legislation authorizing stronger local regulation (1 state).

Negative External Influences

Lack of funding, mentioned by 12 states, was the second-largest external influence (after flooding or the absence of it) on state floodplain management, but the reasons for modest funding are not always clear. Two key measures of state fiscal health (year-end balances and percentage budget increases) both indicated healthier state economies during the seven years covered by this report than during the years covered by the 1995 report,* meaning that on average states had not been facing "harder times" than usual. Yet several states noted that they were facing unspecified budget shortfalls statewide, two reported economic slumps, and there is a general perception of budgets in crisis. These seeming contradictions are probably due to the fairly sharp economic downturn during 2002 (the very end of this reporting period), which was followed by continual worsening during 2003 (not covered in this report). The effects of these more recent economic conditions doubtless will show up a future report covering the years beginning in 2003.

Funding levels also tend to be tied to flooding to some degree, because flood disasters bring financial assistance from outside, trigger the availability of grants, and also can act to stimulate spending on increased staff, mitigation measures, or other program improvements.

Other negative influences on state floodplain management have been

- A general shift within FEMA (the Department of Homeland Security) and at the state level to place more emphasis on mainstream emergency management and less on floodplain management (mentioned by 4 states). This was perceived to have a negative impact on floodplain management, as it tended to get "lost in the shuffle" of reorganized priorities (and, occasionally, reorganized offices and agencies).
- Development pressure (cited by 3 states);
- Reorganization at the state level (unrelated to the shift toward an emergency management focus) (cited by 2 states); and
- Reawakened concern about protecting private property rights (1 state).

* According to data from the National Governors Association and Association of State Budget Officers (2004), the average state budget increase for 1992-1995 was 4.3%, and for 1996-2002 was 5.35%, both below the 26-year average of 6.2%. The average state year-end balance for 1992-1995 was 3.7% of expenditures, and for 1996-2002 was 7.9% of expenditures (5% is considered a healthy reserve).

A Look to the Future

The changes and trends in state and local floodplain management identified in this report, coupled with events that have occurred during the period since the data were collected, suggest several areas that either are likely to engender further change or should be capitalized upon in order to effect changes that are desirable.

Trends to Watch

Some trends that bear watching include:

- The formation of state floodplain management associations (and chapters of the ASFPM) is one of the healthiest and most important recent changes on the floodplain management scene. That, along with the programs for certifying floodplain managers, will have far-reaching implications for all aspects of floodplain management, as professionalism, expertise, and influence grows over the years.
- There has been an apparent strengthening and/or increased influence of regional entities such as the Harris County Flood Control District (Houston vicinity), the Urban Drainage and Flood Control District (Denver metropolitan area), and the Lower Colorado River Authority (central Texas).
- The movement towards homeland security as an overarching concept for emergency management at both federal and state levels may continue to have an impact on floodplain management. Legitimate concern has been expressed that reorganizations, competition for funding and other resources, and changes in attitude among policymakers and others will result in floodplain (and other natural hazards) management's being "lost in the shuffle" over anti-terrorism programs.
- The concept of "no adverse impact" floodplain management has gained currency in the last couple of years and promises to pick up momentum and spread more widely. It is a comprehensive local government approach to identifying the effects of proposed development activities that will have a negative impact on other properties (in or out of the floodplain) and taking immediate steps to counteract them.
- Both states and localities have experienced a rapidly improving ability to obtain, manage, and manipulate spatial data for more sophisticated mapping functions, including floodplain management. The full potential for applying this capability to floodplain management has yet to be seen.

Shifts in Federal Funding

Funds provided by federal agencies are a significant contributor and incentive for state and local floodplain management programs. In a few key areas, funding has been increased since the data for this report were collected; in others, the prospects for continued or even increased support are more uncertain.

- As noted above, since these data were collected CAP funding has gone up to $7 million for FY2004 (from $5 million in 2002). States continually express the need for additional CAP funds to help build their capabilities and fulfill NFIP responsibilities, and these are the first increases in many years. This additional amount of money should bear fruit in the future.

- For fiscal year 2004, $5.4 million in funding is being provided under Map Modernization Management Support to help states implement their state business plans. Most of this money will go to states and some will go to special districts that are Cooperating Technical Partners. As this program becomes institutionalized, it is likely to become a significant source of funding for state involvement in mapping.
- The reductions in post-disaster funding for mitigation are already having negative impacts, although it may be a while before they can be clearly quantified. Although there is still some post-disaster mitigation funding available under the Hazard Mitigation Grant Program, when the amounts fall below a certain level their usefulness to states and localities diminishes disproportionately. Not only is there less money with which to undertake mitigation measures for damaged properties or in affected areas, but also the lack of funds to make reasonable mitigation offers to property owners makes it more difficult for local (and state) personnel to enforce the substantial damage regulations, thus perpetuating the presence of at-risk property.

  In theory, the reduction in post-disaster funding is being balanced by the appropriation of $150 million in fiscal years 2003 and 2004 for the new Pre-Disaster Mitigation Program. Further, some states will produce "enhanced state plans," making them eligible for the original 20% HMGP funding. It remains to be seen how effective these new provisions and programs will be and whether they will end up balancing out the reduction in HMGP.

New and Improved Programs

As always, the culmination of initiatives long in process, the introduction of new legislation, changes to existing statutes and programs, and various other factors will affect the future of state and local floodplain management programs.

- The passage of the Flood Insurance Reform Act of 2004 will bring a variety of adjustments to the NFIP and, significantly, a new program and funding for addressing problems of repetitive flooding. This doubtless will be a major factor in state and local activities in the coming years.
- The evaluation of the National Flood Insurance Program, set to be completed in the next year or so, will provide some hard data not only on the effectiveness of the NFIP but also that of many other areas of floodplain management. Those results will help shape state and local programs in the future.
- A new effort by the ASFPM Foundation, the Gilbert F. White National Flood Policy Forum, will be an annual gathering of experts in floodplain management to examine a selected issue of national policy and identify research needs and gaps in data. Besides supplying expert, focused input on key topics from a range of perspectives, over the years this tradition also will help to integrate floodplain management ideas across disciplines and through all levels of the public sector.
- November 1, 2004, will be the deadline for communities and states to have in place approved mitigation plans in order to be eligible for receipt of certain federal funds. The value of such planning (and the plans themselves) has been touted by floodplain managers for many years. Having a significant portion of them actually completed and

in place should result in improved capability at all levels for anticipating and coping with flood hazards.

- Ongoing work on repetitive losses by both the states and FEMA is yielding new and valuable data that will help refine future efforts in this direction.
- FEMA's new Pre-Disaster Mitigation Program (funded at $150 million for fiscal years 2003 and 2004) will provide another source of support for state and local flood loss reduction efforts in the future.
- What impact will FEMA's ambitious Map Modernization Program have on state capabilities? The program, and accompanying Cooperating Technical Partners initiative, has the potential to strengthen not only floodplain maps but also state capabilities in map production, inventory maintenance, data retrieval, and integration of flood hazards with other mapped features, enabling states to carry on with improvements and revisions to maps into the future. On the other hand, missteps now in map quality or diminution of funding over the coming years could be a significant setback both to states and to floodplain management overall.
- The rise in Increased Cost of Compliance insurance coverage to $30,000 per NFIP policy holds the promise for more and better individual mitigation efforts in the future.
- Beginning in fiscal year 2004, all states will be formulating 5-year floodplain management plans as part of their agreements with FEMA under the Community Assistance Program. Taken all together, these plans will shed considerable light on the total workload needed to have effective floodplain management in the nation, and on the areas in which there are gaps in capability or resources.

Some Recommendations

From the data presented in this report, it can be seen that the variety among state programs is wide and that there are many different ways to achieve similar goals. States have found ways to make the most of available funding, leverage existing resources to be more effective and to garner additional support, challenge long-held notions about priorities and get them re-aligned, learn from the experiences of other states, and work together to effect national changes. States have accepted the challenge of doing more with less, even as their responsibilities have been increasingly tied to larger, more complex floodplain and watershed management issues and mitigation activities.

The future challenge to state floodplain management programs, as always, will be to use funds more wisely, and focus resources where they will achieve the most urgently needed results. State staff and other professionals reviewing these data have made the following suggestions.

- States could benefit by using this report and the companion *Effective State Programs* to identify activities, policies, and strategies for improving their own programs.
- States should adopt certification programs for their floodplain managers at local, state, and intermediate levels.
- States should foster professional associations of floodplain management personnel within their states, including local and state staff, academics, the private sector, and other interested people.

- States should continue to concentrate effort on the formulation of state and local mitigation plans, not only for purposes of obtaining federal funding but also because of the value of ongoing examination and thought that the planning effort entails.
- States should contribute to, and encourage the continuation of, the U.S. Geological Survey stream gaging program, whose data are a cornerstone of flood mitigation;

Based on their judgments about the usefulness of certain federal programs to their state floodplain management efforts, states formulated the following "wish list" for Congressional and federal agency action:

- Funding support for state staff for floodplain mapping;
- Enhanced support for the mapping assistance programs of the USGS, the Corps, and the Natural Resources Conservation Service, which have been useful to many states;
- More support to the states from the Environmental Protection Agency for stormwater management, enabling it to be better integrated with floodplain management;
- Incentives for increased state involvement in various federal floodplain initiatives (to encourage state-level decisionmakers to support floodplain management); and
- More funding and support for the USGS stream gaging program.

For Further Investigation

Although this project has provided valuable information about floodplain management at state and local levels, it has also raised additional questions and pointed the way toward refinements in data that would be useful to practitioners and policymakers who seek to better understand and thereby improve the way the nation manages its watersheds to reduce flood losses and protect the natural functions of its floodplains. Some of the steps for future investigation are:

- Determine extent to which states have standardized their monitoring and evaluation of communities, and how records are kept.
- Find out which states, if any, conduct periodic program evaluations.
- Find out which states, if any, conduct periodic assessments of the progress of floodplain management as measures on the ground.
- Much more activity is underway and much more progress is being made in the management of coastal flooding problems and natural coastal areas than is reflected in this report; more extensive information needs to be gathered.
- Find out more about assessment of natural floodplain resources within states, and how states can better integrate flood risk reduction and the protection of natural functions and resources.
- Find out more about state requirements for and/or conduct of flood risk assessments.
- Find out if any new floodplain management functions/agencies were added in any states.

- Determine whether any states are integrating their (or others') resources mapping with floodplain areas. For example, does any state spatially correlate its endangered species habitat with riparian/floodplain lands? Or wetlands with flood risk maps?
- Explore the extent to which the floodplain management activities of regional (both multi-state and sub-state) entities, such as flood control districts or river authorities, are affecting state and local floodplain management, and vice versa.
- Catalog and explore ways in which the successes of states and localities can be shared to improve capabilities across the board. Promoting the most effective processes, tools, and standards so that others can benefit from them is what will move all states'—and the nation's—floodplain management programs forward.

References

Association of State Floodplain Managers 2004. *No Adverse Impact: A Toolkit for Common Sense Floodplain Management.* Madison, WI.: ASFPM. http://www.floods.org/NoAdverseImpact/NAI_Toolkit_2003.pdf.

Association of State Floodplain Managers 2004. *Effective State Floodplain Management Programs.* Madison, WI.: ASFPM. http://www.floods.org.

Association of State Floodplain Managers 1995. *From the Mountains to the Sea: Developing Local Capabilities.* Proceedings of the Nineteenth Annual Conference of the ASFPM. SP#31. Boulder, CO.: Natural Hazards Research and Applications Information Center.

Association of State Floodplain Managers 1995. *Floodplain Management 1995: State and Local Programs.* Madison, WI.: ASFPM.

Association of State Floodplain Managers 1992. *Floodplain Management 1992: State and Local Programs.* Madison, WI.: ASFPM.

Association of State Floodplain Managers 1989. *Floodplain Management 1989: State and Local Programs.* Madison, WI.: ASFPM.

Berke, Philip R., and Steven P. French. 1994. "The Influence of State Planning Mandates on Local Plan Quality." *Journal of Planning Education and Research* 13(4):237-250.

Bond, Leslie A. 2003. "Thoughts on State and Regional Floodplain Management Associations." Pp. 71-81 in *Lessons Learned: Gateway to Flood Mitigation. Technical Papers of the 27th Annual Conference of the Association of State Floodplain Managers*. Madison, WI: ASFPM.

Burby, Raymond J. and Steven P. French 1985. *Flood Plain Land Use Management: A National Assessment.* Studies in Water Policy and Management 5. Boulder, CO.: Westview Press.

Burby, Raymond J., and Peter J. May, with Philip R. Berke, Linda C. Dalton, Steven P. French, and Edward J. Kaiser. 1997. *Making Governments Plan: State Experiments in Managing Land Use*. Baltimore, MD.: Johns Hopkins University Press.

Curtis, Ed and Jerry W. sparks. 2002. "Scoping the North Carolina Cooperating Technical State Project. Pp. 87-191 in Association of State Floodplain Managers, *Plan, Prepare, Protect: New Trends in Floodplain Management, Proceedings of the 25th Annual Conference*. Madison, WI: ASFPM.

Federal Emergency Management Agency 2002. *National Flood Insurance Program Community Rating System Coordinator's Manual*. FIA-15. Washington, D.C.: FEMA.

Federal Emergency Management Agency and Interagency Task Force on Floodplain Management 1986. *A Unified National Program for Floodplain Management*. FEMA 100. Washington, D.C.: FEMA.

Federal Interagency Floodplain Management Task Force 1994. *A Unified National Program for Floodplain Management 1994*. FEMA-248. Washington, D.C.: Federal Emergency Management Agency.

Federal Emergency Management Agency. 2000. *Rebuilding for a More Sustainable Future: an Operational Framework*. FEMA 365. Washington, D.C.: FEMA. Available at http://www.fema.gov/mit/planning_toc2.htm.

Federal Emergency Management Agency. 2000. *Planning for a Sustainable Future: The Link between Hazard Mitigation and Livability*. FEMA 364. Washington, D.C.: FEMA. http://www.fema.gov/mit/planning_toc.htm.

Federal Interagency Floodplain Management Task Force 1994. *A Unified National Program for Floodplain Management 1994*. FEMA-248. Washington, D.C.: Federal Emergency Management Agency.

National Governors Association and National Association of State Budget Officers. 2004. *The Fiscal Survey of States.* Washington, D.C.: NGA and NASBO.

Schwab, Jim, Kenneth C. Topping, Charles C. Eadie, Robert E Deyle, and Richard A Smith. 1998. *Planning for Post-Disaster Recovery and Reconstruction.* PAS Report No. 483/484. Chicago, L:

American Planning Association. Abstract available at http://www.planning.org/apapubs/details.asp?Num=1178.

Task Force on the Natural and Beneficial Functions of the Floodplain. 2002. *The Natural and Beneficial Functions of Floodplains: Reducing Flood Losses by Protecting and Restoring the Floodplain Environment*. FEMA 409. Washington, D.C.: Federal Emergency Management Agency.

Tennessee Valley Authority. 1985. *A Guide to Evaluate a Community's Floodplain Management Program*. TVA/ONRED.AWR 86/26. Knoxville, TN: Floodplain Management Program, TVA.

Wisconsin Department of Natural Resources. 1983. *Effectiveness Study of Wisconsin's Floodplain Management Program. Vol. 1, Local Programs*. Madison, WI: Wisconsin DNR.

Wisconsin Department of Natural Resources. 1984. *Effectiveness Study of Wisconsin's Floodplain Management Program. Vol. 2, State Agencies*. Madison, WI: Wisconsin DNR.

World Commission on Environment and Development. 1987. *Our Common Future*. New York: Oxford University Press. Abstract available at http://www.oup.co.uk/isbn/0-19-282080-X#desc.