Modifying the Impacts of Flooding

Despite efforts to control flooding and to reduce susceptibility to it, floods do occur, with adverse consequences on individuals and communities. A third strategy for mitigating floodplain losses is to help individuals and communities prepare for and recover from floods. This can be done through information dissemination and education, spreading the costs of the loss over time, and transferring some of the individual losses to the community.

It is not clear whether the present combination of flood insurance, disaster assistance, tax adjustments, and postflood recovery practices designed to implement this strategy is producing an equitable sharing of the capital and operating costs of floodplain occupancy among its beneficiaries, or shifting the costs from the individual to the public and government agencies. Neither has there been a clear statement of how much, if any, of the cost of floodplain development should properly be borne by the general public. Some argue that all costs should be borne by those occupying the floodplain; others that development of the floodplain provides economic benefits and, therefore, the general public should shoulder them.

Information and Education

Information and education activities for floodplain management have expanded dramatically since the 1960s, as illustrated by the number of publications, technical manuals, brochures, conferences, workshops, organizations, and media presentations now in existence. The effectiveness of this activity is difficult to assess. It is clear that many local officials and property owners still do not thoroughly understand concepts of probability, cumulative impacts, off-site impacts, and functional values—all of which are important for successful floodplain management. It is also clear that little of the material that has been generated and released adequately integrates the flood loss reduction and natural resources protection aspects of floodplain management.

Much of the basic information about floodplain management was developed or sponsored by federal agencies, and includes technical design and application manuals, research reports, computerized databases, and public awareness materials. Federal and state agencies train their own personnel in floodplain management programs and activities. Both levels of government have actively provided financial and technical support to hundreds of conferences, seminars, and workshops on every aspect of floodplain management for professionals at all levels of government and the private sector, and for floodplain residents

In addition, states respond to individual inquiries from local officials, insurance agents, lenders, property owners, and the general public, and publish information tailored to the particular legal, administrative, and geographic situations of each state. Numerous nonprofit and professional organizations with concern for floodplain management have been formed in the last two decades These organizations conduct research, produce publications, hold conferences and workshops, and provide a network through which professionals can exchange information.

Flood Insurance

Insurance is a mechanism for spreading the cost of losses both over time and over a relatively large number of similarly exposed risks. Until 1969, insurance against flood losses was generally unavailable. Under the National Flood Insurance Program, initiated in 1968 and significantly expanded in 1973, the federal government made flood insurance available for existing property in flood hazard areas in return for enactment and enforcement of floodplain management regulations designed to reduce future flood losses

Although participation in the program is voluntary, of 21,926 communities in the nation identified as floodprone, 18,023 (82%) had joined the program as of November 30, 1990 At the end of calendar year 1990, there were 2.39 million policies in force with $201 billion of coverage. From 1978 through 1989, over 384,000 claims were paid totalling over $3 1 billion. Net receipts from policy premiums versus claims payments varies substantially from year to year. From 1978 to 1989 the net operating deficit or surplus ranged from a

Much information on floodplain management and flood hazard mitigation has been published in illustrated, clearly written manuals directed toward both private property owners and public officials

STATE INITIATIVES TO EDUCATE THE PUBLIC

- *Texas holds workshops on the National Flood Insurance Program tailored to the host county's flood situation and invites lenders, insurance agents, real estate agents, and others.*
- *In Tennessee, a community planner will visit a floodprone site upon request, recommend actions, and direct the owner to more information or assistance*
- *Wisconsin state law requires real estate agents to advise prospective purchasers if a property is shown as floodprone on NFIP maps*
- *The Maryland Department of Natural Resources created "Farley Floodhound," a cartoon character who appears in a coloring book and helps "flood pups" learn flood safety tips*
- *Arizona is preparing a short course to be presented at local real estate schools.*
- *The Oklahoma legislature passed a law in 1986 that reads "If the premises to be rented have been flooded within the past five years and such fact is known to the landlord, the landlord shall include such information prominently and in writing as part of any written rental agreements."*

deficit of $261 per policy in 1979 to a surplus of $98 per policy in 1987. A surplus was realized in fiscal years 1986, 1987, and 1988. As of October 1, 1988, the flood insurance fund was operating with a net surplus of $450 million, the result of a combination of rate increases and relatively low flood losses during those years. The accumulated surplus provides a reserve for years with catastrophic losses.

In 1983, the Federal Insurance Administration initiated its "Write-Your-Own" program whereby private insurance companies, under special arrangements, are permitted to sell and service flood insurance under their own names. The success of this program is evidenced by the fact that 80% of all flood insurance is presently sold by the participating WYO insurance companies.

Insurance premiums are based on the location of a structure within the floodplain and are determined primarily by the height of the structure's lowest floor in relation to the height of water during a base flood. Higher rates apply to structures subject to fast-moving waters New and substantially improved structures in the floodplain that are not properly elevated to the base flood level are subject to higher rates than structures already in the floodplain at the time a community joined the program. Since 1974, flood insurance rates have increased several times in order to reduce the amount of the federal subsidy and bring the cost of flood insurance closer to true actuarial rates. In early 1988 the administrator of the Federal Insurance Administration announced success in "making the National Flood Insurance Program self-supporting for the historical average loss year." Even so, the existing premium base is not large enough to permit the National Flood Insurance Program to operate on a fully actuarial basis. But because only 15% to 30% of the nation's floodprone structures are insured, there is plenty of room for increased market penetration. Several strategies for increasing the number of insured structures have been suggested, including requiring more stringent enforcement by lenders of the mandatory purchase requirements, increasing public awareness of the flood hazard, imposing disclosure requirements on real estate agents, offering special insurance coverage and policy riders, and maintaining premiums at more affordable levels.

Concern has been expressed that flood insurance premium costs have increased to a level so high that many people do not purchase flood insurance unless they are required to do so by a mortgage lender or unless they have experienced flooding. Many of those who do purchase insurance allow it to lapse later The net result appears to be that only those individuals with the greatest risk actually purchase and maintain flood insurance. To maintain actuarial rates for this group, insurance rates may be forced even higher.

Many of the claims paid out each year are on structures that have previously incurred damage. The Federal Emergency Management Agency defines these as repetitive loss structures—those for which two or more losses of more than $1,000 (building and contents combined) have been paid during the most recent 10-year period. From January 1980 through December 1989, 27 5% of the total losses and 32.5% of the amount paid on them were repetitive losses. Most repetitive losses are suffered by structures built before regulations and are for relatively small amounts; the building damage is usually a low percentage of the building value (53.2% of repetitive losses are for 10% or less of the building value). A high proportion of the repetitive loss claims payments are for contents.

Repetitive losses tend to be concentrated in a small number of National Flood Insurance Program communities, and many occur outside the designated floodplain. Six repetitive loss communities have had 29 7% of all the repetitive losses; 20 communities have had 44 3% of the losses. Although 12 of the top 20 repetitive loss communities are coastal, only two have significant numbers of policies in coastal areas. Only 22 of the top 100 repetitive loss communities are primarily subject to tidal flooding. Because of this it is believed that the repetitive loss problem is more related to riverine or stormwater flooding than to tidal flooding.

The Federal Insurance Administration has implemented a Community Rating System to encourage communities to go beyond the required standards. The incentive will be a reduction in flood insurance premiums for policyholders within communities that take approved actions to reduce flood losses.

NFIP Flood Claims Paid 1978-1987

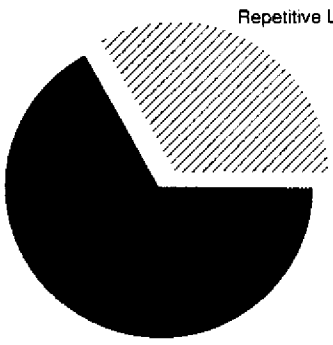
State[1]	Amount of Claims Paid
Alabama	$ 87,805,791
Alaska	332,839
Arizona	14,064,010
Arkansas	10,800,307
California	108,846,266
Colorado	3,223,467
Connecticut	34,906,126
Delaware	1,929,167
District of Columbia	101,518
Florida	165,125,349
Georgia	8,455,396
Guam	17,492
Hawaii	10,354,101
Idaho	499,193
Illinois	81,307,867
Indiana	13,289,339
Iowa	3,101,421
Kansas	12,957,557
Kentucky	48,913,951
Louisiana	502,019,965
Maine	15,921,597
Maryland	21,859,402
Massachusetts	40,890,955
Michigan	23,999,710
Minnesota	16,518,655
Mississippi	108,496,982
Missouri	113,043,717
Montana	1,943,610
Nebraska	9,460,795
Nevada	1,891,589
New Hampshire	3,729,914
New Jersey	117,979,379
New Mexico	490,587
New York	105,271,504
North Carolina	15,495,792
North Dakota	9,786,873
Ohio	29,549,982
Oklahoma	60,986,298
Oregon	2,404,346
Pennsylvania	61,971,275
Puerto Rico	32,200,608
Rhode Island	7,828,172
South Carolina	10,324,333
South Dakota	1,403,419
Tennessee	8,482,208
Texas	575,588,046
Utah	4,439,661
Vermont	1,140 338
Virgin Islands	2,332,664
Virginia	59,077,329
Washington	13,196,518
West Virginia	67,738,531
Wisconsin	3,295,144
Wyoming	1,038,852
Totals	$ 2,657,819,907

Source Flood Insurance Producers National Committee

[1] 'State,' as defined by FEMA program regulations, means any state the District of Columbia the territories and possessions of the United States, the Commonwealth of Puerto Rico and the Trust Territory of the Pacific Islands

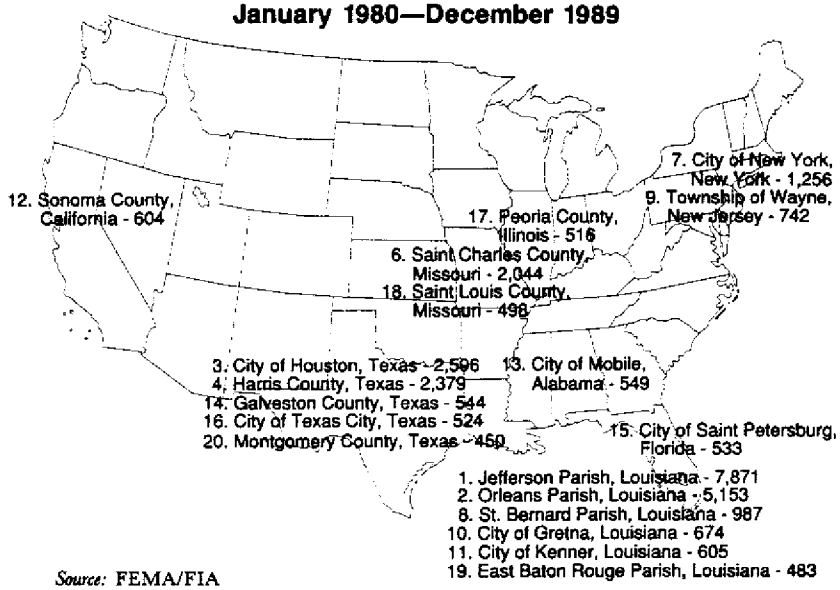
Amount Paid for NFIP Losses, 1980-1989

Total Paid = $2.27 Billion



Source: FEMA/FIA

Top 20 Repetitive Loss Communities by Number of Losses January 1980—December 1989



Source: FEMA/FIA

ACCEPTING THE NFIP

During the first 15 years of the National Flood Insurance Program, communities often challenged it and resisted adopting the required regulations. Now, because communities have seen the regulations supported in the courts, because there has been intensive media coverage of flood disasters, and because concerns about local liability for flood damages have been heightened, there is increased awareness of the program's benefits. As a result, NFIP regulations and other floodplain management activities have become institutionalized and generally accepted as a community responsibility.

TAX POLICIES TO MODIFY THE IMPACTS OF FLOODING

- *In 1987, Des Plaines, Illinois, began a permit surcharge of $200 for floodplain development projects to help finance city flood protection activities.*
- *The city of Stamford, Connecticut, has required developers of certain projects constructed in the floodplain to contribute funds for the operation and maintenance of their automated flood warning system.*
- *After disastrous flooding in 1982, the state of Connecticut enacted special flood relief legislation that included a provision for tax abatements for those whose property was damaged more than 10% of its value. Towns were authorized to abate up to one-third of the taxes due, and the state would reimburse them for 90% of the taxes lost. Eighteen towns offered some tax abatement to property owners, and the state reimbursed the towns a total of $49,504.*

Today, flood insurance is largely unavailable except under the National Flood Insurance Program. An exception is a Lloyds of London-based policy which has as many policyholders in Utah as does the National Flood Insurance Program. Some private policies or riders are available for basement flooding; these were initiated after the National Flood Insurance Program limited its coverage for basements and subsurface flows. Flood insurance is included as part of a comprehensive flood insurance policy for some large businesses with offices and land holdings in many locations, in and out of the floodplain. Crop insurance available under the U.S. Department of Agriculture's Federal Crop Insurance Corporation provides protection to agricultural producers from losses caused by insects, disease, fire, hail, drought, floods, freeze, and wind.

Tax Adjustments

Most provisions of federal, state, and local tax codes are designed to encourage development without regard to whether it might take place in a floodprone area, while relatively few provisions provide incentives to leave land in its natural state. Some tax-based incentives for development are reductions in property taxes, abatement or deferral of taxes to entice or retain businesses in an area, and the establishment of enterprise zones or other special business zones to promote development and employment in economically depressed areas. These make locating businesses, homes, and other development in some floodprone areas financially feasible and even attractive. On top of this, the federal Internal Revenue Code and many state codes also provide casualty loss deductions on income taxes to those suffering flood losses. After disastrous floods, many states and localities provide additional types of tax relief, reducing or temporarily suspending real estate taxes or business taxes for those affected by flooding, for example.

Still, more integration of tax policies and floodplain management is occurring. The Tax Reform Act of 1986, for example, made major changes in the Internal Revenue Code, some of which have an impact on floodplain management. Individual casualty loss deductions under $100 are now prohibited, and the deduction is limited to the portion of the loss that exceeds 10% of the adjusted gross income. The new rule does not apply to business property. The Act also eliminated or restricted many of the tax deductions and credits that had been used as incentives to build in floodplains, on barrier islands, and at other hazardous locations.

Flood Emergency Measures

Flood emergency measures are typically carried out by local civil defense, police and fire departments, public works agencies, and public health personnel, supplemented as necessary by assistance from state and federal agencies. Emergency activities during and immediately after a flood may include removing people and property from areas about to be flooded; sandbagging around individual structures and constructing emergency dikes to direct water away from vulnerable areas; search and rescue; and steps to protect the health and safety of residents.

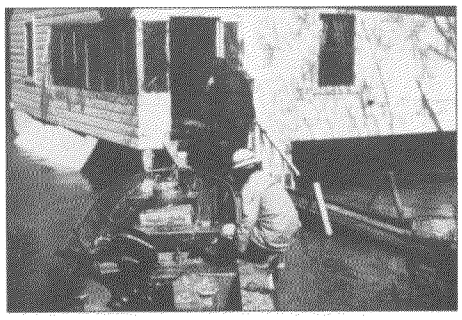
To be successful, flood emergency measures must have the thorough involvement of the private sector, from individuals who evacuate and take household-level emergency precautions, to the organized group efforts like those of the American Red Cross local chapters. Private contractors work for communities and individuals to remove debris and repair homes, roads, bridges, and other property damaged from floods. Some states have standing contracts with private businesses to provide emergency services in disasters. The 1983 floods in Utah showed what literally thousands of volunteers, acting individually and in groups, can accomplish during flood emergencies.

The Corps is the federal agency most commonly involved in flood emergencies, under authority of P L. 84-99, which authorizes it to help in flood fighting, repair and restoration of flood control works, provision of emergency water supplies, implementation of advance protective measures, and the performance of other hazard mitigation activities. The support may take the form of technical assistance, materials, equipment, or services. The Soil Conservation Service may also become involved with emergency efforts The Federal Energy Regulatory Commission requires emergency action plans for all its licensed dams The Federal Emergency Management Agency helps state and local governments assess the extent and severity of damage in order to seek disaster assistance. State emergency services agencies generally coordinate state resources and activities during flood emergencies, and the state police and transportation or public works departments, the state national guard, and the agencies responsible for dam safety and water resources also play major roles.

Disaster Assistance

Disaster assistance is provided by federal, state, and local governments, and the private sector It may take the form of financial relief, or of help to repair, replace, or restore facilities damaged or destroyed by a disaster The system is most often efficient and adequate to provide the necessary financial relief to individuals and communities.

The greatest source of federal disaster assistance is provided under the Disaster Relief Act of 1974 and takes the form of grants to the states from the President's Disaster Relief Fund after Presidentially declared disasters. The assistance is administered by the Federal Emergency Management Agency, which also directs and coordinates the disaster assistance functions of all federal agencies The Small Business Administration issues its own disaster declarations and makes low-interest loans available directly to eligible individuals and businesses to replace or repair damaged real estate, inventory, or other business property. The Federal Highway Administration provides funding assistance for damaged highway facilities that were constructed with federal aid Under the Emergency Watershed Protection Program, the Soil Conservation Service may directly undertake emergency work such as clearing debris from channels and stabilizing streambanks As mentioned above, the Corps has authority to provide assistance for disaster the Corps has authority to provide assistance for disaster preparedness, advance protective measures, rehabilitation of flood control works damaged or destroyed by flood, protection or repair of federally authorized shoreline protection works threatened or damaged by coastal storms, and provision of emergency drinking water. The Farmers Home Administration State Director may make emergency loans to farmers, ranchers, and oyster planters. Under the Emergency Conservation Program, an Agricultural Stabilization and Conservation Service State Director may designate areas eligible for cost-sharing grants of up to 64% to rehabilitate farm lands damaged by natural disasters.



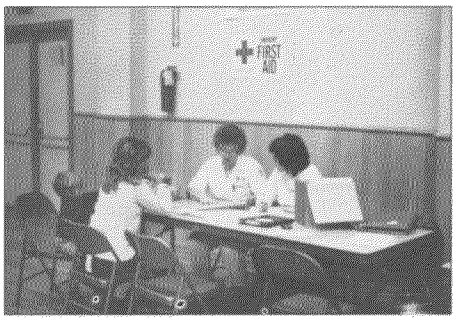
Emergency response to flooding is usually the responsibility of local agencies, with supplemental assistance from state and federal agencies However, private citizens are typically the first to respond and provide assistance to others

FIGHTING FLOODS IN UTAH

In early May 1983 Salt Lake County, Utah, began 24-hour monitoring of critical streams in anticipation of severe flooding as a result of a large snowpack and unusually cold spring. The most vulnerable flooding location was identified as 13th South, where three streams came together City forces, with assistance from volunteers, built temporary dikes along the street so it could be used as a channel. After a sudden thaw on May 26, the county and city declared an emergency and flood control plans were activated Two days later another creek reached a flood discharge nearly double its previous record and went out of control. Volunteers were called in to sandbag 1 5 miles of State Street through the city; flood waters were successfully controlled in this temporary river

During the extended period of flooding and subsequent cleanup in Utah in 1983, volunteers put in an estimated 50,000 days of work in Salt Lake City, and about 100,000 days in the rest of the county. The value of the volunteer work has been estimated at over $18 million.

State Street, Salt Lake City, Utah, May 1983 (Street was used as a temporary water conveyance path.)



Most federal disaster assistance is provided through FEMA, although the Small Business Administration, Federal Highway Administration, Soil Conservation Service, Army Corps of Engineers, Farmers Home Administration, and Agricultural Stabilization and Conservation Service also administer programs. State and local governments, as well as private, nonprofit organizations such as the Red Cross, are also centrally involved in providing aid following flooding.

Disaster Assistance Center, DeRidder, Louisiana, 1983.

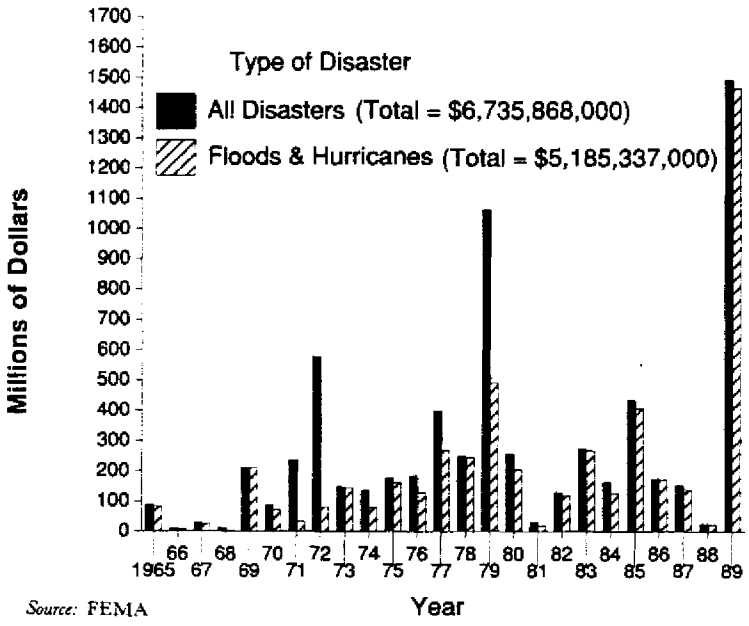
THE "AVERAGE" DISASTER

A 1990 preliminary report by the U.S. General Accounting Office noted that in an "average" disaster about 2,000 individuals and families seek federal disaster assistance and the Federal Emergency Management Agency spends about $10 million.

Although all state and most local governments have programs to coordinate and provide assistance during an emergency, few have special funds for financial assistance to victims. Most states limit their own disaster assistance funding to local governments, rather than extending it to businesses or individuals. All states now contribute some of the nonfederal share of assistance for Presidentially declared disasters. States may also declare their own emergencies or disasters; 28 states then provide assistance to localities out of a governor's emergency fund.

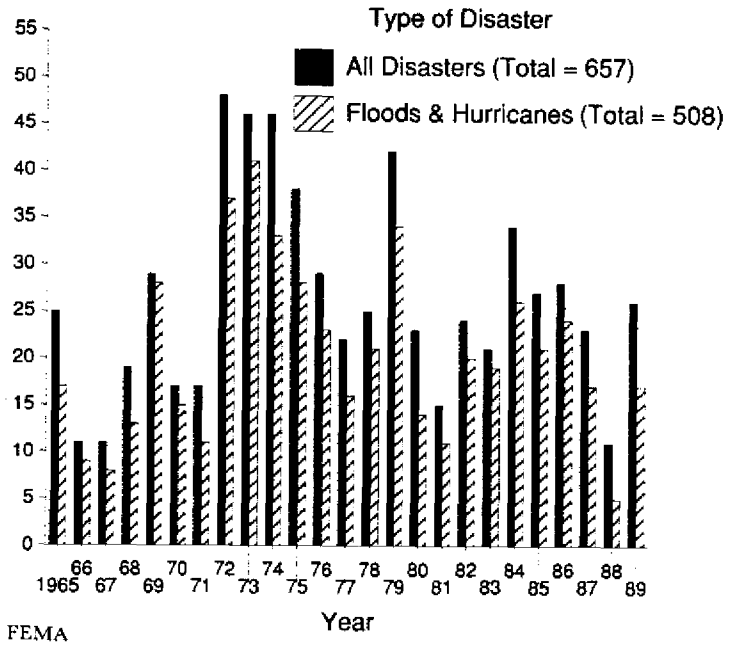
Local governments may provide disaster assistance to their residents and business community, most commonly through some form of tax break. Many localities have joined mutual aid agreements with nearby communities to pro-

Dollars Paid for Disaster Assistance, 1965-89
All Disasters versus Floods and Hurricanes



Source: FEMA

Number of Presidentially Declared Disasters, 1965-89
All Disasters versus Floods and Hurricanes



Source: FEMA

vide equipment, personnel, and other disaster assistance Research has shown that local governments have the capacity to assume a much higher proportion of losses than they usually do within the existing framework of federal and state programs.

A number of national voluntary organizations provide disaster relief services, primarily emergency shelter, food, clothing, and medical aid. Some also provide longer-term assistance, such as rebuilding homes or job placement. A committee known as the National Voluntary Organizations Active in Disaster coordinates 11 private relief groups. Three of these organizations, the American National Red Cross, the Salvation Army, and the Mennonite Disaster Service, were formally recognized in the Disaster Relief Act of 1974 and have signed memoranda of agreement with the Federal Emergency Management Agency formalizing the provision of their disaster assistance. In addition to national organizations, local churches and other voluntary groups often provide significant assistance during and after disasters.

Postflood Recovery

Postflood recovery work, aided by many types of disaster assistance, has been largely effective at restoring flood-damaged communities and individual properties to their preflood condition. Unfortunately, this has not always been the wisest course of action, because returning to the status quo leaves the door open for a repeat of the disaster. Numerous recommendations have been made over the years to alter recovery procedures to take advantage of the opportunities presented immediately after a flood, when outside expertise and money flows into a community, damaged or destroyed facilities are waiting to be repaired or replaced, and local attitudes toward mitigation are more flexible than before. It was thought that this would be the best time to identify mitigation actions that might easily be taken and to delay reconstruction until wise decisions about the vulnerability of future development could be made. Gradually federal agency policies began to change so that over the past two decades individuals and communities have had to meet certain conditions in order to receive disaster assistance. These include protecting the environment, implementing floodplain management measures, purchasing flood insurance, and taking action to mitigate hazards. Passage of the Disaster Relief and Emergency Assistance Act in 1988, which allows federal disaster assistance funds to be spent on mitigation activities and not just to rebuild to the predisaster condition, signalled a new approach to postflood recovery.

Restoring and Preserving the Natural and Cultural Resources of Floodplains

The strategies of preserving and restoring the water resources, living resources, and cultural resources of floodplains are generally intertwined. The best way to protect these floodplain resources is to avoid development within floodplains It has been suggested that stronger federal support of programs to set aside floodplains from development is needed, and that federal policies and procedures actually do not encourage and sometimes even obstruct innovative approaches to preserving natural floodplains. Several federal policies, for example, limit the features of water resources projects to those that have quantifiable economic benefits. Because many natural and cultural resources are difficult to quantify, or add only incremental benefits, the cumulative effect of eliminating these features may not be taken into account.

Limited preservation and restoration can be accomplished indirectly through flood loss reduction activities. Numerous programs at all levels of government establish policies that encourage, but generally do not require, protecting floodplain resources. Natural resources management itself is usually not focused on floodplains but instead addresses a particular resource throughout its natural range.

NAGS HEAD PLANS ITS RECOVERY FROM A FUTURE FLOOD

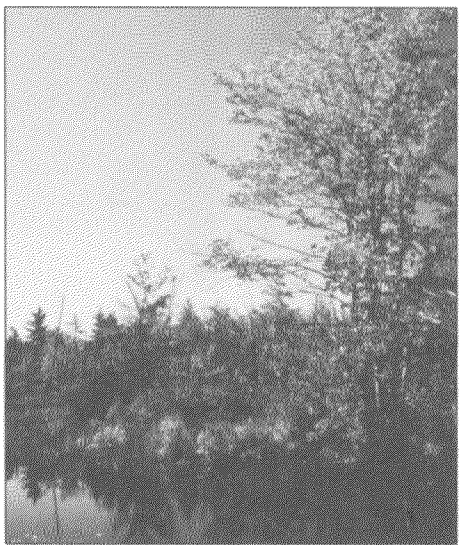
The Town of Nags Head, formerly a quaint village of seaside cottages on the Outer Banks of North Carolina, is now a resort community facing substantial growth and development. One of its main concerns is protecting the quality of its natural resources and preparing its residents and thousands of visitors for hurricanes and coastal storms With guidance from the state's Coastal Area Management Act Program, Nags Head began preparing a local land use plan that would incorporate a prestorm mitigation program, warning and preparedness plans, and poststorm reconstruction policy.

In developing its plan, Nags Head surveyed all its properties at risk, finding that 84% of the town's 2,500 buildings lay in the 100-year floodplain and 44% in the high hazard areas. There were also four public buildings, 27 miles of streets, and 32 miles of public water mains within the floodplain

After a series of meetings and workshops, the Board of Commissioners adopted policies and actions "to reduce, to the extent possible, future damage from hurricanes and severe coastal storms" There are 12 mitigation policies, including using the capital improvements program to encourage growth away from high hazard land into public open space, and opposing construction of finger canals and other projects that destroy the protection provided by natural features.

The poststorm reconstruction policies are designed to take advantage of the natural land clearance provided by severe storms When it begins to redevelop the cleared areas, the town will limit reconstruction of substantially damaged buildings and public utilities, will rebuild public structures strong enough to be used as shelters, and will not permit oceanfront reconstruction until the state reestablishes the setback line

(Adapted from ASFPM News & Views, *1988)*



It has been difficult to quantify the value of the natural and cultural resources of floodplains and therefore difficult to justify government expenditures to preserve floodplains in their natural state However, there is a growing desire among the public to make sure that the natural benefits of the riparian environment are safeguarded