Hurricane Floyd, the state's worst disaster in history, left a trail of misery across eastern North Carolina: towns invaded by floodwater, homes destroyed or severely damaged, families uprooted, people left jobless, dreams shattered.

Clockwise from top right: Robert Miller, *Raleigh News & Observer*; Christobal Perez, *Raleigh News & Observer*; Ed Hayden, *Goldsboro News-Argus*; Sher Stoneman, *Raleigh News & Observer*; Christobal Perez, *Raleigh News & Observer*. Opposite page: inset, Chuck Liddy, *Raleigh News & Observer*; hurricane photo courtesy of the National Oceanic and Atmospheric Administration.

Preventing Disasters through "Hazard Mitigation"

◎

ANNA K. SCHWAB

North Carolina is blessed with an abundance of rich natural resources, as varied and as vital as the people who live here. Its beaches are clean, its mountains spectacular, its rivers and streams plentiful, and its climate temperate. This bounty provides the state's residents with a wonderful place to call home, but there also are inherent dangers. From time to time, hurricanes ravage the coast, ice storms immobilize the mountain areas, and heavy rains cause the waterways to flood the surrounding countryside.

Storms, floods, earthquakes, and wildfires are a part of the natural balance of the environment. A storm that levels dunes displaces the sand to another part of the beach system. A wildfire that blackens a forest allows new growth to flourish. But when such events occur where people have made

A Marine Corps helicopter rescues a trucker stranded by flooding on I-95 near Rocky Mount.

thousands of people from their homes and structurally damaging or destroying entire neighborhoods and downtowns, the flooding may have serious environmental consequences. The actual extent of these problems is not yet known, but many believe that the floodwaters were polluted with waste from hog lagoons, sewage from septic tanks and municipal treatment plants, hazardous materials from chemical facilities and factories, oil and gas from storage tanks and salvage yards, dead animals from farms, and numerous other contaminants.

Floods of the magnitude caused by Hurricane Floyd also have more insidious effects. The long-range economic consequences may far surpass the costs of replacing damaged structures and repairing infrastructure. People have been out of work while the floodwaters have invaded employment centers, and many businesses will never recover. Some people will leave the region, changing the workforce for businesses that do remain viable. Farmers have not only lost this year's crop but suffered losses of farm equipment and other capital. Many may not recoup the loss, even after insurance payments and government relief funds have been distributed. (For estimates of the physical damage from Hurricane Floyd, see the sidebar on page 5.)

Perhaps most complex of all are the changed social and psychological circumstances following Floyd. Citizens have been emotionally traumatized in ways that may manifest themselves in increased incidents of domestic abuse, depression, anxiety, and substance abuse. Communities have lost civic and social centers, recreational facilities, schools, and other identifying elements of their character. Although in some communities the shared experience of disaster may have pulled the people together, in others the disaster itself may have fractured the entire sense of place irrevocably.

their homes and built their businesses, the results can be devastating. Weather- and geology-related phenomena can wreak havoc in towns and communities, disrupting the flow of goods and services, destroying property, and unsettling people's lives. The more dramatic natural events have even caused death and injury.

This article summarizes the widespread effects of North Carolina's worst disaster, the flooding brought on by Hurricane Floyd, and then describes an initiative of the state government to promote local planning that may lessen the disastrous effects of such natural events. [For an article on recovery efforts following Hurricane Floyd, see page 40.]

Hurricane Floyd and Its Aftermath

Hurricane Floyd was a storm whose impact will be felt for years. The unprecedented flooding in many parts of eastern North Carolina following the September 1999 storm has ramifications far beyond the obviously high water levels. In addition to displacing

Hurricane Floyd Damage Estimates

Scope of Impact
- About 6,600 square miles of eastern North Carolina (about 23 percent) were under floodwater on September 23–24, 1999.

Fatalities
- As of January 27, 2000, fifty-two fatalities were confirmed by the North Carolina Medical Examiner's Office.

Rescue Operations
- More than 1,400 swift-water evacuations were performed by the U.S. Coast Guard (the lead agency), the U.S. Air Force, the U.S. Army, the U.S. Marines, North Carolina Marine Fisheries, the North Carolina National Guard, North Carolina Wildlife Resources, and private citizens.

Flood Levels
The flooding set new records:

- In Tarboro the Tar River crested at 40.92 feet. Flood stage is 19 feet, and the previous crest was 34 feet in 1919.
- In Rocky Mount the Tar River crested at 32.2 feet. Flood stage is 15 feet, and the previous crest was 23.9 feet in 1998.
- In Goldsboro the Neuse River crested at 28.8 feet. Flood stage is 14 feet, and the previous crest was 27.4 in 1929.

County Impact
- Sixty-six of the state's 100 counties were declared disaster areas.
- A 500-year flood (the kind of flood that has a 1-in-500 chance of occurring each year) occurred on the Tar and Neuse rivers.
- Hurricane Floyd was the worst disaster in North Carolina history; the cost is expected to exceed that of Hurricane Fran ($6 billion).
- Almost 75,100 people have applied for recovery assistance.

Utilities
- Seven community water systems in Edgecombe, Nash, and New Hanover counties remained uncleared as of November 30, nearly eleven weeks after Hurricane Floyd hit North Carolina. Uncleared water systems are those with "Boil Water Advisory," "Boil Water Notice," or "System Not in Use" status.
- At the peak of the disaster, 1.5 million customers were without power. Costs were as follows:
  Debris removal: $24 million
  Pipeline replacement: $30.5 million
  Utility restoration: $97.5 million
- Twenty-four wastewater treatment plants were flooded or severely damaged.

Transportation
- At one time, nearly 1,000 roads were closed, including I-40 from Sampson to New Hanover counties, I-95 from Johnston County to the Virginia line, and U.S. 70 from Johnston County to the coast.
- Rail lines were closed in North Carolina, affecting Amtrak's East Coast routes.
- The Department of Transportation's Customer Service Line received more than 100,000 calls on Saturday and Sunday after the storm.
- Ten bridges were washed out, and 44 road sections were closed as a result of Hurricanes Floyd and Irene.
- Topsail Inlet (in Pender County) was closed on November 9 for dredging.
- As of November 23, highway construction costs were $150.6 million, with 77 roads still out.
- As of November 23, bridges and drainage-structure construction costs were $75 million, with 13 bridges still out.

Dams
- Seven dams in Nash, Wake, Wayne, and Wilson counties were either receiving emergency attention or undergoing fundamental repair. Also, one dam in Robeson County was being examined to determine its hazard classification.

Underinsured and Uninsured Housing Losses
- Eighty-one percent of the damaged homes were primary residences.
- Forty-six percent of the affected population had no insurance, or fire insurance only.
- Damage estimates (from FEMA, as of November 29) were as follows:
  Minimal damage ($2,500 or less): 11,807 homes
  Minor damage ($2,500–$5,000): 2,765 homes
  Major damage ($5,000–$10,000): 2,565 homes
  Destroyed: 2,912 homes
  Total: 20,049 homes

Claims Submitted to National Flood Insurance Program for Housing Losses
- Twelve thousand claims were received, totaling $61.1 million in losses.

Agricultural Losses
- As of November 1, total agricultural losses were $812.6 million.
- Livestock losses totaled $13 million. The number of dead animals broke down as follows:
  Hogs: 30,500
  Chickens: 2.2 million
  Turkeys: 737,000
  Cattle: 880
- Crop losses: $543.3 million
- Farm structure losses: $256.3 million

Forestry and Fishery Losses
- Forestry losses: $89.4 million
- Fishery losses: $19 million

Disaster Unemployment Assistance
- Nearly 5,100 applications for disaster unemployment assistance were approved, worth $1.9 million.

Note: All figures are approximate. They were supplied by Tom Hegele, Chief, Education and Emergency Information Section, North Carolina Division of Emergency Management, and were current as of November 29, 1999, unless otherwise noted.

Keeping Hazards from Becoming Disasters

Although Hurricane Floyd is the worst disaster North Carolina has ever experienced, it is by no means the first. Hurricane Hazel ravaged the coastline in 1954. The "Ash Wednesday Storm" of 1962 was a fierce winter storm that survivors still have not forgotten. Hurricane Opal in 1995 and Hurricane Bertha in 1996 weakened the coastline just in time for Hurricane Fran, which until Floyd took the spot as worst disaster in the state.

Many scientists theorize that hazardous events are on the rise from factors such as global warming, sea-level rise, and fluctuations in weather patterns. In addition, development is growing rapidly in numerous areas of risk. It is becoming more and more apparent that something must be done to prevent hazard-related devastation from occurring again and again in North Carolina. Although people cannot eliminate *hazards*, they can prevent *disasters* through "mitigation." Hazard mitigation encompasses a range of activities undertaken by governments, corporations, builders, developers, and individual business and home owners. It can in-volve strengthening buildings (for example, remodeling a structure to withstand earthquake tremors), modifying the environment (for example, constructing a levee or another type of barrier to protect property from rising floodwaters), using avoidance techniques (for instance, conserving high-risk property as public open space), and adopting other public policies (such as refusing to extend municipal services and utilities to undeveloped areas in hazard zones).

Mitigation at the Local Level

Undertaking mitigation at the local level is a particularly effective way to create safer, more hazard-resilient communities. Although the economic effect of large disasters like Hurricane Floyd is statewide, the brunt of the physical, financial, and emotional impact is felt in the settings in which people live and work—in the towns, neighborhoods, homes, businesses, schools, and farms damaged or demolished. Knowing from experience the extent to which Mother Nature can transform the landscape, the people of these communities may be willing to support changes that could prevent a repeat experience. The power of local decision makers to affect the future is substantial. They regulate land-use patterns and building practices, make many public spending and taxation decisions, and largely determine growth and development policy. Local resolution can control to a large degree where, when, and how homes, businesses, schools, and farms are built.

Following a disaster, many local governments take advantage of federal and state aid to decrease their vulnerability to natural hazards, and an active, engaged community can use the window of opportunity that arises during the reconstruction period to build a community that is better than before. Ideally a community that engages in hazard mitigation will come up with an overall program ensuring that individual mitigation projects are not carried out in a disjointed, ad hoc fashion.

Robert Willett, *Raleigh News & Observer*

At the North Carolina State Fair, a consultant for the Federal Emergency Management Agency uses a scale model to demonstrate the impact of flooding on towns.

A community-wide mitigation program can be effective in tying *all* local activities together so that no single project detracts from the overall goal of creating a safer community. For example, the Federal Emergency Management Agency (FEMA) has granted thousands of dollars to local North Carolina governments through the Hazard Mitigation Grant Program (HMGP) to acquire flooded property, remove it from the marketplace, and relocate the resident homeowners and businesses to other, safer areas. But removing structures from isolated parcels is not nearly as effective as placing an entire block or riverfront out of harm's way and integrating the land into the local park or greenway system so that the hazardous area will remain undeveloped in perpetuity, as well as contribute to the community's open space program.

One way that local governments can achieve an integrated approach to hazard mitigation is by creating and implementing a local hazard mitigation plan. Under the Hazard Mitigation Planning Initiative (HMPI), a program established by the Mitigation Section of the Division of Emergency Management in the North Carolina Department of Crime Control and Public Safety, local governments throughout the state are breaking new ground in mitigation planning. With grants from HMPI, eleven cities and counties are formulating hazard mitigation plans that will serve as models for other communities in the state (see the sidebar on this page for a list of the communities). These Demonstration Communities are receiving technical assistance and guidance in formulating their plans, as well as training in using sophisticated computerized analysis in the planning process. HMPI is rapidly expanding the scope of its services to include as many governments in the Floyd disaster area as feasible. These communities soon will be receiving training and materials to begin their own mitigation planning activities.

The Hazard Mitigation Planning Process

Although the Division of Emergency Management allows for local creativity and flexibility among the communities enrolled in HMPI, there are some standards to shape and guide the various plans being formulated. The following description of the planning process is adapted from documents prepared for use by HMPI and other communities to guide local planning activities (to obtain more information, including a copy of the planning guide, see the sidebar below for contact data).

Conducting Background Studies
The first step in the planning process involves information gathering. Basic studies that must be performed before a

HMPI Demonstration Communities

Boone
Carteret County
Craven County
Elizabethtown
Franklin County
Johnston County
Lenoir County
Mecklenburg County
New Hanover County
Pender County
Washington

Becoming an HMPI/ Project Impact Community

The Division of Emergency Management is eager to expand the Hazard Mitigation Planning Initiative (HMPI) to communities across the state, and it continues to seek local governments that have demonstrated a commitment to hazard mitigation. As mitigation funds become available, the division will continue to award mitigation planning grants to local governments that have applied for and are selected as new HMPI communities. Local governments are encouraged to prepare and submit grant applications for participation in HMPI even if adequate funding is not currently available through the division.

An essential component of HMPI is Project Impact, an initiative launched by the Federal Emergency Management Agency (FEMA) in October 1997 in response to rapidly escalating disaster costs and the growing need to assist communities in protecting lives and property. Project Impact communities receive grant funding and technical assistance from both the federal and the state government to begin addressing their potential hazards and implementing disaster prevention strategies. Such strategies may include but are not limited to hazard mitigation planning, policy and regulatory standards, public awareness and education programs, and structural mitigation projects.

The designation of Project Impact communities occurs annually in coordination with FEMA. Each year the Division of Emergency Management nominates at least one community to participate in the project. Once approved by FEMA, the nominated communities receive their Project Impact designation and funding award. All North Carolina communities awarded a Project Impact designation also become participants in HMPI.

Communities that apply for participation in HMPI or Project Impact are evaluated on the basis of numerous criteria, including (1) a demonstrated commitment to hazard mitigation, (2) hazard vulnerability, (3) capability to adopt and implement mitigation strategies, and (4) local political support.

To learn more about applying for participation in HMPI and Project Impact, or to receive copies of the planning guide, contact Darrin Punchard, HMPI/Project Impact Coordinator, North Carolina Division of Emergency Management, 116 West Jones Street, Raleigh, NC 27603-1335, phone (919) 715-9195; or visit the Division of Emergency Management's Web site, www.ncem.org.

As Hurricane Floyd makes landfall in North Carolina, evacuations of coastal areas create near-standstill traffic as far inland as Interstate 40 near the Raleigh-Durham International Airport.

mitigation plan can be formulated are as follows:

- Identifying and analyzing the natural hazards that affect the area
- Analyzing the area's vulnerability to each type of natural hazard
- Assessing the capability of the area to mitigate those hazards effectively
- Analyzing the acceptability of the existing level of risk

Hazard Identification and Analysis

In the first basic study, the community identifies and maps its problems—the types of hazards that exist, the frequency and the probability of their occurrence, their strength and impact, and the location within the community where the impact may be felt. This step allows the community to focus limited resources on hazards with the highest likelihood of occurrence and the greatest potential impact. Resources for collecting hazard data include local maps; state, regional, and local agencies; and federal Flood Insurance Rate Maps (FIRMs). Unfortunately, FIRMs and other types of hazard maps for many localities are in need of updating, but the lack of precision in delineating hazardous areas should not dissuade communities from using all available data

for planning purposes. Not to be discounted as a source of information is historical evidence from past hazard events and the cumulative knowledge of residents and long-time community members. Even anecdotal evidence about "the big one" that occurred a generation ago can provide valuable information for planners and policy makers.

Vulnerability Analysis

The second background study is to determine the community's level of vulnerability—both now and in the future—to the natural hazards identified in the previous step. This analysis highlights who and what is at risk. To target mitigation efforts appropriately, the community must know where and to what extent it is susceptible to the impact of natural hazards. Vulnerability assessment includes recording population numbers (including such details as seasonal fluctuations and special populations); the number, type, location, and value of residential, commercial, and industrial structures; the location of critical facilities such as hospitals, power plants, and police and fire stations; the types of regional activities that may affect the community's vulnerability; and the location of developable

and undevelopable lands. Data sources include local and state population figures, existing land-use maps, and tax assessment maps. Future vulnerability of people can be determined using population projections or estimated growth rates. Local land-use plans, zoning ordinances, and other regulatory and policy instruments that determine where, when, and how land may be developed can be used for assessing the vulnerability of the future built environment.

To be truly useful, hazard background analyses must be mapped. All the identified hazard areas should be displayed, and critical facilities, employment centers, structures that have been repeatedly damaged, and infrastructure (roads, bridges, water and sewer lines, and so forth) should be marked. Planners can then overlay existing land-use maps and tax maps to determine what is at risk in relation to the hazards. Future vulnerability can be displayed graphically by overlaying the local zoning map and vacant-lands map to show potential development in relation to areas of risk. Many communities find that the application of Geographic Information Systems (GIS)—a computerized analytical tool—is an effective means to carry out this step, but

GIS is merely an instrument to help determine vulnerability. Communities that do not have the resources to engage in the sophisticated analyses that GIS affords can carry out hazard assessment in a more rudimentary fashion with traditional maps and grease pencils. The critical issue is to gather the data and present them in a format useful for policy formulation.

Capability Assessment

The capability assessment involves ascertaining the legal authority vested in local governments to pursue measures to mitigate the impact of natural hazards. The assessment also involves evaluating the community's political willpower, institutional framework, technical know-how, and ability to pay for mitigation. The capability of all levels of government (local, state, regional, and federal), as well as the potential contributions of nongovernmental organizations (churches, charities, community relief funds, the Red Cross, hospitals, for-profit businesses, nonprofit organizations, and the like) should be included, with a description of their

usefulness to the local community in terms of hazard mitigation.

The capability assessment is more than an inventory of existing mitigation measures and organizations with responsibility for hazard mitigation. It should include evaluation of the *de facto* mitigation measures—those that may be designed for another purpose but nevertheless have an effect (either positive or negative) on hazard vulnerability. For example, preserving ocean-front dunes for aesthetic purposes also buffers shoreline property from wind and waves. The assessment also must identify and analyze existing local policies or practices that may weaken mitigation efforts or even exacerbate the risk facing the local community from natural hazards. These might include formally adopted policies (for example, relaxation of building code requirements following a flood or a hurricane to speed recovery) or political directives concerning allocation of public resources (for example, a decision to finance the extension of utilities and public services to hazardous areas).

There often is significant divergence

between the legal authority to act and the political willingness or the financial ability to carry through. The political dimension may be particularly difficult to assess in advance. However, analyzing how to insert mitigation routinely into everyday decision making can go a long way toward depoliticizing the issue. If mitigation comes to the forefront of the community's concerns, local elected officials may be much more likely to promote its implementation. Public education and awareness campaigns about the long-term economic benefits and social utility of mitigation also can help foster its general acceptance by citizens and, in turn, by elected officials.

Funding for mitigation may be a low priority in some local budgets. Fortunately, diverse sources of assistance are available to communities to increase their financial capability, including both government and private programs. National programs provide the bulk of disaster-related financing. Mitigation grants and loans are available to eligible communities from FEMA, the U.S. Department of Housing and

Officials in the state's Division of Emergency Management used a geographic information system (GIS) to generate this map of 100- and 500-year flood zones in a section of Wayne County. Officials analyzed land parcels within the flood-hazard areas to identify opportunities for mitigating future damage from floods.
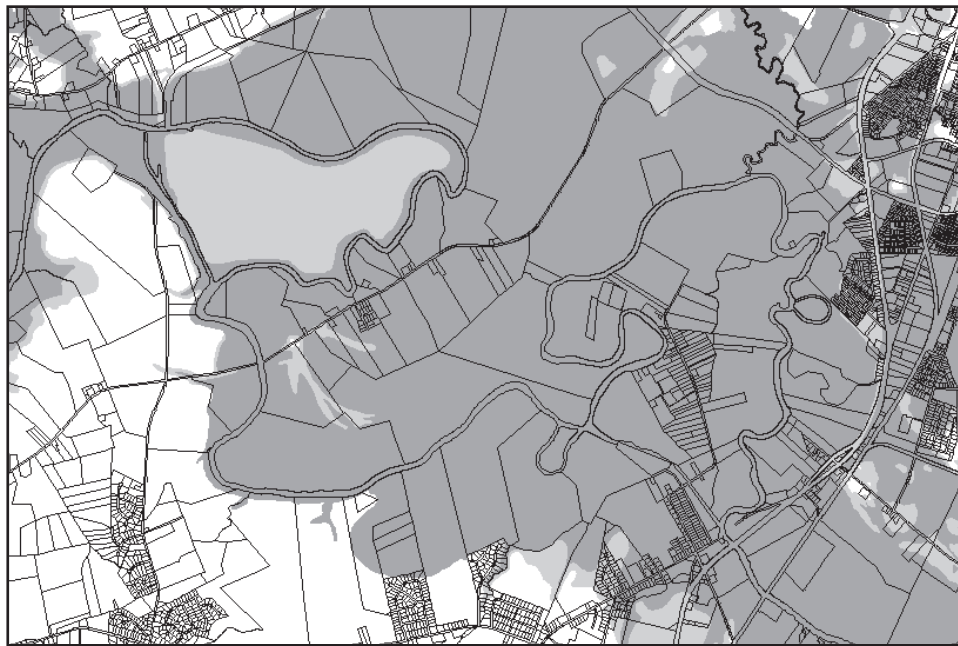
Flood Zones
and Properties,
Goldsboro Area

☐ Wayne County parcels

Flood Zones

■ 100-year flood zones

■ 500-year flood zones

2   0   2   4 Miles

Map prepared by North Carolina Center for Geographic Information and Analysis

The flooding may have serious environmental and health consequences. Above and right: pigs struggling to stay alive as rising floodwaters threaten them; a flooded hog lagoon. Below: one of more than five junkyards located within the floodplain of the Neuse River that were overrun by floodwaters.

Urban Development, the federal Small Business Administration, and other federal agencies following a declared disaster. But local communities need not rely solely on government financing to augment the local hazard-mitigation budget. For instance, local businesses and organizations will frequently support projects that benefit their customers or employees or constitute good public relations. Other groups or individuals may be willing to donate in-kind goods or services, eliminating the need for cash. Often the in-kind and volunteer contributions of community members can be counted toward the local share

that is typically needed to supplement an outside source of funds.

Acceptability Assessment

On the basis of the background studies on hazards, vulnerability, and capability to respond, the locality should determine whether the existing level of risk is acceptable. If not, the locality should create a plan to reduce its vulnerability.

Formulating Goals and Objectives

Once the background analyses have been performed, the community can use the information to create a vision for change. Often a community already

has formulated goal statements in other documents that can help develop mitigation priorities and support mitigation objectives. The comprehensive plan (which governs the locality's overall land-use pattern), the capital improvements plan (which identifies where and when local expenditures for infrastructure will take place), the floodplain management plan (which delineates flood-hazard areas and regulates activities located there), and other locally enacted policies and plans may be sources of already existing goal statements that can be incorporated into the hazard mitigation plan.

Many communities, however, did not address hazards when they established their goals and objectives. As a result, they may have overlooked hazard risks, and some of their goals and objectives may even hinder mitigation. Thus they may have to create new goals or reconcile old ones with their interest in mitigation.

To the greatest degree possible, mitigation goals and objectives should be integrated with other local interests. Examples of other, broad-based goals that can support mitigation goals (and vice versa) include providing open space, conserving the environment, protecting natural areas, improving water quality, preserving historic buildings

The flooding of cemeteries, like this one near Kinston, had bizarre results: coffins unearthed and washed away.

and structures, and maintaining a stable and growing business community.

Formulating Policy, Programs, and Strategies

The policies, programs, and strategies contained in the local mitigation plan direct what action will be taken to make the community safer. *Policies* are principles of hazard mitigation, expressed as action statements. Policy areas to which mitigation concepts should be directed include environmental protection, transportation, housing, and management of growth and development and other major local functions. For example, a policy might determine which critical environmental areas merit special protection from development, thereby enhancing their natural mitigation features. Another policy might govern transportation capacity, ensuring that adequate evacuation time is allowed in case of a major hazard event.

Programs, made up of *strategies* designed to implement the plan, are the means by which policy is carried out. A comprehensive mitigation plan will contain several programs, each of which complements and supports the others. For example, as part of their mitigation plans, some communities have enacted programs to control the rate of growth in environmentally sensitive areas and areas with limited evacuation capacity. Strategies used to carry out such programs include delineating preferred-growth areas and developing small-area plans for the targeted locations. Increasingly, local governments are devising acquisition programs to obtain rights to critical pieces

Residents of Edgecombe and south Pitt counties, surrounded by floodwaters, were airlifted by U.S. Coast Guard SH-43 helicopters to a shelter at Tarboro High School.

Princeville, the first town chartered by freed blacks, on February 20, 1885, was severely damaged by floodwaters. At right, water overtakes the Princeville Town Hall. On February 29, President Clinton created a special council on the town, directing a dozen Cabinet members and senior officials to help rebuild it. It "holds a special and highly significant place in our nation's history," he said.

of property. By acquiring property either in "fee simple" (with full rights of ownership) or through easements, local governments can protect sensitive areas from development and prevent a dramatic rise in the locality's vulnerability.

Adopting and Implementing a Plan

To become enforceable policy, a local hazard-mitigation plan must be adopted by the governing body of the local government. A series of recommendations made by planning staff will not have the same impact as an official document that lays out the government's policies regarding mitigation.

No plan is self-executing, so the real challenge of hazard-mitigation planning involves converting the plan into action. It is important to have some implementation mechanisms in place before a disaster occurs, such as a list of sites to be acquired or a reserve fund to move damaged infrastructure. The plan should specify the people or the offices within the community that are responsible for carrying out the actions, and set forth a schedule to ensure timely implementation. The intent of the implementation section is to alter the traditionally reactive nature of a response to disaster. The proactive nature of mitigation planning is what leads to successful reduction of hazard vulnerability.

Creation of Sustainable Communities through Hazard Mitigation

Communities that have been through a disaster such as Hurricane Floyd have lost much. But they also can gain much. Redevelopment can take place in a manner that allows localities to rebuild as stronger, more resilient, even better communities than before. Following

a disaster the significant challenge for communities is how to balance the driving need for rapid recovery with the importance of implementing long-term hazard mitigation. Meeting basic needs and resettling displaced populations often overshadow consideration of the community's sustain ability. Once a community has initiated full-scale reconstruction, modifying projects to meet sustainability objectives is difficult. This phenomenon highlights the need for pre-disaster mitigation planning that incorporates principles of sustainable development within the context of reconstruction.

By looking closely at the hazards they face and the impacts those hazards can have, citizens can direct development in ways that do not pose the same risks. They can take the process further, incorporating into all redevelopment efforts the principles of smart growth: a sense of stewardship, an ethic of environmental protection and natural resource preservation, and a commitment to equity and parity. Both urban and rural areas can be rebuilt to meet the needs of the current generation while protecting the ability of future generations to meet their own needs.

This Oak Island home was partially lifted off its foundation and grotesquely twisted.

Sustainable development through mitigation is not an impediment to growth. By building a community that is resilient to natural hazards, citizens strengthen the local economy. A locality that reduces its vulnerability will experience less restoration time, shortened business downtime, and less social disruption following a disaster, freeing resources that would otherwise be devoted to response and recovery, and more quickly improving citizens' lives.