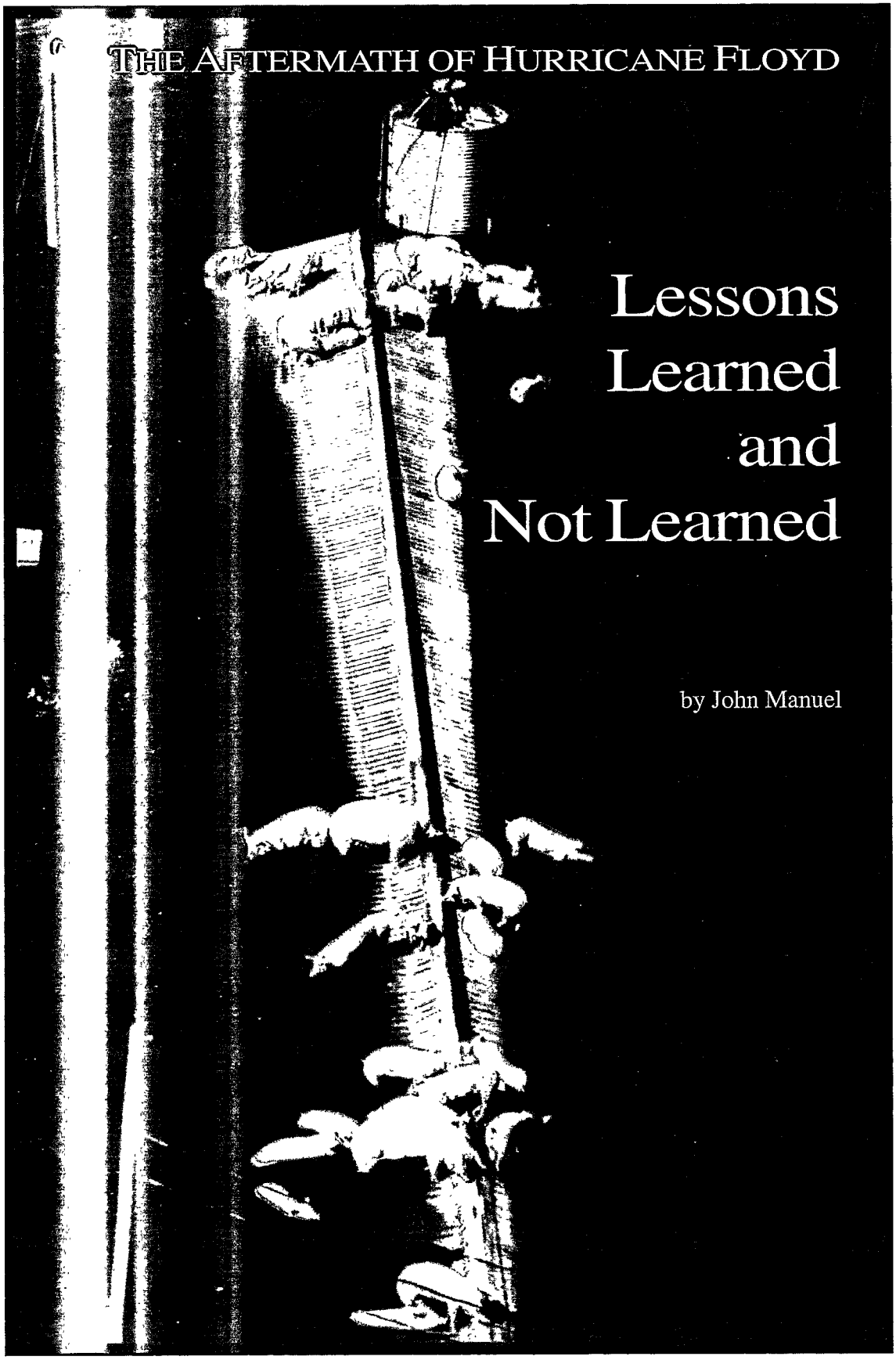
THE AFTERMATH OF HURRICANE FLOYD

Lessons Learned and Not Learned

by John Manuel



News & Observer

Executive Summary

Hurricane Floyd dumped more than 21 inches of rain on Eastern North Carolina in September 1999, inundating an area the size of Maryland. By most accounts, it was the worst natural disaster to strike North Carolina in recorded history. A total of 52 lives were lost as swollen rivers and sounds engulfed homes, farms, junkyards, and anything in their paths. The haunting scenes of dead livestock floating in rising floodwaters dominated state and national news mediums.

More than two years later, the state is still rebuilding. There have been lessons learned and some not learned in how to crawl out from the wreckage and how to lessen the risk that such a disaster will occur again.

Among the positives: The state drew criticism for its rescue efforts in reaching people trapped by rising floodwaters. With federal funds resulting from Floyd, the state has been able to purchase an information management system that will enable it to deploy its resources better to dispatch people and supplies in the face of future emergencies.

Environmentalists became concerned that more than a dozen junkyards were inundated, raising fears that the state's public waters would be contaminated with heavy metals and other pollutants. To date, proceedings are underway to purchase nine of the junkyards with an eye toward converting them to green space. So far, studies have detected little flood-related pollution in the affected sounds and rivers.

Among the negatives: Buyouts of hog farms located in floodplains are proceeding at a snail's pace. One photograph became almost synonymous with the flood. It pictured hogs perched upon the rooftop of a barn, half submerged beneath floodwaters. The surrounding waters bore the carcasses of animals that had already floated free. Critics say another Floyd-like storm could wreak the same havoc. The farm is yet to be purchased or relocated—symbolic of the slow pace of buy-out efforts.

The picture in housing is mixed. More than 67,000 homes were damaged by Hurricane Floyd, nearly 8,000 of which were destroyed. While many homeowners have relocated or rebuilt their homes, many more are still mired in negotiations for loans or buyouts. Affordable housing was an issue in the East even before Hurricane Floyd, and renters are having particular problems finding affordable places to live. For example, when Edgecombe Community Develop-

ment Corporation completed apartments that had been under construction before Floyd, the agency had 732 inquiries and applications for 32 apartments—and not all of them went to Floyd victims.

Homeowners generally have fared better than renters, though the pace has been slow for many homeowners as well. Only about 13 percent of homes in counties affected by Hurricane Floyd were covered by flood insurance. For those not covered by flood insurance, the primary vehicle for financing a rebuilding effort is a Small Business Administration Disaster Home Loan. As of Sept. 14, 2001, the SBA had approved loans to some 13,000 North Carolinians totaling $510.9 million. However, many homeowners had incomes too low to qualify for an SBA loan (A family of four must make at least $20,563 to qualify). Still others—particularly seniors—did not want to enter into a 30-year promissory note. For these, a patchwork of loan and grant programs has been pieced together, but it takes time to make people whole after a disaster of the magnitude of Floyd, and many homeowners and renters have not reached that point. As of Nov. 1, 2001, 207 families still lived in FEMA travel trailers and mobile homes.

As for avoidance of future disasters, again, the picture is mixed. Local governments will have a better picture of their floodplains to help guide development, thanks to Digital Flood Insurance Rate Maps developed through a $23 million state appropriation—the largest such commitment to better floodplain mapping in the country. Some cities, such as Kinston, have instigated exemplary efforts to buy out flood prone areas and relocate their citizens. Yet some homeowners are building back in the same places they lost their houses before. In conclusion, while Floyd was a harsh teacher, it's clear there are still lessons left unlearned in the storm's wake.

On a cool, clear winter's day, pilot Phil "Snoopy" Bowie banks his Cessna 110 over the city of New Bern and heads west along the Neuse River. Rick Dove, southeastern representative of the River Keeper's Alliance, is seated beside him. In September 1999—a year-and-a-half earlier—Hurricane Floyd had swept through Eastern North Carolina, dumping more than 21 inches of rain and flooding an area the size of the state of Maryland. In the storm's aftermath, former Governor Jim Hunt and the North Carolina General Assembly allocated $836 million in storm relief money, passed a flood hazard prevention act, and initiated more than a dozen new programs to make the region whole and prepare it for future storms. Dove has come aloft to find out what has actually changed on the land.

"There's the McCoy farm right down there," Dove says, pointing to a block of eight rectangular barns and adjoining waste lagoons. In September 1999, those lagoons were completely underwater, their contents spilled out into public waters. Hogs were clinging to the roofs of the half-submerged barns or floating dead nearby. Aerial photos of that image were published nationwide, often accompanied by articles admonishing North Carolina for allowing such farms to be built in the floodplain. Today, the lagoons are once again full, indicating

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the barns have been restocked with animals. Dove shakes his head.

"That farm should not be back in operation," he says. "The state said they were going to buy it out, but they didn't. The money's gone elsewhere. The next time we get a major rainfall event, that farm will be underwater again."

Bowie steers the plane west to the town of Kinston. A pair of junkyards straddle a bend in the river, rusting cars and trucks parked in long irregular rows. These, too, were inundated by Floyd, and oil and gasoline from their rusting tanks and engines spilled into the river.

"The state has done a little better on the junkyards," Dove says. "I understand they've got contracts to buy some of them out and turn the land into greenways. That's going in the right direction."

Table 1. Hurricanes That Have Significantly Affected North Carolina Since 1879

Hurricane Name/Date	Category*	Deaths in N.C.	Maximum Winds*	Damage Totals in N.C. (Unadjusted)	Damage Totals in N.C. (Adjusted for Inflation)
August, 1879	4	40+	168	NA	NA
September, 1883	3	53	100+	NA	NA
August, 1899	4	25	140	NA	NA
September, 1933	3	21	125	$3 million	$36.6 million
September, 1944	3	1	110	$1.5 million	$14.4 million
Hazel, 1954	4	19	150	$136 million	$845 million
Ione, 1955	3	7	107	$88 million	$544 million
Donna, 1960	3	8	120	$25 million	$142 million
Diana, 1984	3	3	115	$85 million	$141 million
Gloria, 1985	3	1	100+	$8 million	$12.8 million
Hugo, 1989	3	7	100	$1 billion	$1.4 billion
Emily, 1993	3	0	111	$13 million	$15.3 million
Bertha, 1996	2	2	105	$1.2 billion	$1.3 billion
Fran, 1996	3	24	115	$5.2 billion	$5.6 billion
Bonnie, 1998	3	3	104	$1 billion	$1 billion
Floyd, 1999	2	52	110	$6 billion	$6 billion

* These numbers are as they occurred in North Carolina. Categories are based on the Saffir/Simpson Hurricane Scale, which uses the storm surge, central pressure, and/or maximum sustained winds to classify Atlantic hurricanes into one of five categories. Category 5 is most severe. However, none of the above-referenced storms had this level of intensity when it reached landfall in North Carolina. The categories do not take into account flood damage, which was Hurricane Floyd's signature agent of destruction.

Sources: J. Barnes, J. (2001) "Selected Notorious Hurricanes in North Carolina Since 1879." http://www.ibiblio.org/uncpress/hurricanes/charts.html, and T. Ross and N. Lott, "Billion Dollar U.S. Weather Disasters 1980–2001," National Oceanic and Atmospheric Administration.http://www.ncdc.noaa.gov/ol/reports/billionz.html.

Flood waters rise, dams leak
cemeteries give up their dead . . .
Do you see the long-buried coffins floating down Main Street
even time cannot hold the departed . . .
How do you bury the dead
When the ground won't allow it . . . .

—FROM "LOOSE COFFINS IN CAROLINA"
BY MAUREEN A. SHERBONDY

Bowie circles the Cessna, bringing the circular holding tanks of Kinston's Peachtree Sewage Treatment Plant into view. This plant is located right in the floodplain of the Neuse, and high waters have hampered its operation on an almost annual basis. During Hurricane Floyd, the plant was totally inundated, dumping millions of gallons of raw sewage straight into the river.

"This darn plant breaks down every time it drizzles," Dove says. "But the state is finally going to shut the thing down. They're going to run everything to another plant outside the floodplain. Now, that's a real success."

As Bowie banks his Cessna toward home, it's clear that North Carolina has learned some important lessons in the wake of Hurricane Floyd. Changes are already visible on the ground and others are underway. At the same time, some individuals and communities are carrying on business as usual, either not believing that another storm of Floyd's magnitude will come along soon or assuming that the state and federal government will bail them out if it does. There are still livestock and junkyards in the floodplain, and houses by the score. With Hurricane Floyd two years passed, *Insight* looks at some lessons learned and not learned by the citizens and political leaders of North Carolina.

Emergency Preparedness and Response

When Hurricane Floyd hit on September 15, 1999, North Carolina was largely unprepared for the devastation that followed. Flooding of inland streams and rivers was the primary agent of destruction, not the coastal storm surge and wind that accompanies most hurricanes. Fifty-two lives were lost, most by drowning. Sixty-six counties were declared disaster areas, twenty-seven of them being severely damaged by the storm. Seventy-three municipalities were severely damaged by the disaster, most notably the communities of Princeville, Greenville, Tarboro, Kinston, and Rocky Mount.

After the storm passed, agencies across the eastern part of the state sprang into action. Local rescue squads, state forest and park rangers, N.C. Wildlife Commission officers, N.C. Department of Transportation workers, National Guardsmen, and others performed acts of heroism in rescuing people and animals from the floodwaters. Without taking away from these individual acts, some people are critical of the state's preparedness and response both prior to Floyd and in the storm's wake.

Slim Ray is president and chief executive officer of CFS Press, which specializes in books on flood and swift-water rescue. Ray has more than 20 years' experience as a raft guide, canoe/kayak instructor, and rescue instructor for Rescue 3 International. In an article written for *The News & Observer* one year after Floyd, Ray detailed a series of issues that he says remain unresolved.

First, Ray says that relevant state and local agencies, including local rescue squads and N.C. Department of Transportation workers, were not properly trained or equipped in swift-water rescue prior to Floyd. Ray says they still lack this training, despite plans announced by the State Fire Marshal's Office to develop these programs. Ray also contends that the state did a poor job of getting trained rescuers where they needed to be in the initial stages of the disaster. He blames this disorganization largely on divided command for emergency training and management at the state level. The State Fire Marshal within the Department of Insurance is responsible for rescue standards and training. The Division of Emergency Management

News & Observer / Scott Sharpe

Hobucken residents wade through flood waters from Hurricane Floyd to reach the Goose Creek Island Community Center, that was destroyed by a tornado generated when Hurricane Floyd moved ashore in Eastern North Carolina.

within the N.C. Department of Crime Control and Public Safety is responsible for the actual management of disasters. But when Floyd hit, Ray claims that the Fire Marshal's office oversaw the actual mobilization of rescue forces, and "because they were not familiar with the resource manual developed by Emergency Management, there were delays and confusion."

Although Emergency Management has the authority to manage rescue operations in counties after the governor declares a state of emergency, Ray contends that the division took a "wait-and-see attitude," not intervening unless asked by local rescue squads. "All these factors virtually guaranteed a slow, reactive response during the first 24 hours of Hurricane Floyd," Ray writes. "Were it not for the prompt intervention of the military with its fleet of helicopters, the death toll would have been much higher. . . . The state response system is broken."[1]

Responding to Ray's criticisms, Division of Emergency Management Director Eric Tolbert says he does not agree with Ray's call for a "statewide incident command system" that would direct local rescue operations in a crisis. Tolbert says the Division of Emergency Management is not sufficiently staffed, nor is it intended to manage all emergency functions that happen in a crisis. Rather, he says, it should serve a coordinating role.

"A greater problem that was experienced during Floyd was that we did not have an information management system that connected the State's Emergency Operation Center [EOC] with the county EOCs," Tolbert says. "With the [Federal Emergency Management Agency] financing that resulted during Floyd, we were able to purchase a system called EM-2000, which provides for far better efficiency in inventorying, securing, and dispatching resources statewide. We are in our infancy with this system, but have already seen dramatic improvements in our resource management."

Tolbert also disagrees that there was too long a delay in getting swiftwater teams from the west-

ern part of the state into the floodzone. He says that highly trained swiftwater rescue teams were rarely needed during Floyd, and that "operations" level teams were readily available among local fire and rescue organizations and wildlife officers. Given that just 24 hours before Floyd's landfall, the projected hurricane path was into Charleston and inland across Winston-Salem and Greensboro, Tolbert says it would have been imprudent to move highly trained resources from the western part of the state into the coastal plain.

Tolbert does agree there is a need to train and equip all personnel who might be called upon to respond to a water-related emergency or might find themselves in a flood emergency situation as a result of their duties. Specifically, Tolbert envisions these personnel being divided into three levels of capability—awareness (able to provide minimal rescue services), operations (able to provide rescue from a boat, shoreline, and bridges, but not in the water), and technician (able to perform rescues in moving floodwaters using special equipment). Thus far, the division has received a FEMA grant of $70,000 to begin this training, but no state appropriation. Tolbert estimates a need for training and equipment in excess of $2 million.

Ray's criticisms also were broadly rejected by the Office of the State Fire Marshal in the N.C. Department of Insurance. Tim Bradley, Senior Deputy Commissioner of Insurance in the Office of the State Fire Marshal, notes that N.C. Department of Transportation officials are not trained or equipped for swift water rescue because their job is not rescue. He says that rescue squad personnel, on the other hand, often do have such training, especially where they provide protection in areas with large bodies of water. "During Floyd, everyone helped out, including numerous citizens who were not trained," says Bradley.

"Large investments in swift water techniques and equipment in areas without major rivers or large bodies of water would likely not be tolerated by the taxpayers," Bradley adds. "When a jet crashes in a rural community, local fire departments are usually ill-equipped to handle that incident unassisted by outside help. Airports, on the other hand, have crash-fire equipment and training as would be expected. The same scenario exists for

Flood Speak: A Guide to Some Common Terms

- 100-year-floodplain: Inundation during periods of higher than normal stream flow that has 1 percent chance of being equaled or exceeded in any given year. This is also known as "base flood."
- Floodplain: The area adjoining a drainageway such as a river or stream that is subject to inundation by a base flood. The floodplain consists of the following two parts:
    1. Floodway: The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than 0.2 feet.
    2. Floodway Fringe: The area of the floodplain lying outside of the floodway.
- Hazard Mitigation: A series of preventive measures designed to avoid future risks to people and property from natural disasters. Some preventive measures include upgrading facilities, relocating property in flood-prone areas, or elevating floodplain buildings.
- National Flood Insurance Program: A program managed by the Federal Emergency Management Agency (FEMA) that provides federally backed flood insurance to communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage.

—Long Vo and Patrick Cash

Long Vo and Patrick Cash were summer 2001 Center interns.

water rescue. It's easy to say where swift water rescue teams should have been placed after you know where the storm went, but four hours before landfall the state still was not sure of Hurricane Floyd's path. Early predictions showed a westward path for the storm. Based on that information, where would you place teams?

"Few instances where swift water rescue teams were needed occurred, and when they did, it would have been necessary for a team to have been in that location to have made a difference," Bradley says. "Had we ignored the storm's probable path and moved a couple of the mountain teams east, what was the likelihood of them being in the district, or even the county where they were needed? It would have been luck."

Bradley also disagrees that divided command was an issue in the Floyd response, and he says that unfamiliarity with Emergency Management resource manuals was not a problem. "This isn't divided command but integrated command, which is the way major disasters involving multiple agencies are supposed to be managed," says Bradley. "The Department of Insurance employees from the State Fire Marshals Office had trained on the EM [Emergency Management] system for years. There were imperfections, but unfamiliarity with the resource manuals was not an issue. Unfamiliarity with the system did not cause problems."

Bradley notes that the tiered training envisioned by Tolbert will be completed by the Office of the State Fire Marshal by Jan. 1, 2002, with each level available to rescue squads and fire departments statewide. He cautions, though, that the next major disaster to afflict the state may not be a flood. "I agree we need to train for water rescue and be as prepared as we can, but there are a lot of other potential areas for disaster as well, and we've got to be prepared for them all."

Housing Assistance, Repair, and Reconstruction

According to reports issued by the North Carolina Redevelopment Center, a temporary state agency set up by former Governor Hunt to oversee

News & Observer / Robert Miller

Cindy Jennings sweeps up debris in her mother Shirley Denton's home in the town of Chinquapin, flooded when heavy rain from Hurricane Floyd pushed water from the North East Cape Fear river into nearby creeks and streams.

John Manuel

the recovery effort, more than 67,000 homes were damaged by Hurricane Floyd, nearly 8,000 of which were destroyed.[2] Counties responded by setting up 227 emergency shelters housing more than 62,000 people. Other organizations, including local fire departments, churches, and motels, provided shelter for another 41,000 victims. Food was provided by a variety of groups, including nonprofits such as the Red Cross (91 mobile feeding stations), Salvation Army (seven mobile kitchens), and the Baptist Men of the Baptist State Convention of North Carolina (four mobile feeding sites). The state provided 450,000 MREs (Meals Ready to Eat) through an existing contract with the manufacturer, SOPAKCO, Inc. of Mullins, S.C. Emergency medical attention was provided by volunteer physicians from SORT (Special Operations Response Team), a private group centered in Winston-Salem.

In the days and weeks following the storm, donations of money, food, clothing, furniture, and supplies poured in from all over the world, much of it to a disaster relief organization set up by Governor Hunt. The state set up several dozen distribution centers to hand out donated food and supplies. Local organizations, primarily church groups, also pitched in and provided hundreds of volunteer workers. State officials say the distribution was orderly, although not all donated material could be used. "Don't send clothing, send cash," officials wound up saying. In sum, no one lacked for emergency food or shelter following the storm. However, getting damaged housing repaired and finding new housing for those whose homes were beyond repair was an enormous problem—one that continues to this day. Indeed, Gov. Mike Easley, in an Oct. 17, 2001, letter to local government officials, declared the state's role in disaster recovery complete but chided local officials to get the job done on housing. Easley, who took office in January 2001, noted that only three local governments are more than 50 percent complete in the rebuilding process and the majority are less than 25 percent finished. He warned that unless significant strides were made, the state's Hurricane Floyd Redevelopment Office would reassign its funding to other areas in need.

While wind and storm surge along the coast are typically the major causes of damage from hurricanes, rainfall and subsequent flooding far inland were Floyd's signature agent of destruction. In excess of 20 inches of rain fell in some areas, sending rivers out of their banks and inundating 4.2 million acres of land. Although the water didn't knock many buildings down, houses flooded to any degree were rendered uninhabitable. Insurance is the basic vehicle relied upon to make people whole after a natural disaster, but this did not work for Floyd. *Basic homeowners insurance does not cover flood damage, and only a small fraction of people in the affected counties—approximately 13 percent—owned flood insurance on their homes.*

"Flood insurance was available in virtually all areas affected by Floyd, but there were several problems that deterred its use," says Phil Letsinger, National Flood Insurance Program Coordinator in the N.C. Division of Emergency Management. "Property owners and renters have been unaware of the flood risks where they live. Many are unaware of the opportunities to purchase flood insurance, and of those who are aware, a certain number find the insurance unaffordable. Insurance agents themselves are often poorly informed about the program. Some will say you can't get insurance because you live in the floodplain. Others will say you can't get it because you don't live in the floodplain."

For those without flood insurance whose homes were damaged, the primary avenue of relief

was the temporary housing assistance program offered by the Federal Emergency Management Agency (FEMA). FEMA offers several options. Owners whose houses can be made livable for $10,000 or less may qualify for a direct grant for up to that amount. For owners whose homes cost more than $10,000 to be made livable, and for renters who are driven out of their homes, grants are available to pay for rental of comparable housing. Alternative housing was in drastically short supply in Eastern North Carolina, and in recognition of this fact, FEMA offered homeowners a third option. Rather than accept the grant for rental assistance, homeowners could obtain a $10,000 direct grant to use for alternate housing.

"We recognized that there was just no other place for most homeowners to go, so we offered this special one-time grant of $10,000 as a means of getting them started on the road to recovery," says Russ Edmonston, spokesperson for FEMA. "In general, it takes homeowners much longer to recover from these disasters than renters."

FEMA also provided temporary housing in the form of 2,536 mobile homes and travel trailers. Trailer parks were set up in 10 locations around the region. People could also opt to set their trailers up next to their homes, which many chose to do. Mobile homes and travel trailers were made available primarily to homeowners, but a large percentage of renters also were included. According to Edmonston, FEMA had expended approximately $142.7 million for all disaster housing assistance as of June 6, 2001.

"Finally a man in a boat comes by—we scream for help, he sees us, we're free. At least I think so. Suddenly a wave washes us in the water, all except my brother. He is on the house. We scream and scream."

—FROM "WE SCREAM FOR HELP" BY MARY KEARNS, JONES COUNTY MIDDLE SCHOOL STUDENT

For those who don't have flood insurance, the primary avenue for rebuilding is through a federal Small Business Administration Disaster Home Loan. These loans are for up to $200,000 (15 percent more is available if the home is to be elevated above the floodplain) at 3⅝ annual interest for up to 30 years. As of Sept. 14, 2001, the U.S. Small Business Administration (SBA) had approved loans to some 13,000 North Carolinians totaling $510.9 million.

Those who were outside the SBA criteria or who were turned down by the SBA for credit/debt reasons were referred to the Individual and Family Grant Program (IFGP). Funded by FEMA and administered by the state, IFGP is one of the standard federal disaster assistance programs offered in all areas declared disaster areas by the President of the United States. It offers grants of up to $13,600, based on a formula for the value of lost or damaged furnishings. According to a FEMA spokesperson, as of Sept. 14, 2001, 87,000 people had applied for these grants, of which 48,149 had been approved. The IFGP grants totaled $94.9 million.

North Carolinians soon became aware that the housing assistance offered by FEMA, while much appreciated, was not sufficient to restore most homeowners and renters to anything near their previous living status. Leza Wainwright, former director of the N.C. Redevelopment Center, says that approximately 65 percent of applicants for SBA loans were below the limit in terms of income (a family of four must make at least $20,563 to qualify). Of those who met the income criteria, 53 percent ended up getting turned down for credit and debt-carrying reasons. Rental housing and affordable new housing were also in desperately short supply.

Joyce Dickens, president of the Rocky Mount/Edgecombe Community Development Corporation, says the organization did a need-and-demand analysis for single-family housing in June of 1999 and found a need for 1,600 homes over the 2000–2005 projection period just in the Rocky Mount area. "That was *before* Hurricane Floyd," she said.

It was clear that North Carolina was going to have to commit a substantial amount of its own funds to supplement those programs offered by FEMA, and to create new programs. In an emergency session held Dec. 15–16, 1999, the General Assembly passed the Hurricane Floyd Recovery Act, which allocated an unprecedented $836 million for housing, business, agricultural, environmental, and local government assistance.[3]

In the area of housing, the state provided as-

News & Observer

Floyd's destruction included Tarrytown Mall in Rocky Mount—one of Eastern North Carolina's hardest hit cities.

sistance through 10 different programs. The State Acquisition and Relocation Fund (SARF) provides funds for supplemental grants to homeowners who participate in the FEMA program to buy out homes located in the 100-year floodplain. These grants are not to exceed $50,000, except where necessary to place low and moderate income families into comparable housing as defined by the federal Uniform Relocation Act. SARF also offers relocation assistance grants to renters whose housing units were to be purchased under the federal buy-out program.

For those homeowners approved for SBA disaster home loans, the state offered an additional grant of up to $10,000 to pay for repairs or losses not covered by the SBA loan or to lessen the amount of debt that they had to take on.

The Replacement and Repair Grant program provides local governments with funds to repair or replace homes of low-income homeowners not subject to the federal buy-out program, not covered by insurance, or not eligible for SBA loans.

To stimulate the construction of new subdivisions in the affected counties, the state is providing infrastructure grants to local governments for new housing developments. The state also has allocated funds for nonprofit housing organizations to purchase land for the construction of new homes and to hire project managers to oversee the building efforts. In addition, the state has appropriated money for the construction of rental housing in Eastern North Carolina.

Three final programs which indirectly contribute to housing construction include funds to local governments to hire housing inspectors, rehabilitation specialists, and project managers; funds for Housing Recovery Assistance Centers to hire housing counselors; and funds to set up and staff a Housing Recovery Office.

According to Robert Carver, former spokesperson for the North Carolina Redevelopment Center, the application period for the state housing grants closed Feb. 16, 2001, and local governments were required to get their final paperwork in to the

John Manuel

This flood damaged home was approved for a buyout in Kinston.

N.C. Redevelopment Center by March 9. "The state provides funding based on applications from local governments," says Carver. "It is then the responsibility of the local government to carry out the work."

Thus, the state has to rely on local governments to tell them how many homes have been completed. As of October 2001, the N.C. Redevelopment Center had completed timelines and funding agreements with all local governments to get the work finished and had shifted to a role of monitoring ongoing projects and assisting local governments as problems developed.

The Role of Nonprofits

Along with these governmental programs, the nonprofit community played a tremendous role in the recovery effort. Faith groups, in particular, have played a key role in raising money and organizing volunteers for the clean-up repair of flood-damaged homes. The North Carolina Interfaith Disaster Response, a nonprofit organization with delegates from 15 church denominations, hired a full-time director to coordinate the efforts of the faith community in the Floyd recovery and to offer assistance in obtaining resources for volunteers. Executive director Carolyn Tyler reports that as of Feb. 15, 2001, faith groups had directly spent more than $15 million raised from donors around the world and contributed an estimated $10 million in volunteer labor to help put flood victims back on their feet. This includes the repair of 3,231 houses and assistance of 10,452 families with other unmet needs such as payment of rent and utilities and provision of appliances and furniture.

In addition to these efforts, the American Red Cross spent $22 million on Floyd relief and recovery efforts and the United Way of North Carolina distributed $20.5 million raised through the Office of Governor Hunt. These United Way contributions were channeled to local nonprofits providing services on the ground. Fundraising for Floyd recovery is ongoing, says United Way of North Carolina President Jim Morrison, and there is still a great need. "This is a five-year adventure," says Morrison. "We are still raising money, but the disaster was two years ago. People don't realize there are still needs that are not being met." Indeed, the massive flood may have stretched the capacity of charitable givers. In the aftermath of the storm,

—continues on page 95

mated $6 billion in insured and uninsured damage. Ultimately, the storm damaged more than 67,000 homes in some way, and it destroyed 8,000 homes. Therefore, of the $836.6 million dollars set aside for the relief effort, the state obligated $493.6 million dollars toward housing programs.

Crisis Housing Assistance Fund: Aid for housing relief falls under this fund, which is administered by the Division of Community Assistance and North Carolina Housing Finance Agency. The primary goal of these two agencies is to help people (especially low-income families) repair or find affordable and adequate housing. They help victims through a variety of initiatives, such as:

1. The State Acquisition and Relocation Fund, which provides a supplemental grant to homeowners participating in FEMA's Hazard Mitigation Grant Program buy-outs to purchase replacement homes. These grants also give relocation assistance to renters whose homes have been bought out.
2. Grants to low-income homeowners to repair or replace their home.
3. State grants to successful SBA loan applicants in order to reduce the amount of debt that they accumulate to repair their homes.
4. Infrastructure grants to local governments to build new housing developments.
5. Funds to build affordable rental units for people.
6. Funds for more personnel—such as housing inspectors or housing counselors—and a Housing Recovery Office to oversee the housing effort.

Before victims of Floyd can apply for these state funds, they must also register with FEMA, and, with the exception of Hazard Mitigation Grant Program buy-out homes, have documentation proving that they have already exhausted all attempts to seek federal aid. This is to prevent double dipping and assure that state funds go as far as possible. Thus, applicants must have documentation stating their grant approval or denial from the federal Individual Family Grant program, or be able to show that they did not receive any SBA loans. Families that fail to adhere to these guidelines are not eligible for any aid other than relocation assistance within the buy-out program.

—Long Vo

FOOTNOTE

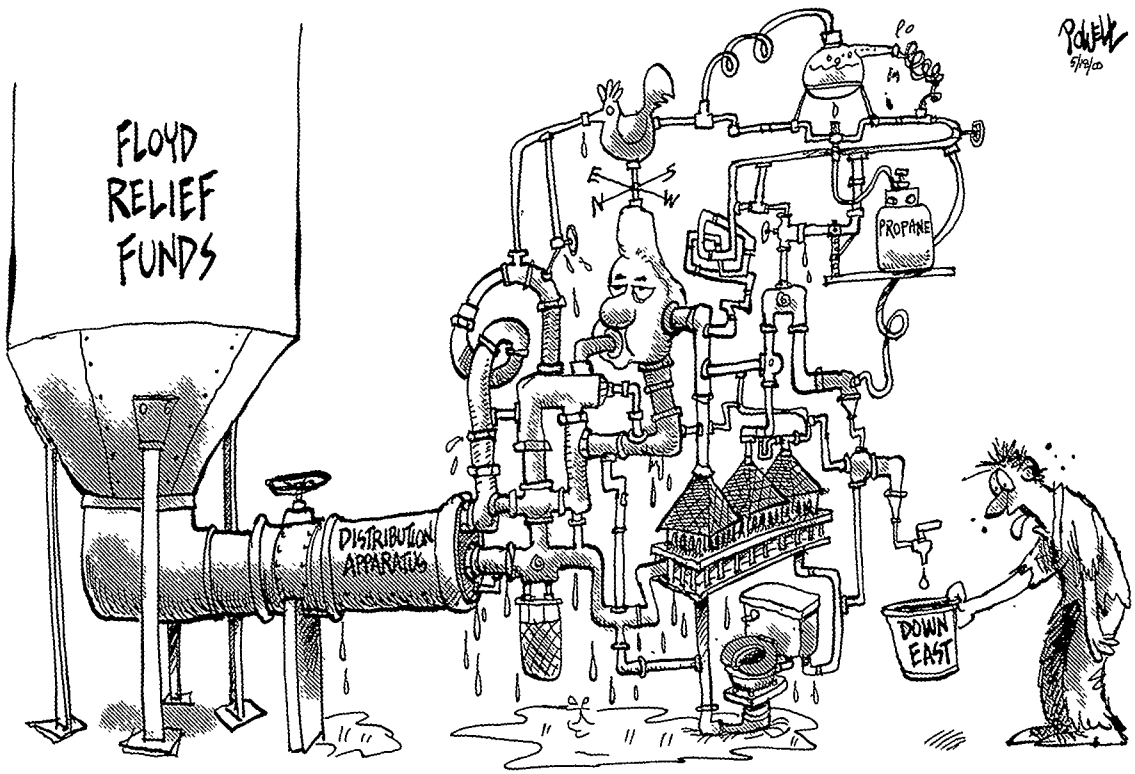
[1] The federal deadline for registering for disaster aid was Feb. 29, 2001, and the state application deadline was Feb. 16, 2001.

Long Vo was a summer 2001 Center intern.

some local United Way agencies suffered what could be called Floyd fatigue, as giving for community campaigns dropped. Flood-ravaged Greenville saw a decrease of 13.2 percent in its 1999–2000 United Way campaign, while Goldsboro saw a dip of 9.6 percent. The impact immediately following the flood could be felt as far away as Iredell County in the western Piedmont, where local United Way officials reported trouble reaching their campaign goal due to Floyd-related generosity.

But the rebuilding continued even as non-Floyd-related giving was returning to pre-flood levels. Tyler says the faith groups are only halfway through the rebuilding effort in terms of meeting requests for housing repair. Faith groups are hoping to continue assisting families in need. However, raising funds to support recovery programs is becoming more difficult as the crisis atmosphere fades and in the wake of Sept. 11, 2001, relief efforts. The state Housing and Business Redevelopment Center, an arm of the N.C. Department of Commerce, initially offered to reimburse faith groups for construction materials used to rebuild homes later found to qualify for government aid. However, the center backed away from that offer in the midst of the spring 2001 state budget crisis. Currently, the North Carolina Redevelopment Center and the United Way are seeking funds to pay for future material costs incurred by faith groups in the Floyd recovery effort.

"The role of nonprofits in picking up projects not covered by state or federal governments has



Duane Powell / News and Observer

been huge," says Robert Carver, formerly of the N.C. Redevelopment Center. "We want to do what we can to keep those programs going."

A Lack of Housing

For all these efforts, there is still a tremendous lack of housing for flood victims in Eastern North Carolina. As of Nov. 1, 2001, 207 families were still living in FEMA travel trailers and mobile homes, and untold others were living with relatives or in substandard housing. The principal problem is that it simply takes time to get publicly financed housing underway.

"You have to find land that is available, affordable, and close to the support services like jobs, churches, and schools that the people have ties to," says Tom Hegele, who retired in October 2001 as spokesperson for the Division of Emergency Management. "Then, you have to find builders who are willing to do the construction, and that's not been easy when it comes to affordable housing. We had a builder in Kinston who left to build $300,000 homes in Arizona. He said he could make as much money on one of those houses as he could make on 10 houses for low-income buyers."

Paul Wilms, director of governmental affairs for the North Carolina Home Builders Association, says the story of a single builder leaving Kinston to build high-priced homes in Arizona represents anecdotal evidence of a problem. "Hundreds of builders in Eastern North Carolina are responding to this need," says Wilms.

When housing units do become available, the demand for them is overwhelming. And there is no guarantee that flood victims will qualify for them. Rocky Mount-Edgecombe Community Development Corporation recently completed apartments that were under construction before Floyd. The N.C. Housing Finance Agency urged the CDC to give preference to flood victims, but that was not always possible.

"We had a total of 732 inquiries and applications for 32 apartments," CDC director Dickens says. "Among them were 153 flood victims, of which we ended up accepting 13. Some of those who applied were ineligible due to income restrictions—either too little or too much [to qualify]—some were disqualified because of bad credit ratings or criminal records. The need for rental property is tremendous."

And then there are those who could qualify for

a new home loan, but simply don't want to take on that obligation. "We've heard a lot of anecdotes about people who are 60 or 70 years old, who lost everything, and don't want to take on a 30-year loan," says Hegele. "I don't have an answer for that."

In sum, when large numbers of people are displaced by an event like Hurricane Floyd, no amount of housing repair and construction programs is enough to make everyone whole within a reasonable period of time. The state is doing a commendable job in attempting to spur the construction of new apartments and affordable housing, but clearly other approaches are needed to avoid continued problems.

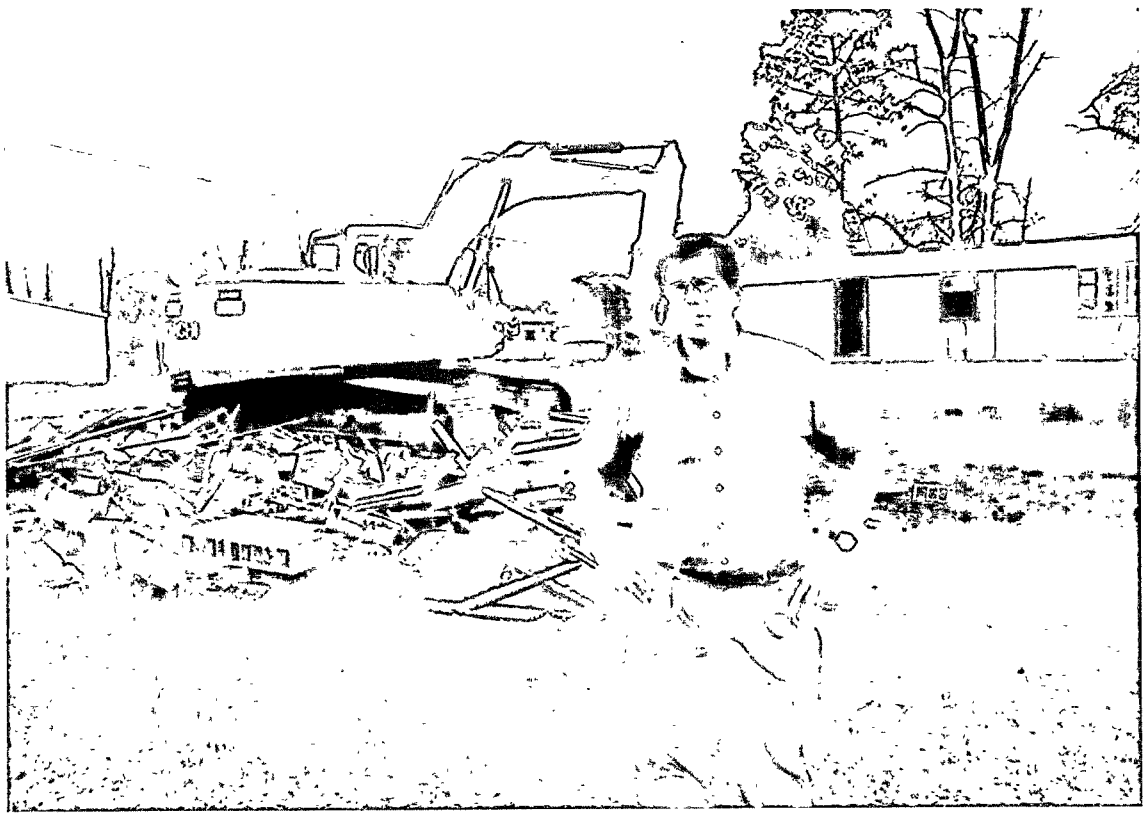
Hazard Mitigation

As he drives through the neighborhoods of Southeast Kinston bordering the Neuse River, city planner Chris Cabral points to the shotgun shacks, mobile homes, and brick bungalows that line the narrow streets. Cabral says this area has been repeatedly flooded at least since 1899 when a major hurricane hit. Had that flooding occurred a few decades ago, most of the owners and tenants would be back in the houses, unable to afford to move elsewhere, hoping against hope that they wouldn't be flooded again. But the federal government and the city of Kinston have learned their lesson.

"We've bought out all of these homes," Cabral says proudly. "All of them will come down within the next year. The residents are moving to nicer neighborhoods in North Kinston well out of the floodplain. Our plan is to convert this area to a park. The next time the Neuse River overflows its banks, the only homes flooded out will belong to the snakes."

After decades of paying for repairs to homes in the nation's floodplains, the federal government in the mid-1980s came to the realization that it is far cheaper to remove buildings from the floodplain than to repair them after a storm. That realization was translated into policy in 1988 with the passage of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (P.L. 93-288).[4] Among other programs, the Stafford Act authorized the Hazard Mitigation Grant Program (HMGP), which provides funds for the buyout and removal of flood-prone

Kinston planner Chris Cabral, pictured in an area bought out after Hurricane Floyd, takes pride in the city's plans for the floodplain.



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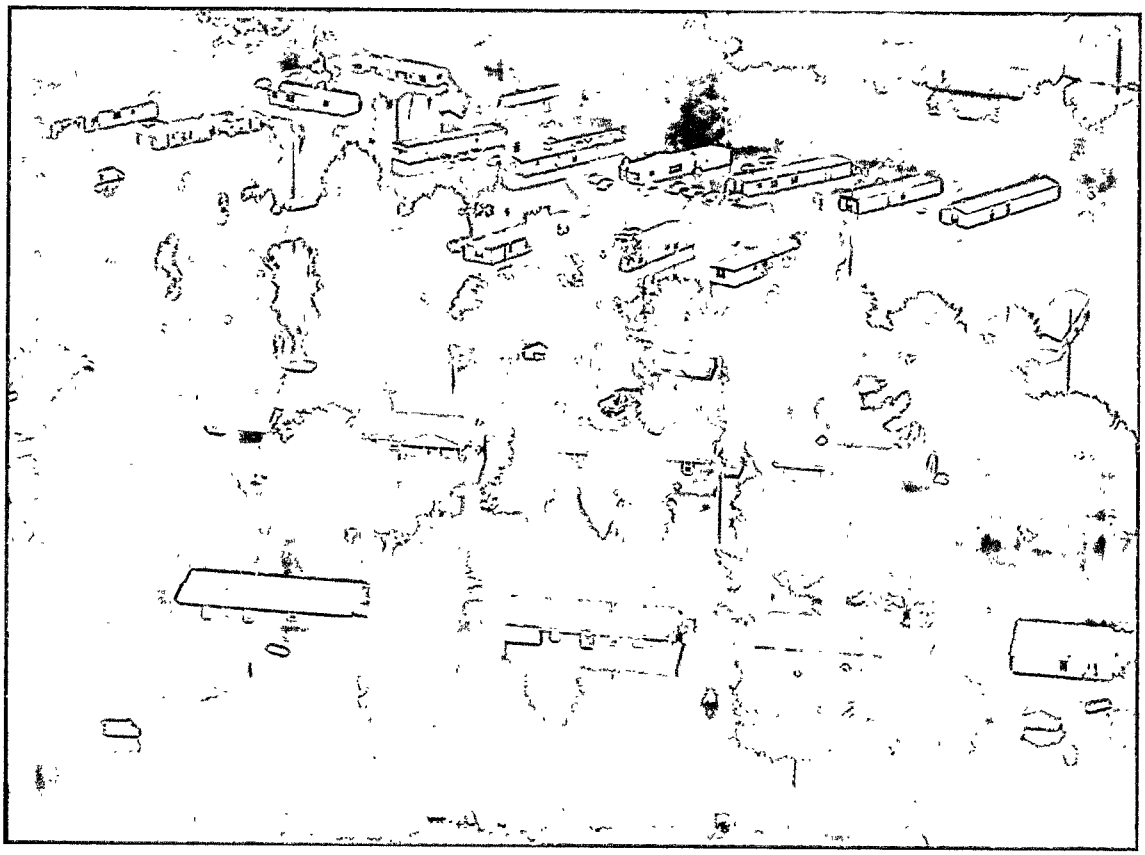

News & Observer

The town of Princeville, inundated by Floyd's flood waters, opted to rebuild and repair on the same site.

structures. That program went into full swing in 1993 when Mississippi River floods inundated thousands of homes and communities in the Midwest. The state of North Carolina began to get serious about it in 1996 in the wake of Hurricane Fran. Buyouts of homes in coastal areas inundated by Fran got underway, a move which paid off handsomely when some of those same communities were flooded by Floyd. "In the cities of Washington, Kinston, and Belhaven alone, we avoided $9.2 million in potential damages from removing structures after Fran," Tolbert says. "The best rescue is one that doesn't have to happen."

After Floyd, the state committed $139 million to supplement FEMA grants to buy out homes located in the 100-year floodplain. According to the Division of Emergency Management, approximately 8,000 homes have been declared eligible for buyout. As of Nov. 19, 2001, however, FEMA had only approved the purchase of 4,377 structures at a total cost of $287.3 million.

The pace of the buyouts has been criticized for its slowness, and buyouts do not help everyone, including renters and people with inadequate documentation, such as migrant farmworkers. Unquestionably, many of the region's poor have been left worse off than before the storm struck. But officials say that given the arduous process of setting up the programs at the local level, signing homeowners up for buyouts, finding alternative housing, and condemning the buildings, progress actually has been phenomenal. "Our hazard mitigation section has done a Herculean job in helping local governments put together their programs, getting applications compiled, submitted, reviewed, and approved by the state and federal government," says Hegele. "I realize that doesn't help the disaster victim who has been sitting in an apartment for a year, but these things take time."

Opting Out in Princeville

Not every flooded community has chosen to participate in the buyout program. Princeville, settled by freed slaves in 1865 and consid-

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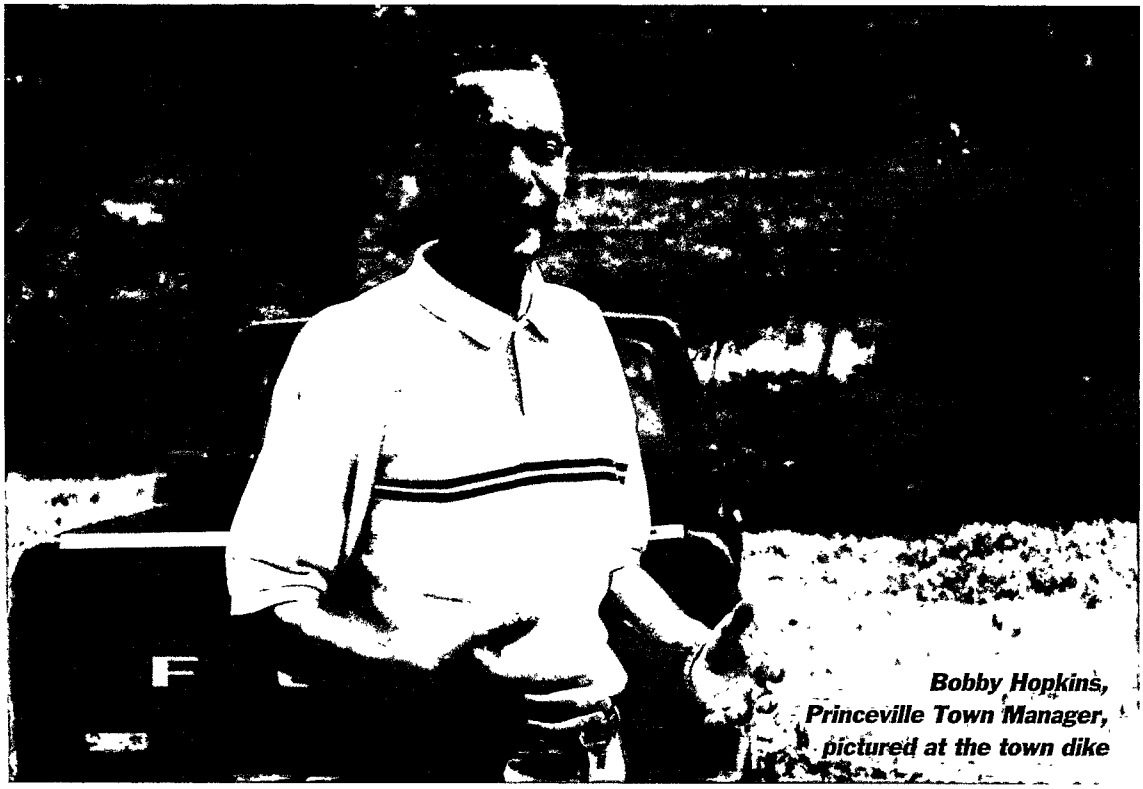


Bobby Hopkins, Princeville Town Manager, pictured at the town dike

Long Vo

—continued from page 98

ered the oldest African-American town in the nation, was completely inundated when the Tar River broke through a protective dike. Virtually every building in the town was flooded to the rooftop, and the dike kept the water in for more than a week thereafter. Owing to its precarious position in the floodplain and the degree of devastation, Princeville seemed a natural to participate in the buyout program. However, the thought of vacating the town was too much for Princeville's political leaders. By a 3–2 vote, the mayor and town council voted not to participate in the buyout program, and instead to rebuild the dike and repair the damaged buildings.

The Artist [formerly known as Prince] must still have a place in his heart for his former name: He has donated $37,000 to the hurricane-devastated town of Princeville, North Carolina."

—ROLLING STONE, MARCH 2, 2000

While acknowledging the unique heritage of the town, East Carolina University geology professor Stanley Riggs considers the decision to stay a terrible one. "There is not a worse place in the entire [Tar] river basin to build a town," Riggs says of Princeville. "It is located in a very narrow floodplain right below where a major creek empties into the Tar and right above the U.S. 64 bridge crossing, which effectively acts like a dam in high water. The Corps of Engineers rebuilt the dike exactly as it was before Floyd except for a gate that will close over the railroad tracks where they penetrate the dike.

"In my estimation, Princeville missed a major opportunity to relocate outside the floodplain," Riggs says. "The local politicians have not learned the lesson of river dynamics. Their town is going to get flooded again."

Princeville leaders, however, argue that rebuilding the town was worth the risk. (See "Back on the Map: Princeville Rebuilds After Flood's Devastation," pp. 99–101, for more.) Town Manager Bobby Hopkins says improvements to the town dike have placed the town at the 500-year floodplain level, rather than at the 100-year flood-

plain level where it was situated before. That means a less than .2 percent chance that the town will be flooded in any given year.

Outdated Floodplain Maps

One lesson North Carolina learned from Floyd, however, is that many of the floodplain maps of local watersheds are badly outdated. There was widespread flooding in areas not indicated on maps as being in a floodplain. This is a problem nationwide, not just in North Carolina.

"The hydrology of many streams and rivers has changed, sometimes radically, from when the maps were first drawn," says Mary Hudak, public affairs officer for FEMA Region IV. "Much of this is due to the effects of development in the watersheds, and some to other factors."

FEMA and the state of North Carolina are engaged in a pilot project to remap the six eastern river basins and put all the information in digital form. These Digital Flood Insurance Rate Maps will enable state and local governments to speedily update maps and put the information out on the web. The maps will be useful not just for setting insurance rates, but also for land use planning. The state has committed $23 million toward this project, a level unprecedented anywhere in the country.

"This is a huge step forward, and it never would have happened without the commitment of the governor and the legislature," says Hudak. "This means each local government will be able to manage their floodplain and keep it updated. This will outlast all the other programs Governor Hunt has engaged in. It is a gift to the future for North Carolina and the nation." In part due to this and other efforts, North Carolina was named the Outstanding Disaster Resistant State at the Federal Emergency Management Agency's Project Impact Summit in November 2000.

Having accurate floodplain maps is a vital first step to hazard mitigation, but it is only a first step. Buildings must be elevated above or removed from the floodplain to keep them out of harm's way. Facilities such as hog farms and toxic waste dumps must also be removed from the floodplain to avoid the risk of pollution. Hurricane Floyd provided an opportunity for the state to put those seemingly common sense practices into law, but the recommendations developed by the affected state agencies were, for the most part, not approved by the legislature.

And Bill Holman, former Secretary of the Department of Environment and Natural Resources under Gov. Hunt and now executive director of the state's Clean Water Management Trust Fund, does not believe the effort to map the state's floodplains has gone far enough. "Floodplains are wider and floods have increased because wetlands and floodplains have been filled; wetlands that store, treat, and slowly release floodwaters have been ditched and drained; streams have been buried, culverted, straightened, and channelized; and watersheds have been paved," notes Holman. "North Carolina has 17 river basins. We've only funded mapping in six eastern basins."

Hurricane Floyd Flooding by the Numbers

Number of lives lost: 52

Number of homes damaged: some 67,000

Number of homes destroyed: nearly 8,000

Number of N.C. counties declared disaster areas: 66 of 100

Number of municipalities severely damaged: 73

Number of hog farms inundated: 50

Farm animals lost: 21,000 hogs, 2.1 million chickens, 700,000 turkeys, 680 cattle

State aid allocated for Floyd victims: $836 million

Federal aid allocated for Floyd victims: $2 billion

II. Neuse River Basin Description

The Neuse River Basin originates in the north central Piedmont region of North Carolina in Person and Orange Counties, extends southeast through the Coastal Plain region, and eventually flows into Pamlico Sound (see Figure 4). It is bordered by the Roanoke River Basin to the northwest, the Tar-Pamlico River Basin to the north and northeast, the Atlantic Ocean to the east, the White Oak River Basin to the south, and the Cape Fear River Basin to the south and southwest. Encompassing approximately 6,200 square miles, the Neuse River Basin is the third largest river basin in North Carolina. It is also one of four river basins located entirely within the State.

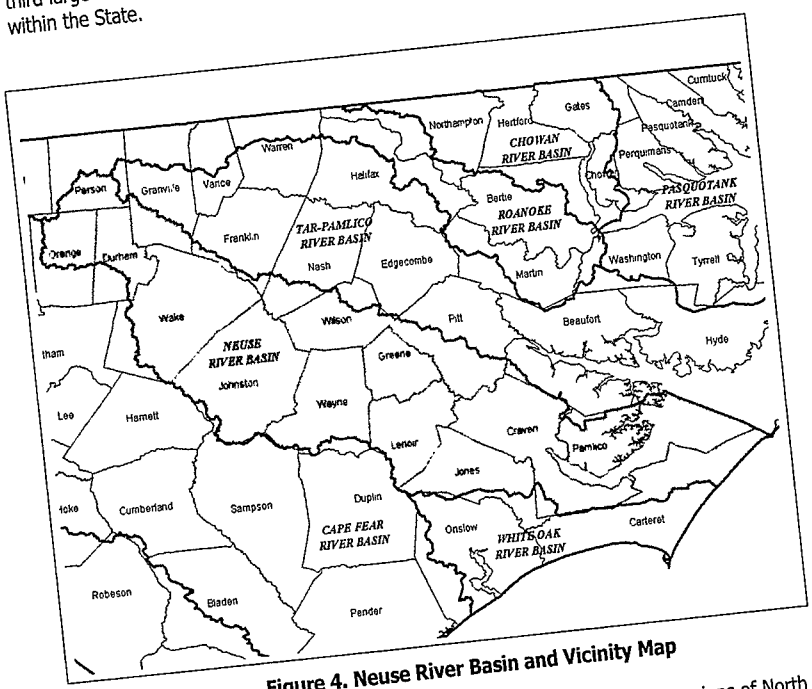


Figure 4. Neuse River Basin and Vicinity Map

The Neuse River Basin is located in both the Coastal Plain and Piedmont regions of North Carolina. The majority of the basin, approximately two-thirds of it, lies within the Coastal Plain. Flat terrain, slow moving streams, and swampland characterize the topography of the Coastal Plain, particularly the lower area. The Piedmont region is characterized by rolling terrain and fairly well forested floodplains. Land cover in the basin is largely forestland and agricultural land.

Prepared for the:

State of North Carolina and the
Federal Emergency Management Agency
Draft: April 13, 2001

Prepared by:

Dewberry & Davis LLC
A Dewberry Company

In addition, says Holman, floodplain maps will accomplish little unless they are used to guide land use decisions. "Floodplain maps will be useful only if local governments and state agencies adopt and enforce regulations and use the maps to steer and relocate inappropriate development out of the 100-year floodplain," Holman says. Nonetheless, he assures that updated floodplain maps will get some use. "The Clean Water Management Trust Fund and other environmental agencies will use the maps," notes Holman. "CWMTF prefers to acquire, protect, and/or restore riparian buffers in the 100-year floodplain."

Post-Floyd Legislation

In the months following Hurricane Floyd, the N.C. Department of Environment and Natural Resources and the N.C. Division of Emergency Management drafted legislation that attempted to significantly limit new construction in floodplains. The bill they developed was sweeping. First, it conditioned local government eligibility for water and sewer loans and grants and future state disaster relief funds upon those governments adopting floodplain ordinances mandating all new structures to be raised at least 2 feet above the 100-year-floodplain. Additionally, the legislation required that those ordinances prohibit new salvage yards, chemical waste facilities, and solid waste facilities from locating within the 100-year floodplain.[5]

The Flood Hazard Prevention Act of 2000 was introduced into the General Assembly's short session in 2000. The bill, Senate Bill 1341, went into the "605 process," a reference to the room in the Legislative Office Building where stakeholders are called in to hammer out compromises on major environmental bills. The N.C. Home Builders Association, N.C. League of Municipalities, and N.C. Association of County Commissioners among others voiced strong opposition to the mandatory elevation requirement.

"It wouldn't have mattered if it was 2 yards or 2 inches, we simply don't know where that line is," says Ed Regan, deputy director of the N.C. Association of County Commissioners, in reference to the floodplain designation. "We couldn't support that provision not knowing what it would look like in the affected communities."

"The prescription for a 2-foot freeboard was totally arbitrary and could have been damaging," says Paul Wilms, director of government relations for the N.C. Home Builders Association. "In some communities, 2 feet would be excessive; in others it might not be enough. You can't determine that without doing a hydrologic study, which, until the new state/FEMA mapping is done, most communities cannot afford. We opposed the linking of water and sewer funds to the development of local ordinances for the same reason and because it was, in effect, a mandate."

Elaborating on his association's opposition to the freeboard requirement, Wilms notes that "Senate Bill 1341, even in its original version, did not address the problem—the lack of accurate base flood elevations for most rivers in North Carolina. Simply elevating structures two feet above an inadequate base flood elevation (Charlotte's was 5.7 feet too low) would create the illusion of protection without addressing the problem."

Holman, however, does not agree that the 2-foot freeboard requirement was excessive. "Given the age of the existing maps, the proposed 2-foot freeboard was conservative," notes Holman, then Secretary of the Department of Environment and Natural Resources. "State buildings use the 2-foot freeboard standard."

As a result of this opposition, the bill that emerged required structures to be raised only 1 foot above the 100-year floodplain, and no longer required local governments to adopt floodplain ordinances as a condition for receiving water and sewer funds. Instead, the legislation awarded points to those who followed this practice. (Local government applications for limited state water and sewer loan and grant monies are ranked according to a point system. More points equates to a higher priority for getting a grant.) The prohibition on new solid waste disposal facilities, hazardous waste management facilities, salvage yards, and chemical storage facilities being located in the 100-year floodplain was retained.

After the addition of an amendment that delayed the start date of the priority points until after the water and sewer money had run out, the bill passed the House. The Senate then further weakened the bill, eliminating the elevation requirement entirely, and providing priority points for simply adopting a floodplain ordinance that required new construction to be above the 100-year floodplain, the same requirement for entry into the National Flood Insurance Program. Senate Bill 1341 was enacted into law with tepid support from the environmental community. As it was finally passed, the Flood Hazard Prevention Act of 2000 was a bitter disappointment to those who felt the state enjoyed a golden opportunity to capitalize on the lessons of Hurricane Floyd.

"We had a lot of hope going into the short session that the visceral response to Hurricane Floyd would carry the legislation through, but what resulted was a comedy of errors," says Nat Mund, lobbyist for the Conservation Council of North Carolina. "Floodplain regulation may come up again in the next session, but a lot of people will say, 'We've already dealt with that.'"

"When you put the word 'may' into legislation, you are letting people off the hook," says Jackie Eubanks, assistant planning director for the City of Kinston, in reference to the act's provisions that local governments "may" enact ordinances limiting development in floodplains. "The problem in Eastern North Carolina is convincing landowners and commissioners that regulation reflects better stewardship and management."

Holman says he too was unhappy with the outcome of Senate Bill 1341. "I was very disappointed that Senate Bill 1341 was practically gutted—and it took a major push to get it enacted. I note that the Water Supply Watershed Protection Act of 1989 set minimum standards (adopted by the Environmental Management Commission and implemented by local governments) to protect drinking water supplies. It was the first successful land use regulation. I was surprised that over 10 years later an effort to set minimum statewide standards for development in floodplains failed."

The Local Role

With the failure of state government to impose comprehensive floodplain zoning standards, the spotlight has turned to local governments. Before Floyd hit, there were 26 communities in North Carolina—five counties and 21 municipalities—with designated flood hazard areas that did not even meet minimal FEMA requirements for floodplain zoning. None of the five counties are in the eastern part of the state, although a number of municipalities are. The Eastern North Carolina towns not participating are: Bolivia in Brunswick County; Four Oaks and Wilson Mills in Johnston County; East Laurinburg in Scotland County, and Sims in Wilson County. Non-participating counties are Alleghany, Caswell, Henderson, Wilkes, and Yadkin. According to state NFIP coordinator Phil Letsinger, most but not all of the non-compliant municipalities are now moving in the direction of adopting floodplain ordinances.

With prodding from the state, a significant number of communities are also developing hazard mitigation plans. In general, a hazard mitigation plan involves identifying hazards in the community (e.g. structures in the floodplain), determining the degree of vulnerability, and preparing and implementing strategies to reduce overall risk. North Carolina requires that local communities develop such a plan as a condition of receiving

Kinston is buying out this area for a park. "The next time the Neuse River overflows its banks, the only homes flooded out will belong to the snakes," says city planner Chris Cabral.

John Manuel

state or FEMA hazard mitigation funds. Plans must be developed within one year of signing a grant agreement. The state launched its Hazard Mitigation Planning Initiative in 1997, and had 11 communities enrolled in the program prior to Floyd. Since Floyd, another 50 are joining, according to Darrin Punchard, planning branch manager for the Mitigation Section of the N.C. Division of Emergency Management.

A Positive Example

When asked to point to a community that is setting an example in terms of hazard mitigation, state officials invariably point to the City of Kinston. Kinston actually began relocating people out of the 100-year floodplain in the early 1980s. After Hurricane Fran inundated large areas of the city in 1996, the city pursued buyouts in a major way. That year, the federal government awarded Kinston $25 million to buy out homes in the floodplain. To date, some 250 homes have been removed, with another 25 or 30 left to go. After Floyd hit, the city was awarded another $50 million and added another 420 homes to the list, but it has yet to remove the first of those. Why are the buyouts taking so long?

"Getting started after Fran was tough," says Cabral. "We'd never done buyouts before so we had to set up the whole administrative structure and basically fly by the seat of our pants. Our legal team first had to conduct surveys and find the titles for all the properties, which was difficult given how old some of these properties were and how messed up some of the property lines were. Next, we had to physically locate the owners. That was a real nightmare. One property had 11 heirs scattered all over the country. Finally, we had to convince the owners to sell and agree on a price. Most people were eager to sell when they found out we would basically buy them a new home, but a few have resisted."

The refusal of some property owners to sell is creating a problem known as "checkerboarding," whereby many properties in a neighborhood are vacated and bulldozed while others remain standing. As long as some homes remain occupied, services such as water and sewer cannot be cut off, and streets cannot be removed. Still, the city is persevering with its buy-out program and has come up with creative uses for the land in the floodplain. "Our goal is to convert 400 to 600 acres into an educational state forest next door to an urban environment," Cabral says. "We will have a series of trails where the streets were, and educational programs to go along with it."

With the state's help, Kinston has also secured $32 million from FEMA to expand the Northside Municipal Sewage Treatment plant, which is located outside the Neuse River floodplain and shut down the Peachtree plant, which is inside the floodplain. This is considered a major victory, as the latter has been plagued with operational problems on an almost annual basis and dumped millions of gallons of raw sewage into the Neuse after both Fran and Floyd.

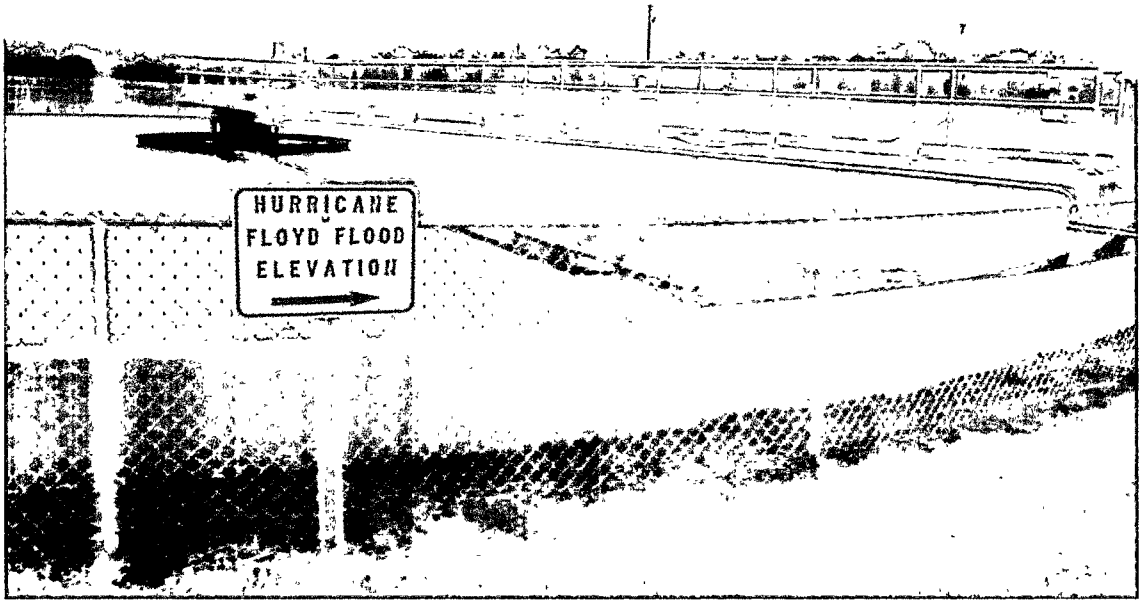
The city of Greenville is also participating in FEMA's buy-out program. According to City Manager Marvin Davis, 750 applications for buyouts have been submitted and approved. Greenville also has adopted a Tar River Floodplain Redevelopment Project through which the city will be lowering development density in areas adjacent to the floodplain. Following the intent of the state's Flood Hazard Prevention Act, Greenville has amended its floodplain zoning ordinance to raise new structures a minimum of 1 foot above base flood level. However, that requirement does not apply to existing structures, and some owners whose homes were flooded during Floyd are rebuilding.

"I don't have exact numbers on how many are rebuilding, but it's true that some people are," Davis says. "We don't have any laws that prevent that. These are mostly people whose homes were less than 50 percent damaged."

Rebuilding is also going on in floodplains out in Pitt County, including the repopulating of a 150-unit mobile home park beside the Tar River that was completely inundated during Floyd.

"We've never had any land use controls in the unincorporated areas of Pitt County, and the flood is an indication that we clearly need some," says James Rhodes, Pitt County planning director. "We've just held a public hearing on a Hazard Mitigation Plan for unincorporated areas and jurisdictions where we are doing buyouts. The plan recognizes the need for zoning throughout the county. It would also involve awarding points for raising the elevation of homes in the floodplain and for distributing educational materials to homeowners in the floodplain. The points would lower the price of the National Flood Insurance Program [NFIP] premiums."

Rhodes admits, however, that there are some communities that do not even participate in the NFIP. And there will always be homeowners that choose to stay in their homes for a variety of reasons. "There are a number of folks who have been



John Manuel

The oft-flooded Peachtree Sewage Treatment Plant in Kinston, now being replaced.

living on the land for generations and don't want to let go of it," Rhodes says. "Some of it is price-based—people can't afford to take on another mortgage. Some of it is people who were in the 500-year floodplain who suffered minimal damage and don't believe it will occur again."

Holman believes the state should do more than just leave it to local governments to operate the buy-out programs, believing cities like Kinston are more the exception than the rule. "North Carolina, like most states, defers to municipalities and counties to operate the buy-out programs," says Holman. "Some local governments, like Kinston, have the capacity, experience, and want-to to do a good job. Others lack all of the above. Kinston was better prepared to respond to Floyd because it was still working on Fran from 1996. I think the state ought to give itself the option of stepping in to run the program where local governments fail to deliver for their citizens."

The View from the Academy

David Godschalk is professor of urban planning at the Department of City and Regional Planning at the University of North Carolina at Chapel Hill. He says many North Carolinians wrongly assume that existing laws will protect them from harm if they build in a floodplain. "It was the existing zoning ordinances and subdivision regulations that got us into Floyd in the first place," he says. "The rationale of many individuals and communities is, 'If I want to put myself at risk, that's my business.' However, we all pay the bill, as taxpayers, for disaster relief and reconstruction."

Godschalk says the state should adopt floodplain land use and elevation standards that are higher than those in the Flood Hazard Prevention Act. He says the state should limit infrastructure development, such as bridges and water and sewer lines, in hazard areas. Land in the floodplains should be purchased for public open space, as Kinston is doing. And the state should mandate that local governments *implement* their hazard mitigation plans. "We're not checking up on implementation," Godschalk says. "We should make localities and individuals responsible for risk."

Wilms, however, offers an opposing view regarding location of utilities and sewer lines. "Utilities, especially sewer lines, should be in floodplains and are required to be protected from the 100-year flood," says Wilms. "Doing other-

wise requires increased numbers of pump stations and a greater risk of chlorinated phenol formation—both greater risks to the environment than flooding."

Godschalk says local governments should map hazard areas and publish the maps for the public to see, "not a popular move in areas where much development is in the floodplain," he says. The governments should then assess vulnerability and reduce exposure. They should involve citizens in building a constituency for mitigation and add hazard area restrictions to zoning regulations. They should direct new development away from floodplains and relocate existing housing from the floodplains to safe areas. Finally, they should create parks and wooded areas along riverfronts. "We need to build communities that bend, but don't break," he says.

Gavin Smith, Chief of the Mitigation Section with the Division of Emergency Management, agrees. "Land use is the biggest challenge," he says. "There are literally hundreds of thousands of structures still in the floodplain, and there continues to be rapid development in the floodplain. We do not have the state laws to prevent that. Local governments can do that, but they don't want to be told they can't build. Also, if they make a condemnation, they have to be able to win in court on the takings issue.

"On the plus side, the new floodplain maps should be a big help in this regard," Smith says. "New mapping will likely lead to a 2- 3-foot rise in the 100-year floodplain line. That will essentially do more to protect homes than the 2-foot freeboard requirement that failed in the legislature." Holman is less certain that new maps will change behavior more than stronger regulations such as the 2-foot freeboard requirement. "I think most local governments will not rush to adopt new ordinances based on the new maps," says Holman, "I'm not sure how aggressively FEMA and the National Flood Insurance Program will push. Maps are tools. It takes plans and regulations to change behavior."

Removing Hog Farms from Floodplains

With respect to the removal of agricultural hazards, progress has been slow. Robin Smith, DENR's assistant secretary for environmental protection, says that the state is making progress on removing hog farms from the floodplain. She points out that the Hog Farm Siting Act of 1995 requires new hog farms to be built outside of the 100-year floodplain. And she says the state has secured $5.7 million from the Clean Water Management Trust Fund to buy out existing hog farms in the floodplain. However, this is only a beginning. There are 185 hog farms in the 100-year floodplain.

"We have prioritized the facilities according to hazard and solicited bids from the owners to buy out hog production rights," Smith says. "We have gotten about 80 applications and have bought out about 14 farms."

The Division of Soil and Water Conservation in the Department of Environment and Natural Resources applied to the Clean Water Management Trust Fund on June 1, 2001, for a second round of funding of approximately $6 million to buy out active swine producers in the 100-year floodplain, says Holman, the fund's executive director. "We anticipate a third round of funding next year," he says, adding that "40–50 producers may ultimately decide to be bought out."

In the flood animals are killed,
They are carried out by the current,
Some are alive, some are dead,
Their corpses float on the waters top,
Still as night,
The animals lay,
The water is filled with disease and decay. . . .

—FROM "FLOODING, HOWLING, RAINING"
BY RUBY LIGI, JONES COUNTY MIDDLE SCHOOL STUDENT

Holman believes there are steps the state could take to increase the number of farmers seeking buyouts. "The Department of Environment and Natural Resources/Division of Water Quality could 'encourage' more producers to participate by requiring old lagoons and hog houses in the 100-year floodplain to be upgraded and flood-proofed," notes Holman. "We don't know how many inactive waste lagoons are in the 100-year floodplain. DENR unsuccessfully sought authority to require owners of lagoons to decommission and clean them up in 1999 and 2000. DENR did not seek legislation in 2001. Many poultry operators were also flooded during Floyd. Poultry operations can be legally built in the floodplain."

Those who have seen hog farms repeatedly inundated in flooding events are frustrated at the small number of hog farms that have been purchased. "Virtually none of the farms I've seen flooded along the Neuse made the list, and some of the worst ones are back in operation," says River Keeper Rick Dove. "If we get another rain event like Floyd, we'll see the same thing all over again."

However, Beth Anne Mumford, director of public affairs for the North Carolina Pork Council, believes that because of widely distributed photographs of hogs perched on the rooftop of a barn as they scrambled to get out of rising waters, hogs have gotten undue attention as a flood hazard. "Ninety-eight percent of hog farms were unaffected," says Mumford. "[Only] 50 farms were flooded. Concerns regarding contamination have not materialized. "Compared to all the things that happened in the flood, we weren't that significant."

Mumford notes that the McCoy farm, the one featured frequently in photographs of flood devastation, is owned by an individual rather than a corporation, and the owner did apply for a buyout. The farm was rated 17th, but the state only had enough funding to purchase 14 farms. Consequently, the owner absorbed his losses due to Floyd and continued operations. "He bought that farm in the mid-1970s," says Mumford. "I don't think until it flooded that he knew he was in the floodplain."

An N.C. Pork Council fact sheet indicates 21,000 hogs were lost to Floyd flooding, along with 2.1 million chickens, 700,000 turkeys and 680 cattle. Tommy Stevens, now the Pork Council's water quality expert but head of the Division of Water Quality in the N.C. Department of Environment and Natural Resources when Floyd struck, notes that the vast majority of hog waste lagoons functioned as designed during Floyd with only six lagoon breaches. "Waste from the majority of those farms was contained in the lagoons," notes Stevens. "They contained that rainwater. I think those operations fared surprisingly well during those storm events." Stevens says it's difficult to document all of the sources of surface water contamination after a storm, but he says that the wholesale pollution forecast in Floyd's wake failed to materialize.

Drinking Water Contamination and Other Health Concerns

Drinking water contamination is another area of ongoing concern. Following Floyd, the Division of Environmental Health with assistance from local environmental health specialists conducted a massive water-sampling program of private water supplies in the affected counties. Over 12,000 bacteriological samples were collected, of which 29 percent proved positive for total coliform and 5 percent positive for fecal coliform. These results raised concerns about the quality of drinking water in Eastern North Carolina and prompted the legislature to appropriate $1 million for follow-up sampling of these same wells.

According to a study concluded in November 2000, a total of 2,650 wells have been sampled and inspected. DEH reports that 1.9 percent of these tested positive for nitrates and 2.1 percent positive for fecal coliform, slightly less than the statewide percentage of 2.9 percent for wells tested. Many of these wells have since been abandoned or disconnected. However, the percentage of contaminated wells remains a concern to public health officials. Through inspections of the wells, public health officials have learned some key lessons.

"The first thing we have learned in terms of protecting water quality is the deeper the well, the better," says Malcolm Blalock, deputy director for the N.C. Division of Environmental Health in the Department of Environment, Health, and Natural Resources. "The second thing we have seen is that the quality of well construction varies widely. When you drill a hole for a well, you create a cavity larger than needed for the well casing. Grouting needs to be poured in around that casing to prevent surface water from getting in the well. That's not being done in many, many cases.

"In North Carolina, there are only 25 counties that inspect and permit wells, and there are no full-time state staff dedicated to well inspections," Blalock adds. "We would love to see a program in North Carolina to see that every well sunk is inspected to make sure it is done properly."

News & Observer

Health officials also were concerned with mosquito infestations that never materialized and with fungal contamination in houses exposed to floodwaters. Once owners disposed of ruined building materials such as insulation and sheetrock, they were eager to close in their walls. However, doing that when wood framing has a moisture content of higher than 15 or 20 percent can lead to the growth of dangerous mold and mildew. The N.C. Division of Public Health provided county health departments with meters to check the moisture levels of wood, while Raleigh-based Advanced Energy Corporation provided training on how to use them. Will Service, industrial hygienist with the Division of Public Health, says he has received reports of mold and mildew as a result of improper closure of buildings, but he has not heard of any widespread health problems. The division is currently engaged in a study with the UNC-Chapel Hill School of Public Health to compare asthma rates in affected areas before and after the flood.

Service says one positive outcome of the flood is that the public health departments in Eastern North Carolina are now much more aware of how to properly clean and restore flood damaged-buildings. Ironically, new construction may also improve as a result of Floyd. A group called the Healthy Building Resource Center is working with nonprofit housing agencies, such as the North Carolina Community Development Initiative, to ensure that the housing units they build adopt the latest standards in healthy and energy-efficient building design.

"We are writing the standards and specifications, training the contractors, conducting quality control during construction, and performance testing after construction," says Arnie Katz, director of the Healthy Building Resource Center. "On top of that, we will guarantee the energy bills."

Katz says the focus on the connection between building design and indoor air quality in the wake of Floyd has left people more open to trying alternative building practices. He cites as an example the

growing sales of a new generation of modular homes that include mechanical ventilation systems and are well constructed. At the same time, Katz says, there is such a shortage of housing in the east that many people are buying trailers and manufactured housing that only meets minimal HUD standards.

Removal of Junkyards and Other Hazards

With respect to removal of junkyards and solid waste facilities from the floodplain, progress has also been slow. The legislature awarded the N.C. Division of Waste Management (DWM) in the Department of Environment and Natural Resources $4.5 million to evaluate and remedy those facilities deemed to be a hazard. Letters were sent out to local governments seeking voluntary applications to purchase conservation easements on affected facilities. Applications for eleven sites were returned. Independent appraisals for land and structures have been conducted on eight of those, and negotiations for purchase of conservation easements are underway.

"The ball is now in our court to see if we can fund [these] sites," says Bill Meyer, former director of DWM, now retired. "If we can't, we will ask the local governments which of these sites would yield the most public benefit and go after those."

The Flood Hazard Prevention Act prohibits new junkyards in the 100-year floodplain, but Holman notes that "the enforcement mechanism in the law is weak" because the state does not require junkyards to get permits. "We all hope that local governments will enforce the prohibition, but many local governments don't have land use regulations."

DWM also received $5 million to test, evaluate, and in some cases remove underground storage tanks that were affected by the hurricane. DWM contacted the owners of 102 facilities in the flooded areas, of which 71 were determined to be worthy of testing. As of Nov. 1, 2001, DWM had inspected 56 commercial sites and 15 noncommercial sites. Soil contamination was confirmed at four commercial facilities and 14 noncommercial sites, and soil and tank removal has been completed or is in progress at all of these sites.

The Impact on Fisheries

Although untold volumes of toxic and hazardous wastes were washed into the waters of Eastern North Carolina, the dire environmental consequences predicted just after the flood have not

And the rain was upon the earth forty days and forty nights.

—*Genesis*, Chapter 7, Verse 12

And the waters prevailed exceedingly upon the earth; and all the high hills that were under the whole heaven, were covered.

—*Genesis*, Chapter 7, Verse 19

materialized. There were some fish kills in the Neuse the summer after the hurricane, but no more than ordinary. Landings of commercial species of fish and shellfish in 1999 varied widely compared to previous years. Shrimp landings almost doubled over 1998 levels; blue crab, herring, southern flounder, and mullet were all down. Don Hesselman, commercial statistics coordinator for the N.C. Division of Marine Fisheries, says it's unclear as to how the hurricane may have affected these.

"There are just too many factors that impact landings," Hesselman says. "I think we can conclusively say the hurricane prevented many fishermen from engaging in commercial fishing activities, and we can also say that a lot of commercial gear was lost. We could probably go out on a limb and say that the floodwaters certainly caused migrations of fish and crab away from low salinity areas. However, the long-term effect of the storm waters, subsequent low salinity, and the influx of pollutants on commercial fish species is something we best leave up to the researchers." Initial estimates ranged as high as $19 million for commercial fishermen's losses due to Hurricane Floyd, and the legislature appropriated $11.4 million based on that estimate. However, just over $6 million was ultimately paid out, says Hesselman, and the remainder of the money was transferred to other purposes.

Despite this lower-than-anticipated payout, Hesselman says the impact of the storm is still being felt, as indicated by the stock status report released in August 2001. "Although North Carolina led the nation in blue crab harvest in 2000, landings were off by 46 percent in the Neuse River and Pamlico Sound. In 2001, crabs, the state's most valuable fishery, appear scarce throughout coastal

waters. The shortage of blue crabs is thought to be linked to flooding associated with Hurricane Floyd in 1999. It appears only blue crabs were immediately impacted by the hurricane, but it is too early to determine the long-term effects of the storm on the overall health of [the state's] fisheries."

After Floyd, the legislature awarded the N.C. Division of Water Quality in the Department of Environment and Natural Resources $2 million to monitor coastal rivers and sounds. This work has been contracted out to researchers at Duke University, the University of North Carolina at Chapel Hill, N.C. State University, and Oak Ridge National Laboratories. While all contracts have not been completed, those that have been completed do not show widespread pollution.

Damian Shea is associate professor of toxicology at NCSU. Beginning two weeks after the hurricane and continuing for the next 18 months, Shea monitored levels of 146 toxic chemicals in the surface waters and sediments of the Tar, Neuse, Chowan, and Pasquotank rivers. Shea saw an increase in petroleum-related compounds in certain sites immediately after the storm, but these dropped down to background levels within two weeks. Examining known sediment deposition sites in the lower estuaries and sounds, Shea found a slight increase (statistically significant, but not significant health-wise) in DDT and toxaphene in three sites, but not in seven others. There was no increase for any of the other 144 toxic compounds tested.

"It appears we got lucky," Shea says. "We haven't seen any apparent increase in the toxic chemicals that we measured. However, we did not look at nutrients such as nitrogen, phosphorus, and organic carbon, which other researchers are examining at this time."

Financing Recovery from Future Storms

One final issue that the state has not addressed is how to finance the recovery from a future crisis of Floyd's magnitude. Floyd made it clear that federal funds, while generous, will not cover all the costs associated with recovery from a storm of Floyd's size or greater. The state was fortunate in that Floyd struck at a time when the state's coffers were full and funds were available to allocate to the recovery effort. However, that may not be the case in the future, and some experts feel the state should be setting money aside now to deal with future crises. Billy Ray Hall, executive director of the North Carolina Rural Economic Development Center, says there are two reasons why North Carolina needs such a fund.

John Manuel

Long Vo

Student volunteers help rebuild a church in Princeville.

"First is the fact that federal relief programs are predicated on disasters costing at most $2 to 2^1/_2$ billion," Hall says. "Once you go beyond that, you're on your own. Second is the fact that despite our best efforts, we have a lot of people in Eastern North Carolina who are poor, uninsured, and in substandard housing. When another storm hits, as it inevitably will, these people will be in trouble again."

Hall feels the state should be building a fund through some sort of real estate assessment, as is being done in Florida. Since being devastated by Hurricane Andrew in August 1992, Florida has been collecting $15 to $17 million annually through a surcharge on insurance premiums—$2 per year for homeowners and $4 for businesses—to be spent on improved communications systems and hazard mitigation projects. The majority of these funds are redistributed to Florida's 67 counties (approximately $105,000 each per year), $3 to $4 million annually is awarded in competitive grants to nonprofit organizations, and some is spent directly by the Division of Emergency Management. The state also has set up a Catastrophic Insurance Fund to keep insurance companies from going bankrupt in the event of a major natural disaster.

Florida also has declared that in future disasters in which federal funds are awarded on a matching basis (usually 75 percent federal, 25 percent state), affected counties must pay half of the state match. "No longer is it going to be just the state picking up the tab," says Joe Myers, director of Florida's Division of Emergency Management and former director of the North Carolina Division of Emergency Management. "Local governments need to take some of the ownership for what happens to them and this match is an incentive for them to engage in advanced planning."

In sum, it seems fair to say that North Carolina has taken one step out, but still has one foot stuck in the muck of Hurricane Floyd. The state failed to pass a meaningful Flood Hazard Mitigation Law, but it does require local governments to develop hazard mitigation plans as a condition of receiving state or federal hazard mitigation funds. Further, the state has embarked on an ambitious effort to remap the

100-year floodplains using the latest digital technology. This effort should greatly increase community and individual awareness of floodplain zones and lead to wiser use of those areas. Thousands of homeowners living in the floodplain have opted to participate in buy-out programs, yet thousands more have not. Several dozen junkyards and hog farms are in the process of being bought out and converted to open space. State law now requires new facilities of this nature to be constructed outside the floodplain. Yet many of the hog farms that were flooded in Floyd and other hurricanes are not participating and are back in business. Unincorporated areas in virtually all of the eastern part of the state are regulated by county flood ordinances. However, it is difficult for counties to administer the floodplain regulations for agricultural development effectively. The five non-participating counties, Alleghany, Caswell, Henderson, Wilkes, and Yadkin, are in the Piedmont or West. Wiser emergency response policies are being initiated, along with better training of emergency response personnel. Obtaining proper equipment for swift-water rescue remains a problem. A whole host of new programs have been set up to help homeowners and businesses get back on their feet in the wake of Hurricane Floyd. Those programs should be of vital assistance in the event of a future disaster. If nothing else, administrators say, North Carolina now has a wealth of experienced personnel on the state and local level to deal with flood hazards.

And the state continues to fine-tune its disaster response apparatus. The 2001 General Assembly adopted Senate Bill 300,[6] which establishes three categories of disasters and authorizes the governor to declare a disaster and provide disaster relief when damages are below federal thresholds for assistance. The law also requires the adoption of local hazard mitigation plans by August 2002 and requires participation in the National Flood Insurance Program for communities to qualify for infrastructure grants from the state in Type I disasters. These are disasters that overwhelm local resources but do not do enough damage to necessitate a federal disaster declaration.

The failure to spend all the state and federal money allocated for Hurricane Floyd relief represents another problem, though one that appears all but resolved. Faced with a budget shortfall estimated at more than $800 million, Governor Mike Easley considered using unspent Floyd monies to balance the state budget, though he ultimately decided not to follow through with this proposal. The Office of the State Auditor found that only $10.4 million of the $836 million in state funds allocated for Hurricane Floyd relief efforts had not been spent or obligated as of June 2001, effectively taking these funds off the table in budget debates that roiled the General Assembly in the 2001 session.[7] As of Nov. 2, 2001, $828.9 million had been allocated with some $7.8 million remaining in a contingency fund.

While the wheels of the bureaucracy have been turning slowly, they have been turning. Disaster relief officials at both the state and local level say it would be a huge mistake to cut or divert funds intended for recovery and hazard mitigation. Robert Carver, former assistant director of the N.C. Redevelopment Center, believes the state has done well in allocating and spending relief funds. "We are way ahead of where either North Dakota or Florida were after their disasters."

Marvin Davis, city manager of Greenville, agrees. "With the extent of damage we had, the rebuilding will be going on for three or four years," says Davis. "We live in an instant gratification society where if you don't see progress immediately, you assume nothing is being done. That is not the case."

Time is needed to allow the programs instituted in the wake of Floyd to take effect. But time can also cause people to forget the damage that was done. Thus, it is up to policymakers to see that the lessons of Floyd continue to be turned into meaningful hazard mitigation policies at the state and local level.

"Hazard mitigation is a policy without a public," Godschalk says. "Once a disaster has passed, people want to forget about it. But hazard mitigation is an important public responsibility, and our leaders must be willing to take it on."

FOOTNOTES

[1] Slim Ray, "Pressing issues remain unresolved," *The News & Observer*, Raleigh, N.C. Sept. 24, 2000, p. 26A.

[2] Hurricane Floyd Redevelopment Update, December 13, 2000, published by the N.C. Redevelopment Center, Raleigh, N.C., p. 1. Available from the N.C. Redevelopment Center, 20325 Mail Service Center, Raleigh, N.C. 27699.

[3] N.C. Session Law 1999-463 Extra Session, House Bill 2, ratified Dec. 16, 1999.

[4] Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S. Code 5121, *et seq.*

[5] The Flood Hazard Prevention Act of 2000, N.C. Session Law 2000-150 (Senate Bill 1341), ratified Aug. 2, 2000, and codified as N.C.G.S. Chapter 143, Art. 21, Part 6.

[6] Session Law 2001-214 (Senate Bill 300), ratified June 4, 2001, and amending N.C.G.S. 166A-4 through 166A-6A.

[7] *Performance Audit: Hurricane Floyd Reserve Fund*, Office of the State Auditor, Raleigh, N.C., June 2001, p. 5.