

North Carolina hurricane flooding—the manmade component of a natural disaster

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Nearly two weeks after Hurricane Floyd came ashore September 16 at Cape Fear, North Carolina, this Southeastern US state is confronting an ecological and human disaster without precedent. The entire coastal plain east of the capital city of Raleigh—an area comprising 18,000 square miles and home to 2.1 million people—remains in a state of emergency, devastated by the worst flooding in the area in recorded history.

The North Carolina death toll stands at 47, although rescue workers expect to find more bodies as flooded homes and cars are searched. Approximately 2,100 people remain in 21 emergency shelters, down from a high of more than 10,000. State emergency management officials say that 3,010 homes of the estimated 30,000 homes flooded have been destroyed or seriously damaged, although this figure does not include reports from six of the worst-hit counties. Waters have begun to recede, but many neighborhoods are still covered by up to four feet of water.

Corn, cotton and peanut crops have been severely damaged. While current damage estimates stand at \$1.3 billion for the state, this will undoubtedly rise as the full impact of Hurricane Floyd becomes known.

The flooding has produced an environmental disaster. An estimated 2.5 million chickens, 500,000 turkeys and 100,000 hogs have drowned, and many of these animal carcasses continue to float and rot in the flood waters. More than 200 municipal and industrial sewage treatment plants were damaged, and 340 animal operations were overrun. The resulting water contamination continues to threaten the population with gastrointestinal illness, tetanus, E. coli, cholera and typhoid. Coffins also bobbed up from flooded cemeteries. Once the flood recedes, huge swarms of mosquitoes are expected, which can carry viral

meningitis.

Other contaminants being carried in the flood waters, and drifting downstream through farmlands and business districts to the Atlantic Ocean, include petroleum, propane, chromium, mercury and farm pesticides. The impact on wildlife and coastal fisheries is of particular concern.

A major contributing factor to North Carolina's environmental crisis is the largely unregulated explosion of hog farming that has taken place in the eastern part of the state in the last decade. Since 1987, the hog population has grown from 2.6 million to 10 million, a 285 percent increase. These hogs produce approximately 50,000 tons of feces and urine a day, or 19 million tons of waste a year. Almost all of this hog farming is concentrated in the eastern coastal plain, which is made up an ecologically interdependent network of wetlands, rivers and coastline.

Floyd's flood waters have served to exacerbate an already serious threat to the natural environment posed by the operation of these giant hog farms. Hogs live their lives packed into hog houses the size of football fields, each containing up to 1,000 pigs. North Carolina is the leading hog farming state, producing close to 10 million hogs in 1997. Only one in ten pigs now come from small family farms, as many of these farms have been put out of business.

While human waste is treated and disinfected in sewage plants, hog waste is collected in open-air pits, known as lagoons, where it is minimally treated and then sprayed on land. Hog waste contains large amounts of nitrogen and phosphorus, which can cause rapid algae growth and rob the water of oxygen, posing a danger to fish. Runoff from sprayfields also pollutes groundwater and drinking wells. Pollutants from leaking waste lagoons seep into waterways and the soil.

Large quantities of ammonia nitrogen escape from hog farms, and fall on water and land. Disease-causing bacteria, or pathogens, are 100 to 10,000 times more prevalent in hog waste than in treated human sewage. Heavy metals, particularly copper and zinc, toxic to plants and animals, are also concentrated in sludge that accumulates in the waste lagoons.

While some regulations on hog farming have been enacted in recent years, most of the farms either came into existence before the new laws, or are exempt from them. New hog operations are still allowed to use the lagoon method of waste disposal. There are few restrictions on locating the hog farms in environmentally sensitive watersheds. Operators are not required to test groundwater or surface water. The quality of life for area residents in many rural areas has been severely impacted, as factories are allowed to spray waste within 75 feet of residential property.

With the flooding, the contamination from these lagoons has been literally lifted up and washed across the entire coastal plain area. No small portion of the threat to human life and the environment connected to the flooding can be traced to the refusal of the state to regulate the \$2 billion a year hog farming business.

While North Carolina authorities have bent over backwards to accommodate these giant hog farmers, the attitude of the state, the Federal Emergency Management Agency and the insurance companies has been less generous towards the flood victims. Many residents will be unable to collect insurance to repair or replace their homes, as only one in four homeowners carries flood insurance, and flood insurance is only offered by the government in areas where the local communities have spent money on flood protection. North Carolina Governor Jim Hunt has also emphasized the responsibility of the state's residents to volunteer and make personal donations in response to the crisis.



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