

## HURRICANE KATRINA

### Introduction

In August 2005 the citizens of New Orleans and the surrounding area were led to believe that Hurricane Katrina, which was coming their way fast, would be 'the big one'. For those affected, it was a huge event, and it certainly did come fast, but at that early stage little did they know that Katrina would be only the first of three high category hurricanes to hit the central Gulf Coast zone in quick succession. For some, as soon as they returned home after Katrina, they were evacuated again; others, still evacuated, had to move on again – the reason: Rita.

Caribbean coastlines, the US Gulf Coast in particular, are used to the impacts of hurricanes. This region is one of the world's main hurricane zones, along with the Indian Ocean, the West Pacific and North Eastern Australia. 2004 was reckoned to have been the worst hurricane season in the Caribbean in a series of bad years, but even this was superseded by 2005's events. The Katrina/Rita/Wilma trio broke records, but only time will tell whether this is a function of global warming, natural climatic fluctuations or sheer chance, though it would be sensible for US government policies to assume the first and react accordingly.

### Katrina's development

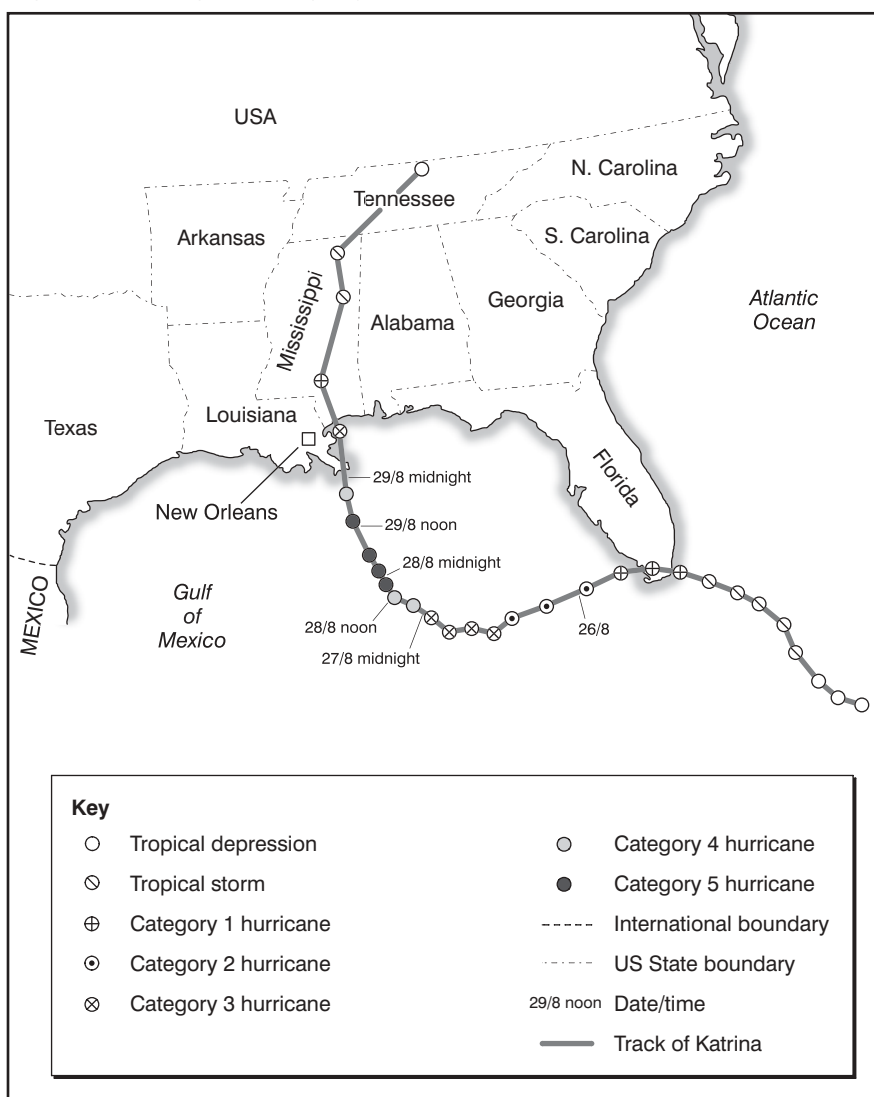
Tropical storms and hurricanes usually begin as a 'wave' on the African side of the Atlantic. Katrina developed as a tropical depression, approaching the southern tip of Florida from the south east (Figure 2). Having enlarged into a tropical storm it made its first landfall at 6.30 pm local time between Hallandale Beach and Aventura. Although it did not experience a smooth rise in strength, Katrina moved through levels 1–5 on the Saffir-Simpson scale as it curved across the Louisiana coastline around New Orleans. A NASA map for the time showed that over the whole of the Caribbean, sea surface water temperature was at least 28°C, ideal for hurricanes to gather strength.

At 12.40 am on 28 August Katrina was upgraded to a Category 4 storm, rapidly followed by Category 5 status.

Figure 1: The Saffir-Simpson scale – used to measure hurricane energy and damage potential

Level	Predicted damage	Wind speed (mph)	Katrina status
1	minimal	74–95	
2	moderate	96–110	
3	extensive	111–130	Katrina within hours after landfall
4	extreme	131–155	Katrina as it made landfall
5	catastrophic	155	Katrina in the Caribbean

Figure 2: Tracking and strength of Katrina



Maximum sustained winds were then 175 mph (280 kph), with gusts of 215 mph (344 kph). Air pressure had dropped to as low as 918 mb. Katrina was one of the most intense Atlantic Basin hurricanes on record. By 29 August, some power was lost and it hit the coastline as a Category 4 event with sustained wind speeds of 145 mph (235 kph) plus stronger gusts.

At 6.10 am on 29 August Katrina's second landfall was at Buras-Triumph, Louisiana. Heading eastwards along the coastline for a relatively short time, major damage was caused at small towns like Plaquemines and Slidell by the storm surge and the winds at the eyewall (the edge of the eye of the storm). New Orleans was next, the eastern side of the city being worst hit,

Figure 3: Katrina in action



as it was grazed by the eyewall. When the levees protecting the city from its adjacent lakes failed, the whole area was flooded.

Briefly going back out to sea, Katrina made a third and final landfall near the Louisiana/Mississippi border with 150 mph (200 kph) winds, but reduced to Category 3. It must be remembered that Category 3 hurricanes are regarded as severe and extensive damage is expected. In fact, the sheer scale of Katrina meant that the damage done at this stage was immense. The north east quadrant of the storm pushed record storm surges onshore, smashing the entire Mississippi Gulf Coast. At the same time, the extreme eyewall winds were behaving like those of a stronger event. Towns including Waveland, Bay St Louis, Pass Christian, Long Beach, Gulfport,

Biloxi, Ocean Springs, Gautier and Pascagoula (all in Mississippi) and Bayou La Batre (in Alabama) suffered particularly badly. Biloxi recorded the largest ever storm surge recorded in the USA at 10 metres, although it is thought (from other historical and archaeological evidence) that 150-200 years ago similar surges occurred along the Mississippi coastline which destroyed many large old colonial homes. Katrina then carried on inland, diagonally across the state of Mississippi, cutting a swathe of damage across almost the entire state.

By the time Katrina reached as far north as Clarksville in Tennessee it was reduced to a tropical depression, but it continued northwards across the USA, doing some lesser damage, until it reached the eastern Great Lakes region on 31 August. Crossing into

Canada it was absorbed by a frontal boundary over SE Quebec, making it a powerful extra-tropical low pressure system which gave Quebec Province 170 mm (50 inches) of rainfall in one day, causing severe damage to roads.

## Hundreds of thousands flee disaster area

'Neighbouring states struggle to cope with influx of people ... Texas bears brunt of problem as hundreds of thousands flee disaster area, many of them vowing never to return.'

*The Guardian*, 5 September 2005, p.5

The flight from New Orleans was by no means instantaneous. Many people tried to leave when news of the likely devastation was announced, but of course thousands were on the roads and traffic was at a standstill. Some escaped, but others had to give up. Services were soon at a standstill and by the time flooding had occurred, roads were impassable and the environment was highly toxic.

By 5 September 363,500 had fled New Orleans and its immediate area for other states (Figure 4). In addition a further 236,700 were expected across the country by friends and relatives, making 600,200 in total. In fact, actual numbers were impossible to measure, but were significantly beyond even these figures.

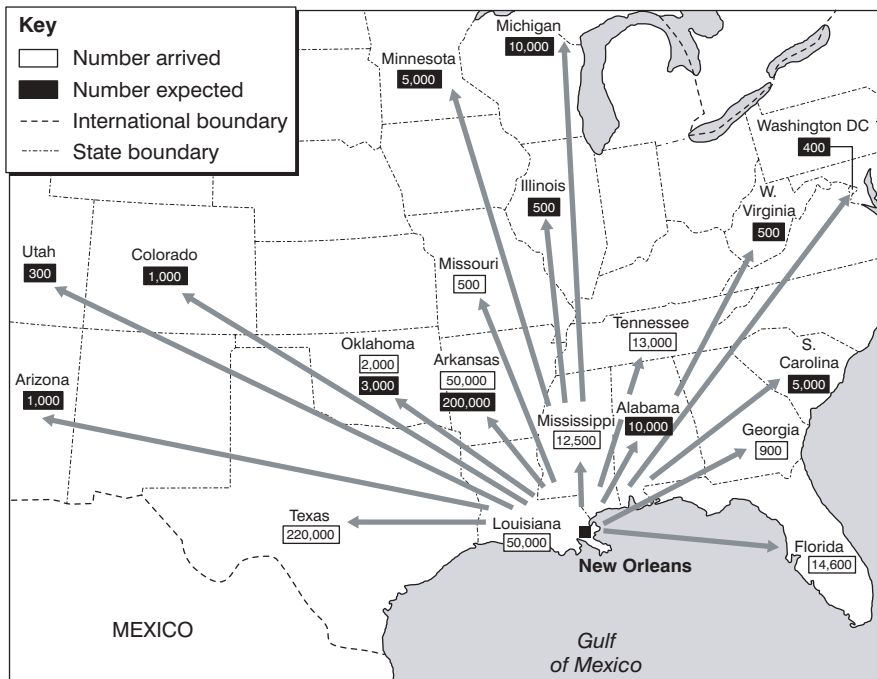
Some states admitted that they were struggling with the numbers of evacuees flocking over their borders. Figure 4 shows that, not surprisingly, the nearer states received the greatest numbers. In any refugee situation people tend to flee to the nearest place of safety. Why go further than you have to in difficult circumstances? Hence Texas was the state with the largest influx and the greatest problems coping. Refugees going further afield than the immediate neighbouring states usually did so because family or friends offered security and some degree of comfort.

## Aid for the Katrina victims

### 1. Sanctuary within New Orleans - the Superdome

As a huge sports stadium, sturdily constructed, this building seemed an excellent place to house those fleeing from the hazards. Many people together could be efficiently dealt with, plus it was not too far to go and might be reached on foot by the poor without

Figure 4: Where the refugees went



Source: *The Guardian*, 5 September 2005

transport. It was a good idea which went extremely wrong!

Crime, squalor and fear were reported, and conditions became so bad that on Saturday, 3 September the last 300 refugees were evacuated from that building. While it is likely that the press exaggerated the situation, the first-hand accounts of those sent there show that circumstances were truly grim. Thefts and rapes were reported, and at least one person attempted suicide.

Moreover, 100 mph winds ripped part of the Superdome roof away. There was no electricity, water or functioning toilets or washing facilities. People who had been there later referred to it as 'chaos', 'devastation', and 'the most frightening experience of my life.'

**2. Sanctuary in Houston**

In contrast to the New Orleans Superdome the 25,000 people gathered in the Houston Astrodome had a better experience. It took longer for the refugees to reach this haven, so there had been time to organise clean and hospitable conditions. However, even Houston reached its limits of accepting displaced persons. To cope, it shipped people on to smaller towns and cities in the region. Even the state of Texas as a whole was panicking. State Governor, Rick Perry, warned on Saturday 3 September that Texas was reaching its capacity, referring to 'the largest influx of refugees in American history', and he asked other states outside the region to offer more

assistance. Dallas, having accepted 15,000 people, asked that new evacuees be directed elsewhere. This shows the severity of the whole situation.

**3. The Red Cross effort**

The American Red Cross set up 275 shelters in 9 states remarkably quickly, with more on standby. Details are laid out in Figure 5.

**4. The emergency services, the city authorities and the federal government**

The programme was as follows:

SUNDAY 28 AUGUST Ray Nagin, Mayor of New Orleans, ordered mandatory evacuation of the city  
 President George Bush declared state of emergency

Figure 5: The Red Cross effort (as reported by *The Guardian*, 5 September, 2005)

<p><b>Shelters</b>                      356 American Red Cross shelters holding more than 107,400 evacuees in Alabama, Mississippi, Louisiana, Texas, Tennessee, Arkansas, Florida, Missouri and Georgia, with many more on standby</p> <p><b>Emergency vehicles</b>                      249 Red Cross emergency response vehicles in Louisiana, Mississippi and Alabama with additional units en route to the affected area</p> <p><b>Relief workers</b>                      Thousands of Red Cross staff and volunteers across the country working around the clock. More than 4,200 Red Crossers left their families</p>	<p>to serve in affected areas and more than 600 additional workers moving into the area every day</p> <p><b>Food</b>                      Nearly 137,600 meals served in the last 24 hours. The Red Cross in association with the Southern Baptist Convention, the Adventists and Second Harvest [all Christian churches] preparing to serve 500,000 hot meals each day</p> <p><b>Health</b>                      The Red Cross working with health services partners to develop strategies to cope with the public health emergency</p>
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- MONDAY 29 AUGUST Search and rescue teams prepared but have to wait for worst of storm to pass before they can be effective
- TUESDAY 30 AUGUST A disastrous day - 80% of New Orleans under water due to failure of levee. Mayor Nagin critical of lack of coordination of relief efforts
- WEDNESDAY 31 AUGUST Mayor Nagin ordered total evacuation of the city  
 President Bush convened federal task force  
 Public health emergency declared along whole Gulf Coast to speed up delivery of food, water and fuel BUT armed police ordered to cease rescue operations and tackle lawlessness  
 Military transport planes evacuate only seriously sick and injured to Houston
- FRIDAY 2 SEPTEMBER Congress approved \$10.5 billion (£5.8 bn) in aid
- SATURDAY 3 SEPTEMBER Military to take over New Orleans  
 Largest ever airlift in USA rescued thousands  
 Relief workers at last begin collecting corpses (the living had been the priority)
- SUNDAY 4 SEPTEMBER Refugees moved out to other cities

**5. Other assistance**

One aspect of America highlighted by this disaster was the common decency, the willingness to help, of ordinary people. Churches and private homes opened their doors to strangers. Websites offered accommodation for those in need. Schools took in out of state children, despite rising class sizes.



## The rescue effort – a failure?

Even as the majority of citizens were evacuated from New Orleans, the number who chose to stay, the number who wanted to leave but had no means of transport (primarily the poor and black), and the late entry of federal rescue workers into the city combined to cause a high death rate. Many people were caught in circumstances utterly beyond their control. Rescuers expected to find many bodies, trapped in houses, on roofs from which they had not been rescued, in waterlogged attics where they had gone for safety, and simply floating in the floodwaters as these retreated. Policy was to attend to the living, to save those who could be saved, but at the cost of leaving bodies for longer than was desirable or even decent.

## The politics of the situation

The USA is a country perceived as being able to cope well with natural disasters. It is prone to more of these than most MEDCs, with its susceptibility to hurricanes, tornadoes, earthquakes and volcanoes, so it gets plenty of practice! It has the National Guard in place, trained personnel, plus all the heavy equipment that many LEDCs can only dream of.

Hurricane Katrina has cast doubt on America's ability to cope well in such an extreme situation. Speed of relief was not all it might have been. People died unnecessarily and many more suffered. These events may have the benefit of making Americans think in the future that it is foolish to sit out such events, that planning ahead is essential for survival. President Bush and his government were severely criticised for their slow response, although so also was the UK government, as 150 Britons were unaccounted for for too long. The US central government blamed local and state authorities for all the delays.

In the long term, perhaps the worst aspect of Katrina is that it has highlighted the racial divide that still exists in America: it was the poor and black who were in the most trouble and the white and wealthier who had a better chance.

'The women pleading for their lives in handwritten signs, the children clinging to tree branches, the prisoners herded onto a jail roof – they were overwhelmingly black.'

*The Guardian* 5 September 2005, p. 3

## Conclusion

On the other hand a comparison of all the faults of the Katrina situation with the havoc wreaked by the massive Pakistan earthquake in October 2005 and the whole world's inability to cope with that incredibly difficult physical environment, perhaps puts the USA's performance into perspective.

'Category 4 storms carrying 145 mph winds are acts of God. Most Americans understand that theirs is a vast and often wild land where nature can wreak terrible damage in minutes. New Orleans would have been very badly damaged regardless of human intervention.'

*The Daily Telegraph* 5 September 2005, p. 10

'I'm not going back. I'm going to rebuild in Dallas.'

Thomas Washington, aged 46, evacuee from New Orleans

*The Guardian*, 5 September 2005, p. 5

'I was trapped in [a] tree for five days with corpses floating by. ...The mosquitoes were so rough out there. It was 100 degrees during the day. I wouldn't have wished this on my worst enemy. I wouldn't have wished this on Saddam Hussein.'

Gary Mullins, refugee in New Orleans

*The Daily Telegraph*, 5 September 2005, p. 11

Nevertheless, one long-term lesson for the USA must be the consequences of the differential impact of any natural disaster on its poor compared with its middle classes.

This is a topic which could have filled several Geofiles, so what you have just read is selective. Major world events (especially in an MEDC) generate huge amounts of news coverage and

subsequent analysis which you can research yourself. Some websites are suggested below, but even these are just a selection!

The next series of Geofile, in September, will update you with the post-Katrina events and evaluations.

## Suggested websites

[www.nhc.noaa.gov](http://www.nhc.noaa.gov) (US National Hurricane Centre)

[ohsep.louisiana.gov](http://ohsep.louisiana.gov) (Louisiana state emergencies)

[guardian.co.uk/usa](http://guardian.co.uk/usa)

[news.telegraph.co.uk](http://news.telegraph.co.uk)

## FOCUS QUESTIONS

1. Write a comparison of, or prepare one side of a debate on, the impacts of hurricanes in MEDCs versus LEDCs. Also consider the ability of such countries to cope.
2. The key questions: Could the disaster have been avoided? Would better flood defences have made a difference? Could the city have been evacuated before the storm? Could federal aid have reached New Orleans sooner? What are your reactions to these questions posed in the press?
3. 'I cannot believe that this is America' (*The Daily Telegraph*, 5 September 2005, p. 10). 'When Sri Lanka offers to send aid, the humiliation is complete' (*The Guardian*, 5 September 2005, p. 5). Explain the significance of these newspaper quotations about the consequences of Hurricane Katrina.