



Photo: NASA/ SSEC/ NOAA

Hurricane Katrina approaches New Orleans (28 August 2005)

New Orleans - a tragedy waiting to happen?

Martin Quick argues that the devastation caused by Hurricane Katrina could have been averted.

Few can have failed to be moved by the images of the disaster inflicted by Hurricane Katrina on the Gulf Coast of the USA in August. Particularly shocking was the plight of the huge number of (mainly poor) people - most of whom had been unable to evacuate from New Orleans due to not having cars - while even those gathered in accessible locations received virtually no help in the form of food, water or other essentials for several days.

A disaster such as this had been predicted at three different levels. Firstly, warnings had been issued in the days running up to the landfall of Katrina as it reached the most severe storm category (category 5). Secondly, there had been warnings for many years that there was a shortfall in the strength of the flood defences. Thirdly, there were decades-old warnings in relation to the dangers of trying to control

and effectively canalise the course of the lower Mississippi.

The hurricane was one of an increasing number of very severe storms to have struck the USA and the surrounding region in recent years - a possible consequence of human-induced climate change (see p.15). Yet warnings that over 100,000 people would need to be evacuated and/or given aid were met with a completely inadequate response by the US authorities, notably the Federal Emergency Management Agency.

The inadequacy of the flood defences had been highlighted by engineers for many years. They had only been designed to withstand a category 3 hurricane. Arguments in favour of strengthening them fell on deaf ears. Indeed the budget for maintenance and improvement of the flood defences (carried out by the US Army Corps of Engineers) had recently been cut - not least as finances had been stretched by the Iraq war.

The problems associated with the control of the Mississippi River have been documented by John McPhee¹. The natural state of the Mississippi is to form a huge delta as the watercourse deposits silt

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**SGR and AESR
agree to merge**

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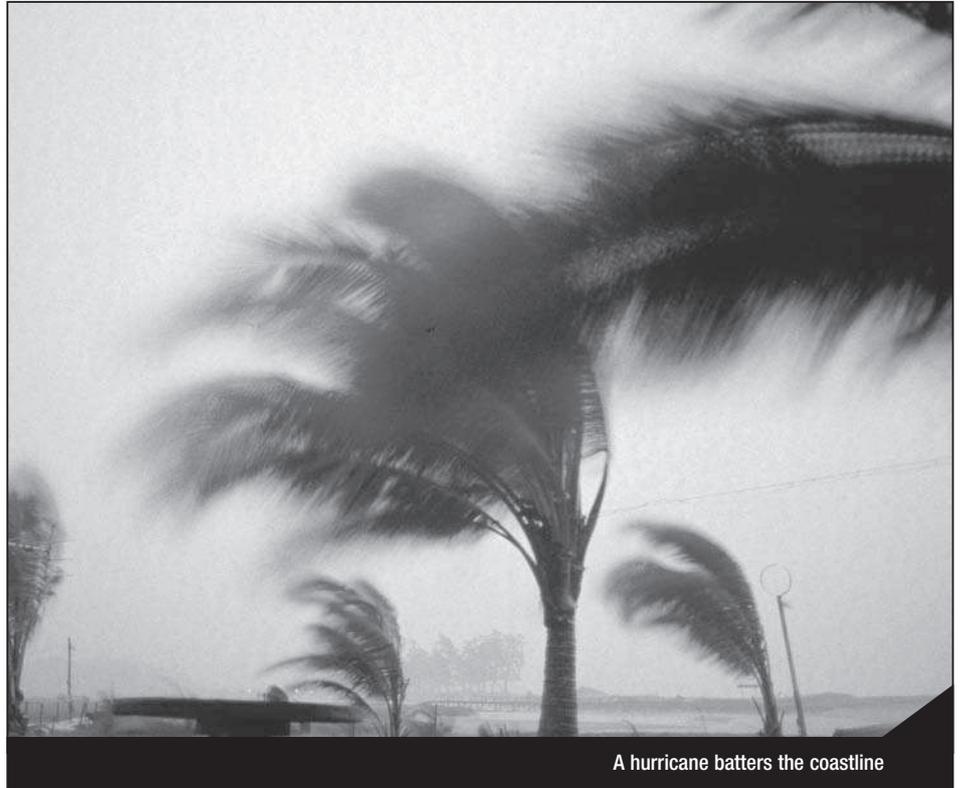
New Orleans - a tragedy waiting to happen?

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brought down from the catchment area, which covers half the area of the USA. The main course of the river has changed substantially at intervals of about a thousand years. Left to its own devices, the main flow would by now have diverted to the adjacent Atchafalaya River that flows further west to the Gulf. However, because so much industrial and commercial development, ports and other infrastructure has developed along the existing course of the Mississippi, massive civil engineering works have been built to control and limit the flow into the Atchafalaya, and the huge flow of the Mississippi is contained within levees and flood barriers which have to be raised every few decades. This effective canalisation of the river means that silt, which would in the natural state deposit on low-lying areas to compensate for the gradual compaction of the alluvial soil, is prevented from doing so. This leads to progressive sinking of much of the land in and around New Orleans, much of which is now below sea level. This sinking in some areas has been exacerbated by oil and gas extraction. Continuous pumping is required to remove rainwater and seepage and pump it into the river. A further factor, making the city more vulnerable to sea surges, is the construction of a shipping canal cutting through the delta below New Orleans, to shorten by 40 miles the distance between the port and the sea. This canal has widened as a result of erosion, and this huge channel means the city is less protected by the natural wetlands and delta downstream.

While the original historic French quarter and the city centre is on (relatively) high ground, much of the city and surrounding residential areas are on the low ground, always at risk from flooding. Although there are other cases of large populated areas below sea level (most notably much of the Netherlands), the combination of factors in New Orleans left it particularly vulnerable.

Climate change could heighten the risks to the city both from the sea and from the inland watercourses. The threat from the sea could increase, partly due to rising sea levels and partly due to the possible increase in the frequency and intensity of hurricanes and associated storm surges. Meanwhile, the threat from the river could rise due to a greater likelihood of prolonged and intense rainfall over a large area, which would cause it to swell (as has happened in the past, most disastrously in 1927).



A hurricane batters the coastline

The challenges to planners, architects and engineers in recovering from this tragedy are huge. These include the repair of infrastructure and provision of housing and other development for those of the population that wish to return, in ways which are less prone to flooding. They also include the revitalisation of the most beautiful historic areas of the city with its rich culture. It may be that the authorities will see the advantages of working with nature, rather than against it. A good example is the case of the Rhine, where some of the embankments have been removed to allow the river to revert more to its original course and increase the area of flood plains.

The latest death toll attributed to Hurricane Katrina is 1,200 people, with the estimated cost of the damage put at \$125 billion - making it the USA's most expensive disaster in history. We must hope that this tragedy convinces the US Administration to take the threat of climate-related disasters much more seriously, not least the possibility that climate change could make such threats even worse.

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Reference

- 1 McPhee J, *The Control of Nature*, Noonday Press, 1990.

Other statistics from BBC news online
http://news.bbc.co.uk/1/hi/in_depth/americas/2005/hurricane_katrina/default.stm