

The great Labe-Elbe river flood of 2002

by Chas Keys

In 2002 the Czech Republic and Germany experienced devastating flooding on the Labe-Elbe river system. Stream heights were reached which had not been experienced for centuries. Late in 2003 Chas Keys of the NSW State Emergency Service spent several days in Aue and Dresden, in the German state of Saxony, and in Prague talking to mayors, hydrologists, emergency managers and people who had been caught in the flooding. He reports on his findings.

The flood

The Labe-Elbe river system drains a large area encompassing the western two thirds of the Czech Republic and much of eastern and northern Germany. Extreme flood rains in August 2002 over the upper reaches of the system produced flooding of great rarity. On some tributaries, the floods were once-in-10,000-years events. Above the Czech capital, Prague, the Vltava River had something like a 1000-year flood, and in Prague itself the river reached its highest level since 1432. Downstream, the city of Dresden had a flood of a magnitude expected there only once in every 300–500 years. Further downstream again, as levels attenuated on the flood's way through Magdeburg and Hamburg to the North Sea, the return frequencies fell away.

The damage in the upper parts of the catchment was considerable, especially in the Czech Republic and on the northern slopes of the Erzgebirge (Erz Mountains) in the German state of Saxony. One hundred Czech towns and villages were completely flooded and a further 350 partly so, with scores more in Germany experiencing partial or complete inundation.

Hundreds of houses in the two countries were destroyed and there was severe damage to industrial

and commercial premises and to infrastructure (especially roads, railway lines and bridges) across a wide area.

The damage bills were estimated in the Czech Republic at 70 billion krone and in Germany at six billion euro. Taken together, these sums represent in excess of \$A13 billion. No single Australian natural disaster event of the past several decades comes close in terms of total costs incurred—not *Cyclone Tracy* (1974), the Newcastle earthquake (1989), the Sydney hailstorm (1999), or any of the numerous serious floods, bush fires or droughts experienced in Australia.

The high cost of the Labe-Elbe flood was largely a measure of the high population densities of central Europe and the great exposure of assets on floodplains. It also indicates the extreme nature of the event which damaged assets few would have believed would be liable to flooding.

The response

Germany and the Czech Republic do not have volunteer flood management agencies like the State and Territory Emergency Services in Australia. Fire services deal with the bulk of the sharp-end flood response work, including rescue, with local and regional councils and welfare agencies playing significant

roles. As in Australia, the armed forces can be called upon and in western Europe these are large, very well equipped, and have great technological power. In recent times, with the Cold War over, these armed forces can focus on civil protection when necessary. They played a major role during the floods in Saxony in 2002.

Over 12,000 military personnel were deployed in Saxony on a wide range of flood tasks. Laser-equipped Tornado jets were used to measure flood heights after many gauges in the Czech Republic were washed away. Amphibious and submersible craft were employed for transport purposes when bridges were closed or damaged. Military aircraft also played a major role in evacuating hospital patients to cities far away from the flood-affected areas including Cologne and Berlin.

Thousands of people were rescued by trucks, boats or helicopters, and almost 300,000 people – most of them in the Czech Republic – had to evacuate. Some, in the upland areas where the flooding came and went quickly, were out of their homes for only a few hours, but a few could not return for months. Many people simply moved from ground floors to higher levels of their homes. The capacity for 'vertical evacuation' is high in Europe where large proportions of dwellings near watercourses are two or more storeys

high. Personal property was saved by moving it to upper floors.

One success in the response was the deployment of the new 'pallet barrier' temporary levee system in central Prague. The system, which is now available in Australia, kept most of the famous 'old town' free of flood waters.

The lessons

As always after a major event there were several enquiries conducted and many lessons to be learned. The emergency planning regimes in both countries were found wanting in various ways.

In and near Prague, many nominated evacuation shelters were useless because they were flooded and too few shelters were available to meet the evacuation demand. On the German side of the border the high-quality flood planning that had been undertaken in the former East Germany had fallen into disuse. The priorities of German reunification and the reconstruction of the former Soviet satellite state had seen emergency plans largely ignored for more than a decade and there had been little updating or exercising of them. Consequently managers were uncertain of their responsibilities and powers, co-ordination suffered, and the majority of the response to the flooding was crisis-driven.

These management difficulties were exacerbated by the sheer scale and severity of the flooding and, in the upper reaches of the river system, by the lack of warning time available. Warning quality was diminished by the failure of gauges and communications, the lack of prior knowledge of the effects which would be felt by the extreme flood heights reached and the lack of emphasis given to the warning function generally.

Civil defence sirens that had been widely installed in Germany during the Cold War had been sold off after reunification and few remained to alert people to the

approaching danger. Municipalities are re-investing in sirens as well as developing warning strategies incorporating SMS and email delivery. Some are also preparing warning messages ahead of time for floods of differing severities and impacts. Warning initiatives, in short, are being planned for more fully.

Land management issues also came to the fore in the post-flood analyses. Near Dresden, a new village established since German reunification was lost—a reminder of the folly of building large numbers of dwellings on land which will inevitably be inundated. It has since been decided that new facilities will not be provided for this village.

There is also a focus on the need for reforestation of areas clear-felled for agricultural use or where forests had been badly damaged by acid rain over recent decades. To retard runoff and reduce erosion in the Erzgebirge, thousands of hectares will be taken out of farming and re-forested over the next few years using funding from the European Union.

And what are the implications for Australia? In the eastern States the flood hazard sits at or near the top of the list of natural disaster agents as far as costs incurred are concerned, and flood management planning should not be neglected. These central European floods illustrated the need for planning to consider the full range of flood severities, not just the more common, lower-level flood events. They showed, too, the critical importance of the warning function and the need to maintain vigilance in relation to development on floodplains. These lessons are capable of being learned, but there is doubt as to whether they are heeded sufficiently in Australia or elsewhere. For this reason flood damages continue to increase.

The State and Territory Emergency Services, as flood combat agencies, would be wise to take note of this given Australia's history of occasional very severe and highly damaging floods. There is a real danger that emergency managers will focus on the more common, less consequential lower-level floods with which they are familiar and will ignore the events which will most test their capabilities and expose weaknesses in their management systems.

Huge floods like those on the Hawkesbury River in 1867, at Mackay in 1916, on the Hunter River in 1955 and on the Brisbane River in 1974 will happen again and will one day be exceeded in severity. Not to plan for such events by developing flood intelligence in depth, building strong warning systems and procedures, planning evacuation strategies, and ensuring that flood managers understand they might one day have to manage really severe flooding, is a mistake. Failure to plan guarantees that the next genuinely big flood will elicit a poor management response. The Czechs and the Germans discovered in 2002 just how devastating a flood can be and how much better prepared they could have been.

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