

Chapter 3 Slipping and a Sliding - an examination of recent landslides in Australia

‘Thousands stranded by mudslides and floods’

On the morning after the Illawarra disaster this headline (*Sydney Morning Herald* of Tuesday, 18 August 1998) dramatically drew attention to the catastrophic events of the previous evening near Wollongong. These happenings are summarized below.

The railway lines, F6 Freeway and all other major roads were closed, railway commuters could not get home and as many as 4,000 people were trapped in their cars. More than 2,000 commuters sheltered from torrential rain on Waterfall station because

Nick Hutchinson



Figure 3.1a Road damage following flooding/landslides Illawarra, 1998

Photograph courtesy of Mr Gary Pearton, NSW State Emergency Service and Emergency Management Australia

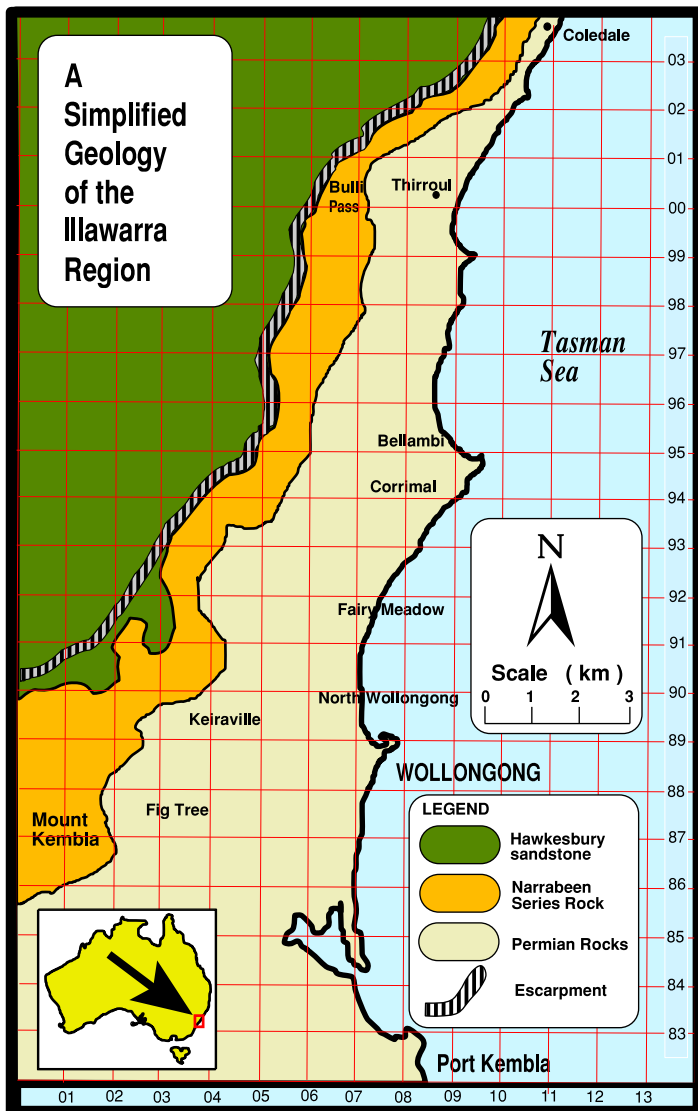


Figure 3.2 A simplified geology of the Illawarra region

mudslides had cut the train line in several places between Waterfall and Dapto, on the Illawarra coast south of Sydney in New South Wales. Where the main road winds down to Wollongong at the Bulli Pass many drivers fled from their cars moments before a mudslide. Eleven cars and an ambulance were stranded on the pass on this stormy night. There were even reports of six people clinging to the roof of one car. At Bellambi one man tragically died when he tried to drive across the swirling floodwaters of the creek. Mudslides forced the evacuation of residents in several townships on the Illawarra escarpment and there were stories of heroic rescue attempts and lucky escapes. In the Wollongong suburb of Fairy Meadow, two teenage boys used surfboards to pull an elderly woman, immersed up to her neck in water, from her flooded home. In another suburban shopping centre a Tarago van containing a woman and five children floated 100 metres along the street. The occupants leapt out, in the nick of time, before the van toppled into a swollen creek.

A journalist slowly driving up the hill to the Bulli Pass realized that her Hyundai Excel could go no further - the road was blocked by the mudslide. When she pulled on the hand-brake the car began sliding across the road towards the cliff edge. She jumped out, held on to a tree, and phoned 000 on her mobile phone. The police told her to stay where she was because it was too dangerous to reach her. She survived to tell the story. Meanwhile her boyfriend who had been contacted on the mobile

Falls of rocks or soil occur from the top of cliffs and escarpments where detached pieces of rock or clumps of soil 'free fall' down to the slopes below.

Slides of rock, mud and soil take place by movement on a sliding surface, which is sometimes circular in shape but can also be a more even surface. The slide may disintegrate into a flow, which is a bit like an avalanche or mid way between a streamflow or mass movement.

Flows may be simple flows on hillsides, spill their debris out into great fan shapes, or, be so catastrophic that they obliterate the existing land surfaces. By way of contrast, creep is a slow movement.

Creep includes the more or less continuous movement of hillslope material under gravity. Bulges appear on hillsides, trees and fence posts are bent over and miniature terraces are formed across the hillslopes.

Box 3.2 Specific concepts associated with mass movement

Talus ... a sloping accumulation of rock fragments at the foot of a cliff or escarpment.

Colluvium ... material that is transported across and deposited on slopes as a result of wash and mass movement.

Activity 3.1

- a Identify the types of mass wasting that occurred in the Illawarra in August 1988. List them.
- b Find a local example of mass movement of earth. This does not need to be a large one. It may be something like a slumped bank in a local creek, or a rock fall in a cutting on the side of a road, or a mild bulge on a hill slope with a distorted fence line.

Write a brief report on this feature which includes:

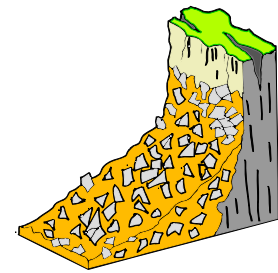
- a sketch map showing its location in relation to other things mentioned in your explanation (e.g. a stream, hard rock, soft soil)
- a labelled sketch of the landscape feature.
- a paragraph which explains how it may have happened.

c Possible extension activity

Collect, from old magazines and newspapers, pictures of landscapes which have evidence of some form of mass movement of earth. Choose a picture and paste it, or a photocopy, onto a page and write a brief explanation, with a simple sketch, of how the movement may have happened.

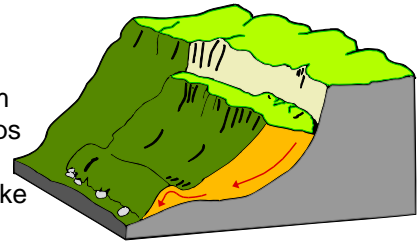
Types of mass movement

This sketch shows rockfall from resistant (hard) rock. Softer soils and rocks lead to debris piles with more gentle gradients.



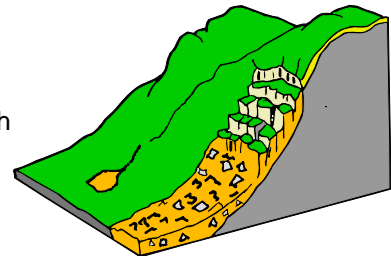
Falls

Slides vary from more planar slips to those with some rotation like that illustrated.

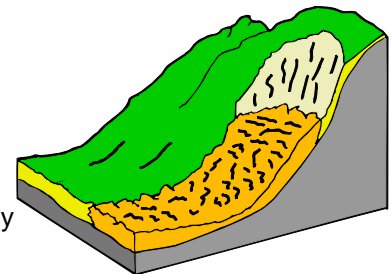


Slides

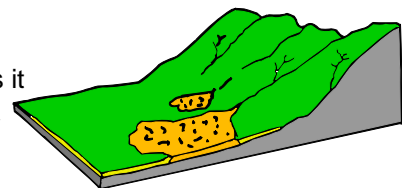
Debris flows such as this are like deformed slides.



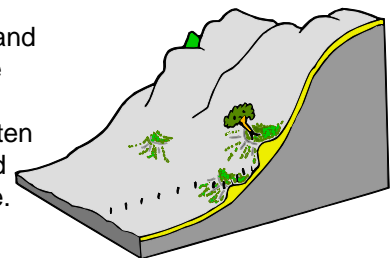
Debris avalanches like this are usually associated with some water, but may be fairly dry.



When the debris flows out onto the plain like this it is a sign of a lot of water



Look for bulges and small terrace like features on hill slopes. Creep often pushes trees and fences out of line.



Creep

Figure 3.4 Types of mass movement