



▼ Distribution of karst in Australia

- Margaret River, Yanchep and Shark Bay (Western Australia)
- Eyre Peninsula, Glenelg River (South Australia)
- Buchan (Victoria)
- Mole Creek (Tasmania)
- Jenolan (New South Wales)

Other karst areas include:

As much as 15% of the Australian continent is made up of karst landscapes. However, only 4% can be seen at the ground surface. This means a large number of karst landscapes are underground. Karst areas occur mostly along the southern, eastern and western margins of the continent. The Nullarbor Plain is one of the largest karst regions in the world.

Australia's karst regions- Where do they occur?

What to do if you notice karst hazards:

- Contact your local council, emergency services or police
- Put a fence or protective barrier around the karst feature to prevent injury occurring
- Contact a specialist geologist or engineer

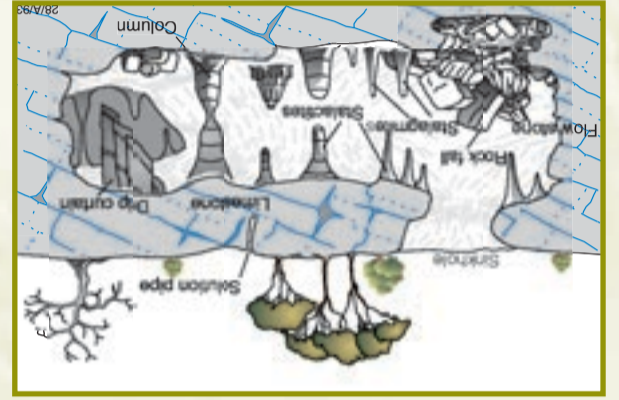
Geoscience Australia's Risk Research Group aims to identify risk in order to improve community awareness of natural hazards and to advance the community's capability in making informed decisions in order to reduce the loss of life, property damage and economic disruption associated with these hazards.

To find out more about Natural Hazards look up Geoscience Australia on the Worldwide Web at <http://www.ga.gov.au/urban/> or by phoning (02) 6249 9111.



What is Karst?

Karst landscapes are shaped when surface or ground water becomes weakly acidic and reacts chemically with atmospheric or soil carbon dioxide. The dissolving actions of water on limestone bedrock result in a distinctive landscape defined by depressions such as sinkholes, caves, holes and solution pipes.



▼ Karst terrain with caves, sinkholes and solution pipes in limestone rock

How do karst environments affect us?

Knowing the location of karst features is important in making land use decisions regarding roads, buildings and other structures. This information could prevent costly repairs to structures that are built on unstable karst landscapes and also reduce the risk of injury.

► Holes can occur in your backyard. Fence the hole and contact a specialist Survey, University of Kentucky Copyright, 2001 Kentucky Geological Survey, University of Kentucky



Australian Government

KARST Hazards

Hazards associated with karst features include:

- **Building failure** – soil subsidence and caves represent a potential ground stability hazard to surface structures or engineering works.

Structural failure is often related to pre-existing cavities and voids.

- **Groundwater contamination** – rainfall runoff containing pollutants can contaminate groundwater as openings provide an easy and quick way for surface water to interact with groundwater.

- **Road collapse** – roads built over caves or water pipes have the potential to cave in. Fractures can occur in cave roofs and excess water from burst or damaged pipes can gradually wash away soil within a cavity, forming a hole in the middle of a road.

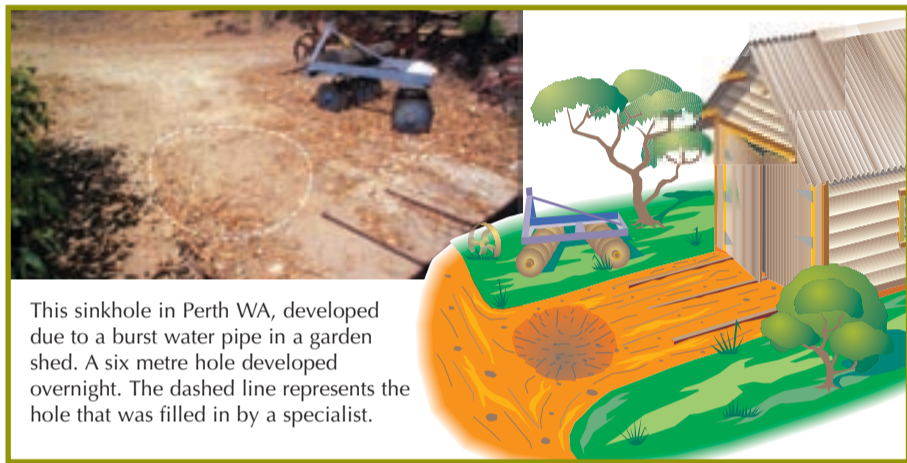


▲ Road collapse at Linea, Northern Tasmania, Australia. Copyright: Elerly Hamilton-Smith

- **Sinkholes** – sinkholes may occur due to varied land use practices and can occur spontaneously. Small solution pipes are common, as are large caves.

Risk to individuals exists in karst areas, where the landscape varies greatly.

- **Cave collapse** – compaction, blasting and vibrations can cause small fractures to occur in the roof of caves. When the limestone's cap rock is disturbed, its strength is weakened and structural failure can occur.

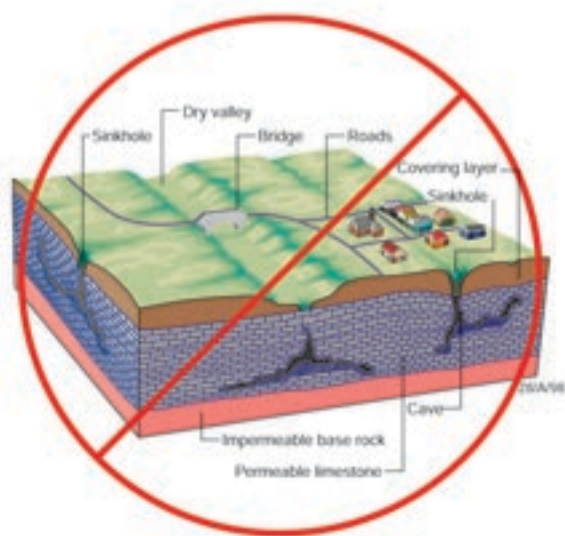


This sinkhole in Perth WA, developed due to a burst water pipe in a garden shed. A six metre hole developed overnight. The dashed line represents the hole that was filled in by a specialist.

Key questions to ask prior to developing in known karst regions.

Land use planning is vital in karst regions and is the key to minimising karst risk to the community. In addressing karst risk, managers should be asked the following:

- Will the proposed land use trigger sinkhole development?
- Will in-filled sinkholes remain inactive through the anticipated lifetime of the proposed land use?



▲ Roads and houses should not be constructed near caves or sinkholes. Survey your land before you build.



Tilted fences and cracks in buildings are indicators of potential hazards.

Indicators of potential karst hazards:

- Slumping or sagging – tilting of fence posts or other vertical objects
- Structural failure – cracks along mortar joints and in pavements
- Rainfall ponding
- Vegetative stress – vegetation may become stressed due to lowering of the watertable
- Tree roots, stones and rocks become exposed
- The development of small rills and gullies

For positive identification, seek advice from your local government, specialist geologist or engineer.

Preventative measures- Be aware!

- Ensure that housing and roads are not constructed on or near caves
- Leave a natural buffer of trees and understorey vegetation around sinkholes and caves
- Never dump rubbish in holes
- Reduce soil erosion, sedimentation and subsidence
- Vary sprinkler locations or water runoff locations – do not concentrate watering in one spot
- Promote vegetative land cover - bare ground leads to poor soil structure enabling cavities to be exposed



▲ Do not allow water to be concentrated in one small zone



▲ Devegetated land is at higher risk of karst collapse