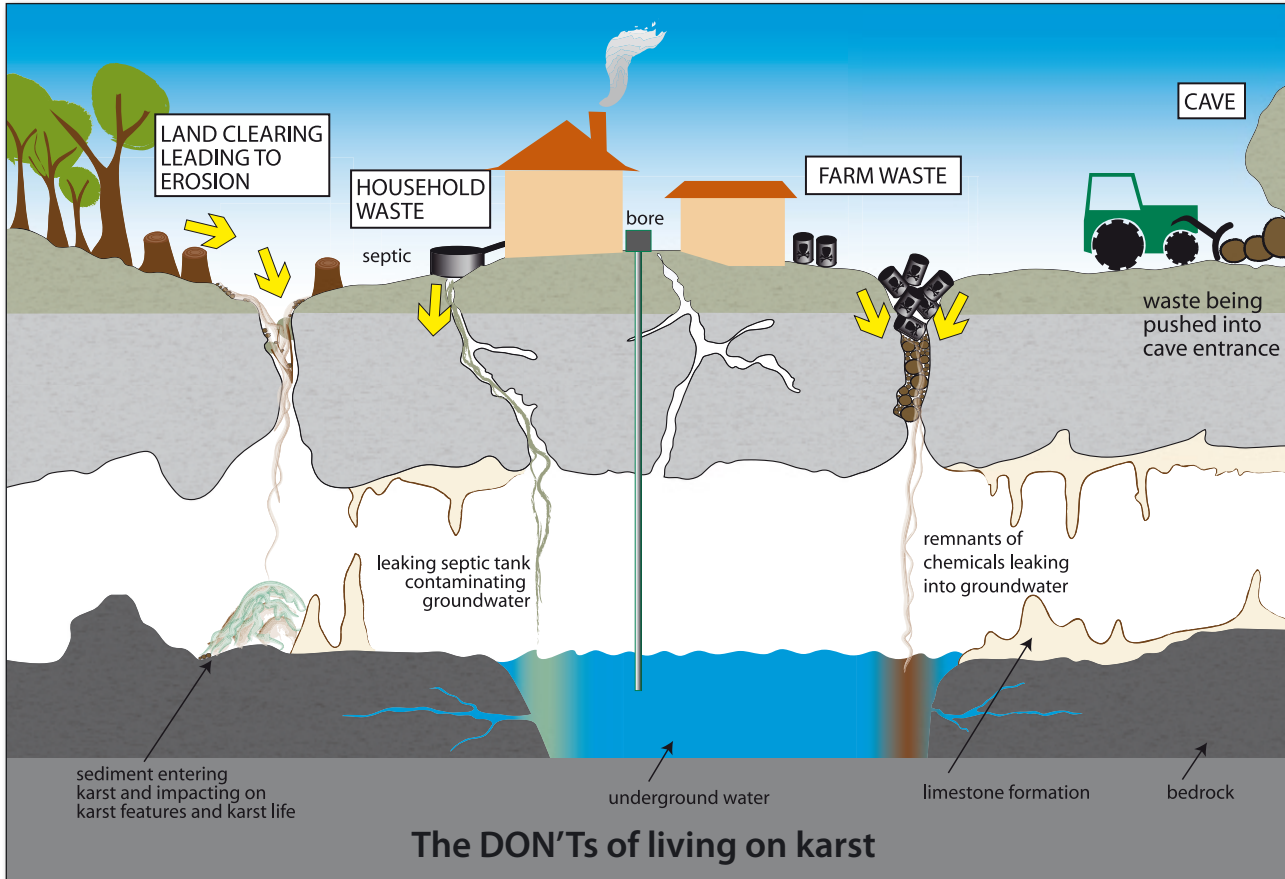


Living on karst



The don'ts of living on karst. ©M.Inwood



Underground reservoirs of water. ©S.Babka

It's in your hands

It is estimated that 10% of the Earth's surface is comprised of karst, which supplies water for up to a quarter of the world's population. For this fact alone the protection of karst environments remains a critical and often difficult task.

In New South Wales (NSW) there are over 100 karst environments containing caves, almost half of which are in national parks and the remainder on private land. While many property owners respect and take measures to protect these environments, land-use practices may often conflict with conservation objectives. Custodians of karst environments need to be aware of the impacts of everyday activities on karst values and the relationship between surface and subterranean environments.

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Subterranean environment. ©S.Babka

Are you a custodian?

The first step towards protecting karst environments is recognising what is commonly referred to as the karst footprint. This can be done by identifying and documenting distinguishable features which include:

- **Carbonate bedrock.** Karst environments form where there is carbonate bedrock, which in NSW is limestone or marble (metamorphosed limestone). Carbonate rocks underly approximately 4% of the State's surface landforms and are typically light to dark grey in colour; however, some deposits may be cream, yellow or even red. If you are unsure, a simple test is to place a small sample in a cup of white vinegar (if it is not your land make sure you have permission to take a sample). If the rock is limestone or marble or dolomite, it will react with the acidic vinegar and slowly release bubbles of carbon dioxide.
- **Karst features.** The most recognisable karst features are arches and caves. However, there are other features which will help you identify karst including:
 - Depressions – called sinkholes and dolines. These sometimes look like old farm dams and almost never hold water.
 - Sinking streams – where flowing water seems to disappear, occasionally into dolines and cave entrances, but often just into the gravel creek bed.
 - Springs – which often occur at the edge of karst environments.
 - Fluted and sculptured stone – where rain water dissolves patterns on exposed surfaces. The most common type is called rillen karen.

- **Distinct vegetation.** Karst environments include alkaline soils and create conditions where water availability is different to the surrounding terrain. As a result, the edge of the karst is frequently defined by a dramatic change in vegetation.

Careful management is required

Landholders that live on or near karst environments may influence their overall condition and health. For example, a considered approach to managing



Cave feature. ©P.Woodward

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Cave shawl. ©S.Babka

these environments may bring benefits to both the landholder and wider community, including increased spring and ground water quality and healthier ecosystems with high quality habitat. In contrast, poorly devised and implemented management practices may lead to the destruction of unique geological and biological features, as well as contributing to local and regional surface and groundwater pollution.



Limestone deposition. ©S.Babka.

As a landholder living on or near karst, there are many things that you can do to help protect and conserve this important landform.

- **Minimise the disturbance of karst soils.** Karst soils are highly susceptible to erosion. A loss of soil cover may reduce land productivity, and have devastating effects on cave fauna and the processes below.
- **Minimise the planting of exotic species.** Non-native plants have the ability to alter the chemical and physical characteristics of karst environments, and do irreparable damage to fragile features found in caves. Woody canes and vines, such as blackberry, thrive in many karst environments and have the potential to restrict threatened bat species from accessing the caves, which they need for their survival.



Caving. ©J.Whitby

- **Minimise the use and storage of fertilisers, pesticides and fuels near sensitive karst areas.** Polluted runoff from chemical use and storage can travel underground through pipe-like passages before rising at springs or being pumped from bores in a largely unchanged state. Karst waters are used in many parts of NSW for domestic, agricultural and recreational purposes and its contamination by chemicals and other pollutants may impact on both human health and that of the environment generally.
- **Reduce the access of livestock and other domestic animals to sensitive karst areas.** Livestock and other domestic animals should be restricted in their access to karst features such as sinkholes. As well as creating a danger to the animals themselves, animal wastes may enter the karst system and pollute groundwater resources.

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- **Remove wastes from karst features.** Sinkholes and caves have sometimes been used to dispose of waste. Even very old rubbish can leach toxins into the groundwater.
- **Do not block or plug karst features.** Often exposed karst features such as sinkholes and cave entrances have been filled to maximise land usage or to reduce risk of injury. This practice may have dire consequences for the often rare creatures that live deep within caves and to those that visit.
- **Where possible avoid fire on and around karst outcrops and cave entrances.** When exposed to fire carbonate rock, such as limestone, undergoes physical changes which may cause it to fracture and fall apart (known as spalling). As the fire intensifies the extreme heat may also produce a chemical change in the limestone (known as calcination) causing its surface to disintegrate. These physical and chemical changes will not only destroy surface features, but may also affect the way in which water moves and acts in karst environments resulting in increased erosion, loss of habitat and lower land productivity.
- **Where possible keep fires away from cave entrances.** Many caves in NSW are used as roosts for micro bats. These bats survive on a diet of moths, mosquitoes, beetles, wasps, weevils and other insects, which are often considered pests. Micro bats are extremely sensitive to disturbance, particularly during the summer maternity season and winter hibernation months, and the smoke from fire may prove harmful to these species.



Crystal and bone remains. ©S.Babka

Help is available

Help is available to support landholders in their efforts to rehabilitate and better manage karst environments.

This fact sheet was produced by the Karst and Geodiversity Unit of the Department of Environment and Climate Change. The Unit works with other government agencies, the community and volunteer organisations on a range of karst-related issues, and provides advice to landholders on best practice karst management and conservation.

For further information on karst and related matters please contact the Manager, Karst and Geodiversity Unit on 02 6332 7681 or alternatively, call the Environment Line on 131 555.



Caves can be maintained sustainably by private landholders. ©R.Commins



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