

LIVING ON KARST (MOLE CREEK, TASMANIA)

What is interesting about this case study?

The Mole Creek karst system in Tasmania is one of the most complex and spectacular cave systems in Australia. Most of the 118 named caves in the system are active stream caves (a rare phenomenon in Australia).

The Mole Creek area is subject to diverse land use priorities, including conservation, agriculture, forestry, limestone mining, and urban development. This case study looks at how the Mole Creek community is balancing this diversity within a karst landscape.

Karst as a groundwater feature

Water moving through the soil profile absorbs carbon dioxide and becomes acidic (carbonic acid). This acidified groundwater will dissolve carbonic rock (such as limestone), resulting in karstic landscape features that may include:

- Underground cave systems
- Sinkholes and more expansive depression features (uvalas and poljes)
- Limited surface water, because landscape features promote drainage into the karst aquifer.

The interaction between land use and underlying caverns and groundwater creates significant challenges in karst landscapes.

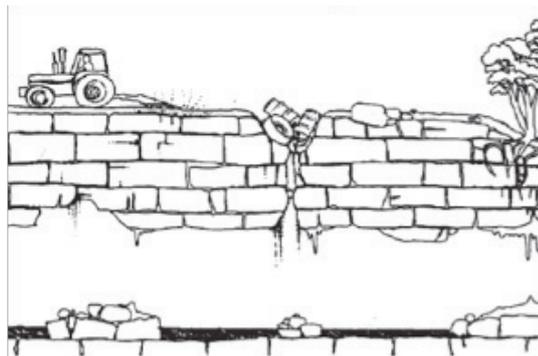


FIGURE 1 LANDSCAPE MANAGEMENT CAN AFFECT THE QUALITY AND STABILITY OF KARST (SOURCE TASMANIAN PARKS AND WILDLIFE SERVICE)

Karst is also interesting because it allows groundwater enthusiasts to study relationships between land use and groundwater management without the complexities of temporal dispersion. The luxury of being able to get underground and actually see what is going on (see Figure 2) makes karst an important asset in promoting a public awareness and understanding of the role of groundwater function and services.

Going further

Whet your appetite for karst with an online image search on 'karst China'.

Mole Creek Kars

The Mole Creek karst catchment is an area of 49 440 ha. Within this catchment, karst accounts for about 22 000 ha, 6200 ha of which is exposed (generally free of covering; covered karst is not always readily discerned from the surface, except where sinkholes are evident). About 8 850 ha of the Mole Creek karst is listed in the Register of the National Estate.

The township of Mole Creek has a population of 680. Many industries underpinning the town and area are directly dependent upon the karst system.

Land tenure within the karst and karst catchment is summarised in Table 1.

Land tenure boundaries that take little account of catchment or landforms boundaries are inherent to the highly fragmented land use and tenure around Mole Creek. As a result, management practices between land users have had little historic incentive for consistency or priority of collective impact on the karst system.

	Karst only (ha)	Karst plus catchment (ha)
Reserves under the Nature Conservation Act 2002	1 446	20 101
Forest Reserves	585	4 299
State forest (excluding Forest Reserves)	1 280	13 862
Unallocated Crown land	182	373
Private land	18 540	32 834

TABLE 1 LAND TENURE OF MOLE CREEK KARST



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FIGURE 2 CAVE IMAGE FROM MOLE CREEK (IAN HOUSHOLD)

This community sense of the karst system has fostered the local incentive for individuals to adopt management practices that are progressively more 'karst friendly'. Some of these practices may be almost unintentional, such as pointing out landscape features out to guests. At the other end of options, land owners can enter voluntary covenants to ensure parts of their property is conserved.

Going further

Cave tourism is an important part of educating people about karst. What are the conservation trade-offs of developing caves for tourism?

Agriculture

Filling sinkholes with rubbish may seem a logical use of a natural depression, but Figure 3 is the kind of image that keeps karst enthusiasts (and any down stream users) awake at night.



FIGURE 3. UNDESIRABLE USE OF A SINKHOLE DEPRESSION - LOCATION UNKNOWN. (TASMANIAN GOVERNMENT WEBSITE)

A Mole Creek property that is managed with consideration of karst features in Figure 4. The round ponds in the image are sinkholes which are flooded because of recent rains. The owner of this property has worked to manage according to highly variable water levels in these sinkholes.

The stream in the image flows into the wetlands on the right, around which vegetation has been retained. From here, the water enters the underlying karst. It travels three kilometres underground, and emerges on the other side of the wooded reserve in a neighbour's spring.

One of the measures the land owner has undertaken with the local Landcare group that can temper nutrient entry to the karst is fencing off and revegetating along the stream.

Going further

How do you think knowledge of karst flows might affect neighbor relations in a small agricultural community?



FIGURE 4. AERIAL VIEW OF AN AGRICULTURAL FARM IN THE KARST LANDSCAPE AROUND MOLE CREEK (GOOGLE MAPS)

Forestry

Forestry can be a double edged sword in a karst environment. Generally, the presence of vegetation is highly desirable because it slows erosion and drainage into the karst, while also supporting structural stability.

However, harvesting of forests is a major change in landscape cover. The forest industry around Mole Creek has worked hard to adjust management practices to recognise karst attributes and manage associated (environmental and production) risks.

Figure 4 shows a forestry landscape in Mole Creek. Areas of sinkhole evidence can be clearly identified as clear circles which have been targeted for stabilisation by native revegetation of their perimeters.



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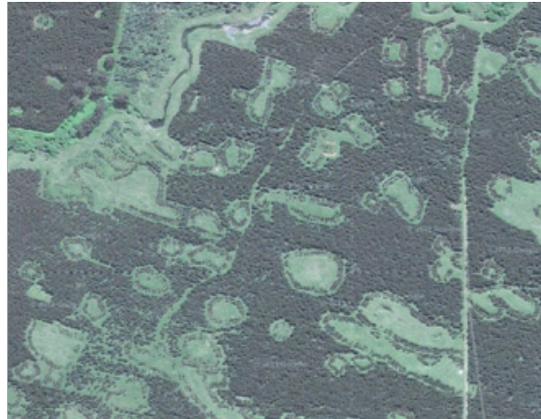


FIGURE 4 FORESTRY AROUND MOLE CREEK (GOOGLE MAPS)

Going further

Harvest cycles for forestry can be decades. What kind of commitment does it take for an industry with that kind of crop rotation to change their management practices?

Limestone mining

All over the world, karst is quarried for limestone, gravel or metals associated with ore deposits. Quarries or mines at some sites within the karst catchment could entail significant impacts to the karst system.

For some decades a private company has operated a limestone quarry on Crown land west of Mole Creek township. The site, known locally as Old Man's Head (see Figure 5), is located downstream of the principal areas of karst aquifers and caves.

In many respects the site appears ideal for quarry development, and there is no evidence to suggest that the operation is adversely affecting karst values.



FIGURE 5. THE LIMESTONE QUARRY AT MOLE CREEK

Going further

Find out what range of products limestone and karst are mined and used for.

Urban development

Locally, water sourced from the karst aquifer is used for domestic and agricultural purposes. It also supports a mineral water bottling enterprise.

Urban interactions with karst can include things like pollution from landfill, sewerage, storm water, and infrastructure works. Many of these risks are managed through the relevant council.

Mole Creek (see Figure 6) is in the municipal area of the Meander Valley Council. Karst is a key consideration in all development planning of the Council. Karst associations with tourist opportunities, environmental management and infrastructure risk all help ensure karst remains a Council consideration of high priority.



FIGURE 6. THE TOWNSHIP OF MOLE CREEK, TASMANIA (WWW.MOLECREEK.INFO)

Going further

Mole Creek is a small town, but many large cities and populations around the world are located on or near karst. Infrastructure management is often a major issue.

Finding out more

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Australian Government
National Water Commission



Teacher Earth Science Education Program