GEODIVERSITY

The Lake Highway

A geological journey back in time

Parks and Wildlife Service Tasmania

DEPARTMENT *of* TOURISM, PARKS
HERITAGE *and the* ARTS

A journey from Deloraine up to the Central Plateau takes you onto the roof of Tasmania. The plateau rises sharply and has prominent escarpment edges along its northern and eastern sides. This includes the spectacular Great Western Tiers, which dominate the surrounding countryside. To the west of the plateau are the rugged glaciated landforms of Cradle Mountain, Lake St Clair and the Mountains of Jupiter, while to the south the change is less dramatic as the plateau merges gradually into the Derwent Valley.

The Central Plateau is the most extensive alpine plateau in Australia and one of its most glaciated landscapes. It is special on a world scale and is therefore part of Tasmania's Wilderness World Heritage Area. It is a wild place with such a harsh climate and rugged landscape that it almost feels as though time has stood still and the last Ice Age was only yesterday.

A drive up into the high country will take you to an altitude of over 1200 metres and, with a little imagination, back to a time of volcanoes and glaciers.

In the beginning

From shallow sea to the first rocks (1100 million years ago to 205 million years ago)

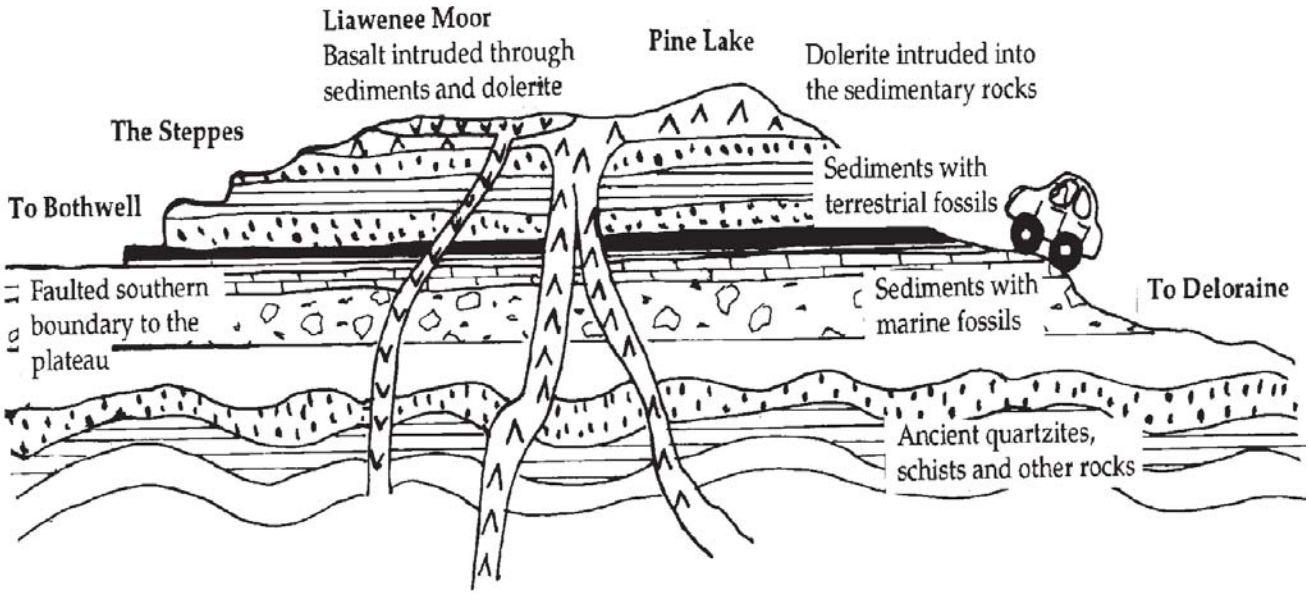
The foundations of the Central Plateau were formed when sand and silt accumulated at the bottom of a shallow sea, about 1100 million years ago, before there was any life on land.

Over considerable time these deposits were buried beneath more layers of silt and sand and as the continents moved they were subjected to great pressures and temperatures. This produced quartzite and schist which are the oldest rocks in Tasmania. The harder quartzite takes longer to erode and so forms many of the ridges and mountains in western Tasmania, while the softer schists, along with other rock types, have been eroded forming the valleys below.

Much later, between about 300 to 205 million years ago, sedimentary rocks were deposited on top of the quartzite and schist. Good examples of this can be seen on the Lake Highway between Golden Valley and Pine Lake. These sediments are essentially flat lying, like a layered cake, and were formed after life had evolved in the sea and on land. As a result in some locations these rocks contain many fossils.

During a past ice age, about 300 million years ago when Tasmania was still part of the giant super-continent Gondwana and covered by a large ice sheet, glacial deposits called tillites were laid down. These outcrop on the pass between Golden Valley and Pine Lake.

As the road winds further up the escarpment you will see outcrops of younger sedimentary beds consisting of sandstone, mudstone and some limestone which were deposited as the sea level rose when the ice caps melted. These sediments contain marine fossils.



Sedimentary rocks which are visible on the upper slopes were, in contrast to underlying rocks, deposited in a freshwater environment. By this time, about 240 million years ago, Tasmania was once again a land environment and the types of fossils present in the rocks reflect this. Plant fossils suggest a relatively humid, cool environment with swamps and lakes. Fossils of reptiles, amphibians and fish have also been found and provide clues which link Tasmania to other Gondwanan continents such as Antarctica, South America and South Africa.

A time of great upheaval

The Gondwanan break-up (205 million years ago to 130 million years ago)

On the upper part of the escarpment dolerite is clearly visible especially where it has formed spectacular columns, giving an 'organ pipe' effect. These columns may have formed as the cooling magma contracted, in much the same way as drying mud contracts to form polygonal flakes. During the break-up of Gondwana, about 175 million years ago, tremendous pressure and tension caused fractures in the earth's crust. The central part of Tasmania was pushed up for the first time to form a vast plateau and the dolerite magma in the earth's crust was forced up into the overlying rocks. Enormous masses of dolerite, enough to fill several Sydney Harbours, were pushed up into the sedimentary rocks which have since been removed by erosion. Today dolerite covers most of the plateau and due to its resistant nature often caps many of the higher mountains in the state.

Continuing pressure and tension in the earth's crust during and following the Gondwanan split resulted in further uplift of the Central Plateau and the development of deep valleys in the Midlands and Derwent River areas.

A time of volcanoes

(65 million years ago to 2 million years ago)

Basalt, which is very closely related to dolerite, underlies the undulating plains of Liawenee Moor, St Patricks Plain and parts of the Lake Augusta area. About 65 million years ago very runny basalt lava was thrust up onto the land surface and oozed into depressions such as river valleys and lakes. Water systems such as the Ouse, Shannon and Upper Nive, which were blocked by the basalt, changed their course. Rapid cooling under water resulted in the formation of pillow lava. These are rock forms which are pillow shaped and form as a result of rapid chilling of the outer skin of the lava by water. Examples can be seen in the road cutting of the Nive River near Bronte Park.

Basaltic plugs, or the solidified neck of volcanoes, were also formed and although these have been eroded in the Lake Augusta and Liawenee region, two excellent examples occur as conical hills 10 km southeast of Bothwell near Ram Paddock Hill.

A time of glaciers

(The last 2 million years)

In the last 2 million years a number of glaciations have occurred which resulted in the formation of an ice cap mainly on the western side of the plateau. Large glaciers flowed down the Forth, Mersey and Narcissus rivers on the western side of the Central Plateau forming
U-shaped valleys. Ice spilt over the escarpment edge of the Great Western Tiers and onto the plains below.

Many of the features you will see from the road have been shaped by past ice ages. The glaciers scoured the landscape to the west of the highway and deposited glacial debris which has created thousands of lakes and tarns on the plateau. Many of the large boulder fields and scree slopes you can see from the road started to form during glacial times and are probably still developing. They typically occur at the base of cliff lines or on steep slopes as a result of dolerite boulders toppling from the cliffs above.

The ice sheets also left their mark underground. The meltwater from retreating ice flowed down from the plateau and helped to erode some of the caves in the Mole Creek area. The water often carried large dolerite boulders that may have smashed the older decorations in caves, such as Marakoopa, which are close to the escarpment edge.

After the glaciers finally retreated, about 7 000 years ago, the landscape was probably barren and the climate was cooler and drier than today. Lunettes or small sand dunes and sand sheet deposits formed on the margins of the lakes in areas from Lake Ada to Lake Crescent. The lunettes around Lake Ada were probably formed from wind blown glacial material such as dolerite fragments. They are the only alpine lunettes in Australia and, together with the glacial landforms, are very important geomorphological features.

Soils

The link with the living world

Soils began forming after the glaciers retreated and vegetation invaded these areas. On the Central Plateau better drained locations usually have very rocky yellow-brown mineral soils while more poorly drained locations such as around Lake Ada and Pine Lake, and those in higher rainfall areas such as Lake St Clair, have dark organic or peat soils. Like most alpine soils, peat soils take a long time to develop as plant growth at high altitudes and organic accumulation on the ground is very slow. A centimetre of peat, for example, probably takes about 100 years to develop. Some of the most extensive peatlands in the southern hemisphere occur in Tasmania.

The future

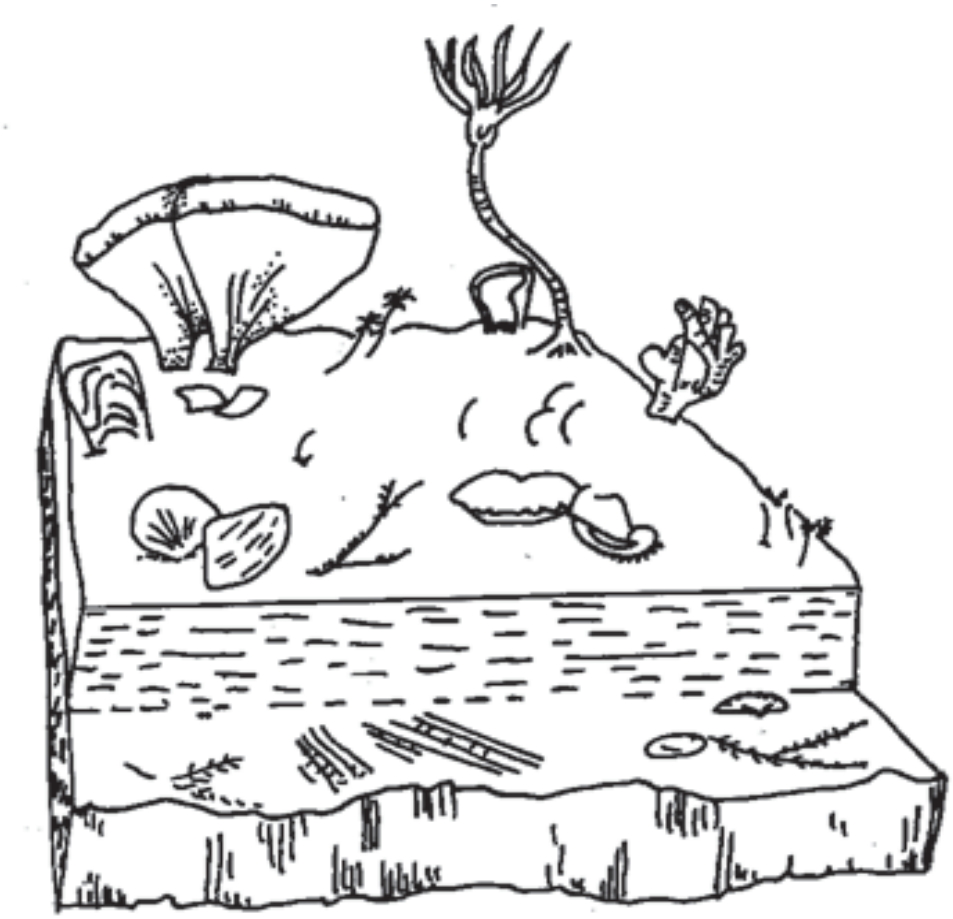
A fragile balance

Soil plays a vital role in the ecology of the Central Plateau, so any threat to the soil threatens the whole ecosystem. One of the greatest threats is fire which can have a devastating effect in alpine areas. Fire not only destroys ancient pencil pines but it can also burn the organic soils.

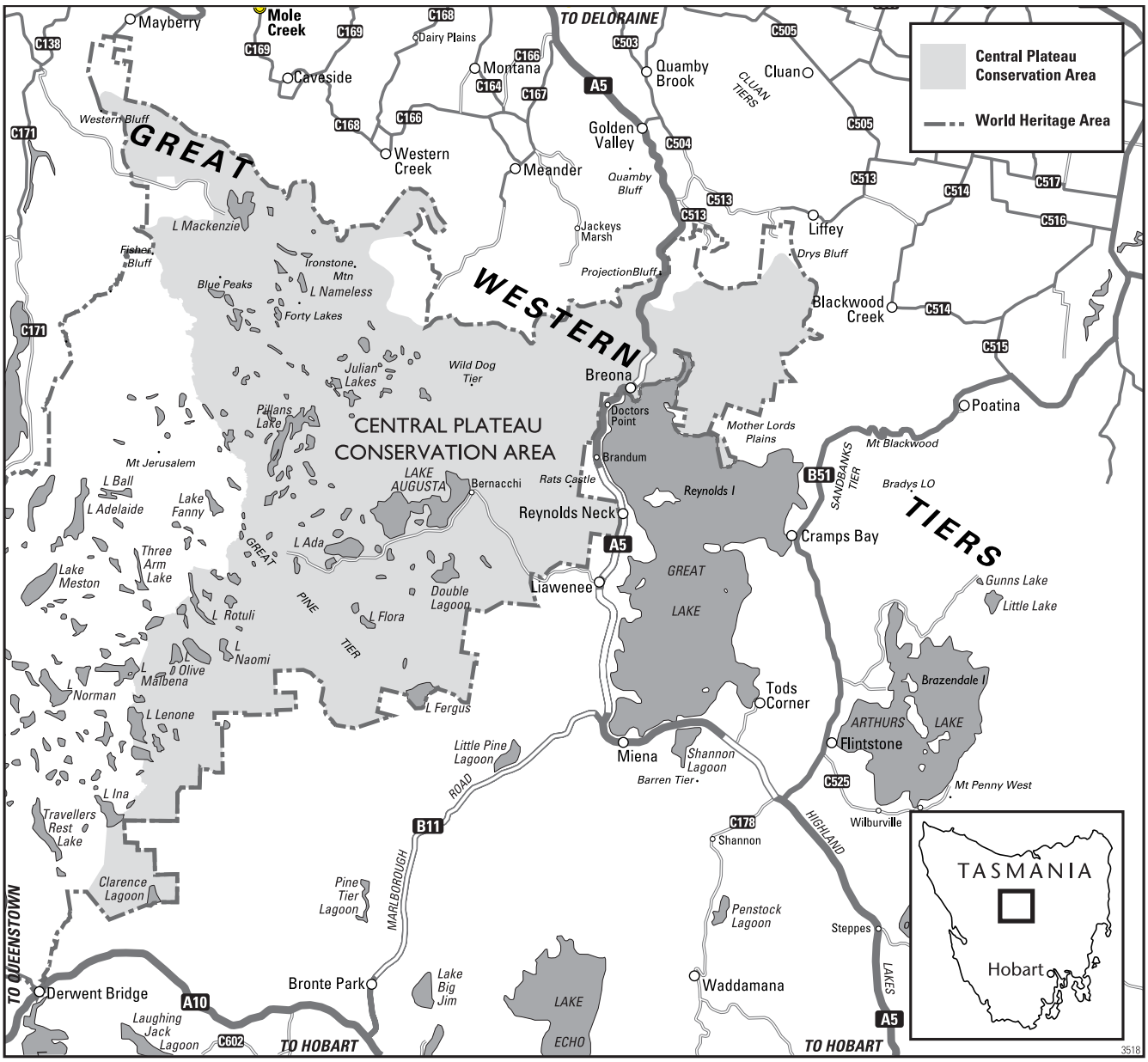
Fires associated with past land use practices and arson have caused some of the most extensive sheet erosion in Tasmania. This is where soil literally erodes away in large sheets. Some areas may take thousands of years to fully recover. Plants and animals are also affected because suitable habitats become more restricted as soil loss becomes more extensive.

Like the rocks and vegetation you see around you, the soil you walk on is an ancient survivor, the result of thousands of years of weathering and organic accumulation. By protecting areas like the Central Plateau, as part of Tasmania's Wilderness World Heritage Area, we increase its chances of surviving into the future.

As you follow the Lake Highway towards Bothwell the windswept, wild country of the Central Plateau is soon left behind. It almost feels as though you are entering another world, a world where the ice ages are far gone and time is rushing on at its normal pace.



Marine organisms on the sea floor about 270 million years ago. Some can now be found as fossils on the central plateau.
(From 'Behind the Scenery' by P. Scanlon, G. Fish and M. Yaxley)



Further information

Behind the Scenery, P. Scanlon, G. Fish and M. Yaxley

Contact

Biodiversity Conservation Branch; DPIWE
134 Macquarie Street, Hobart. 7000
Phone: (03) 62336556
Fax: (03) 62333477

