

The Central Plateau of Tasmania:

A Resource Survey and Management Plan

by

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Except as stated therein, this thesis contains no material which has been accepted for the award of any other degree or diploma in any university. To the best of my belief, it contains no copy or paraphrase of material previously published or written by another person, except when due reference is made in the text of the thesis.

*R. R. Shepherd.*

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1. Shepherd, R.R. (1973). Land use on the Central Plateau with special reference to the grazing industry. Considerations relevant to the preparation of a regional land use plan. In The Lake Country of Tasmania : 161-176. Ed. M.R. Banks. Royal Society of Tasmania : Hobart.
2. Shepherd, R.R., Winkler, C.B. and Jones, R. (in press). Management of the Central Plateau of Tasmania as a conservation area. Proc. Ecol. Soc. Aust. 9.
3. Shepherd, R.R. (in press). The impact of the grazing industry on the Central Plateau of Tasmania. Aust. Vet. J.

## SUMMARY

The Central Plateau is a distinct geographical unit in central Tasmania covering an area of 5,060 km<sup>2</sup> which is subalpine and alpine in character. The principal resources are water, natural pastures, timber and recreational and tourist attractions. Since European settlement, the resources have been exploited with little heed being paid to their conservation.

Surveys were made to obtain data on past and present uses and to assess the condition of the resources.

The natural pastures were formerly extensive and were in demand by lowland graziers for relief grazing. The number of stock summered reached a peak in the late nineteenth century but since about 1920 has declined steadily, sheep numbers by as much as 75%. This decline can be linked to the degradation of the pastures, particularly above 900 m, caused by frequent burning and overgrazing. Rabbits have contributed significantly to the grazing pressure. In many places the natural pastures have been replaced by shrubs or the plant cover eliminated completely resulting in bare areas, many of which are affected by sheet erosion.

The main timber areas occur below about 850 m. Most of the high quality sawlog timber has been utilised and production has declined to about 70,000 cu m per annum. Existing forests are of low timber quality but serve a vital role for catchment protection and the maintenance of wildlife while woodchip production may be a potential use, provided stringent measures are taken to ensure regeneration and prevent erosion.

Water is the most important economic resource and nearly all of the run-off is committed to electricity production. Capital investment in hydro-electric developments is about \$400 million. An increasing amount of water is being used for irrigation, domestic and industrial purposes (64% of Hobart's water supply is obtained from the River Derwent). The prime catchment areas are in the far north and west but their vegetative cover is in a degraded condition, impairing their ability to regulate run-off and maximise yield.

The recreational and tourist values of the region are high. Fishing, hunting and shooting are long established sports and recently, cross country vehicle riding has become popular. Unplanned shack development has disfigured lake shores while uncontrolled use of vehicles has destroyed ground cover and aggravated soil erosion problems. Areas in the far north and west have outstanding wilderness values; as yet they are little used but need protection against misuse.

The Plateau is clearly a multi-use region and assessment of future needs shows that water harvesting will continue to be the most important use and overall management of the region's resources should be directed towards this objective. Other uses may be appropriate in particular areas if compatible with water harvesting or, in special circumstances, if their values are considered to exceed that of water.

A management plan has been developed which divides the Plateau into zones according to the most appropriate use of resources. Details of management procedures and behaviour of users are given for each zone.

The present unco-ordinated control of the Plateau by a multiplicity of government agencies and private individuals is a major obstacle in the effective use of the region's resources. To give effect to the management plan it is proposed the region be made a conservation area and administered under the National Parks and Wildlife Act, 1970.