LAND CAPABILITY STUDY
IN THE
UNITED SHIRE OF BEECHWORTH

Erosion Risk Assessment: Other Land Use

Constraints: Land Management Guidelines

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PREFACE

Three requirements for sound use planning are:

* An understanding of the extent to which the use will be limited by the natural characteristics of the land

* The effect the use will have on the land and the water derived from it

* The need for special land management or structural design to overcome limitations or to restrict the impacts to acceptable levels.

Land capability assessment is a rational and systematic means of obtaining this information.

The Soil Conservation Authority is able to provide land capability information for a range of uses and at different scales to meet the various needs of planning. This information provides a relatively stable base on which to superimpose other planning considerations.

THE SCOPE AND LIMITATIONS OF THE REPORT

* This report is based on an assessment of the physical characteristics of the land. Social or economic factors have not been considered.

* The scale of the assessment has necessitated some generalisation. Site – specific data will be required for detailed planning.

* The precision with which boundaries are mapped is affected by the scale of the map. Subsequent enlargement of the map does not improve the precision and may be misleading.

* The boundaries on the maps usually represent readily seen changes in the land. However, where an important land characteristic changed gradually, the boundary indicates approximately where there is a significant change in the effect on the land use.

PART 1 SUMMARY AND CONCLUSIONS

Outline of the Study

The study was undertaken at the request of the Town and Country Planning Board for use as an aid to planning and development at a broad scale. The report describes erosion risk and other characteristics of the land which may impose constraints on land development in the Shire.

The United Shire of Beechworth (see locality plan) has an area of approximately 769 square kilometres, of mostly rolling hilly country with some are of very steep land. Annual rainfall varies from about 760 mm in the north to over 1020 mm in the south-east. The Shire is based around the town of Beechworth.

Approximately two thirds of the Shire is freehold land, the remainder being largely forested public land. The study concentrates on the freehold and is less detailed on the public land.

Areas of special interest to the Soil Conservation Authority are the Nine Mile, Clear and Hurdle Creeks Water Supply Catchment, Reedy Creek and several group conservation areas. These are detailed in Part 2.

Conclusions

The erosion risk classes in the Shire are shown on Map 2. General management guidelines are presented in Table 2. The main conclusions and recommendations are summaries below.

(i) Land with sever erosion risk (Class 5) comprises 20% of the Shire, however only a small proportion of severe risk land is freehold. This land is considered highly hazardous and should have strong limitations placed upon its development.

* It is recommended that subdivision of land in Erosion Risk Class 5 should not be permitted unless the developer can demonstrate to the satisfaction of the Soil Conservation Authority that the development will not results in increased soil erosion from that area.

* Permanent clearing of Class 5 land should be prohibited and reafforestation should be actively encouraged. In general, such land should be considered as best used for forestry and passive recreation.

(ii) Land with a high erosion risk (Class 4) comprises 22% of the Shire and a considerable amount of the high risk land is freehold.

* Intensive small-lot subdivision and clearing should be discouraged and reafforestation should be encouraged.

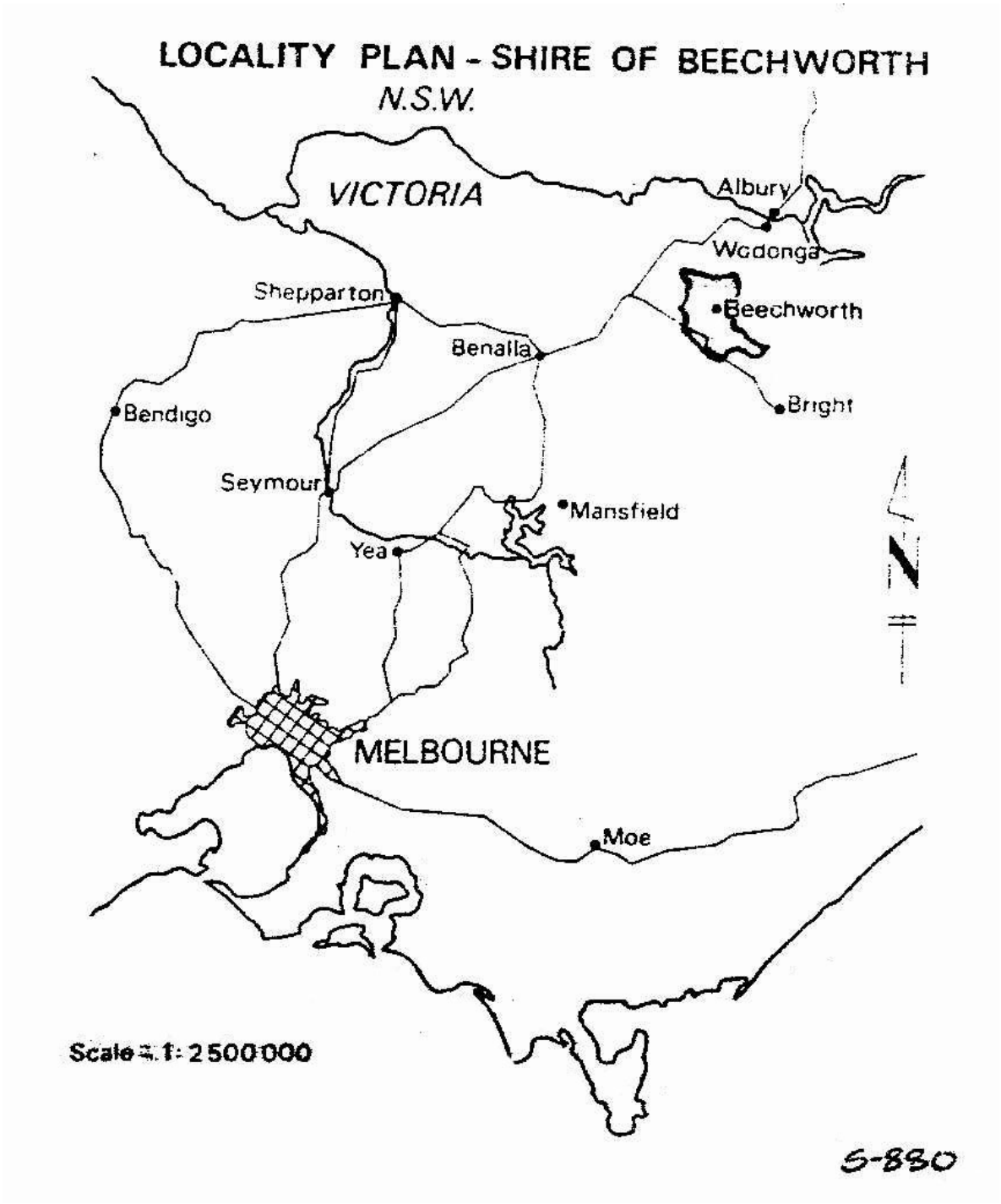
* It is recommended that all proposals for development of land in Erosion Risk Class 4 be referred to the Soil Conservation Authority for specific advice on soil conservation requirements at the earliest possible stage.

(iii) Land with a moderation erosion risk (Class 3) comprises 50% of the Shire and most of the land in this risk class is freehold. Development of most of the moderate risk land should be possible without causing increased erosion provide specialised techniques and careful management, which take account of the natural characteristics of the land, are adopted.

In particular, areas were water naturally concentrates should not be disturbed, and disposal of water which would be concentrated by the development should be carefully planned.

* Advice on the need for specialised design and construction techniques and follow-up management should be sought from the Soil Conservation Authority prior to approval of any development.

(iv) Although land in Erosion Risk Class 2 and 1 is not generally regarded as presenting significant erosion problems there may be small areas of higher risk which would require special management within the areas shown in these Classes in Map 2. Where such areas become apparent, the Soil Conservation Authority should be consulted for advice on appropriate management.



Locality Plan – Shire of Beechworth

PART 2 TECHNICAL ASPECTS OF THE STUDY

Outline of the Methods

In order to identify and map areas of land with differing land capability, a systematic study of the natural characteristics of the land has been made. Areas of land which have consistent patterns of landforms, soil and native vegetation on similar rock types and with a limited range of climate are identified. Such areas are referred to as land systems.

Within the Shire, fourteen land systems have been identified on a variety of rock types. These are shown on Map 1.

Because land systems consist of sequences of land types which are not uniform, there may be a range of erosion risk within each. The land system information has been reinterpreted on the basis of local knowledge of the erosion risk of the various land types to produce a map of erosion risk classes (Map 2).

The land system descriptions (Appendix A) provide a range of information which can be adapted for us by planners for purposes other than erosion control. In particular, areas subject to flooding or having poor effluent disposal or water holding characteristics can be identified. Where these constraints exist they are referred to in the Constraints section of the tables in Appendix A.

Assessment of Erosion risk

The components of the land systems are assessed for the risk of erosion of all types if the land is subjected to poor management or to disturbance such as exposure of bare soil during development. The steepness of the land, the erodibility of the soil, including soil depth, permeability and structure, and the effect of increased soil-water accumulating if plant cover is decreased are taken into consideration.

The erosion risk is assessed in five classes – Class 5 being the highest. Definitions of the classes are presented in Table 1.

For each of the five erosion risk classes, the proportions which fall into each land system are determined and these are indicated in bar-chart form in the tables of Appendix A.

It should be realised that because of the broad scale of mapping (1:50 000) the map units can only represent a general level of erosion risk over relatively large areas. Obviously at a more detailed level, local variation will be found. It is important therefore, that where areas of land are nominated for intensive development, such as small lot subdivision, the need for further detailed mapping at a much larger scale is recognized.

Table 1 – Erosion Risk Classes

(Read in conjunction with Map No. 2)

CLASS	EROSION RISK	GENERAL LIMITATIONS ON DEVELOPMENT
1	None to very slight	Erosion risk does not occur or is very slight. Standard designs and installation techniques and normal site preparation and management should be possible without risk of erosion.
2	Slight	Slight erosion risk exists. Areas of high erosion risk may be avoided by not disturbing drainage lines and steeper slopes. Careful planning, and use of standard specifications for site preparation, construction and follow up management should be satisfactory to minimise erosion.
3	Moderate	Moderate to high erosion risk exists which may lead to difficulties during and after construction. Specialised design, construction techniques and follow up management are necessary to overcome these difficulties and minimise erosion.
4	High	High erosion risk. Avoidance of erosion during and after construction is difficult and long term problems may occur. Adverse effects may be inflicted upon adjoining land. Extensively modified design and installation techniques, exceptionally careful site preparation and management would be necessary.
5	Severe	Severe erosion risk and/or danger of large landslides is prevalent. Any development will cause instability which cannot be practically overcome.

Management Guidelines

There are considerable variations in standards of land management which can substantially effect stability, particularly in areas with high erosion risk. Similarly, techniques of earthwork construction and follow-up treatment can vary considerably with possible significant or drastic effect upon stability where these are inadequate or inappropriate.

The guidelines in Table 2 outline the kind and levels of management considered necessary to guard against unacceptable land deterioration within each erosion risk map unit.

Table 2 – Land Management Guidelines

(Read in conjunction with Map No. 2)

CLASS	EROSION RISK	GENERAL LIMITATIONS ON DEVELOPMENT
1	None to very slight	Generally no specific conservation management practices are required in this map unit, except along drainage lines where erosion may occur. To minimise the danger of erosion in drainage lines, avoid disturbance and maintain a protective vegetative cover. Roads which cross drainage lines where high flows are likely should be designed with adequate culvert capacity or alternatively low profile floodway fords. Crossings should be as near as practicable at right angles to the flow to minimise coast and erosion potential.
2	Slight	Generally only limited special management inputs are required in this map unit to prevent soil erosion, except along drainage lines where erosion is likely to occur. To minimise the danger of erosion in drainage lines, avoid disturbance and maintain a protective vegetative cover. Roads which cross drainage lines where high flows are likely should be designed as for Unit 1 above. In addition, roads should be aligned close to contour and have adequate surface and/or subsurface cross drainage or be aligned directly up and down the slope with drainage water dispersed laterally. Areas disturbed during construction works should be revegetated by topsoiling and sowing. To avoid problems with spillways when siting farm dams in drainage lines which carry large flows, off-stream storages are recommended. Planning for fence locations should take account of significant topographical features so that it is possible to conform to the criteria above.
3	Moderate	Specialised land management techniques are required to minimise soil erosion. Moreover, localised areas of severe risk occur in which intensive development of any kind should be avoided.

CLASS	EROSION RISK	GENERAL LIMITATIONS ON DEVELOPMENT
		To minimise the danger of erosion in drainage lines, avoid disturbance and maintain a protective vegetative cover. Employ contour cultivation or minimum tillage techniques for cropping and contour cultivation for pasture establishment. Locate roads and fences on contour, along ridges or directly up and down slope. Disperse water from roads at frequent intervals by surface or subsurface drainage. Design roads as recommended under Unit 1 above. Take care to minimise disturbed areas during construction and undertake adequate soil conservation measures. Conserve topsoil for respreading after construction. Revegetation of these areas may require special treatment as well as sowing and adequate maintenance. All dams constructed in this unit will require careful siting, design and construction techniques. Generally a vigorous vegetative ground cover should be maintained throughout this unit. Existing timbered areas should remain and reafforestation should be encouraged in the more hazardous areas. Subdivision into areas of small lots could cause increased erosion unless carefully planned, and due consideration is given to topographical features. Planning of fence locations should also take into account these features so that it is possible to conform to the above criteria.
<u>It is recommended that:</u> Advice on the need for specialised design and construction techniques and follow-up management should be sought from the SCA prior to approval of any development.		
4	High	High inputs of specialised land management techniques are required to minimise soil erosion and/or landslides. Localised areas of severe risk occur in which any development should be avoided. Employ contour cultivation or aerial seeding for pasture establishment. Specialised management techniques for grazing are required. Cropping is not advisable. SCA advice should be sought. A vigorous vegetative ground cover should be maintained throughout this unit. Prevention of further forest clearing is very desirable and reafforestation should be encouraged. All earthworks, including dam construction, roading and other construction works, should employ conservation specifications suitable for each site and include topsoil saving, rapid revegetation, and other soil stabilisation measures and maintenance. Limited subdivision may be possible with careful planning and due consideration to topographical features. SCA advice should be sought at the earliest planning stage.

CLASS	EROSION RISK	GENERAL LIMITATIONS ON DEVELOPMENT
		Planning of fence locations should take into account topographic features to avoid stock concentration in hazardous areas. SCA advice should be sought.
It is recommended that: All proposals for development of land in Unit 4 be referred to the SCA for specific advice on soil conservation requirements at the earliest possible stage. Intensive small-lot subdivision and clearing should be discouraged, and reafforestation should be encouraged.		
5	Severe	Any land disturbance will require extremely high levels of specialised management input to minimise soil erosion and/or landslides. Intensive development of any kind is undesirable and should be avoided. Cultivation is inadvisable. Pastures should be sown by aerial seeding only and maintained as a vigorous ground cover. Grazing should strictly controlled and consultation with the SCA on grazing management is highly recommended. Clearing of timber should be prohibited unless for timber harvesting and then should be strictly controlled and the area reafforested immediately after. Reafforestation of existing cleared areas should be actively encouraged. Earthworks of any kind should be discouraged except for emergency or fire protection purposes. In these instances strict attention to design specifications according to SCA requirements should be mandatory. Subdivision should be discouraged. However, isolated areas may be suitable for limited development. Such areas would require detailed terrain evaluation due to the severe risks involved. Planning of fence locations should take into account topographic features to minimise erosion by stock trafficking. SCA advice should be sought.
It is recommended that: Subdivision of land in this map unit should not be permitted unless the developer can demonstrate to the satisfaction of the SCA that the development will not cause increased soil erosion or land deterioration. Permanent clearing of land should be prohibited and reafforestation actively encouraged. In general the area should be regarded as being best used for forestry and passive recreation.		

Areas of Special Conservation Interest

These areas have been outlined on Map 2 in Roman Numerals as numbered below.

I **Nine Mile Creek, Clear Creek and Hurdle Creek (Lake Kerferd) Water Supply Catchments**

This area has been Proclaimed under provisions of the Soil Conservation and Land Utilization Act. A copy of the Proclamation appears as Appendix B in this report.

This area should be regarded primarily as a water supply area and provision made in any planning scheme to control development. Proposed land use changes should be compatible with the primary objective of water harvesting for domestic purposes. Proposals for development of areas within these catchments should be referred to the Soil Conservation Authority.

In respect of Forests Commission activities within this area, the Commission will soon be working within special prescriptions and in consultation with the Soil Conservation Authority.

II **Burgoigee Creek No. 1 Group Conservation Area**

III **Proposed Burgoigee Creek No. 2 Group Conservation Area**

Group Conservation Areas are projects which have the aims of controlling existing erosion, preventing further erosion and utilizing land to its maximum potential. These projects are co-operative schemes involving the landholders, Shires and SCA.

Co-operation between the Shire and the SCA in respect to erosion control in these areas has been established. Referral of other developmental matters, regardless of the erosion risk classification would be beneficial to all parties concerned.

IV **Reedy Creek**

Management of Crown Land along the Creek between Eldorado township and the Chiltern-Beechworth road is at present being transferred from the Department of Crown Land and Survey to the Forests Commission. It is to be managed as a Multi-Purpose Park.

The SCA, in conjunction with the State Rivers and Water Supply Commission, has a special interest in Reedy Creek. This is because of the high bed-load carried by the stream. There are long-standing siltation problems affecting high quality agricultural land (in Wangaratta Shire) downstream of Eldorado. In addition, Municipalities have a continuing desire to extract vigorous types of road making material from the valley.

Proposals for development, particularly of freehold land in these areas should be referred to the Authority. Any developments which are likely to impinge on or affect Reserved Forest should be referred to the Forests Commission.

References

Soil Conservation Authority (1975) – Land Systems of Victoria

Appendix A – Land Systems Descriptions

(Read in conjunction with Map No. 1)

Land System Number	521242	521233	621252
Erosion Risk Rating	3 / 4 / 5	3 / 4	5
Location	To the north and west of Beechworth	North and west of Mudgegonga, across Barwidgee Creek	Mount Stanley
Landform	Undulating to steep hills with Plateaux	Rolling hilly terrain with some outcropping rock	Mountain slopes with broad valley
Rainfall/Slope	750 - 1000 mm / 10 – 30%	750 - 1000 mm / 8 – 26%	1000 - 1250 mm / 25 – 35%
Geology	Devonian granite	Silurian granite	Granite, with some metamorphosed rocks
Soils	Generally well drained; sols have sandy loam surface texture	Sandy loams with increasing fineness of texture with depth	Sandy loams with increasing fineness of texture with depth
Native Vegetation	Open forest – Stringybark and various Box species	Open forest – Red Box, Stringybark, Peppermint species. Mostly cleared.	Open forest – Blue gum, Peppermint, Candlebark, Box species.
Constraints	Springs and seepage areas in granitic country offer constraints to some forms of intensive subdivision. Erodible nature of granitic soils requires careful planning and development considerations. Granitic soils may present difficulties in water holding for earthen dams. Accuracy of land system and map unit boundaries within Crown Land is reduced due to limits of field checking and the fact that further alienation in unlikely.		

Land System Number	553123	553111 (453118)	453117
Erosion Risk Rating	1	1	3
Location	Everton area	Near the Ovens River	Near Eldorado township
Landform	Gently sloping alluvial fans in valley floors	Flood plains with terraces	Gently sloping plain with swamps
Rainfall/Slope	625 – 750 mm / 1 – 4%	625 – 1000 mm / 3 – 5%	625 – 750 mm / 0 – 4%
Geology	Alluvium	Recent alluvium	Alluvium
Soils	Sandy loams with moderate permeability	Deep soils with loams surface textures	Loams and sandy loams of moderate to low permeability
Native Vegetation	Woodland of Red gum and various Box species.	Red gum woodland.	Woodland of Red gum and various Box species.
Constraints	Floodplain areas are subject to waterlogging and localised flooding. Thus flooding is the prime determinant for small lot development, particularly adjacent to major streams. Occasional sand or gravel seams may present difficulties in water holding for earthen dams. These units are not erosion prone except in watercourses and depressions. Septic effluent/disposal maybe hazardous in some of the soils in these units due to high percolation rates of alluvial soils near streams.		

Land System Number	513133		553231		553120		
Erosion Risk Rating	3	4	2	3	2	3	4
Location	Bowmans Forest and Hodgsons Creek area		Wooragee Valley		Valley floors in the south of the Shire		
Landform	Undulating to steep hill country with narrow ridge lines		Low hills and dissected valley floors		Undulating to hilly valley. Low slopes.		
Rainfall/Slope	750 – 1000 mm / 5 – 25%		750 – 1000 mm / 3 – 15%		750 – 1000 mm / 3 – 18%		
Geology	Sedimentary rocks with some areas of metamorphism		Alluvium and hillwash material		Alluvium and hillwash material		
Soils	Shallow soils with loam surface texture; permeability is moderate to low		Red soils of moderate permeability		Sandy loams with a moderate permeability, subject to areas of seasonal waterlogging		
Native Vegetation	Various Box species and Stringybark		Stringybark, Peppermint species. Mostly cleared.		Various Box species and Red gum. Mostly cleared.		
Constraints	Areas of steep hills where topographical constraints limit development. Thus specialised land management practices are required.		Seasonal waterlogging and some localised flooding occurs. Drainage lines may be eroded when run-ff is rapid and ground cover is poor. Seasonal waterlogging will be the prime determinant for small lot development.				

Land System Number	613251	513251
Erosion Risk Rating	5	2 5
Location	East of Mount Stanley	East of Murmungee valley
Landform	Mountains	Mountains
Rainfall/Slope	1000 – 1250 mm / 20 – 40%	750 – 1000 mm / 30 – 40%
Geology	Sedimentary rocks	Metamorphic rocks
Soils	Loams and gravelly loams of high permeability	Gravelly loams with moderate to high permeability
Native Vegetation	Open forest – Stringybark, Peppermint, Blue gum and Box species	Open forest of Stringybark, Blue gum, Peppermint and Candlebark
Constraints	Inherently unstable due to steep slopes. Development is very limited due to topographical constraints – i.e. slopes, drainage patterns. Desirable to encourage tree cover under any management system. The areas are predominantly public land. Alienation is unlikely and would be subject to LCC consideration.	

Land System Number	513243	613331
Erosion Risk Rating	5	3 / 4
Location	Murmungee and north-east of Beechworth	Stanley area
Landform	Steep hills, often with escarpment	Undulating to hilly plateau
Rainfall/Slope	750 – 1000 mm / 12 – 40%	1000 – 1250 mm / 8 – 25%
Geology	Sedimentary rocks with some degree of metamorphism	Sedimentary rocks
Soils	Gravelly loam surface textures, soils have a moderate to high permeability	Friable red soils with high permeability
Native Vegetation	Open forest – Box Peppermint and Stringybark species. Partly cleared.	Open forest – Manna gum, Candlebark, Peppermint species
Constraints	Inherently unstable due to steep slopes. Desirable to prohibit small lot development and encourage tree cover under any management system. Topographical constraints limit development.	Red soils may present difficulties in water holding for earthen dams.

Appendix B – Proposal for Proclamation

[Extract form the *Victoria Government Gazette*, No. 47, dated 13 June 1979]

Soil Conservation and Land Utilization Act 1958
Land Conservation Act 1970

NINE MILE CREEK, CLEAR CREEK AND HURDLE CREEK (LAKE KERFERD) WATER SUPPLY CATCHMENTS

PROCLAMATION

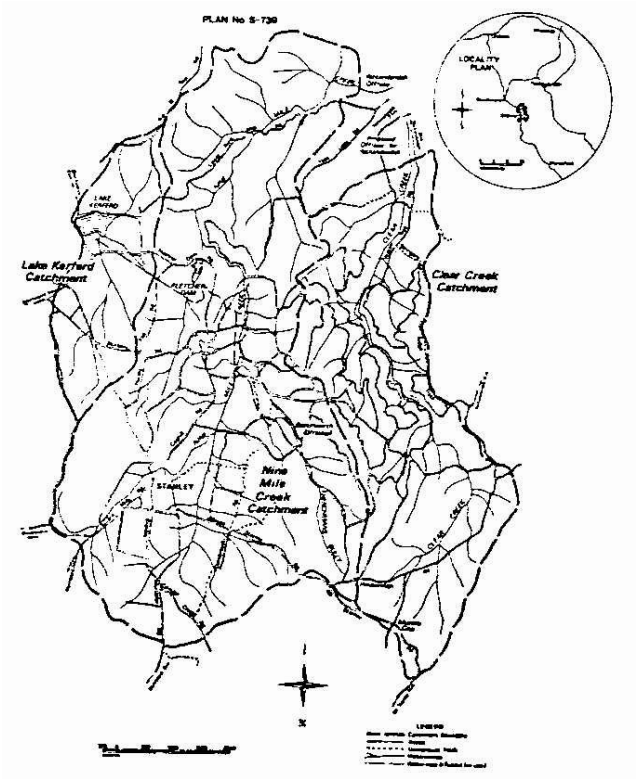
By His Excellency the Governor of the State of Victoria and its Dependencies in the Commonwealth of Australia, &c., &c., &c.

I, the Governor of the State of Victoria in the Commonwealth of Australia, by and with the advice of the Executive Council of the said State and having considered a recommendation of the Land Conservation Council in pursuance of the provisions contains in Section 22 (1) of the *Soil Conservation and Land Utilization Act* 1958 (No. 6372) and Section 5 (1) (b) of the *Land Conservation Act* 1970 (No. 8008) do by this Proclamation define the water supply catchment areas to be known as the Nine Mile Creek, Clear Creek and Hurdle Creek (Lake Kerferd) Water Supply Catchments.

The area proclaimed for Nine Mile Creek is the catchment to an offtake constructed by the Yackandandah Waterworks Trust within Reserved Forest, Parish of Stanley. The area proclaimed for Clear Creek is the catchment to an offtake to be constructed by the Yackandandah Waterworks Trust within Reserved Forest, Parish of Stanley. The area proclaimed for Hurdle Creek is the catchment to Lake Kerferd, within a Water Reserve in the Parish of Stanley and controlled by the Shire of Beechworth as the Local Governing Body.

The use of land within these catchments is subject to specification by notice or by determination made by the Soil Conservation Authority, active under the provisions of Sections 22 (2) and 23 (1) (a) (b) and (c) of the Soil *Conservation and Land Utilization Act* 1958, as amended.

The area described is indicated on Plan No. S-739 hereunder, the original of which is lodged at Head Office of the Soil Conservation Authority, 378 Cotham Road, Kew, 3101.



Given under my Hand and the Seal of the State of Victoria aforesaid, at Melbourne, this sixteenth day of May in the year of our Lord One thousand nine hundred and seventy-nine and in the twenty-eighth year of the reign of Her Majesty Queen Elizabeth II.

(L.S.)

HENRY WINNEKE

By His Excellency's Command

W. BORTHWICK
Minister for Conservation

GOD SAVE THE QUEEN!

By Authority: F. D. Atkinson, Government Printer, Melbourne