Reference SC/C/56

SOIL CONSERVATION AUTHORITY

Report on the proposed

LAND USE DETERMINATION OF RYAN'S CREEK CATCHMENT
(Benalla Water Supply)

Prepared for consideration by the
Land Conservation Council

June 1974

TABLE OF CONTENTS

INTRODUCTION

In November 1968 the Benalla Waterworks Trust requested proclamation of the catchment to their Loombah Weir on Ryan's Creek, under the provisions of the *Soil Conservation and Land Utilization Act* 1958. On the basis of a report submitted to the then Land Utilization Advisory Council in January 1970, the catchment was proclaimed on 3rd March, 1970.

This present report proposed a Land Use Determination for the catchment and recommends the form which the various categories of the Determination should take.

Authority officers discussed the proposed Determination with the Benalla Waterworks Trust at its meeting on 20th June, 1974.

After consideration by the Council the report will be submitted to the Authority, with any suggested amendments, for approval. The Determination will come into effect when it is published in the Victoria Government Gazette, and copies of the gazettal notice will be forwarded to all landholders in the catchment, and relevant State, Federal and Local Government bodies.

The Supply System

Loombah Reservoir on Ryan's Creek has a capacity of 740 ML (600 ac. ft.) and in 1973 the new McCall-Say Reservoir added 1000 ML (800 ac. ft.) to water storage capacity. The new storage is 8 km upstream of Loombah Reservoir, and water from the latter is gravitated by pipeline to Benalla where it is used for domestic and industrial purposes without treatment. Water from the Broken River (also untreated) has been used to supplement the Ryan's Creek water during drought years, but the need for that will be greatly reduced now that the new storage is in operation.

At present the population supplies is about 8,500 in the city, together with domestic supplies to some adjoining rural area. Increasing amounts of water are being used for public facilities (the racecourse, cemetery, parks, etc) and industry. The city's growth rate is still about 50 houses per year, and a population of 14,000 could be supplied with the present storage capacity.'

Average annual consumption over the past five years has been 1280 ML (282 m gallons) per annum, and average daily consumption is about 400 L (90 gallons) per head.

The Catchment

Loombah Weir is some 30 km south east of Benalla, and the catchment extends upstream along Ryan's Creek to its headwaters at Archerton, a distance of 20 km. Total catchment area is 8000 ha (30 sq miles), within the Parishes of Toombullup, Toombullup North and Myrrhee. The only all-weather road through the catchment is the Tatong-Archerton Road ("The White Road"), although Tiger Hill, Webb's and Whiskey Creek Roads are trafficable for much of the year.

CATCHMENT DESCRIPTION

For a more detailed description of the area please refer to:

i) SCA report to LUAC dated January 1970
"Report on Ryan's Creek Catchment" SC/C/56

ii) Rundle, A. S. and Rowe, R. K. "A Study of the Land in the Catchment of the Broken River" (SCA in press).

iii) LCC Report on North-eastern Study Area, District 2, (1973).

Precipitation

Archerton, at the south eastern extremity of the catchment and at an elevation of 1 000 m, is the only rainfall station in the catchment. Another station at Ryan's Creek 10 km downstream of Loombah Weir, is at 270 m elevation. Rainfall data is summarised as follows:

	Archerton	Ryan's Creek
Recorded Period	1940-1969	1915-1929
Average Annual Precipitation	1350 mm (53")	760 mm (30")
Range	680 - 2360 mm	430 - 1020 mm
Average no. of wet days/year	111	101
Storm* days/year	15	5
Peak Incidence of Storms*	March	March, May

* For the purpose of this report a 24 hour record exceeding 250 mm is called a "storm".

It can be seen that rainfall within the catchment is erratic, and particularly in the higher (southern) parts of the catchment, much of it (in fact 46%) arrives in heavy storms. The heavy winter and spring rains result from Orographic uplift of the northerly airstream as it approaches the Tolmie Highlands.

Of particular relevance to the catchment management is the fact that the peak incidence of storms is in March, immediately after the driest month, so that the erosion hazard is highest at that time. Years ago the same late summer storms made potato growing very successful in the catchment (that is why the Waterworks Trust acquired most of the freehold land in the catchment) and the crop is still grown around Archerton.

Recent events Records at Archerton show that precipitation has been well above average for the catchment over the past 18 months.

	1972	1973	1974
Jan	71*mm	136*mm	179*mm
Feb	118*	283*	44
Mar	18	111	204*
Apr	87	204*	227*
May	84	154*	
Jun	73	192*	
Jul	136	144	
Aug	157	257*	
Sept	32	241*	
Oct	131	238*	
Nov	57	63	
Dec	15	113*	
Total	979 mm 38.6"	2134 mm 84.4"	

May	14th	53 mm
	15th	105 mm
	16th	38 mm
		196 mm (7½")

Months marked * in the above data had above average totals, and in 1973 the only months below average were July and November. In the past 33 years the 1973 annual total of 2134 mm (84.4") has been exceeded only once, in 1956 when the total was 2360 mm (93.4"). More recently, the May 15th, 1974 recording of 10.4.6 mm (4.1") is the highest daily total on SCA records for Archerton (which go back to 1940). Bridges on Ryan's Creek Track and Whiskey Creek Track were carried away in flows which followed the rains of May 14th and 15th and 16th.

Streamflow Data

For the past four years the catchment investigation officers have used a portable flow meter to calculate flows at various points in Ryan's Creek, in an attempt to determine yield distribution of the various sub-catchments. Quite large subsurface water flows are indicated by the readings and confound any attempt to analyse them statistically. Nevertheless it is apparent that the plateau areas of the Archerton unit (described later) do not contribute as well to summer flows as might be expected. Thus, while in

winter the top (headwater) 40% of the catchment may produce only 30% of total yield. This information has influenced the decision (see III Land Use) to permit future pine plantations in parts of the Archerton unit.

Temperature

There are no temperature recording stations within the catchment, but the following estimates are made from available data for the surrounding country:

	Northern end	Southern end of catchment
Mean maximum in Jan - Feb	27°C	23°C
Mean maximum in July	12°C	7°C

In the Archerton area frosts are common in May, June and July, extending into August and September. Snow is most common between May and August, with occasional falls as late as December. Total snowfall is usually between 100 and 150 mm.

GEOLOGY AND TOPOGRAPHY

Parent rocks through most of the catchment are Upper Devonian porphyritic dacites, with remnant plateaux of older basalt around Archerton.

Ryan's Creek and Hollands Creek drain the north and northwest slopes of the Tolmie-Archerton plateau. Elevation of the highlands gradually decreases from 1000 m towards the north and the streams flow in a generally northerly direction to join the Broken River.

Three land units can be recognised within the catchment. The first includes the land upstream of the Loombah Weir to the McCall-Say Reservoir. In this section the main stream is deeply entrenched in a narrow valley, which is further dissected by short steep drainage lines entering the main stream more or less at right angles. Land form is consequently a sharply defined system of secondary ridges and spurs. The valley and the catchment widens in the second unit which covers the middle part of the catchment. Ridge tops are wider and less dissected, with moderate to steep slopes. Upstream of Cherry Tree Creek the country is gentle to hilly, and forms the third unit.

SOILS AND VEGETATION

Relationships between soils, vegetation, climate and topography are all recognisable, and are probably best described within the three Land Units.

Loombah (northern) Unit

Annual rainfall 750 to 1000 mm, elevation up to 700 m.

Skeletal soils on the steep ridges, yellow brown duplex soils on the foothills and lower slopes. Pockets of grey sandy soils occur which are stable under natural forest conditions, but prone to slumping when disturbed by roadworks or earthworks.

The dominant vegetation is a dry schlerophyll of Red Stringybark (*E. macrorhyncha*) and Broad-leaved Peppermint (*E. dives*), with Long-leaved Box (*E. bicostata*) in the gullies. Understorey is generally open, with incomplete ground cover.

Tiger Hill (central) Unit

Annual rainfall 1000 mm to 1260 mm, elevation 700m to 900 m.

Friable brown gradational soils are common in this unit. They are shallow on the steep slopes and ridges, deeper on the lower slopes. Within this unit at lower elevation and rainfall the soils are more podsolised, and redder in colour.

Vegetation is a wet schlerophyll forest of Narrow-leaved Peppermint (*E. radiata*) with Candlebark (*E rubida*) and Messmate (*E. obliqua*) the latter sometimes occurring in pure stands.

Archerton (headwater) Unit

Annual rainfall above 1200 mm, elevation 900 m to 1000 m.

Most common soils are kraznozems developed on the basalt. They are typically reddish brown in colour, well structured topsoils merging to paler coloured clayey subsoils.

Natural vegetation is a wet shclerophyll forest of Manna Gum (*E. viminalis*), Messmate and Blackwood (*A. melanoxylon*) in the wetter areas, with Narrow-leaved Peppermint and Candlebark on the drier sites. Understorey is generally dense. The flatter land in this unit has been used for agriculture in the past, and the regeneration of tree species has been poor. Bracken fern and native grasses cover much of the land and blackberry has invaded many of the drainage lines.

EROSION HAZARD AND INCIDENCE

Erosion hazard is high on the steep slopes of the Loombah unit. Although existing erosion under forested conditions is limited to minor sheet erosion, the nature of the soils and slopes precludes safe clearing. Gully erosion is evident where drainage lines have been cleared in the past. Roadworks and earthworks are particularly hazardous, as was instanced during construction of the new dam. On the advice of Authority officers the Benalla Waterworks Trust spent some $5,000 on stabilising borrow pit and roadside areas in 1973, and those areas will require maintenance for several years before they become stable. In the past year the Forests Commission has also treated many unused or little used tracks around the new storage, to improve local drainage and reduce erosion.

In the Tiger Hill unit erosion hazards is lower due to better soil permeability and in part, gentler slopes. Roadworks again represent the greatest threat to water quality.

Erosion incidence is low in the Archerton unit, but indications are that it has been high in the past when agriculture was practiced. During the dry summer months it has been noted that ground cover under the mantle of bracken fern is poor, and in these areas sheet erosion occurs to some extent during summer thunderstorms.

The hazard is quite high for any bare soil areas in this part f the catchment (despite good soil permeability) due to the high incidence of heavy storms.

LAND TENURE

Privately owned land	28 ha	(70 ac)	0.4%
Benalla Waterworks Trust	1280 ha	(3,157 ac)	16.2%
Reserved Forest	6430 ha	(15,845 ac)	81.2%
Crown Lands	715 ha	(433 ac)	2.2%
	7913 ha	(10,505 ac)	100.0 %

Negotiations for the purchase of the Trusts land by the Forests Commission are almost complete.

LAND USE

At present 26 ha (60 ac) near Archerton is the only land in the catchment used for agriculture. The land is part of several large holdings and is used for growing potatoes and other crops in rotation, but represents no threat to the water supply.

Some 60 ha (150 ac) of Douglass Fir and Radiata Pine were planted in 1972 by the Forests Commission as part of a softwood block on the southern boundary of the catchment.

Hardwood logs and pulp billets are the two main forest products from the remainder of the catchment. Forest operations are managed by the Commission using prescriptions agreed upon by both the Commission and SCA. Some minor amendments and additions to these prescriptions will be necessary to tie them in to the proposed Determination categories, and they will again be submitted to the Commission for comment prior to final approval by the Authority.

Potential Land Use

The Forests Commission has indicated (for example, in its submissions to LCC on the North East No. 2 Study Area) that it would like to extend its softwood conversion program into parts of the catchment in future years. LCC and Authority officers jointly inspected the areas concerned in 1973, agreement was reached on the areas suitable for conversion without hazard to the water supply, and sketch plans of those areas have been forwarded to the Commission.

Other forms of land use which Council is considering in the catchment as part of the North East No. 2 Study Area are a scientific reference area and an historically significant area where recreation facilities would presumably be necessary.

On the subject of recreation, Benalla Waterworks Trust has expressed concern at camping and picnicking in the catchment and particularly alongside Ryan's Creek itself. The Authority's general policy on the matter is that in domestic supply catchments where the water is not treated, no development should be permitted which will encourage camping and picnicking within the catchment. Where, however, there exists or develops a demand for such use, steps should be taken to control is and direct it to stable parts of the catchment, away from streams.

There is no immediate hazard associated with the scientific reference area or the historically significant area, and the proposed determination will ensure that any future facilities or roadworks associated with these areas will not produce hazards to the water supply.

PROPOSED DETERMINATION CATEGORIES

The general provisions of each of the land use categories are as follows, and should be read in conjunction with the proposed Determination Plan:

Category 1

Land to be used primarily for the protection of streams and watercourses, where forest operations are to be minimal and where no earthworks or soil disturbance may be carried out without the specific approval of the Soil Conservation Authority. This category covers

a) land within 100 metres of full supply level of either storage or within 100 metes of each bank of Ryan's Creek up to its junction with Cherry Tree Creek.

b) land within 40 metres, or such greater distances as the Authority may specify, of other streams and watercourses within the catchment.

(The 100 metre buffer involves that section of Ryan's Creek between the two storages (8 km) and a further section of 6 km upstream of McCall-Say dam).

Category 2

Protection forest. Forested land where no clear falling operations will be permitted and where timber utilization operations may be permitted only where slopes are generally less than 12^{o} or 20%.

(Approximately 2,200 ha are included in this category, made up predominantly of steep country in the Loombah land unit which has low productivity and a high erosion hazard. It is basically the "protection zone" in the present forest management prescriptions, with some extensions.)

Category 3

Utilization forest. Land generally suitable for timber utilization operations.

(The largest part of the catchment, about 4,500 ha, is included in this category. Note that management prescriptions will still apply to forest operations on this land.)

Category 4

Land best suited to hardwood or softwood forest uses and parts of which may be suitable for more intensive use, subject to conditions.
(Part of the land at present owned by the Benalla Waterworks Trust and which is expected to be transferred tot he Crown as Reserved Forest shortly is included in this category together with other low hazards areas in Reserved Forest. All the land in this category is associated with the basalt plateau remnants, so soils are good and slopes generally less than 10%. Much of the land is in high rainfall areas so particular attention will be paid to protection of drainage lines. The area involved is approximately 1000 ha.)

Specific Requirements

While the categories listed above are given as a guide to the forms of land use which may be permitted without hazard to the water supply, the Soil Conservation Authority may have specific requirements in relation to any land use. In particular:

(a) All forest operations are to be carried out in accordance with management prescriptions drawn up or approved by the Authority;

(b) Prior approval is necessary before any roadworks or earthworks are carried out within the catchment;

(c) Prior approval is necessary before any developments associated with recreation facilities or residential use are carried out in the catchment.

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