Reference SC/C/128

REPORT ON THE CANN RIVER WATER SUPPLY CATCHMENT (CANN RIVER WATERWORKS TRUST) PROPOSED FOR PROCLAMATION

Prepared for consideration by the
Soil Conservation Authority and the
Land Conservation Council

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APPENDICES

1. INTRODUCTION

The Cann River Waterworks Trust made application to the Land Conservation Council in January 1975, to have the catchment to its offtake pump proclaimed pursuant to Section 5(1)(b) of the *Land Conservation Act* and Section 22(1) of the *Soil Conservation and Land Utilization Act*.

Although the Trust envisages no immediate land use conflicts with the production of water of suitable domestic quality, it sees proclamation as a measure of protection of the catchment area.

2. SUPPLY SYSTEM

The Trust derives its water supply by pumping from Cann River to a storage basin in Allotment 31, Parish of Noorinbee. The pump-house, adjacent to Allotment 9C (Parish of Noorinbee), is capable of delivering 150 gal/min (682 litre/min) via a 6 inch (15 cm) rising main to the 500 000 gal (2.265 ML) storage basin. From this storage basin the water is gravity fed, via an 8 inch (20 cm) main, to some 120 consumer outlets (sawmills and houses). There are no plans to enlarge the storage capacity in the immediate future, although there may be extensions to the reticulation system. Bacterial sampling and analysis of the water supply has begun this year by the Latrobe Valley Water & Sewerage Board.

3. THE CATCHMENT

Locality

The catchment covers 632 km^2 and is represented on the Craigie and Cann 1:100 000 topographical map sheets. It extends from the Trust's pump-house, 3 km north of the Cann River township, to beyond the New South Wales border. Only the alluvial river terraces have been cleared and developed for agricultural production and the remaining area (over 90%) is forested.

The catchment is bisected by the Cann Valley Highway which runs from the Cann River township to Bombala (New South Wales), but otherwise the area is sparsely served by roads other than four-wheel drive tracks.

The catchment is within the Parishes of Bondi, Coopracambra, Kowat, Loomat, Weeragua, Combienbar, Cooaggalah and Noorinbee which are all within the county of Croajingolong and the Shire of Orbost.

There are a number of small agricultural settlements within the catchment. Buldah was developed on the river flats of the west branch of Cann River (Parish of Coopracambra) while the other dwellings are scattered along the Cann Valley Highway and the West Cann Road.

Additional information describing this area of East Gippsland can be obtained from the following references:-

Royal Society of Victoria Proceedings "East Gippsland Symposium" Vol. 82, part 1. 29th January 1969.

Nicholson, B.M., "A Study of Land in the Orbost Shire" Soil Conservation Authority. September 1973.

Land Conservation Council, "Report on the East Gippsland Study Area". June 1974.

Central Planning Authority, "Resources Survey East Gippsland Region". 1954.

3.2 Climate[o]*

Climate data is tabulated in Appendix A.

(i) Precipitation

An annual mean of approximately 1 000 mm falls along the length of the Cann River and increases to 1 200 mm in the highlands as one moves east and west towards the catchment boundaries. Variation in average monthly rainfall throughout the years is not great and in the majority of localities in this area of East Gippsland, the rainfall exceeds 50 mm in each month of the year.

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[o] Ref. D J Linforth; "The Climate of East Gippsland". Proc Ray Soc Vic Vol 82: 27-36.

Most of the rainfall originates from depressions centred off south-eastern Australia. They may have passed through Bass Strait and intensified near Gabo Island but more commonly, they have developed off the coast of New South Wales and moved southwards. Such atmospheric conditions bring a vigorous southerly airstream of warm, moist air from the Tasman Sea. The depressions show no seasonal pattern and provide East Gippsland with a reliable, evenly distributed rainfall which is often more intensive that in other parts of the State. A vigorous east coast depression can cause heavy rain and the frequency of 24 hour falls in excess of 75 mm is greater in East Gippsland than other parts of Victoria. The lower country of the Cann River area receives the full force of such depressions which then cause rapid increase in stream-flow. Heavy rainfall further inland depends on a depression being centred over the land. However, topography also has a marked influence on rainfall and in areas where it varies greatly, the rainfall will be correspondingly variable.

Snow falls frequently at levels over 600 m but is a rare occurrence over the lower country.

(ii) Temperature

The Bombala figures in Appendix A are taken from the Land Conservation Council report as being indicative of the highlands, where there is a dearth of climatological data. The town of Bombala in New South Wales is north of the catchment area.

The main factors determining mean temperatures are distance from the sea and elevation. Temperatures are mild along the coastal belt, while at lower elevations, as one moves inland, the differences between maxima and minima increase (maximum temperatures increases and minima decrease). However, with increasing elevation both maxima and minima decrease.

From Table 2 it can be seen that summer temperatures are moderate but winter temperatures may be cold enough to restrict plant growth. Frosts are also more frequent at higher altitudes.

If 10^{o}C is taken as the mean monthly temperature below which plant growth is severely restricted, it can be seen that at Cann River, the months of June, July and August are considered too cold for plant growth while at Bombala, this cold period extends from May to September (inclusively).

(iii) Growing Season

There are no months in which the mean monthly rainfall is less than the effective rainfall needed to promote plant growth, so apart from occasional droughts, lack of rainfall imposes no limitations on the length of growing season. Low winter temperatures however, limit the growing season to nine months on the lowlands and seven months in the higher reaches of the catchment.

3.3 Geology and Topography

The parent materials underlying most of the catchment are Devonian granite/granodiorite intrusions through Ordovician sediments (sandstone, mudstone, slate, silt and quartzite). The Ordovician sediments outcrop along the south-east ridge of the catchment and in the higher country to the west and north west. Upper Devonian sediments (non marine beds of sandstone, conglomerate, grit and shale) overlie the Ordovician material in a down faulted block in the north-west of the catchment. The farming area of Buldah was established on the Quaternary Deposits river alluvium and swamp deposits) within this block of Upper Devonian sediments. The river flats adjacent to Cann River, for some 15 km upstream from the offtake point, are also derived from Quaternary sediments.

The catchment exhibits examples of three main land zones. The Bralak (plains) zone describes the alluvial river valley of the Cann River, and also the land surrounding the Bulda settlement. The majority of the catchment is described by the Coopracambra land zone, in which moderately sloping ridges exhibit a complex pattern of dissection. Areas on Ordovician bedrock tend to be deeply dissected with a drainage system which is not well defined. The plateaux area (Bonang zone) at the very north-west of the catchment are characterised by poorly pronounced relief with wide shallow valleys.

3.4 Soils

Soils with gradational profiles are typical for most of the catchment area. They are shallow and stony on the steeper slopes and increase in organic content with elevation. The alluvial river valleys exhibit earthy brown or yellowish-brown gradationals or brown loams. Other gradational soils are derived from the granite/granodiorite parent material along the length of Cann River and the east branch of the river, (effectively the route of the Cann Valley Highway), and have brownish sandy loam surfaces grading to moderately to strongly structured yellowish-

brown clays. These soils also persist in the lower areas to the east of the Cann Valley Highway while more stony, friable, reddish and brown gradational soils predominate at higher elevations (above 600 to 800 m).

To the west of the Highway there is the same pattern of yellowish-brown gradational soils on the lower slopes are reddish and brownish gradationals in the higher areas. These broad soil types also persist on the Ordovician sediments in the north-west forested country.

Reddish and brownish gradational soils exhibit brownish and reddish-brown loam surfaces developing into moderately to strongly structured reddish-brown clays; and the profiles are usually stony throughout. The soils of the high plateaux country are also friable reddish and brownish gradationals exhibiting a friable loamy surface grading to strongly structured friable clay loams and clays.

35 Vegetation

The combinations of environmental conditions (such as climate, soil type, elevation, slope and aspect) in East Gippsland ensures that this area is endowed with a great diversity of flora.

The basic forest types are (i) tall open forest where the dominant species are higher than 40 cm, in the wetter, upper reaches of the high plateaux and areas of dissected ridges over 900 m, and (ii) a dry sclerophyll open forest (between 28 m and 40 m), existing over the major portion of the foothill country. There are however, many variations of the constituent species comprising these forest types, as are summarised below.

The original open forests of Gippsland (coastal) grey box (*Eucalyptus bosistoana*) with relatively open understories, and the shurb/heath country of scrub she-oak (*Casuarina paludosa*) and spear grass tree (*Xanthorrhoea hastilis*) originally dominated the river plains now developed for agriculture. These areas now carry swards of introduced pasture species such as phalaris/cocksfoot, subterranean clover, rye grass, and various annuals which inevitably volunteer after a programme of fertilizer top-dressing has been undertaken. Closed forests dominated by lilly pilly (*Eugenia Smithii*) with an understorey of vines, ferns and epiphytes grown along perennial streams and may extend to altitudes of 460 m into the foothills.

On lower slopes the dominant open forest species are white (*E. globoidea*) and red stringybark (*E. macrorhyncha*), the red stringybark being mainly confined to the drier northerly sites. The understorey is fairly sparse and includes hickory wattle (*Acacia falciformis*), common cassinia (*Cassinia aculeata*), sunshine wattle (*A. botrycephala*), nodding blue lily (*Stypandra glauca*) and tussock grass (*Poa australis*).

Silvertop (*E. sieberi*) is the common dominant species at higher elevations (up to 850 m but generally below 700 m), especially on moist well drained sites. Red stringybark may occur if the rainfall is less than 1 000 mm on the drier northerly aspects. The understorey associated with silvertop is denser and more varied than that of the stringybark forests and includes silver wattle (*A. dealbata*), black wattle (*A. mearnsii*), hickory wattle (shiny cassinia (*Cassinia longifolia*), hop bitter pea (*Daviesia latifolia*), hop goodenia (*Goodenia ovata*), austral bracken (*Pteridium esculentum*) and tussock grass, as well as other species common to the stringybark forests.

At higher areas (above 600 m to 700 m) where the rainfall is between 1 000 mm and 1 300 mm, the dominant species are messmate *(E. obliqua*) brown barrel (*E. fastigata*) mountain grey gum (*E cypellocarpa*) and broad leafed peppermint (*E. dives*) which are associated with a similar understorey to the silvertop forest.

Above 750 m, candlebark (*E. rubida*) and mountain gum (*E. dalrympleana*) also occur in association with messmate, mountain grey gum and brown barrel.

In these areas between 750 m and 900 m the understorey is fairly open (except in the drainage lines) and includes silver wattle, black wattle, hickory wattle, shiny cassinia, hop bitter pea, hop goodenia, austral bracken and tussock grass. Shining gum (*E. nitens*) occurs above 900 m and alpine ash (*E. delegatensis*) exists in the highest areas above 1 100 m.

There are also several areas of plateaux country in the north and north-east of the catchment. Here a tall open forest predominates with candlebark, broad and narrow leafed (*E. radiata*) peppermints, brown barrel, messmate and alpine ash being the dominant species up to about 900 m; and shining gum (*E. nitens*), brown barrel, white sallee (*E. pauciflora*) above 900 m. Above 900 m, except on very exposed sites there is a dense understorey of silver wattle, hazel pomaderis (*Pomaderis aspera*), blanket leaf (*Bedfordia salicina*) shiny cassinia, prickly bush poa (*Pultenaea juniperina*), Victorian Christmas bush (*Prostanterha lasianthos*), mountain pepper (*Drimys lanceolata*) and Gippsland waratah (*Telopea oreades*). On low lying parts of the high plateaux are open forests of white sallee and mountain swamp gum (*E. camphora*) (on the poorly drained soils). These are associated with a sparse understorey of tussock grass.

3.6 Land Tenure

Freehold	80 sq km (13%)
Reserved Forest	290 sq km (46%)
Crown Land	260 sq km (41%)

There are no current mining leases in the catchment but an exploration licence covers much of the western side of the catchment. If the catchment is proclaimed any future applications for mining leases or licences will be referred to the Soil Conservation Authority for comment.

3.7 Present Land Use

(i) Grazing and Agriculture

As previously stated, land cleared for agricultural production covers less than 10% of the catchment. This land is basically confined to the alluvial riverine terraces which exhibit better drained, gradational soils. The immediate valley to Cann River is primarily used for grazing cattle and sheep, and there are several dairy farms. Cropping is confined to the flats immediately adjacent to Cann River. The same pattern of agriculture occurs at Buldah. Forest grazing is an important facet of agriculture in the area. At present there are no intensively grazed forest areas but there is some risk that grazing the foothill stringybark/silvertop forests could intensify and cause some instability of surface soils. There is also a moderate capability for apiculture in the southern stringybark forests.

(ii) Forestry

State Forest within the catchment area is managed from the Cann Valley District Office of the Forests Commission. Although this area is renowned for its timber potential the catchment area is not being extensively utilised at present. The firm of Brownlie Brothers of Noorinbee North has a licence to log 2 250 cubic metres of timber in areas near Kate Creek and Log Bridge Creek, and is the only company working within the catchment area at present.

As far as future operations are concerned, the Forests Commission intends to eventually log the Lockup Creek subcatchment (west side of the catchment) where there is good quality timber. This will most probably be undertaken by the Club Terrace Sawmilling Group. A more precise idea of future logging activity in the Catchment may be obtained from the Land Conservation Council recommendations for the East Gippsland study area, when they are completed.

3.8 Hazards to the Water Supply

Soils derived from granite/granodiorite constitute a high erosion hazard. They are generally stable in the native forest situation but susceptible to rilling and sheet erosion if disturbed.

An obvious sedimentation problem is created by the Cann Valley Highway which runs alongside the Cann River. Roadworks and quarrying operations as well as tabledrain erosion have led to increased sediment loads in the river. This silt is deposited on downstream meanders but may not greatly affect the quality of water in the storage basin because the turncock employed by the Waterworks Trust has instructions not to pump poor quality water (ie. when the river is turbid and carried a high sediment load). Cann River Improvement Trust has carried out considerable works to the river and environs. Kikuyu has been planted on previously bared banks and willows have been used to stabilize outer meanders.

The forest is prone to periodic wildfire damage but unstable catchment conditions are temporary in most areas due to the rapid recovery of the native vegetation following fire.

The Trust has mentioned that it was concerned about the potential contamination problems posed by dairy farms on the river banks, but as yet there is no concrete evidence to substantiate this fear. Provisions for disinfection have been incorporated into the design of the pumphouse.

4. SUMMARY

Cann River Waterworks Trust has requested proclamation of the catchment to its offtake pump to ensure that water quality is maintained.

Some areas within the catchment have outstanding potential for hardwood timber production. If the catchment is proclaimed the Authority will, together with the managing authorities, prepare management prescriptions, which will have due regard for water supply interests.

There are few obvious hazards to the water supply at present and proclamation is a further step towards ensuring that this situation continues.

5. RECOMMENDATION

That the Cann River Water Supply Catchment be proclaimed pursuant to Section 22(1) of the *Soil Conservation and Land Utilization Act* and Section 5(1)(b) of the *Land Conservation Act*.

S. HANDASYDE
Catchment Investigation Officer

Appendix A - Table 1 - Rainfall (mm)

BENDOC PARK - (1887-1973)

Representative of the Tablelands - 20 km north-west of the Catchment

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Mean	62	66	55	50	49	66	55	54	50	62	71	68	701
Median	55	53	45	38	41	52	44	47	3	59	67	68	670
No. of observations	63	64	62	63	63	63	62	62	62	61	60	58	55
COMBIENBAR - (1951-1966)													
Mean	60	69	65	58	108	141	120	94	113	102	106	102	1138
Median	48	63	49	41	81	100	114	80	98	100	93	82	108
No. of observations	13	13	15	15	14	14	14	13	14	13	14	13	12
CANN RIVER (1951-1973)													
Mean	66	75	61	51	110	103	92	90	81	91	97	96	995
Median	56	54	43	36	74	77	55	89	72	79	84	84	903
No. of observations	21	22	23	22	22	22	22	22	22	22	22	21	19

Appendix A - Table 2 - Mean Temperatures (^{o}C)

CANN RIVER

	Jan	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Year**
Max.	25.9	24.5	24.5	20.1	16.3	13.7	13.5	14..4	17.9	19.6	20.0	24.3	19.6
Min.	12.1	12.8	11.4	7.8	5.7	4.3	2.3	2.9	4.9	7.5	8.8	10.8	7.6
Mean	19.0	18.7	18.0	14.0	11.0	9.0	7.9	8.7	11.4	13.6	14.9	17.6	13.6

BOMBALA (NSW)

	Jan	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Year**
Max.	24.8	25.0	22.6	18.0	14.4	11.4	10.8	12.5	15.7	19.0	21.5	24.0	18.3
Min.	9.6	10.3	8.4	5.2	1.7	-0.3	-1.1	-0.2	2.3	4.7	6.6	8.8	4.7
Mean	17.2	17.6	15.4	11.7	8.1	5.4	4.8	6.2	8.9	11.8	14.1	16.4	11.5