

**A REPORT ON THE
NARRACAN CREEK CATCHMENT
Including
LITTLE NARRACAN CREEK CATCHMENT**

A proposal for proclamation
Prepare for consideration by the
Land Conservation Council

By I Master

July 1990
Soil Conservation Authority

TABLE OF CONTENTS

INTRODUCTION	3
SUPPLY SYSTEMS.....	3
(A) NARRACAN CREEK DIVERSION	3
(B) LITTLE NARRACAN CREEK DIVERSION	3
WATER QUALITY AND TREATMENT	3
DESCRIPTION OF THE CATCHMENT.....	4
(A) GENERAL.....	4
(B) GEOLOGY AND TOPOGRAPHY	4
(C) CLIMATE	4
(D) SOILS AND VEGETATION	5
LAND USE AND TENURE.....	5
HAZARDS TO WATER SUPPLY	5
RECOMMENDATIONS	6
RECOMMENDATIONS	8

INTRODUCTION

In its final recommendations for the Melbourne study area, the Land Conservation Council recommended that the catchments to Narracan Creek and Little Narracan Creek diversion be investigated, and if appropriate, recommended for proclamation. Little Narracan Creek is also known as Easterbrook Creek and is a tributary of Narracan Creek.

This report is the result of such an investigation and was presented to LCC for consideration at its meeting on the 4th September, 1980. Some minor amendments and corrections were suggested at that meeting, and have been incorporated in this report.

SUPPLY SYSTEMS

(a) *Narracan Creek Diversion*

Moe Waterworks Trust diverts water from Narracan Creek to supply the townships of Moe and Westbury. The offtake is located with Crown Allotment 101, Parish of Moe, on river frontage near the Narracan Fall Picnic Grounds. Approximately 8 ML of water per day is gravitated to the treatment plant from the offtake. The supply from the weir may be increased to a maximum of about 16 ML per day. From the treatment plant, still under gravity, the water flows to the Moe service basin (23 ML holding capacity) and to the Newborough service basin (18 ML). From these two basins a total of 17,000 tappings are served within Moe and Westbury area. The treatment plant is located in Moe South about 14.5 km from the offtake point. The treatment plant has been designed for a maximum flow of 18.2 ML per day and the pipeline capacity may be increased accordingly. The Moe WWT is planning to augment supplies to the township of Moe by diverting water from the Tanjil River and constructing a 1364 ML storage reservoir which should be ready for use in mid 1981. According to Moe Waterworks Trust, the Narracan Creek will remain the main source of supply, with the Tanjil water providing supplementary supplies.

Since 1946, the Trafalgar Waterworks Trust has diverted water from Narracan Creek in CA 20A, Parish of Moe, through a 200 mm diameter pipeline which discharges into the headwaters of Sunny Creek. The Trafalgar WWT subsequently diverts water from the lower reaches of the creek.

The rate of discharge is over 1.5 ML per day (a separate report is being prepared on Sunny Creek catchment).

(b) *Little Narracan Creek Diversion*

Thorpdale is a small township within the Melbourne catchment and Thorpdale Waterworks Trust provides water from 350 consumers. The waterworks consist of a small offtake diversion on Little Narracan Creek (Easterbrook Creek) from which water is pumped to an elevated tower and from there into the reticulation system. The offtake is on Crown Allotment 138 Parish of Moe.

WATER QUALITY AND TREATMENT

As mentioned earlier, Narracan and Little Narracan Creeks are connected and constitute one stream system. The offtake for Thorpdale water supply is located about 7 km upstream from the Narracan diversion for Moe water supply.

Bacteriological sampling of the Moe water supply has been carried out on a monthly basis for some time and similar sampling of the Thorpdale water supply has just commenced. High counts of *E. coli* are not uncommon. In addition, chemical analysis of the Moe supply is carried out at six-monthly intervals (in January and August). The raw water is often high in colour, turbidity and conductivity, and possible reasons for the poor water quality are discussed in the section under "Hazards to Water Supply" later in this report.

No chemical analysis is carried out on the Thorpdale water supply.

A program to sample and analyse raw water at various points in the catchments would assist the Authority in identifying the particular sub-catchments where improvements in land use are necessary. The Authority proposes to recommend such a program to the Water Commission.

Moe Waterworks Trust has installed a treatment plant which includes coagulation-flocculation, sedimentation of suspended materials, correct of pH and, finally, chlorination. Treatment of Thorpdale water supply is limited to chlorination, and there are no plans for additional treatments.

DESCRIPTION OF THE CATCHMENT

(a) General

The total catchment area is approximately 82.3 km². Approximately 14.4 km² of this area covers the sub-catchment of Little Narracan Creek above the Thorpdale water supply offtake (see catchment plant).

The catchments are located in West Gippsland, south of the Princes Highway between Yarragon and Trafalgar, and north of Allambee and Narracan South.

Thorpdale, with a population of about 500, is the only major town in the catchment, and there is a small community at Childers. There are some 65 farm houses throughout the catchment.

(b) Geology and Topography

The catchment to Narracan Creek, including Little Narracan Creek sub-catchment, is a part of the north-east corner of the South Gippsland Uplands (otherwise known as Strzelecki Ranges) just south of Yarragon Monocline and north of the Allambee South Fault. The catchment area contains four geological formations, including Cretaceous Strzelecki Group sediments which underlie the other three formations. The Strzelecki sediments consist of non-marine lithic sandstone with interbedded siltstone and minor black coal. They are exposed on only 5% of the catchment area at the north-west corner. Approximately 94% of the catchment area is capped with Older Volcanics, locally known as Thorpdale volcanics, which consist of olivine basalt with tuff and minor interbedded sediments. Between the Strzelecki Group sediments and Thorpdale volcanics lies the Childers formation, which consists of siliceous conglomerate, quartzite gravel, sand, clay and brown coal. It outcrops in less than 1% of the catchment area. The youngest geological formation occurring in minor proportions in this catchment is the Haunted Hill Gravel of late Tertiary age which consists of gravel, sand and clay. This formation occurs as sheet deposits in this catchment and in other parts of the South Gippsland Uplands.

Much of the basalt and Cretaceous sediment areas have undergone active mass movement. There is evidence of many fossil landslips and there are a number of active slips. Only approximately 10% of the area, mainly in the north-east of the catchment, shows no signs of landslips.

The topography of the catchment includes extensively eroded and deeply dissected valleys in the west, with steep slopes to strongly undulating terrain with sharp crests and convex slopes in the Thorpdale area. The elevation of the catchment ranges from about 200 m in the east around the Moe offtake to 240 m near Thorpdale offtake and 400 m in the Strzelecki Ranges in the north-west corner of the catchment area. The streams of the Narracan Creek flow from the west, north and south towards the centre of the catchment and then eastward.

(c) Climate

The mean annual rainfall in Childers on the south-west side of the catchment is 1175 mm calculated from 47 years of records. In Thorpdale the mean annual rainfall is 1077 mm based on 54 years of observation. On the eastern border of the catchment, in Narracan East, the mean annual rainfall is 1048 mm. The average annual rainfall decreases from the west to the east side of the catchment by about 127 mm.

January and February are the driest months of the year with 50-60 mm rainfall in each month. August appears to be the wettest month in Thorpdale and Narracan East with 114 mm rainfall, whereas in Childers June is the wettest month with 127 mm rain. In summary, the rainfall is well distributed throughout the year, with reduced precipitation in the summer months.

There are no stations recording temperatures in the catchment, however it could be assumed that temperature patterns are probably similar to those in Yallourn about 20 km north and Leongatha about 25 km south from the centre of the catchment. In both areas the temperatures are mild with rare frosts and no extreme hot periods. The catchment enjoys in general a mild climate with sufficient rainfall, which together with good soils provides favourable conditions for vegetative growth. The growing season appears to be almost continuous throughout the year, with slow growth in June and July due to low temperatures.

(d) Soils and Vegetation

Several soil associations are found in the Narracan Creek catchments:

1. Soils that have developed from Thorpdale Volcanics. These are of basalt parent material and cover most of the catchment (up to 94%) except that area in the north-west corner. They are red gradational soils with a depth generally greater than 2 m, they have a clay loam surface texture and are well drained, with good to very good permeability. The area covered by these soils is hilly or undulating and subject to landslips. In spite of a large number of landslips, this area of the catchment is extensively used for cropping.
2. Soils that have developed from Cretaceous parent materials and cover 4-5% of the catchment area, mainly in the north-west corner. These are grey-brown uniform porous soils with fine sandy to clay loam texture. They are well drained and generally prone to landslips. Soil depth varies from 0.6 m in most of the area to 2 m on gentle slopes and crests. Slopes range from 15-50% and steep slopes are common.
3. Soils that have developed from pre-volcanic Childers Formation. They occur at the periphery of Thorpdale Basalt soils and contain sand, clay and conglomerate parent material. They are generally gritty soils and cover about 1-2% of the catchment area.
4. There are also minor areas of soils developed from Haunted Hills Gravels, which have uniform or gradational dark grey sand texture and are often over 1 m deep.

The original vegetation over most of the catchment area has been cleared for agricultural use of the land. Remnants of native vegetation indicate that the catchment area was occupied by tall open forest formation. This formation was dominated by Messmate, St John's blue gum, Manna gum, Blackwood, plus Mountain Grey gum and Narrow Leaf Peppermint.

The land is now mostly sown to pasture and potatoes in rotation. Often oats, barley and cruciferous plants such as turnips and rape are used as green manure crops.

LAND USE AND TENURE

Public land in the catchment includes Crown land forming a 20 m margin on each bank of Narracan Creek which is permanently reserved for public purposes. This extends for 7 km upstream of the Moe offtake.

In addition, an area of about 63 ha in the Strzelecki part of the catchment in the north-west is also public land and is leased to Australian Paper Manufactures (APM) for pine plantations. Recommendations referring to public lands used for softwood production were published in Final Recommendations for Melbourne Study Area by Land Conservation Council in 1977. On the remaining freehold in the catchment, farm sizes are commonly in the range of 40 to 150 ha. Favourable climate, fertile and deep soils, availability of irrigation water through licensed diversions from streams and proximity to market places have encouraged intensive agricultural use in the catchment area. The main land use is cultivation of potatoes in rotation with pasture. Grazing stock are mainly dairy, beef cattle and sheep. Approximately 35% of land is used for irrigated potato and other vegetable crops. The remaining 65% is usually under pasture.

Other land uses in the catchment include areas for roads, farm houses, sheds, stock yards and storage sheds. A small portion of land is used for dams on and off stream, mainly for irrigation purposes. With the exception of Thorpdale township, the land is zoned "Rural" in the Interim Development Order of the Shire of Narracan. Since 1976, sub-divisions smaller than 16 ha have not been permitted. Thorpdale area is located within the township zone and requests for sub-divisions, etc are considered individually.

HAZARDS TO WATER SUPPLY

The intensity and diversity of agricultural use of land generally increases from the north-western side of the catchment, with pine plantations and grazing to intensive potato growing in the south-east. Irrigated agriculture is general practice throughout the catchment and becomes most intensive in the Thorpdale area within the Little Narracan Creek sub-catchment.

Raw water quality at both the Thorpdale and Moe water supply offtakes is poor and the water is not suitable for human consumption without treatment. The high levels of *E. coli*, turbidity and colour are attributed to some or all of the following land management practices:

1. Soil preparation for potato and other vegetable crops - This often includes ploughing and fallowing of the land right down to the edge of the streams. Furrows are usually run down the slopes rather than on the contour, so there is a high risk of soil erosion. Most of the ploughed slopes have a gradient of 20% and in rare cases up to 40%. Soil disturbance at harvesting can also lead to soil erosion of such slopes. Soil losses from cultivated land and from landslips are considered to be the main reasons for sedimentation of the two offtake weirs.
2. Fertilizers, herbicides and pesticides probably contribute to the pollution of water in streams, but no data is available to indicate the extent of that contamination.
3. Irrigation dams - There are at least 150 large irrigation dams in the catchment and during the summer months they must have a useful sediment detention effect. During high flow periods, however, sediment bed loads are disturbed and the overflows consist of water with high levels of suspended matter, probably also high in nutrients and other contaminants. Decaying water weeds from the dams are likely to be a main source of discolouration and odours in the water supply.
4. Grazing by cattle and sheep - sheep and cattle have access to the streams. They provide another source of bacterial contamination to water. Areas of unstable soil develop where they concentrate to water or cross, and such areas collectively amount to a significant source of turbid water during rainfall. It is likely that the high levels of *E. coli* can be largely attributed to this source.
5. Run-off from roads (particularly unsealed roads) is also a source of sediment and turbid water.
6. The effluent from houses in Narracan catchment, including those in the township of Thorpdale, is disposed of by septic tank system. Seepage from these septic tanks into streams is likely but no data is available to support this claim.

RECOMMENDATIONS

1. That the Authority approves this report and forwards it to the Land Conservation Council for consideration.
2. That the Land Conservation Council recommends to the Governor-in-Council that the Narracan Creek water supply catchment and the Little Narracan Creek (also known as Easterbrook Creek) water supply sub-catchment as shown on Plan S-872 be proclaimed under section 5(1)(b) of the *Land Conservation Act 1970* and section 22(1) of the *Soil Conservation and Land Utilization Act 1958*.
3. That the land in Easterbrook Creek catchment be further investigated with a view to making a land use determination or introducing other catchment improvement measures.

NARRACAN CREEK WATER SUPPLY CATCHMENT

Moe Waterworks Trust

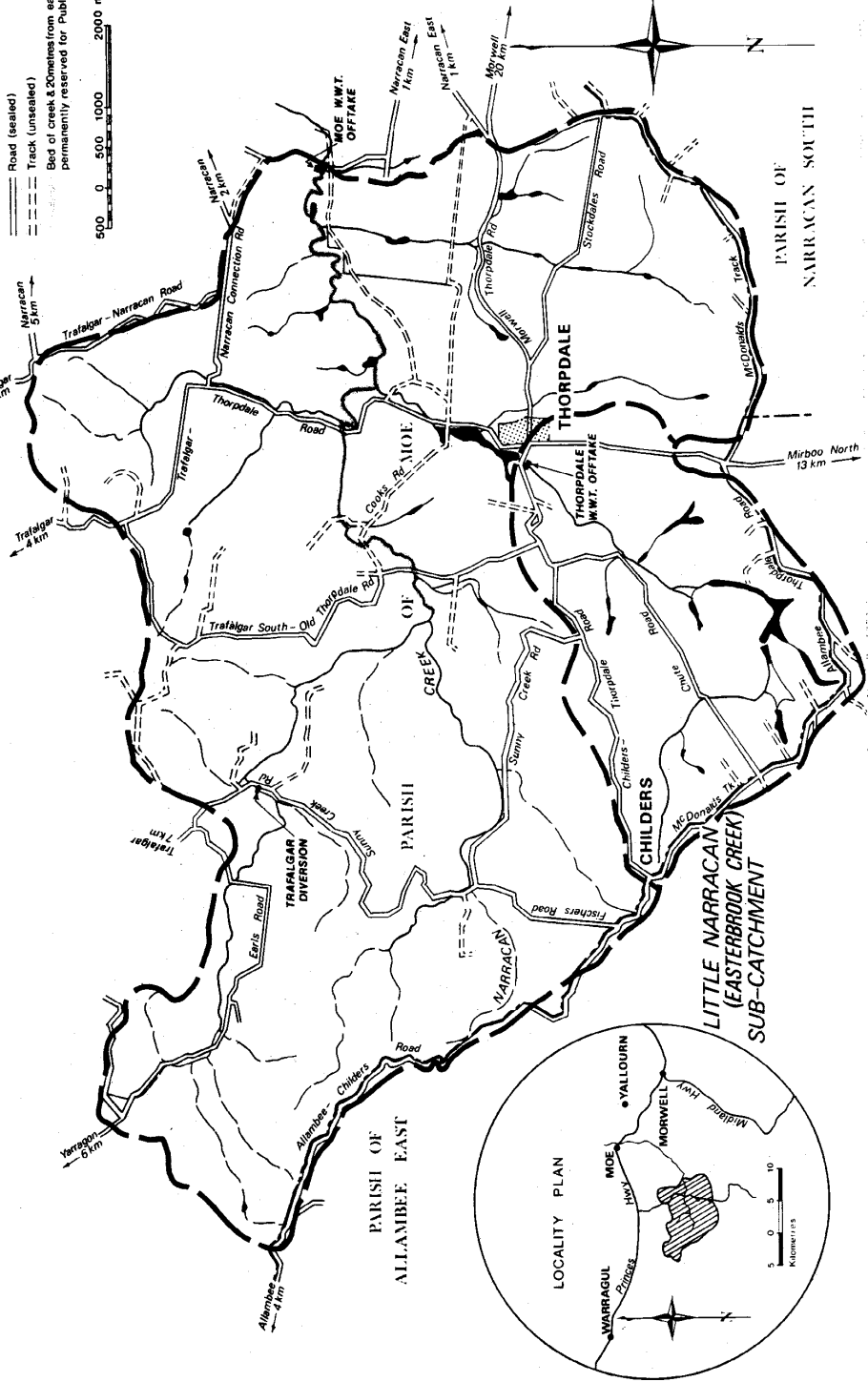
PLAN NO S-872

LEGEND

- Catchment boundary
- Watercourse
- Parish boundary
- Road (sealed)
- Track (unsealed)

Bed of creek & 20 metres from each bank permanently reserved for Public Purposes

500 0 500 1000 2000 metres



REFERENCES

Resources Survey, West Gippsland Region.
Prepared by the Central Planning Authority, 1968.

Report on the Melbourne Study Area.
Land Conservation Council Melbourne, Dec. 1973

Final Recommendations, Melbourne Study Area.
Land Conservation Council, Victoria, Melbourne, 1977.

Royal Society of Victoria Proceedings including West Gippsland.
Symposium, Vol. 84, Part 1, 1971.

Physiography of Victoria, by E. Sherbon Hills.
Whitcombe and Tombs Pty Ltd, 1975.

A compilation of Australian Water Quality Criteria,
By B. T. Hart.
Australian Water Resources Council, Technical Paper No. 7,
Australian Government Publishing Service, 1974.

Catalogue of Australian Rainfall and Evaporation data.
Bureau of Meteorology, 1972.

Central Gippsland.
Report on studies for the Preparation of Statement of Planning.
Policy No. 9, collated from material prepared in 1975 by Town and Country Planning Board, 1979.

Verbal and written communication with:

Moe Waterworks Trust
Thorpdale Waterworks Trust
Latrobe Valley Water and Sewerage Board
State Rivers and Water Supply Commission
Shire of Narracan