

**A REPORT ON THE CATCHMENTS OF  
NINE MILE CREEK, CLEAR CREEK AND  
HURDLE CREEK (LAKE KERFERD)**

A proposal for proclamation prepared by the Soil  
Conservation Authority for the consideration by the Land  
Conservation Council.

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## **INTRODUCTION**

The Land Conservation Council recommends that all domestic water supply catchments within the study districts should be investigated by the Soil Conservation Authority and, where appropriate, recommended for proclamation by the Council, in order to ensure a uniform procedure for land use planning within these areas.

1. In 1976 the Yackandandah Waterworks Trust asked the Land Conservation Council to give consideration to the proclamation of the catchment to the Trust's offtake point on Nine Mile Creek.

Subsequently a request was made to the Soil Conservation Authority to investigate the catchment and report on the matter.

2. In September 1977 a further request was received from the Trust for a Determination of Land Use to be made within the adjacent Clear Creek Catchment.

The catchment is yet to be proclaimed and yet to be developed for town water supply, although approval for this was given by the State Rivers and Water Supply Commission in 1973.

3. Town water supply for Beechworth is drawn from Lake Kerferd. Surface run-off from part of its natural catchment by-passes the storage, the majority of water coming from diversions originating in the adjacent Nine Mile Creek Catchment.

These catchments share common factors which make it appropriate to consider the contiguous area shown in Plan No. S-739 (Figure 2). The area covers the catchments to the present sources of supply to both Yackandandah and Beechworth together with the catchment proposed for Yackandandah in the future.

This report presents some preliminary information enabling consideration to be given to proclamation of the catchment under the provisions of section 5(1)(b) of the *Land Conservation Act 1970*.

## **WATER SUPPLY SYSTEM**

The water supply for Yackandandah is diverted from Nine Mile Creek at a small offtake weir via a 200 mm gravity main to a 1 ML service basin at Walkers Saddle 2.5km downstream, then via a 150 mm pipe to Yackandandah 3.5 km away.

The present maximum daily usage of the system is estimated to be 1,035,000 litres per day.

The following improvements to the system are proposed in the near future:

- |         |   |
|---------|---|
| Stage 1 | Construction of an 18 ML service basin on the north-eastern side of Yackandandah.   |
| Stage 2 | Construction of a weir on Clear Creek is planned together with a supply main from the weir to the existing service basin on Walkers Saddle. A supply of good quality water is available from Clear Creek and would supply an additional 1,170,000 litres per day. |

The water supply for Beechworth is taken from Frenchmen's Gully – a tributary of Nine Mile Creek that is diverted to Lake Kerferd by aqueduct and pipe. The town supply is then gravitated by pipe to a 4.5 ML service basin. From this basin the water then passes through a sand filter and to a further 3.4 ML storage.

The supply is adequate for the present population, with the average daily demand being 1,860,000 litres and the maximum daily consumption being 5,055,000 litres.

It is proposed that water from Nine Mile Creek will be used to supply the township of Stanley in the near future – a small weir and off-stream storage are proposed.

## **WATER QUALITY AND TREATMENT**

Water from these catchments becomes very turbid after heavy rainstorms. This is due to various land disturbance activities occurring in the catchments. The water to Yackandandah is untreated.

*E. Coli* counts from the Nine Mile Creek offtake to Yackandandah are consistently high and from Fletchers Dam are low but are still not satisfactory.

Algae growth in Fletchers Dam is at times causing problems with regard to water taste.

Preliminary tests of the water in Clear Creek have indicated that the water is of a consistently better quality than that in Nine Mile Creek.

Beechworth water supply is generally of adequate quality. However, the present sand filter beds do not operate satisfactorily and the water is frequently discoloured.

## **THE CATCHMENT**

The catchments are located to the east of Beechworth and to the south of Yackandandah. The township of Stanley lies in the upper portion of the Nine Mile Creek Catchment.

Mt. Stanley forms the highest point in the general catchment areas with an elevation of 1,160 m. The offtake from Nine Mile Creek to Lake Kerferd is at approximately 615 m elevation and the Yackandandah offtake is at 135 m elevation.

The total area of the Nine Mile Creek Catchment to the Yackandandah offtake weir is 37.5 km<sup>2</sup>, the Clear Creek catchment to the proposed offtake has an area of 18.7 km<sup>2</sup> and the catchment local to Lake Kerferd has an area of 6.5 km<sup>2</sup>.

The catchments are located in the United Shires of Beechworth and the Shire of Yackandandah.

### **Geology**

The catchments are mainly situated on consolidated sediments of Ordovician age, consisting of generally fine grained feldspathic sandstone beds up to 1 m thick and greywacke interbedded with dark grey shale, mudstone and siltstone. The beds are tightly folded and faulted with slaty cleavage being developed in areas. Fresh rock is grey whereas weathered rock is yellow-brown or brown.

In the headwater of Clear Creek a metamorphic aureole extends into the catchment for 0.8 km due to the intrusion of the Mt. Stanley granite.

The Mt. Stanley granite forms a small pluton in high, forested country 6 km south of the town of Stanley in the upper catchment area.

In the south west of the Nine Mile Creek catchment close to Stanley, is a fluvial deposit of Pliocene age. It consists of partially cemented, reddish conglomerate, gravel, sand, minor clay and is a remnant of a high terrace.

North of this high terrace is a fluvial deposit of Pleistocene age which consists of sand, silt, gravel and clay with a grey brown or red soil. It is terrace alluvium associated with minor streams.

Recent colluvial and alluvial deposits are extensive along the watercourses in the catchments. The more recent alluvium forms a relatively narrow band along the stream margins and consists of unconsolidated sand, silt, gravel and clay, with no soil development.

The colluvial deposits are unconsolidated mixtures of clay and weathered fragments of Ordovician sediments washed and sluiced from upslope.

Large areas of these recent deposits have been sluiced in the search for gold.

## **Geomorphology**

About three quarters of the catchments lie on the undulating Stanley Plateau and one quarter on the steep escarpment of the foothills from the Victorian Alps.

The upper area of the catchments is on the well dissected plateau with the land surface varying from short steep slopes to rolling fans and steeper hills.

In the lower catchment, undulating to moderately sloping valley bottoms are present where colluvial alluvial fans are the major landform with moderate slopes up to low ridges or residual hills.

The area of rolling to hilly country around Yackandandah and to the south is the dissected remnant of an ancient valley floor – a strath bench some 35 m to 70 m higher than the present valley floor. Highly weathered river gravels occur on spur tops at the general level of the ancient surface.

The catchments on the interfluves of the Kiewa River rise from the fairly level strath bench at 500 m, to over 1160 m towards the southwestern end of the Clear Creek catchment at Mt. Stanley.

The creation of the northerly draining streams that produced the catchments occurred in late-Tertiary, as a result of the Kosciusko Uplift. The Stanley Plateau of 760 m (average) may have been part of the Pre-Kosciusko surface.

## **Soils**

The dominant soils over most of the southern, upper half of the catchments are deep friable and hard reddish gradational soils. The steeper slopes have stony soils and friable brownish gradational soils are common in these areas. Shallow depressions may have weakly bleached

yellowish gradational soils, although friable reddish gradational soils may also occur in these locations.

In the middle of the lower northern half of the catchments there is abundant evidence of colluviation of the soil mantle, and depth to bedrock varies according to whether the site is a depositional or an erosional one.

Friable reddish gradational soils with reddish brown light clay B horizons are the most widespread soils on the deeper colluvial material. Higher up the slopes bedrock is usually nearer the surface, and more pronounced differentiation develops between the A and B horizons. These are reddish duplex soils with acid subsoils which are usually very stony and become more so towards the upper slopes. On the tops of the ridges or hills, bedrock may outcrop or there may be shallow, weakly bleached gradational soils or undifferentiated stony loams. Pseudo B horizons of reddish brown well structured clay may or may not be present in these situations and it is inferred that these represent relics of an older soil.

On the steeper areas at the edges of the northern half of the catchment there are stony soils, weakly bleached or massive reddish or brownish gradational soils and undifferentiated stony loams. In moister areas, friable reddish gradational soils occur, and occasionally red friable relic clay subsoils are found below the weakly bleached or massive gradational soils. On less steep slopes reddish duplex soils with acid subsoils may occur. At the higher elevations on southerly aspects, the soils are usually friable brownish gradational soils.

## **Vegetation**

In the lower area of the catchments there are hardwood stands of open forest with the dominant species being narrow leaf and broad leaf peppermint. Narrow leaf peppermint is also present in the extreme top end of the catchment. At the south eastern end of the catchment, stands are in the process of being cleared for pine planting. A narrow stand of swamp gum is present in the area of the weir on Nine Mile Creek. A wide band of softwood plantations straddles the centre of the catchments.

On the northerly and westerly aspects or dry ridge tops the vegetation is a dry sclerophyll forest of broad leaf peppermint with narrow leaf peppermint, long leaf box, candlebark gum, red stringy bark and blue gum numerically co-dominant. On the wetter soils in the valleys, long leaf box and blue gum occur and the swamp gum is common along the streams near the offtake on Nine Mile Creek and on waterlogged soils with an understorey of ferns and reeds.

The area of softwood plantation contains mainly *Pinus radiata*, with other species growing in small plots.

The area around Stanley contains orchards of apples, pears, stone fruit and small areas of walnuts, filberts and chestnuts.

## **Climate**

Records kept at Stanley State Nursery in the upper catchment area for sixteen years indicate an average annual rainfall on the plateau of 1275 mm with 450 mm falling in winter and 175 mm in summer. The 30 year average at Yackandandah, representative of the lower catchment area, is 950 mm. Although, this suggests that an annual average rainfall in the vicinity of 1000 mm in the east to about 1250 mm in the higher country to the west, this is not supported by the vegetation

patterns and it is thought that the area may be in a rain shadow caused by the generally higher Stanley Beechworth country to the west, and that annual average rainfall is probably about 1000 mm down to 875 mm. At Stanley, light falls of snow may be experienced during winter.

Estimated average monthly temperatures for Yackandandah are 22 °C in January and February and 8°C in July. Similar averages for Stanley are estimated to be 19°C in January and 5°C in July.

There is an estimated growing season at Beechworth of eight months from March to October. Further east at Yackandandah the season extends to November. Retarded growth from May to September can be expected due to cool conditions. Frosts are common from about April through to early November with an average frost free period less than 150 days.

## **LAND USE AND LAND TENURE**

Land use in the catchments is varied and includes grazing, orchards, horticultural and row crops, hardwood and softwood timber production.

Approximately 1450 ha of the catchment is freehold land; the remainder 4820 ha is public land.

Forestry is the principal use of public land with the Stanley Plateau the most extensively developed. State owned plantations of exotic conifers take up a large proportion of the Plateau. Softwood timber plantations take up about 3000 ha of the catchment, with some stands up to 35 years old. Softwood species were first planted to stabilize sluiced areas on land disturbed by gold-mining operations. These softwoods proved economically viable and the plantations expanded onto better land.

Much of the remaining area of the plateau is planted to orchards. Apples are the major crop, with pears and stone fruit and small areas of walnuts, filberts and chestnuts. Potatoes are also grown on a commercial scale.

Cattle are grazed around Stanley and within the forest of the middle area of the Clear Creek catchment (licence for 100 cattle).

In the hardwood areas there is honey production. Saw log production from the hardwood forests that cover the lower catchment and extreme upper catchment is by single tree selection basis.

The army occasionally uses the area for training and bivouacs of 20 to 30 men. An exploration license for gems and precious stones has been issued by the Department of Minerals and Energy.

The final recommendations of the Land Conservation Council for the North Eastern Study Area districts 3,4 and 5 apply to the catchments as shown in Figure 1.

## **HAZARDS TO THE WATER SUPPLY**

In the southern half of the catchments, the erosion hazard is generally low, although occasionally severe storms may cause rilling and sheet erosion on cultivated land, particularly where cultivation is done up and down the slopes. The soils are mostly deep and permeable and relatively erosion resistant. Areas of compacted soil, such as earthen roads, may rill or scour.

In the northern half of the catchments the erosion hazard is generally moderate because of the close association of steeper slopes and valley drainage lines in which soils with dispersible

subsoils occur. Loss or reduction of ground cover causes excessive runoff, therefore clearing presents a problem.

The utilization of areas stripped of soil during gold mining is a problem. These are not favoured for agriculture or forestry although many have been planted with pines.

Areas cleared native and softwood timber and the roads are producing turbid runoff that is finding its way into the drainage lines. In particular roadside drainage tends to concentrate in the table drains on the unsealed roads. The infrequent disposal results in erosion of the soil and sedimentation in the streams. Since 1975 these problems have intensified.

The offtake weir on Nine Mile Creek is approximately 1 km below the lowest point of the area cleared for pine establishment. Undoubtedly the close proximity of the cleared area to the streams has been a contributing factor in the high levels of turbidity being experienced in the Yackandandah water supply.

The catchment is intensively roaded by four wheel drive and dry weather tracks as well as sealed main roads. It is likely that the tracks would yield turbid flows to the stream.

The Trust has indicated that Fletchers Dam on a tributary of Nine Mile Creek also presents a problem. The area has been developed into an attractive picnic spot by the Forests Commission, so it is difficult to prevent people from swimming there.

## **RECOMMENDATION FOR WATER PRODUCTION**

The final recommendations to the Land Conservation Council for the North Eastern Study Area Districts 3,4 and 5 states "That all domestic water supply catchments within the study area should be investigated by the Soil Conservation Authority and, where appropriate, recommended for proclamation by the LCC, in order to ensure a uniform procedure for land use planning within these areas."

The report states further:

"Where a number of other products are required from a catchment supplying water used for domestic, industrial, or irrigation purposes, the catchment should be proclaimed under section 22(1) of the *Soil Conservation and Land Utilization Act 1958* and also under section 5(1)(b) of the *Land Conservation Act 1970*."

It goes on to state "that in the case of the locations listed below and shown on the maps (all these locations being within catchments for which no landuse determinations have been made) the present tenure and management of public land continue for the time being, and that once a land use determination has been made the following areas:

- storage areas
- diversion works
- associated facilities
- buffer strips around diversion works and storage areas as defined in the landuse determination
- any other allotment as specified below



be used for:

- a) water supply purposes
- b) other activities permitted by the water supply authority after consultation with the Soil Conservation Authority and the Environment Protection Authority,

and that these areas be permanently reserved under section 14 of the *Land Act* 1958 for water supply purposes, and be managed by the water supply authority named.”

D 12 Nine Mile Creek, Beechworth Waterworks Trust.

D 15 Nine Mile Creek, Yackandandah Waterworks Trust.

Since the recommendations of April 1977, Yackandandah Waterworks Trust has abandoned plans for D14 Commissioners Creek and intends to tap the Clear Creek catchment.

The total area therefore recommended for proclamation includes the catchments to Lake Kerferd (D12), Nine Mile Creek offtake (D 15) and the proposed offtake on Clear Creek as delineated on Drawing No. S-739.

## **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 Nine Mile Creek, Clear Creek and Hurdle Creek (Lake Kerferd) Water Supply Catchments, as shown on plan S-739, 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.

LEGEND

Final Recommendations North-Eastern Study  
Area. Districts 3, 4 & 5.



A6 Beechworth Regional Park



D12 Lake Kerferd. Beechworth Waterworks Trust  
D15 Nine Mile Creek. Yackandandah Waterworks Trust



F1 Softwood Production (existing)



F2 Yackandandah Creek



F3 Wombat Gully



F4 Hillsborough



F5 Mount Stanley Road



F8 Dingle Creek

Softwood Production  
(Proposed)



G1 Forest Area



H21, H22, H25 Bushland Reserves



Q11 Survey, Utility and Other Reserves



S1 Uncommitted Land

**Figure 1 - Locality Plan**

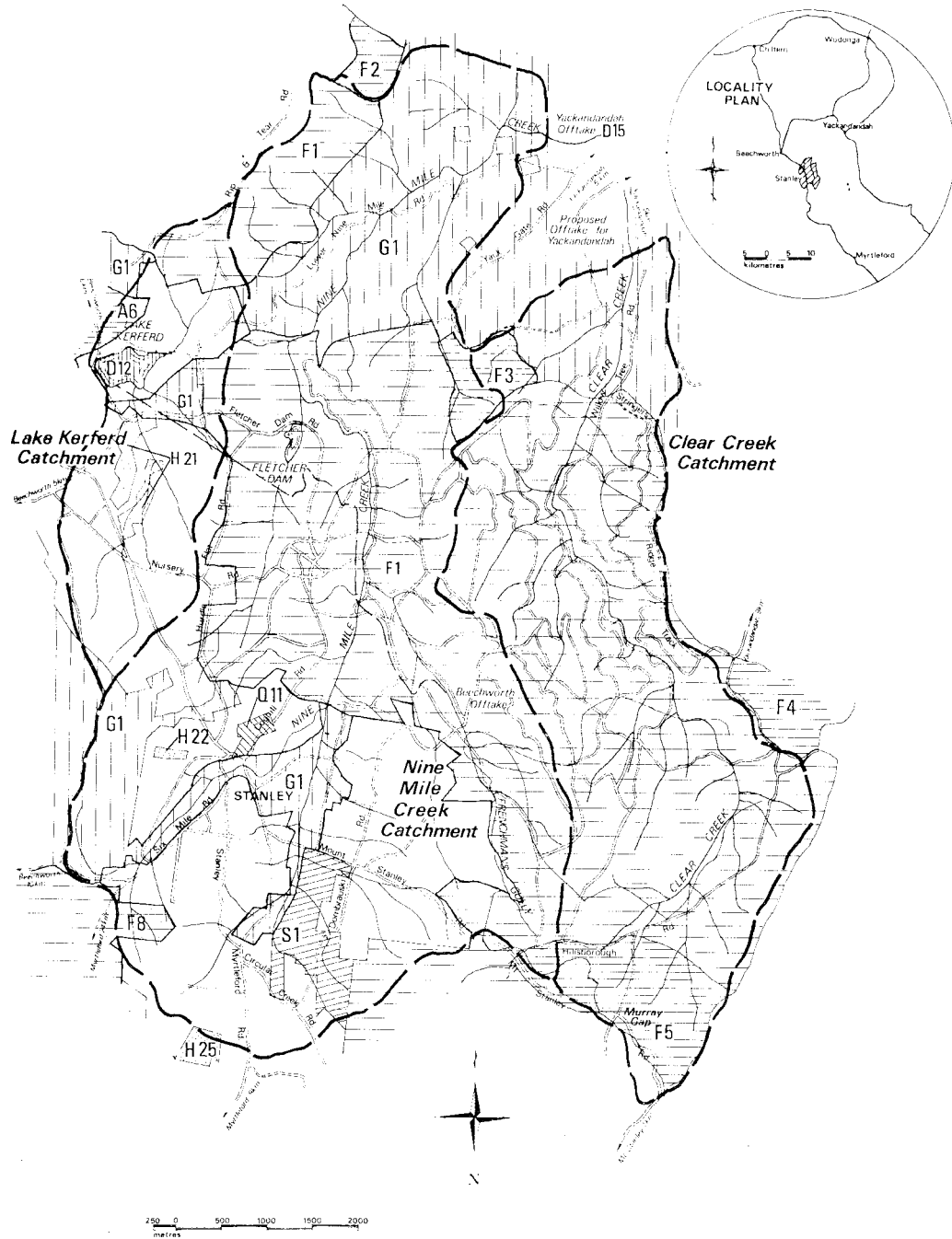


Figure 2 - Plan No. S-739

