

**SOIL CONSERVATION AUTHORITY**

**REPORT ON  
THE LAND-USE DETERMINATION  
IN THE ROCKY RIVER  
WATER SUPPLY CATCHMENT**

**(Orbost Town Water Supply)**

Prepared for consideration by the Land Utilization Advisory Council  
at its 74<sup>th</sup> Meeting on 5<sup>th</sup> July, 1967.

# SOIL CONSERVATION AUTHORITY

## Report on Land Use Determination in the Rocky River Water Supply Catchment

(Attached SCA Plan No. 1988)

### **Proclamation of Catchment:**

The Rocky River Catchment was proclaimed a water supply catchment under Sec. 22 of the *Soil Conservation and Land Utilization Act*, 1958 on the 18<sup>th</sup> May, 1965. The proclamation was published in the Victoria Government Gazette No. 35, dated 26<sup>th</sup> May, 1965.

### **Water Use:**

The present weir was built in 1941. The full width of the reinforced concrete structure is 50ft, its height 4ft. The notch is 23 ft wide and 2 ft high. The sill level is at RL 341 ft. The water flows under gravity, through a 9 inch pipe line over a distance of 14 m to the Orbost reservoirs which have a total capacity of 11 million gallons. The inlet at the service basin is at RL 206 ft, representing a fall of 135 ft from the weir.

The estimated delivery capacity of the line is about 400,000 gallons. The summer base flow of the river was measured at about 600,000 gallons. Because of this the Trust was advised by its consulting engineers that, to provide for the increasing demand, it is safer and more economic to install a pumping station on the Brodribb River at a distance of 6.5 m from Orbost and include Marlo, (140 houses at present) Newmerella (70 houses at present) and about 35 farms of this area into their distribution systems. This plan is now under consideration.

The population of Orbost is estimated to be about 3,000 persons, with the butter factory, golf club and 42 farms as the biggest consumers accounting for about 30 million gallons of the total yearly consumption of 80 million gallons of water.

In 1965, when Orbost had 24 inches of rain for the year (8 inches below the long term average) and only 232 points during the four summer months, restrictions on the use of water had to be imposed.

Up till now the Trust is in the position to shut off the intake during period of turbid flow and supply the town from stored water. From now on, having two-thirds of the town already connected to the sewerage system, the increased consumption may well mean that this protective measure will have to be reduced in length of time, and in prolonged periods of flood the river water will have to be accepted. This naturally increases the need for catchment protection.

### **Climate:**

In the area temperature and rainfall are strongly dependent on topography. Snow, which never has fallen at Orbost, has been recorded on several occasions in the catchment.

The average rainfall for the period 1957-1966 was 50.425 point, which includes the very wet year, 1966, when 72.48 points were registered. The recording station is situated in the southern, low end of the catchment, and local opinion as well as the vegetation, supports the belief that rainfall in the higher elevations of the northern section of the catchment is around 60 inches per annum.

A study of the daily rainfall records reveals that heavy twenty-four falls occur frequently.

### **Daily Rainfall:**

| Date                         | Fall in points | No. of days when rainfall >100 points |
|------------------------------|----------------|---------------------------------------|
| 1966 <sup>4th</sup> October  | 692            | 18                                    |
| 1965 <sup>8th</sup> August   | 360            | 5                                     |
| 1964 <sup>9th</sup> April    | 249            | 8                                     |
| 1963 <sup>30th</sup> April   | 480            | 16                                    |
| 1962 <sup>7th</sup> December | 364            | 13                                    |
| 1961 <sup>2nd</sup> March    | 446            | 17                                    |
| 1960 <sup>26th</sup> June    | 389            | 15                                    |
| 1959 <sup>22nd</sup> July    | 450            | 11                                    |
| 1958 <sup>25th</sup> June    | 233            | 12                                    |
| 1957 <sup>4th</sup> August   | 270            | 9                                     |

The rainfall data presented here underlines:

- (a) the possibility of considerable soil losses occurring from certain sites;
- (b) the difficulty of regeneration of the mountain country forest – tall messmate, gum type – on sites of high quality.

The potential hazards connected to points (a) and (b) are:

- Fire
- Roadworks and stream crossings
- Forest utilization operations
- Farming operations
- Smothering effect of undergrowth
- Slow break-down of slash.

The proposed Land Use Determination and Management Prescriptions for forests are aimed at maintaining water quality at its optimum by reducing these hazards.

### **Present Land Use:**

The main forms of land use are forestry and grazing.

The alienated country totaling about 1,500 acres, is held by five landowners. One only lives permanently on his block, two of them have houses and stay in them periodically, two are absentee-owners using their blocks for logging purposes.

#### **(a) Pasture and Agriculture**

The cleared land is mostly under pasture and used exclusively for the grazing of cattle. The total area under pasture is about 350 acres. The ground cover is good although superphosphate has only been used sparingly. The rate of stocking appears to be well related to the present carrying capacity which, however is considerably below that of the potential of this country.

With the exception of one slowly advancing gully head no occurrences of erosion were seen.

Cropping is practised mainly as an aid for clearing the land. A few acres of potatoes are grown on the flats near the river and an occasional crop of oat or maize is sown for pasture establishment and renovation purposes.

#### **(b) Forestry**

##### *1 Freehold Forests*

About 1150 acres of the freehold land is under forest. Some 650 acres is on soils and slopes which do not preclude the areas from being cleared for pasture establishment under the proposed land use category No. 3.

The forest stand over these areas varies considerably.

#### CA 19B

The area under timber is suitable for clearing for pasture establishment, is about 150 acres. The stand is dominantly Silvertop, fully stocked, mainly pole stage.

#### CA's 16B and 167A

The area under timber suitable for clearing for pasture establishment is about 200 acres.

The eastern half of 16A, together with the small allotment 16B, is on deep, friable, fine sandy clay loam with an uneven aged Silvertop and Messmate stand. The management appears to be selective and group felling. The undergrowth is heavy scrub, the regeneration is on the whole fair.

The western half is of Messmate, box and grey gum association on a grey sandier soil.

The stand consists mainly of over mature and cull trees, the undergrowth is hopbush, the regeneration over all is poor.

## CA 48A

The area under timber suitable for clearing for pasture establishment is 140 acres. On red-brown clay loams tall Messmate and Mountain grey-gum formed the original forest. By selective felling this became reduced to a stand of overmature and cull trees, interspersed with areas of Blackwood and Wattle. The dense understorey is of blanket-leaf, dogwood, prickly Moses and bracken fern. Regeneration is very poor.

## CA's 22, 22B, 23 and 23B

It is proposed that the timber cover of the granitic areas of these allotments be retained in category no. 2, and that forests be utilized under management prescriptions.

The slopes are between 30 to 50% with the side and head slopes to the streams up to 70%.

The tall mountain forest of Silvertop, Messmate and Mountain grey-gum association, according to the system of utilization of the past years ranges from uneven aged to even aged (at the pole stage) stands of timber.

CA 23B is an example of regeneration achieved by clear felling, with seed trees left, and by burning of the slash. An excellent, vigorously growing clear stand of mountain grey-gum has developed on a clean silver tussock floor without the heavy scrub growth found elsewhere.

### 2 *State Forests*

The bulk of the catchment area, about 4,000 acres extending from the southern end up to the north-eastern tip, enfolding the river valley on both sides, is Reserved Forest.

There are two distinct physiographic divisions of land within the catchment. The upper part, involving almost all the land upstream from the Dead Horse Creek, is mountainous type. Below that, the catchment with generally hilly to undulating topography is foothill country.

In the foothills the main species is Silvertop, in the elevated ridge-country the slopes are covered by tall Messmate, Mountain grey-gum and Silvertop association.

The Forests Commission Management Prescription in respect to this area being in a water supply catchment, stipulated selective felling as the silvicultural system of management. The resultant stands show large variations, some brought about by "external" reasons, such as the fires having gone through parts of the foothill areas. The impression gained was, however, that the selective felling has not achieved an overall satisfactory regeneration of the timber and not at the rate of growth expected of high quality sites. The former applies mainly to the tall Messmate and Mountain grey-gum areas in the top section of the catchment, the latter to the Silvertop forests where the growth rate of the saplings seems to become retarded after the first five or six years. Basal areas counts in the Messmate stands near Arte's Junction were between 120 – 180 sq ft per acre. This appears to leave the area under unfavourable light conditions and thus requires further opening up of the stand. At the same time, because of the fire ban, the strongly developing undergrowth further aggravates the situation.

## **FUTURE AND POTENTIAL LAND USE**

### **1 *Pasture and Agriculture***

Most of the areas at present under grass are reasonably free of weeds and in spite of the light stocking bracken infestation is curbed. Response to topdressing and pasture renovation would be excellent.

The total acreage at present under timber but suitable for clearing for pasture establishment in the freehold country is 650 acres. With the possible exception of CA 19B fronting the Murrungowar Road six miles distant from the Princes Highway and seventeen miles from Orbost, it is not expected that the other areas will be developed in the near future. Their situation, isolated from other farms, away from good roads, electricity, schools, etc, coupled with difficult topography and their size which is too small to provide a living as a grazing farm, are factors hindering development.

The high rainfall, cold conditions and steep slopes do not favour agricultural use.

Cloudiness of the Rocky River water following heavy rains is already present and uncontrolled clearing and cultivation for pasture establishment would be hazardous. Category No. 3 of the proposed land use determination provides for the Soil Conservation Authority to specify the areas suitable for clearing and the acreage to be cleared in any one year. In view of the size of the individual allotments, none in excess of 230 acres, 20% of the total area is the suggested maximum allowable for clearing in any one year.

The stability of the soils is good. Sown to pasture and properly maintained it presents a low erosion hazard. However, erosion is likely to occur on the steeper slopes if heavy rain were to fall on a finely prepared seed bed. Continued cultivation soon destroys the structure of these soils and makes such areas more vulnerable, therefore specification of the areas suitable for cropping is necessary, together with a specified maximum slope per cent and maximum width of the areas to be cultivated on these slopes.

## **2 Forests**

It appears that if selective felling remains the silvicultural practice the end result will either be a change from the high quality eucalypt forest to acacias, scrub and bracken or we may have, in the wake of an accidental fire, some degree of regeneration.

Neither of these developments is in the interest of the area while the accepted basic concept of management is multiple use.

Since the Act charges the Authority with the determination of areas to be used permanently for forest purposes the silvicultural practice needs to be designed so as to ensure vigorous regeneration of the stand.

Foresters generally agree that to achieve this under the conditions existing here, utilization felling, to the extent of reducing the basal areas to about 20 sq ft per acre, is desired (6 to 10 trees per acre) with the forest floor severely disturbed or burnt. Without sufficient light and the chance for the seedling roots to push quickly through the litter to reach the soil, there is no satisfactory regeneration. Clear felling with the slash burnt will provide these conditions. It may also be obtained, at a greater cost, by sufficient forest floor disturbance without burning, or by burning the slash after having it pushed into windrows. This latter method may serve the catchment better as it would leave the soil in a condition of good permeability and with good runoff detention ability after providing the second best type of seed bed. It would also remove the serious fire hazard which threatens not only the seedlings growth but the catchment as a whole, in areas where slash is left unburnt.

At the same time to protect the water from sediment and excessive turbidity, following felling and slash burning, it is necessary:

- (a) to limit the acreage so treated in any one year;
- (b) to specify the geographic placement of the cutting units;
- (c) to provide buffer strips sufficient in width for efficient water spreading and sediment retention

In a closely dissected valley such as that of the Rocky River the numerous tributaries incising the valley-sides leave only narrow spurs which unfortunately do not lend themselves well to strip felling. Therefore the cutting units may encompass whole spurs. Because of this and the steep slopes, a climate characterised by heavy rainstorms, and the water being used without the benefit of a sizeable storage reservoir, conservative assessment of the three abovementioned requirements is needed.

Investigations carried out by Mr F Craig, a Forests Commission officer working in conjunction with the University of Melbourne, showed the effectiveness 1 chain buffer strips under clear felling and burning of plots in the Mt Disappointment area east of Wallan. Slope gradients in the Rocky River catchment are considerably higher and so is the intensity of storms, hence, having this system of utilization in mind, the use of a buffer strip of 1 1/2 chain in width, measured from the edge of the bank on each side of the water-course as shown on Plan No. 1988, is proposed.

The practical management of a forested catchment of the type existing here may involve slash burning which, if planned and supervised properly, need not necessarily cause damage. Rather by reducing the wild fire risk and by preventing the forest to degenerate into scrub land it protects ultimate catchment interests.

Since there is a great lack of experimental data and it will be years before the studies in forested catchments at Stewart's Creek and Reefton will give a more definite guide to the hydrologic effect of different methods of logging, it is obvious that decisions cannot await research results. The problem simplifies itself therefore to the determination of risks which will be and which will not be accepted. This must be resolved under the dual obligation of providing good quality water and utilizing and regenerating the forests.

Further, and as a direct corollary to the above, the Land Use Determination, in the absence of any provision by the Act for its revision, must be flexible enough to allow for future advances in technology and management practices. Management Prescriptions for these latter reasons must include the proviso for periodic revision.

A Management Prescriptions proposed for acceptance by the Forests Commission is attached to this report.

## **Roading**

The catchment is well served by roads, although some area poorly located and without adequate provision for the disposal of runoff. The most glaring examples of this area are the Rocky River Road leading to CA 43, and the Dead Horse Creek Road which is nearly one mile long with an average grade of 8%, badly in-sloped and devoid of any form of cross-drainage, both being Shire Roads.

Significant contributions of fine silt are the logging roads at present mainly in CA's 16B and 43A, both freehold allotments.

The improvements envisaged in road constructions are, therefore:

- (a) The re-grading and culverting of the Shire Roads.
- (b) The disposal of seepage and runoff water by the use of cutoff drains and better siting of the private logging roads.

This matter was already discussed with the Shire Engineer and one of the landowners concerned.

The northern ridge road is maintained by the Forests Commission and would require opening up and grading along the last mile of its length to the Kuark Road junction. It will also be necessary for the Forests Commission to construct a connecting road from the western end of this ridge road to a road which joins the Murrungowar road below the offtake, thus eliminating the necessity of using Dead Horse Creek Road for logging purposes.

## **Land Use Categories**

The following categories are recommended for a land use determination in this catchment:

### ***Category No. 1***

Land which shall be used primarily for the protection of streams and watercourses where:

- (a) no cropping shall be practised;
- (b) cultivation may be approved only for specific pasture improvement or weed and vermin control purposes;
- (c) no tree shall be removed or soil be disturbed without the approval of the Soil Conservation Authority; and
- (d) the crossing of streams and watercourses is permitted only by means of properly constructed crossings specifically approved for the particular site by the Soil Conservation Authority.

This category covers areas within a five chain radius of the offtake weir and within a distance of one, one and one-half or two chains from the edge of the banks of streams and watercourses as specified on Plan No. 1988.

The Authority may specify variations of these distances in cases where the quality of the water become adversely affected or following approved changes in land use or management practices.

### ***Category No. 2***

Land which shall be used for permanent forest for catchment conservation purposes where forestry operations shall be carried out only in accordance with management conditions made or approved by the Soil Conservation Authority. The construction of roads, dams or earthworks of any description are subject to the approval of the Soil Conservation Authority.

### ***Category No. 3***

Land which may be used for forest purposes or which may be developed partly for grazing or agricultural purposes, subject to Authority approval and conditions for particular circumstances, such conditions to include:

- (a) the specification of areas which may be cleared and those which shall remain under forest;
- (b) the specification of the acreage which may be cleared in any one year;
- (c) the specification of areas where cropping may be practised and areas where grazing only may be practised;
- (d) the application of management and conservation practices where necessary.

### ***Category No. 4***

Land which shall be used primarily for grazing where any changes in land use shall be subject to approval by the Soil Conservation Authority.

***Category No. 5***

Land suitable for cropping, subject to conditions imposed by the Authority for particular circumstances.

***Category No. 6***

- 6a Land used or reserved for roads on which any changes in land use shall be made only after consultation with the Soil Conservation Authority.
- 6b Land reserved for road or other public purposes on which any changes in land use shall be made only with the approval of the Soil Conservation Authority.

A P FISHER  
Catchment Investigation Officer

June 1967

## ROCKY RIVER WATER SUPPLY CATCHMENTS

### ORBOST FOREST DISTRICT

#### Management Prescriptions with respect to Reserved Forest within the Catchment

1. All operations must conform with good forestry and roading practices, with particular regard to the protection of the area for water supply purposes. Utilization operations shall be so organised that openings in the canopy are kept to a size consistent with the necessity to create conditions conducive to the establishment of effective regeneration. These operations shall be controlled by departmental tree marking.
2. Where clear felling is to be the silvicultural system of management, suitable number of seed trees should remain to enable complete regeneration to take place within the shortest possible time. When conditions are such that natural regeneration becomes doubtful, the seeding of the areas must be undertaken during the first autumn following clear felling.

Areas to be clear felled should be inspected jointly by officers of the Forests Commission and of the Soil Conservation Authority. The aggregate acreage of the clear felled areas for any one year shall not exceed one hundred acres, divided into non contiguous cutting units not greater than fifty acres each.

3. During the period of 1<sup>st</sup> June to 30<sup>th</sup> November, snigging and cartage operations, and construction of new access road and log landings shall be totally suspended except with the written permission of the Soil Conservation Authority.

Temporary suspension of operations shall also be applied during heavy rain and for such period thereafter as in the opinion of the forest officer in charge such operations would be detrimental to water supply interests.

4. All sitings of extraction roads and secondary or spur roads and associated earthworks, including stream crossings and the location and frequency of culverts for drainage disposal shall be subject to joint inspection and agreement by representatives of the Forests commission and Soil Conservation Authority. (Refer FCV Standing Instruction 101 dated 8<sup>th</sup> June, 1962.)

As far as practicable, grades shall not exceed 1 in 14 but short steeper sections up to 1 in 10 may be permitted. Approved crossings over streams or watercourses shall be constructed by use of bridge or pipe culverts; earth filling over logs placed in the stream bed shall not be permitted. Crossings shall be located and constructed with a minimum of soil disturbance. Borrow pits close to streams shall be avoided. Table drains and culverts shall be provided where necessary, mainly above stream crossings and in-curves and below intercepting roads and out-curves. The spacing will vary with grade, soil type and width of road. Runoff shall be discharged at sites suitable for the water to spread and filter through vegetation before reaching the stream channel.

Culvert piping beneath earth fills shall be of sufficient length to ensure that pipe ends are free at each end when the fill has settled. Provide down spoils on culverts or rock aprons where necessary to protect fill slopes. All disturbed or bare soil is to be sown, fertilized and mulched where necessary with a seed and fertilizer mixture approved by the authority for the particular site.

5. Snigging through any running stream or watercourse shall be prohibited and as far as practicable snigging shall be across the slope to ridges trafficable by log trucks. Strict attention shall be paid to disposal of drainage to obviate erosion and the direct discharge of silt into watercourses. On completion of logging, and at the close of each logging season, all snig tracks shall be breached and barred at suitable intervals, to the satisfaction of an officer of the Soil Conservation Authority.
6. Locate landings away from streams and placed so they will not receive drainage from snig tracks. No log landing shall be located within one chain of the edge of the buffer zones running alongside the stipulated streams and watercourses.

The location of all landings shall be approved by the supervising forest officer. When the using of any landing is completed, and at the end of each logging season, the disturbed area shall be leveled and rained so that runoff is directed into the surrounding vegetation.

7. No fuel dump shall be located and no tractor servicing effected within five (5) chains of any running stream. All waste oil and other material removed from a tractor or vehicle or other item of machinery whilst being serviced shall then be removed from the catchment area.



- 8 Clearing, burning, earthworks of any description excepting those for approved crossings, and all forest utilization operations shall be excluded from the following reserved areas:
- (a) the area within five chain radius of the diversion weir;
  - (b) a strip of two chain minimum width along both banks of the main course of Rocky River upstream from the weir;
  - (c) a strip of two chain minimum width along both banks of major tributaries as specified on Plan No. 1988;
  - (d) a strip of one and one half chain minimum width along both banks of all specified watercourses as shown on Plan No. 1988.
- 9 Trees which cannot be felled and extracted without encroachment on areas (a), (b), (c) and (d) above, shall not be removed. Any heads of felled trees or debris accidentally falling into streams or the foregoing areas as a result of forest operations shall immediately be removed.
- 10 Burning operations shall be carried out regularly along the ridges and roads to protect the area from fire. All such operations shall be carried out departmentally under strict control. No burning shall be carried out on the reserved areas listed in para 8.
- 11 No salvage logging shall be permitted on any portion of the catchment without prior approval of the Forests Commission after consultation with the Soil Conservation Authority.
- 12 The establishment of temporary or permanent camps or other living quarters shall not be permitted.
- 13 The establishment of any sawmill or like industry shall not be permitted.
- 14 Sanitary arrangements satisfactory to the forest officer in charge shall be made with respect to personnel required to work within the catchment.
- 15 Grazing shall not be permitted on any part of the area except with prior express approval of the Commission after consultation with the Soil Conservation Authority.

These prescriptions shall remain in force until amended by authority of the Forests Commission and Soil Conservation Authority; any departures from the prescriptions shall only be with the express approval of both Departments.