

Reference SC/C/96

**SOIL CONSERVATION AUTHORITY
REPORT ON THE
LAKE MERRIMU WATER SUPPLY CATCHMENT**

Prepared for consideration by the Land Utilization Advisory Council at its
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Report on Lake Merrimu Water Supply Catchment

A. Introduction.

The catchment to a proposed dam on the Coimadai Creek south of the present township of Coimadai is being proclaimed a Water Supply Catchment under Section 22 of the *Soil Conservation and Land Utilization Act*.

Investigation of this catchment for the purposes of making the subsequent Land-use Determination has been taking place during June and July of this year. Although the water supply will be augmented largely by pipe diversions from Goodman's Creek and the Lerderderg River, the catchments to those streams have so far not, been investigated as they consist largely of Reserved Forest.

The present indications are that the water will be used to augment the irrigation scheme in the Werribee district, but in the future some demand is likely to be made for domestic purposes.

B. General Description of the Catchment.

(i) Areas

The total area of catchment to be used for Lake Merrimu is 135 square miles. This consists of 33 square miles in the Coimadai Creek Catchment which has been investigated; 18 square miles in the Goodman's Creek Catchment and 84 square miles in the Lerderderg River Catchment,

It can be seen from these figures that the Coimadai Creek Catchment is actually only one quarter of the total catchment area involved. However, in terms of total flow this proportion will be higher, as all the Coimadai Creek Catchment will drain to the new reservoir. In terms of land use and land tenure the Coimadai Creek Catchment also stands out because over half the total area is alienated and much of this land is cleared.

(ii) Location.

The catchment falls within the Parishes of Coimadai, Merrimu and Bullengarook. The south end of the catchment is situated some four miles to the north of Bacchus Marsh. The east side adjoins for some distance the Proclaimed Catchment to the Djerrivarrh reservoir. On the west side is the Goodman's Creek Catchment, the divide between the two being traversed by the main Bacchus Marsh to Gisborne road.

The Lerderderg River Catchment is on the west side of the Goodman's Creek area.

The whole catchment to Lake Merrimu including the diversions is covered by the four-military maps:- Sunbury, Ballan, Lancefield and Daylesford. Air coverage is available for most of the Coimadai Creek Area.

(iii) Description of Environment.

(a) Climate.

There are no rainfall records within the catchment. Toolern Vale, to the east of the dam site approximately 6 miles has an average of 24.73 inches. Gisborne approximately 3 miles N.E. of the-north end of the catchment has an average of 29.36 inches. Rainfall is fairly evenly distributed with a winter maximum and a summer minimum. However, what rain does fall during the summer is frequently in the form. of heavy thunderstorms.

The change in elevation from the proposed Full Supply Level at 583 feet to Mt. Bullengarook summit at 2,300 feet over a distance of 9 miles gives rise to considerable change in climate. Mt. Bullengarook receives snow falls in cold winters.

The effect of aspect on local climate is very marked in most of this catchment owing to the deeply dissected nature of the country.

(b) Geology

The geology falls into five sections.

- (i) The major area of the catchment is composed of Ordovician slates and sandstones - deeply dissected and characterised by shallow to skeletal soils.

This rock is the bedrock of the area.

- (ii) Permian tillites, mudstones, and sandstones. These are of glacial origin, and occupy only a small percentage of the area.

- (iii) Newer Volcanic rock, Basalt and scoria.

This is found as a tongue down the entire west side of the catchment. This rock is found overlying the Ordovician rock and is much more resistant to erosion, this has led to very steep slopes on the transition to the Ordovician material.

- (iv) Miocene clays, sands and gravels.

These are found in the extreme north and south of the catchment.

- (v) Pleistocene to Recent - Alluvial deposits.

These are found in a small area in the vicinity of Coimadai township and produce fertile soils, but which have low resistance to erosion. As these are mainly on the flats, erosion has not been severe except on the stream banks. However, as this area will be below full supply level it is of no consequence.

(a) Topography of Soils

Topography falls into three main divisions:-

- (i) The flat or gently undulating areas of the basalt plain, which also includes the volcanic hills in the northern half surrounding Mounts Bullengarook and Little Bullengarook.

Soils on these areas are deep clay loams, greyish brown in colour, well structured and with low erosion hazard.

- (ii) The steep slopes associated with the Ordovician sedimentary formation dominating the north-east and central portions of the catchment. Soils are solodic on the lower slopes and hilltops, and the erosion hazard is high.

Slopes below the basalt cap, which are relatively resistant to erosion. Aspect plays an important part in influencing erosion incidence on these slopes. Slopes in this portion of the catchment vary from 30 to 70 percent, with deeply dissected drainage lines,

- (iii) Moderately to steeply sloping areas associated with the glacial and Miocene deposits limited in extent on which the erosion hazard is somewhat lower than on (ii) owing to deeper and better structured soils.

(d) Vegetation

The land on basalt and that on the glacial and Miocene deposits is almost wholly cleared; the only continuous stands of native timber are on the land of Ordovician origin. These forests consist mainly of Grey Box, Red Box, Yellow Gum with Red Ironbark and Peppermint (*E. vitrea*)

On the slopes below the basalt plain and in the moister situations Manna gum and Candlebark are found. On the basalt plains Red Gum is-the most common species.

The standard of forest cover on the Sedimentary hills is generally poor, Ground cover on northerly and westerly slopes is generally sparse and often non-existent. On other slopes the ground cover is generally better consisting mainly of tussock and wallaby grass.

C. Land-use problems in relation to Water Supply

The aim of land-use determination and the management, conditions to be formulated, is to ensure a minimum of silt reaches the proposed reservoir.

Present land-use on the basalt land requires no significant modification to fulfil this aim.

However, on the sedimentary areas considerable work will need to be done in order to control existing erosion, and to improve the general standard of management.

A Land-use determination call only provide the basis for such improvement. The actual achievement of improved conditions will require joint effort on the part of landholders and the Authority with sufficient funds being made available to finance conservation works. This also applies to the problems met on areas being stripped for gravel in the immediate vicinity of the reservoir site. These problems are dealt with in a later sections

Dealing with the effect of a land-use determination in detail, the following action is suggested:-

1. Freehold Land

(a) Basalt Areas

The favourable condition on this class of land make for a negligible contribution of silt, therefore this land can all fall into a land-use category ' in which both grazing and agriculture are considered suitable and on which no specific conditions of management would have to be specified.

(b) Transitional Areas from basalt to sedimentary land

These areas are all steep to very steep and therefore cultivation is automatically excluded. These areas are at present under improved pasture and because of the soil type are mainly stable. However, the heads of some depressions in this transitional land are extremely steep and would benefit from some grazing restriction. It is therefore intended to introduce a category specifying grazing only with some conditions relating to intensity. However, the exercising of such condition is restaged to be difficult.

(c) Land on Sedimentary formation

(i) *Freehold land*

This cleared land represents the most acute problem, particularly on the Ordovician formation Where this is cleared and under pasture there has been a long history of overgrazing and rabbit infestation which has led to the extensive incidence of erosion in the form of tunnel, sheet and gully erosion. There are undoubtedly many cleared areas which should have remained under native forest. This applies to all land with slopes in excess of 30 percent and could also cover many drainage lines. On lesser slopes erosion can only be reduced by careful management of pastures, by controlled stocking rates and fencing.

On the steeper slopes which would normally be considered as suitable for protective forest only, but which are now cleared, it is considered that better control of the erosion problem can be obtained by pasture improvement than by returning these areas to forest within which there may still be a very poor ground cover. The future of grazing on this land appears very doubtful, and would require some control by the Authority if public money is to be spent on extensive erosion control measures in the drainage lines below.

Therefore while most of these cleared areas can be placed into a category of land suitable for grazing purposes, the conditions which would have to be applied, would necessitate successful treatment before grazing could be permitted or continued,

(ii) *Forested Land.*

Because of the high erosion hazard and extremely low carrying capacity there appears to be no justification for further clearing or removing of forest cover on freehold land on the Ordovician sediments. Those areas which are under forest should be regarded as protective forest in which the only scope for utilizing timber is for firewood or fence posts.

The land-use determination will classify all such land in the category dealing with permanent forest.

2. Reserved Forest.

Some gullying and considerable sheet erosion is occurring at present. This is caused by extremely poor ground cover which prevails in much of the forest due to poor soils and extreme aspect effects, and aggravated by rabbits. Little can be done to improve these conditions. Although utilisation will always be restricted naturally to a long rotation, any extraction of timber should be strictly controlled, particularly in relation to roading, and to effectiveness of stimulating regeneration.

D. Proposed Catchment Land-use Categories.

While the conditions in this catchment are in many ways similar to those in the Djerriwarrh catchment, some categories proposed here are slightly modified on the basis of more recent experience.

Proposed categories are:

1. Land which shall remain as permanent forest and shall not be disturbed in any way except for the requirements for protective forest maintenance under conditions made or approved by the Soil Conservation Authority.
2. Land which shall be used for permanent forest where forestry operations may be carried out only in accordance with conditions made or approved by the Soil Conservation Authority,
3. Land which may be used for agriculture or grazing purposes, subject to conditions of management specified by the Authority. Such conditions to include the application of conservation practices where necessary.
4. Land which may be used for grazing purposes, where no cropping may be carried out and where grazing is subject to conditions of management specified by the Authority.
5. Land within a minimum distance of one chain from the banks of specified watercourses where land-use shall be subject to conditions of management for the maintenance of stream bank stability, such conditions to be made or approved by the Soil Conservation Authority.
6. Land within a minimum distance of five chains from the full supply level of Lake Merrimu where land-use shall be subject to conditions of management for the maintenance of shoreline stability and where such conditions and any changes in land-use to residential, recreational or public purposes shall be subject to Authority direction and approval.
7. Land reserved for roads or other public purposes where any changes, in land use shall be subject to conditions made or approved by the Soil Conservation Authority.

E. Implementation of the land-use determination

In order to achieve some significant improvement in the most eroded sections of the catchment, a co-operative approach involving the Authority and landholders will be necessary.

Group conservation planning would probably be the best way of obtaining the finance required, but the present requests for Group Conservation Areas indicate that it would take, at the very least, five years before work could commence.

By recent information from the State Rivers and Water Supply Commission the dam will be commenced in 1967 and should therefore be storing water well before any useful erosion control work can be carried out. On this basis it is recommended that conservation work involved with conditions to be specified under Section 23 (1)(c) be carried out urgently under a special allocation of funds, as has been done in the Eppalock and Djerriwarrh Reservoir Catchments.

Recommended Content of Conditions under Section 23 (1)(c) of the Soil Conservation and Land Utilization Act.

The following information is to provide a basis for specific management conditions to be applied by the Soil Conservation Authority, when the method of approach is decided and the necessary finance is available. The conditions will apply to areas most affected by erosion and therefore contributing excessive amounts of silt.

Gravel Stripping

It is also necessary to specify in these condition inevitable problems associated with an acceptance of gravel stripping as a temporary form of land-use on a significant of land near the reservoir site. Gravel stripping is not included in the wording of any of the land-use categories it is not considered to be a desirable form of land-use in this water supply catchment. However, because the present gravel extraction site is apparently such a valuable one, and is being considered by the Country Roads Board for the Western Highway diversion near Bacchus Marsh, controlled extraction should be allowed to continue here until the season before storage of water commences.

The following outlines the form of 'Control under the conditions:-

1. Method of working pits from a soil conservation point of view.
2. Type of reclamation methods to be used, including earthworks, seeding, fertilising and fencing where necessary.
3. Specification of bond(s) to ensure the carrying out of recommended works.
4. Specification of time limit for work to be completed in relation to completion of water supply storage.

General Catchment Improvement

The following form of conditions is to apply when finance is available to enable Authority support of erosion control and conservation measures. It is not intended to impose conditions on landholders at this stage because the present condition of parts of the freehold land cannot be related to the landholders who are at present managing these areas. The conditions under this section apply almost wholly to land in Category 4.

1. Rates of stocking and where necessary exclusion of stocking, either permanent or temporary, to enable effective reclamation of eroded land,
2. Methods of erosion control ripping, treatment of tunnels and gully head control.
3. Methods of pasture establishment and improvement to be carried out, including types of implements and application of contour working.
4. Specification of subdivisional or temporary fencing to protect the above works and to enable better management.

Management of Forests

Normal conditions of control as specified in management prescriptions in other similar water supply catchments will apply here, These will be subject to joint consultation between the Authority and the Forests Commission.

F. Conclusions.

While the reservoir on the Coimadai Creek will not be in operation for several years, the Proclamation of the catchment and subsequent Land-use Determinations are being finalised concurrently to give the Authority the best possible basis for negotiation with landholders, gravel operators, Departments and Shire Councils concerned with land-use in this Catchment.

Subject to the land-use determination being approved, the Authority should proceed with a more detailed survey to assess the cost of the conservation works required.

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