THOMSON RIVER

STAGE 3

PROCLAMATION REPORT

Compiled by

I MASTER

DECEMBER 1982

SOIL CONSERVATION AUTHORITHY
378 Cotham Road, Kew. Vic. 3101

TABLE OF CONTENTS

ACKNOWLEDGEMENT **3**

INTRODUCTION **4**

THE CATCHMENT **6**

1. General 6
2. Land Tenure 6
3. Geology and Topography 6
4. Soils 8
   - *4.1 Organic Soils* *8*
   - *4.2 Gradational Soils* *8*
   - *4.3 Duplex Soils* *8*
5. Climate 8
   - *5.1 Temperature* *8*
   - *5.2 Precipitation* *9*
   - *5.3 Growing Season* *9*
6. Vegetation 9
   - *6.1 Riparian or Riverine Type* *9*
   - *6.2 Mixed Species Association* *9*
   - *6.3 Ash Type Species Association* *10*
   - *6.4 Scrub Type* *10*
   - *6.5 Sub-Alpine Vegetation* *10*
7. Present Land Use 10
   - *7.1 Water Production* *10*
   - *7.2 Timber Production* *10*
   - *7.3 Recreation* *10*
   - *7.4 Land Use in Non-vegetated Areas* *11*
8. Clearing of Inundation Area 11
9. Future Land Use 11

WATER SUPPLY AND QUALITY **11**

RECOMMENDATIONS **13**

BIBLIOGRAPHY **14**

LIST OF FIGURES

Figure 1 - Catchments to Thomson Dam 5
Figure 2 - Land Conservation Council Recommendations - Thomson Stage 3 Water Supply Catchment 7
Figure 3 - Proclamation Plan 15

APPENDICES

Appendix I - Summary of water quality data for Thomson River Oct. 73 - Jan. 75 from a report prepared by Board of Works (Ref. 1). 16
Appendix II - Summary of water quality for Thomson River Apr 78 - Jan 81. Supplied by Board of Works 17
Appendix III - Comparison of drinking water standards 18

ACKNOWLEDGEMENT

Much of the information contained in this report is drawn from a publication by the Melbourne and Metropolitan Board of Works entitled "Report on the Environmental Study into the Thomson Dam and Associated Works". The maps contained in the report are also based on those prepared by the Board.

The Authority gratefully acknowledges the assistance provided in the preparation of this report by the Board of Works, the Department of Crown Lands and Survey and the Forests Commission of Victoria.

INTRODUCTION

The Parliamentary Public Works Committee in its final report of 1967 recommended that augmentation of supply of water to the Melbourne metropolitan area be based on the development of the Thomson River and Lower Yarra Catchments.

Work commenced on Stage 1 Thomson development in 1967/68, comprising:

- Some 20 km of tunnel of 3.6 m nominal diameter;
- A works portal on the Upper Thomson River;
- A diversion weir and portal on the Thomson River at Easton;
- A diversion weir on Whitelaws Creek and a pipeline to Easton Weir;
- Outlet works at Fehrings Creek.

Flows could thus be diverted from some 163 km^2 of Upper Thomson catchment west into the Yarra River via Fehrings Creek and thence into Upper Yarra Reservoir.

This stage was completed in 1974 and operated until Stage 2 became available in 1977.

Thomson Stage 2 development comprised:

- East and west extensions to the tunnel;
- A diversion weir and portal at Swingler, downstream of the confluence of the Thomson and Jordan Rivers;
- Outlet works to the Yarra River

This stage became available in 1977, adding some 166 km^2 to the catchment area in service.

Government authority to proceed with Stage 3 development was preceded by an Environmental Study and a Ministry of Conservation appraisal of that study. Authorisation was given in 1976 and work was commenced promptly. The work will comprise:

- A large earth and rock fill dam on the Thomson River near Talbot Creek;
- Multi-level outlet facilities at the dam for downstream releases;
- Southerly extension of the Stage 2 tunnel to Bells Portal;
- Draw-off facilities at Bells Portal for Board's supply.

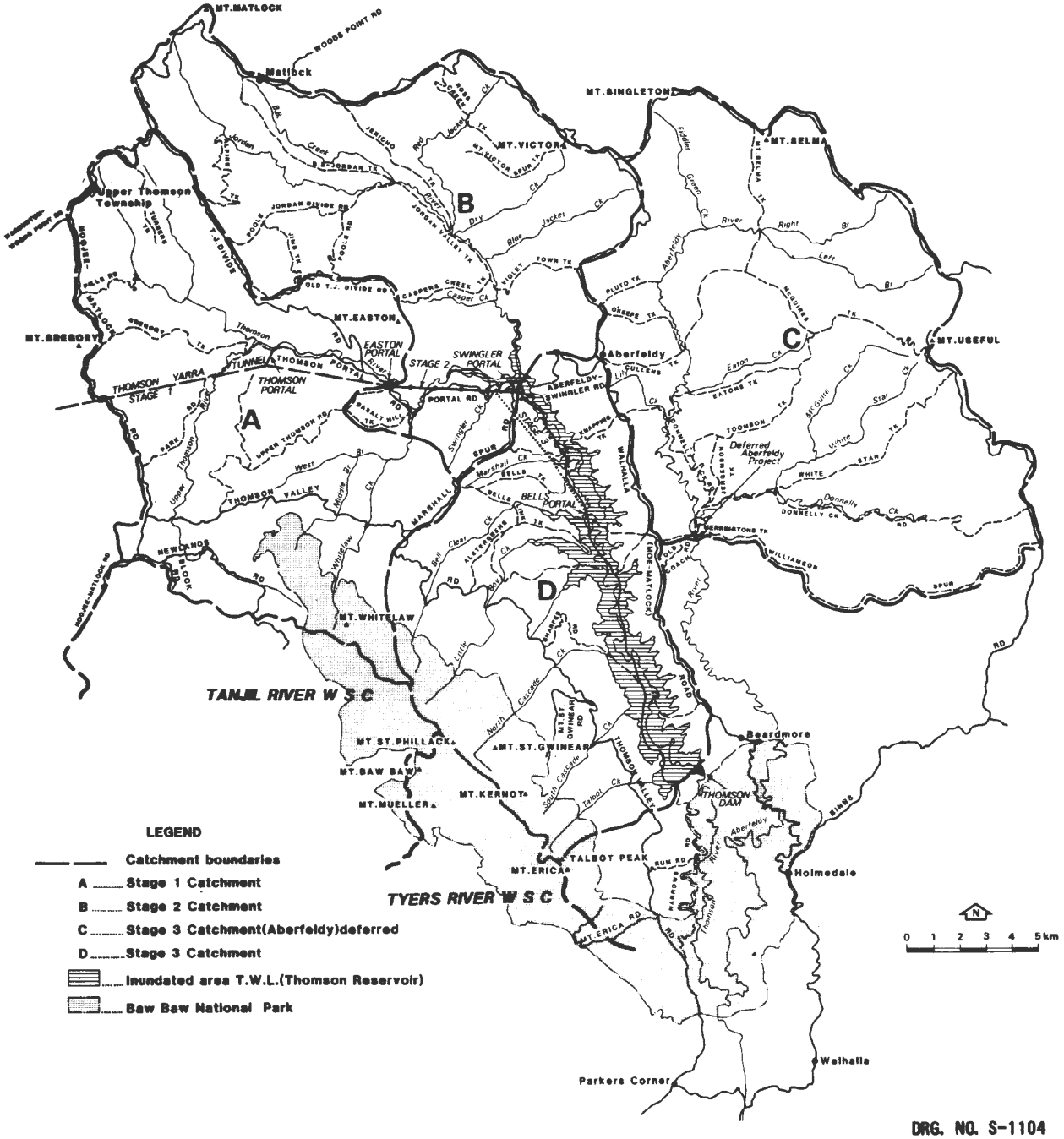
When this stage become operative, a further 158 km^2 will be added to the catchment area in service. It is anticipated that initial storage will commence during 1984 with the operational date being some years later, depending upon rainfall. When the Thomson reservoir is full, Swingler Weir will be inundated but remain capable of future operation should the reservoir fall to a low level. Easton Weir and Portal will remain capable of operation at any time.

The catchment of Stages 1 and 2 were proclaimed on 25 September 1973 and made subject to a land use determination by the Soil Conservation Authority on 4 September 1974. Construction of the Thomson Dam brings into service a third stage catchment and it is this incremental area of catchment which is the specific subject of this report and recommended proclamation (Figure 1).

The term "third stage catchment" will be used in this report to avoid confusion with the whole catchment to Stage 3.

The following pages contain relevant information on this third stage catchment for consideration by the Land Conservation Council for proclamation.

Figure 1 - Catchments to Thomson Dam



THE CATCHMENT

1. General

The third stage catchment to the Stage 3 reservoir covers an area of 158 km^2, increasing the total area of the Thomson River catchments (including all three stages) to 487 km^2.

The Thomson Stage 2 and Aberfeldy River catchments form the boundaries of the catchments to the north and east respectively, and the Tanjil and Tyers catchments form the south-west and south boundaries (Figure 1).

The catchment is located within the Shire of Narracan and in the parishes of Toombon, Baw Baw and Telbit, which are all within the county of Tanjil. The closest townships are Erica and Walhalla which are located about 25 km from the dam site to the south-west and south-east respectively.

In the Thomson River Development Scheme, the Board has allowed for the release of sufficient water through an outlet tower and spillway to meet downstream requirements. Filling of the reservoir when the construction is completed is expected to take from 5 to 15 years depending on the rainfall.

2. Land Tenure

The whole of third stage catchment is public land. In the final recommendations for the Melbourne Study Area, the Land Conservation Council recommended that approximately two thirds of the catchment be managed for hardwood production and the remaining one third be National Park (Figure 2). The Government accepted the Land Conservation Council's final recommendations.

The Baw Baw plateau section of the catchment became a National Park in 1979. The grazing licences issued by the Department of Crown Lands have been terminated permanently and areas designated for hardwood production have been dedicated as Reserved Forest (Govt. Gazette, No. 105, 21/10/81). However, small sections of land lying within the catchment but north and west of Walhalla-Matlock Road remain Crown Land.

The Forests Commission is responsible for fire-fighting throughout the whole area - including that portion (the Baw Baw plateau) which is managed by the National Parks Service.

3. Geology and Topography

The geological parent material of the catchment can be divided into four main formations:

(a) *Upper Devonian Igneous*
More than half of the catchment on the west side is occupied by parts of the Baw Baw plateau which is of Upper Devonian origin. The Baw Baw massif is composed of igneous rocks such as granite, adamellite and granodiorite.

(b) *Silurian Sedimentary*
The north central area is occupied by rocks of Silurian origin consisting of sandstone, mudstone and slate.

(c) *Lower Devonian Sedimentary*
The slopes on the est and north-west corner of the catchment are of Lower Devonian origin. Sedimentary rocks of this group are sandstone, mudstone, siltstone, shale, etc.

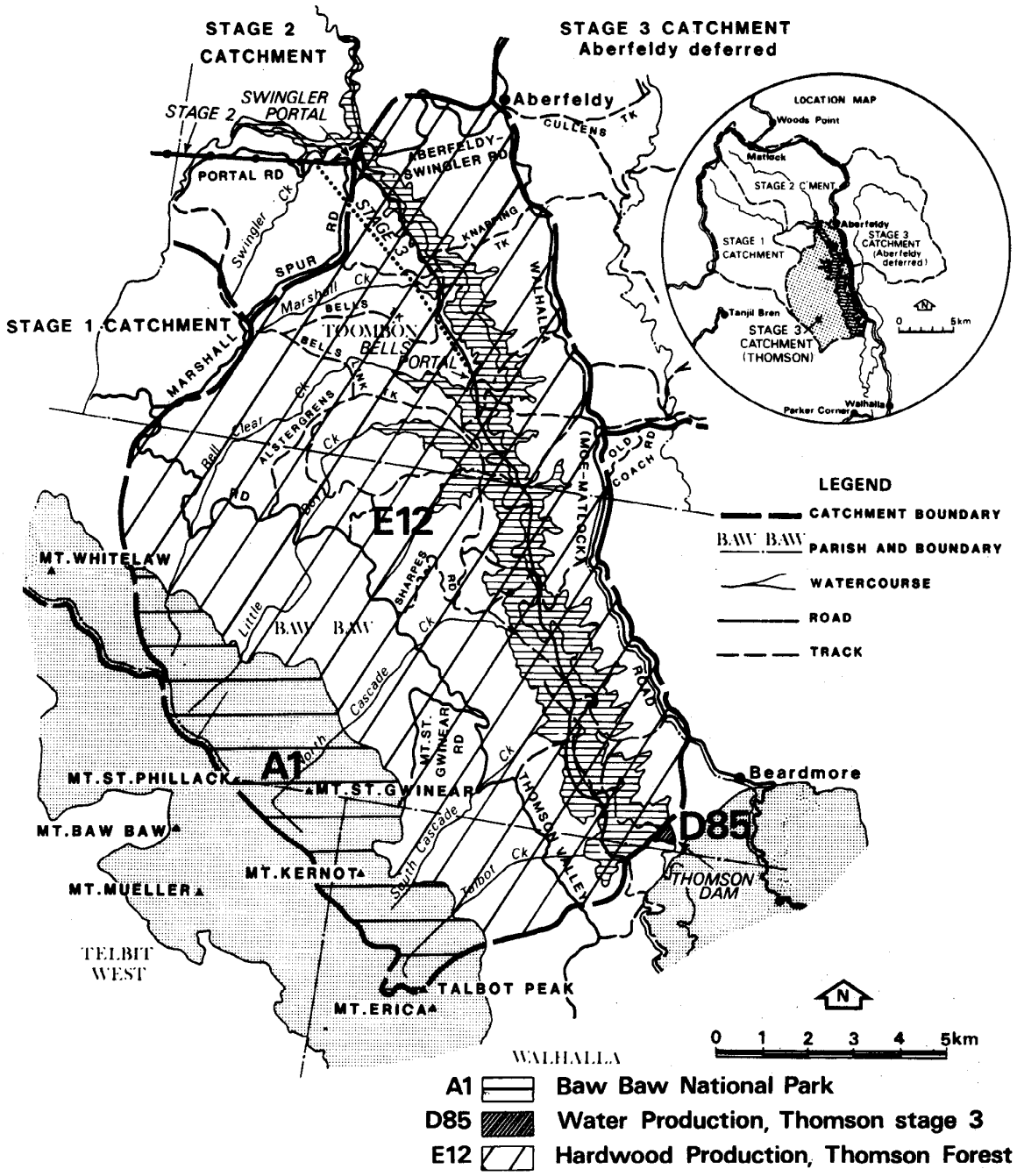
(d) *Recent Sediments*
Those sections of the bed of the reservoir which are not composed of Lower Devonian sedimentary rocks consist of Recent (ie. Holocene) sediments. Such deposits include limited occurrence of fluviatile and swamp materials (sand, silts, clay and gravels) and more extensive ares of alluvial terrace.

In addition to the above formation, there is a zone of metamorphism along the border between the Upper Devonian and other formations, and older basalt cappings on the ridge between the Thomson and Aberfeldy Rivers.

The catchment is located within the Eastern Highlands of Victoria. The most prominent feature is the Baw Baw plateau, reaching a height of 1500 m.

The elevation of the valley floor at the dam site is 300 m. The catchment area is very steep and the mountain slopes range up to 30^o (58%).

Figure 2 - Land Conservation Council Recommendations - Thomson Stage 3 Water Supply Catchment



The strongly dissected mountainous terrain which has developed on Silurian and Lower Devonian sediments drops away from the mountain divides to the Thomson and Aberfeldy Rivers which drain the catchment.

The Thomson River rises at approximately 1220 m elevation on the north-west slopes of Mt Whitelaw in the northern portion of the Baw Baw plateau. After initially flowing north and then east, the Thomson swings southwards from its confluence with the Jordan River.

Within the Stage III catchment the river flows generally south through a narrow steep-sided valley bounded on the west by the Baw Baw plateau and on the east by a narrow ridge which, for much of this length, separates the Thomson River from the parallel flowing Aberfeldy River. This parallel stream development resulted from a lava flow, the remnants of which form intermittent basalt capping along the narrow ridge of the Thomson-Aberfeldy divide. The dam site is in a narrow, V-shaped gorge with a valley floor about 20 m wide.

4. Soils

According to the report by the Board and other field investigations by SCA staff, three main soil groups can be found in the Thomson catchment Stage 3.

4.1 Organic Soils

In sub-alpine areas, including parts of the Baw Baw plateau where mosses and herbs are the dominating vegetation, organic soils have developed. These soils are loamy and contain up to 45% organic matter. They are capable of storing considerable quantities of water and releasing it slowly into small drainage lines. Disturbance of these soils by grazing, earthworks and foot traffic can result in a breakdown of the vegetation complex followed by erosion. An example of this type of erosion caused by four-wheel drive disturbance can be seen on the Baw Baw plateau near Mt St Gwinear.

4.2 Gradational Soils

This group of soils includes the following types:

(a) friable brown gradational
(b) friable reddish gradational
(c) shallow stony soils.

Friable brown and friable reddish gradational soils are characterised by an increase in clay content with depth. They are found on the upper slopes under taller eucalyptus and an understorey of moisture-loving species. These are stable, well-structured soil with good water-holding capacity. Depth of these soils varies from 1 to 5 metres.

Shallow stony soils are found on steeper slopes under the lower mixed species forest. These soils are not well-structured, and vegetation may suffer moisture stress in summer months. Their depth varies from 0.05 to 0.5 metres. These soils are subject to severe erosion, particularly when the vegetative cover is removed.

4.3 Duplex Soils

These soils change sharply from a loam A horizon to a clay subsoil. The A horizon has depth of 0.1 metres and the overall depth to the C horizon is about 0.5 metres. If the topsoil is disturbed the subsoil is easily erodible. These soils are present on the lower slopes on the east side of the catchment where the rainfall is low.

5. Climate

The climatic records for the catchment area are limited and data collected by the Board are of relatively short duration. However, data from nearby stations of the Bureau of Meteorology, in Aberfeldy to the north and Erica and Walhalla to the south, are adequate to describe the climatic conditions in the catchment.

5.1 Temperature

Generally the catchment has a temperate climate with mean temperatures varying with elevation. The mean monthly temperature at Aberfeldy ranges from 3.2^{o}C in July to 15.4^{o}C in February and from 7.6^{o}C to 18.8^{o}C in the same months at Erica. Mean monthly temperatures are below 10^{o}C for 6 months of the year and for 5 months of the year the average minimum temperatures are below that of frost formation. The coldest month is July and the hottest is February. Temperatures seldom rise above 25^{o}C at Aberfeldy and 30^{o}C at Erica.

5.2 Precipitation

Mean annual rainfall varies from 1053 mm at Aberfeldy in the north to 1219 mm at Walhalla in the south of the catchment. In extreme cases, parts of the Baw Baw plateau receives falls in excess of 2500 mm, whereas rain shadow areas on the same plateau receive much less. February, with 68-85 mm average rain, is the driest month and October, with 112 to 126 mm, appears to be the wettest month in the catchment area. Monthly totals in excess of 250 mm have been recorded for Erica on 10 occasions, for Aberfeldy on 3 occasions, and for Walhalla on 23 occasions.

The number of rain days per year varies from 135 at Aberfeldy to 179 at Walhalla. Snow is fairly frequent at Aberfeldy, with 23 snowfall days per annum, mainly during July to September, and much less frequent in Erica with 3 days on average per annum. Snow depths in excess of 2 metres have been recorded during August on the Baw Baw plateau.

5.3 Growing Season

This is influenced by low temperatures rather than by moisture. Growth, therefore, would be severely retarded during May to September. It is difficult to suggest an accurate length for the growing season and it could vary between 6 and 8 months, depending on location and climatic variations in each year.

6. Vegetation

Apart from pockets of land used for works related to dam construction, quarries and roads, the rest of the Thomson catchment is forested.

According to the MMBW report, the forested areas consist of five different forest communities, as follows:

The riparian or riverine type;

The mixed species eucalypts, including tall and low mixed species;

The ash type eucalypts which include mature and alpine ash, shining gum and mountain ash;

Scrub type; and

The sub-alpine woodland type.

Each of these communities is described below:

6.1 Riparian or Riverine Type

The riparian or riverine type vegetation is restricted to flat alluvial areas along main drainage lines of the Thomson and Jordan Rivers and some major tributaries. The riparian vegetation is dominated by the following over-storey eucalypts-manna gum (*E. viminalis*), mountain ash (*E. regnans*), blue gum (*E. st. johnii*), mountain grey gum (*E. cypellocarpa*), narrow-leaf peppermint (*E. radiata*), swamp gum (*E. ovata*) and apple box (*E. bridgesiana*).

The second under-storey of riparian vegetation includes silver wattle (*A. dealbata*) and blackwood (*A. melanoxylon*) and groundcover species such as hazel (*Pomaderris aspera*), blanket-leaf (*Bedfordia salicina*) and soft tree fern (*Dicksonia antarctica*). Common ferns are found in areas where they are not overtaken by introduced groundcover species such as blackberry (*Rubus* spp.) which often occurs in vast thickets. Other introduced species, such as nettle (*Urtica* spp.), thistle (*Onopordum* spp.), dock (*Rubex crispus*), etc., are found in riparian.

6.2 Mixed Species Association

This is a broad category which includes most of the forest cover in the catchment. The mixed species association contains two sub-groups, namely the tall mixed species (20-69 m) which occur in elevations from 650-900 m and the low mixed species (20 m or less) which occur mainly below 900 m elevation. Elevation, aspect and exposure influence the composition of the association sub-groups.

The dominating eucalypts in the tall mixed association are: candlebark (*E. rubida*), narrow-leaf peppermint (*E. radiata*), mountain gum (*E. dalrympleana*), snow gum (*E. pauciflora*), alpine ash (*E. delegatensis*), messmate (*E. obliqua*), white stringybark (*E. globoidea*), mountain grey gum *(E. cypellocarpa*), apple box (*E. bridgesiana*), broad-leaved peppermint (*E. dives*), manna gum (*E viminalis*) and silver-top (*E. siberi*).

Eucalypt species in low mixes associations are: silver-top (*E. sieberi*), broad-leaved peppermint (*E. dives*), apple box (*E. bridgesiana*), silver-leaf stringybark (*E. cephalocarpa*).

The low mixed species association occurs almost exclusively on northerly or exposed aspects, on steep slopes or ridges with shallow, leached and skeletal soils.

6.3 Ash Type Species Association

The ash type eucalypts - mountain ash (*E. regnans*), shining gum (*E. nitens*) and alpine ash (*E. delegatensis*), tend to occupy sheltered aspect sites with higher rainfall, greater soil depth and better soil moisture retention capacity then the tall mixed species sites.

The following are major species in ash type associations: mountain ash (*E. regnans*), shining gum (*E. nitens*), mountain grey gum (*E. cypellocarpa*); alpine ash (*El delegatensis*), mountain gum (*El dalrympleana*) and snow gum (*E. pauciflora*).

Where the secondary layer is dense the groundcover is absent, but where the layer is not so dense there is a groundcover, mainly represented by tree ferns: (*Dicksonia antarctica* and *Cyathea australis*), bracken (*Petridium esculentum*), shield fern (*Polystichum proliferum*), ivy-leaf violet (*Viola hederacea*) and clematis (*Clematis aristata*).

6.4 Scrub Type

Considerable areas of this type are found in the catchment, especially on the northern slopes of the Baw Baw massif. These areas are largely the result of wildfires. The most common species in scrub areas are common cassinia (*Cassinia aculeata*), hop-bush (*Dodonaea* sp), bracken and various acacias such as hickory wattle (*Acacia obliquinernia*) and silver wattle (*Acacia dealbata*).

6.5 Sub-Alpine Vegetation

Sub-alpine vegetation covers the Baw Baw plateau section of the catchment.

The sub-alpine vegetation consists of snow gum (*E. pauciflora*) less than 15 m in height, heath, wet or bog heath, herbfield-grassland and sedgefield. The sub-alpine vegetation is complex and its composition varies according to soil, physiography and micro-climatic conditions.

7. Present Land Use

Land uses in the catchment include water production, timber production, recreation and other uses in non-vegetated areas such as quarrying, roading, etc.

7.1 Water Production

Permanent stream flows and consistent rainfall make the Thomson catchment a reliable water source. Flows from Stages 1 and 2 Thomson catchment now contribute to Melbourne's water supply. When Stage 3 works are completed, the water yield to the whole Stage 3 catchment can be stored in a large reservoir, as described earlier, with selective withdrawal pints at the dam and Bells Portal.

7.2 Timber Production

Ninety-five per cent of the Stage 3 catchment is forested and about 20% of the forested area consists of ash forest. The ash forest is mostly regrowth of the 1932 and 1939 fires and is potentially high yielding for saw log and pulpwood production.

7.3 Recreation

There are numerous recreational opportunities in the area: bush walking, bush camping, ski-touring on the Baw Baw plateau, pleasure driving and picnicking, four-wheel drive touring, trail bike riding, fishing, canoeing, fossicking, hunting and shooting, and nature study.

Most of these recreational activities are currently at acceptable levels and give little cause for concern. However, four-wheel drive touring and extensive trail bike riding by individuals and clubs through the catchment is a growing cause for concern. Narrow gullies, ruts and corrugations observed on some tracks indicate the hazards caused by motorised recreation, particularly when conditions are wet.

Ski-touring is confined to the Baw Baw plateau. The Land Conservation Council has recommended that no skiing facilities be developed on the Thomson site of the Baw Baw plateau. This would not affect ski-touring.

7.4 Land Use in Non-vegetated Areas

There are two quarries along the Marshall Spur Road which provide material for construction works and roads associated with the dam. Quarrying operations will cease when the works are completed.

Existing roads include the Board's construction access, Mt St Gwinear Road and sections of the Thomson Valley Road, Swinger-Aberfeldy and Walhalla-Matlock Roads. These roads are suitable for use in most reasonable weather. In addition to these roads there are a number of minor roads, tracks and bush-walking tracks.

There are several scenic view sites with car park facilities in the catchment. These are located at various sites on the eastern edge of the Baw Baw plateau and along the Walhalla-Matlock Road where it follows the divides between the Thomson and Aberfeldy Rivers.

8. Clearing of Inundation Area

An important, though temporary, use of part of the land within the catchment will involve the clearing of a substantial part of the 2,200 ha of land which will be inundated at full supply level (FSL). Such clearing operations have the potential to increase the risk of erosion and consequently increase output of sediment to the Thomson storage for the period during which the cleared land remains above the advancing water level of the reservoir. This potential will however be reduced by leaving buffers of undisturbed vegetation along the main river channel and its tributary drainage lines. The extent and speed of regrowth of protective vegetation after clearing is encouraging from the erosion control viewpoint.

9. Future Land Use

In February 1976, the Premier directed that a Committee be established (now called the Thomson Stage 3 Committee), to advise the Soil Conservation Authority on policies for land use and management of the catchment to the Thomson Dam. The Convenor is Mr A Mitchell, Chairman of the Soil Conservation Authority, and the Committee has representatives of the Forests Commission, Department of Crown Lands and Survey, Melbourne and Metropolitan Board of Works, Health Department and local Municipalities.

Since its inception the Committee has provided advice to the Authority on policies for the Thomson Stage 1 and 2 catchments and has collected information and data for use in determining policies for the whole catchment once the Thomson Dam starts to fill. That is expected to be in 1984, so the Committee's task now is to review the land uses listed in Section 7 above and advise the Authority whether any of them should be regulated, and if so, how.

The Authority's present view is that most of the current land uses will be able to continue without adversely affecting water production or water quality. It is anticipated that there will need to be some regulation of vehicular traffic on forest tracks, and of recreational activities on and around the reservoir.

WATER SUPPLY AND QUALITY

The Thomson River currently supplies domestic water for Melbourne through Stage 1 and Stage 2 developments and domestic water by means of private diversions, water for downstream irrigation and to satisfy a range of environmental aspects.

A Thomson River Water Resources Joint Committee* was formed by direction of the Premier and is working towards resolution of water resource allocations of the Thomson streams. The Committee issued a draft report in October 1980 and sought public comment. A final report and recommendations to the Minister of Water Supply are expected in 1982.

The Thomson River above the Thomson-Jordan confluence is sampled routinely by the Board at several sites. In its report, the Board assesses the river water quality against the standards established by the World Health Organisation.

However, it is suggested that the presence of an impoundment, ie. after stage 3, will produce changes and certain improvements in the water quality. A comparison of the 1973-1975 river water quality data (see Appendix 1) with

* Footnote: The Thomson River Water Resources Joint Committee is composed of representatives of the Melbourne Metropolitan Board of Works, the Ministry for Water Resources, the State Rivers and Water Supply Commission, the Ministry for Conservation, the LaTrobe Valley Water and Sewerage Board, the Department of Planning and representatives of the public including conservation groups, irrigators, etc.

WHO highest desirable standards for drinking water, shows that there are five indicators which occasionally fall outside the criteria levels at certain locations and times.

These are pH, colour, turbidity, suspended solids and iron. However, these values are well within desirable current criteria recommended jointly by the National Health and Medical Research Council and the Australian Water Resources Council. Nevertheless, detention in storage will generally reduce the levels of these indicators to within WHO criteria at all times.

In conclusion, it can be said that the current water quality of the Thomson River is good and will improve with the detention provided by the large Stage 3 reservoir. Appendix 2 represents a summary of the latest water quality data for the Thomson River and Appendix 3 shows the standards set by WHO and the Australian National Health and Medical Research Council.

RECOMMENDATIONS

1. That the Authority approve this report and forward it to the Land Conservation Council for consideration.

2. That the Land Conservation Council recommend to the Governor-in-Council that the Thomson River Stage 3 Catchment as shown on Plan No. S-1103 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.

BIBLIOGRAPHY

1. Thomson River Water Supply Development,
Report on Environmental Study into Thomson Dam and Associated Works, Vols. 1 and 2, Melbourne and Metropolitan Board of Works 1975.

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

3. Physiography of Victoria by E S Hills,
Whitecombe and Tombs Pty Ltd, Melbourne 1975.

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

5. Report on the Thomson River (Stages 1, 1(a) and 2) Water Supply Catchment,
Soil Conservation Authority 1973

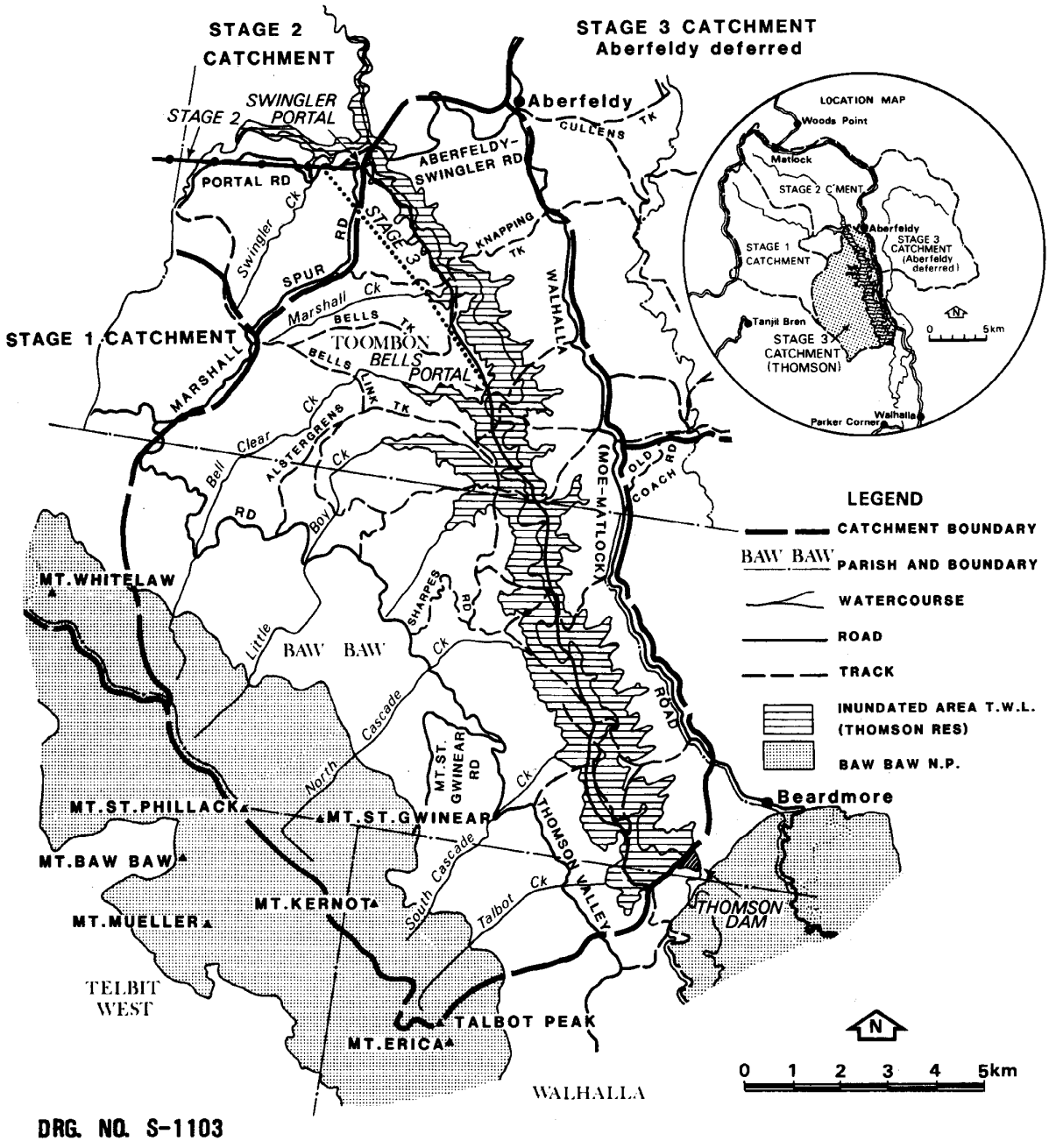
6. Climatic Averages, Australia, Metric Edition,
Australian Government Publishing Service, Canberra 1975.

7. A Handbook to Plants in Victoria, by J H Willis
Vol. I 1970, Vol II 1972, Melbourne University Press

8. Report on Land Use Determination for the Thomson River (Stages 1, 1(a) and 2) Water Supply Catchment,
Soil Conservation Authority 1974.

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

Figure 3 - Proclamation Plan



Appendix I - Summary of water quality data for Thomson River Oct. 73 - Jan. 75 from a report prepared by Board of Works (Ref. 1).

	U/S Thomson Portal			Whitelaws Creek			Thomson D/S Whitelaws			Easton Portal		
	Mean	**Max**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Max**	**Min**
pH	*6.7	7.3	*6.5	7.0	7.6	*6.5	7.0	7.6	*6.2	7.1	7.6	*6.6
Colour Pt/Co	*44	*150	*22	*50	*200	*25	*7	*500	*22	*35	*170	*14
Turbidity FTU	2.3	*10	1	2.0	*6.8	1.0	*6.3	*70	1	2.6	*12.0	0.5
Suspended solids mg/l	5	28	2	7.7	7.8	1.8	28	363	2	6	66	1
Fe (Iron) mg/l	0.3	*2.5	0.14	0.30	*2.6	0.08	0.80	*6.7	0.10	0.37	*3.1	0.12
Na (Sodium) mg/l	3.3	5.5	2.7	3.1	3.9	2.6	4.4	10	2.9	6.6	14	3.1
K (Potassium) mg/l	0.56	075		0.57	0.92	0.40	0.61	1.2	0.40	0.58	1.0	0.36
Ca (Calcium) mg/l	0.9	1.5	0.6	0.8	1.7	0.3	0.9	1.7	0.1	1.3	2.4	0.5
Mg (Magnesium) mg/l	0.94	0.80	1.4	0.74	1.6	0.5	1.0	1.9	0.54	1.6	2.7	0.6
No_3 - Nitrate mg/l	0.06	0.21	0.03	0.04	0.21	0.01	0.04	0.20	0.01	0.07	0.21	0.01
Phosphate mg/l	0.04	0.08	0.01	0.04	0.12	0.01	0.04	0.11	0.01	0.04	0.08	0.01
Biological parameters												
37° Plate Count (Org/ml)		124			-			-			296	
22°C Plate Count (Org/ml)		706			-			-			822	
Confirmed Coliform Count (Orgs/100ml)		220			-			-			135	
E. coli count(Orgs/ml)		49			-			-			43	

Appendix II - Summary of water quality for Thomson River Apr 78 - Jan 81. Supplied by Board of Works

	Jordan R U/S Weir			**Thomson R D/S confluence Whitelaws Ck**			**Thomson R D/S Swingler Diversion**		
Parameter									
	Mean	**Max**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Max**	**Min**
pH	7.3	7.8	6.2	7.1	7.4	6.5	7.1	8.6	6.0
Colour Pt/Co	18	60	7	38	80	12	36	130	18
Turbidity FTU	2.1	9.0	0.5	2.6	23	0.7	2.9	3.0	0.5
Conductivity us/com	45	76	23	29	57	16	37	75	14
Sus. Sols. Mg/l	3.5	23	0.45	5.2	24	1.0	3.6	30	0.45
Nitrate-Nitrogen mg/l	0.064	0.200	0.009	0.066	0.200	0.009	0.050	0.310	0.009
TKN mg/l	0.117	0.340	0.018	0.176	0.400	0.018	0.147	0.510	0.009
TO P mg/l	0.031	0.19	0.009	0.54	0.500	0.010	0.046	0.700	0.009
TOC mg/l	4	6	1	4	7	1	5	9	2
Iron mg/l	0.30	0.92	0.10	0.28	0.78	0.10	0.37	6.0	0.10

Appendix III - Comparison of drinking water standards

Parameter	World Health Organisation		National Health and Medical Research Council	
Physical	**Highest desirable (1971)**		**Desirable current criteria (1980)**	
Colour unit	5		50	
Turbidity unit	5		25	
pH range	7.0-8.5		6.5-9.2	
Chemical				
Total solids	1500	mg/l	1500	mg/l
Calcium	75	mg/l	200	mg/l
Chloride	200	mg/l	600	mg/l
Total iron	0.1	mg/l	1.0	mg/l
	<30 if SO_4 is>250	mg/l		
Magnesium	<125 if SO_4 is <250	mg/l		
Nitrate as N	10	mg/l	10	mg/l
Fluoride	0.8-1.7	mg/l	1.5	mg/l
Total hardness as $CaCo_3$	100-500	mg/l	600	mg/l
Microbiological				
Coliforms	None in 95% of samples in year		90% of all yearly samples should contain less than 20/200 ml	
E coli	Less than 10/100 ml in 90% of samples in year		90%of all yearly samples should contain less than 2/100 ml	