2. DESCRIPTION OF EXPERIMENTAL AREA

2.1 Location

The Reefton Experimental Area is located 32km north-east of East Warburton at a latitude of 37° 40' S and a longitude of 145° 55' E (Figure 2.1). It forms part of the water supply catchment area for Melbourne. The Experimental Area consists of six gauged catchments (Figure 2.2) which are located in part of the Armstrong Creek (East Branch) catchment. Armstrong Creek is a tributary of the Yarra River. The catchments vary in size from 70.4 ha (catchment 1) to 521.2 ha (catchment 6) (Table 2.1), and are separated by distinctive ridges.

Some drainage basin characteristics of the catchments are shown in Table 2.1. Catchment aspect and slope are 'lid' characteristics. They have been determined by statistically fitting a plane through a minimum of 19 points equidistant around the catchment perimeter. Circularity ratio is defined as the ratio of catchment area to the area of a circle with the same length perimeter. Characteristics relating to the streams have been determined by Spurritt (1981).

2.2 Geology

The geology of the Experimental Area has been surveyed in some detail by the Department of Minerals and Energy, Victoria. The catchments are underlain by Lower Devonian sediments which have been classified into two groups, viz. Monty's Hut Formation and Norton Gully Sandstone (Figure 2.3). The Monty's Hut Formation consists of thinly-bedded sandstone, siltstone and claystone which are extensively folded, often vertically, and have occasional faulting and fracturing. The Norton Gully Sandstone Formation consists of sandstone, siltstone and claystone, the sandstone being of variable thickness but thicker than in the Monty's Hut Formation. Fracture and vertical bedding are also a feature of this Formation.

Although the folding of the strata of both Formations is variable, the occurrence of vertical bedding would seem to be conducive to the percolation of water into the bedrock. This is particularly likely on the thinly-bedded siltstone and claystone which have greater weathering potential, and especially so where the beds have been fractured. It is unlikely therefore that these upland catchments are "watertight", and hence deep seepage should be taken into account in any examination of their water balance.

The thinly-bedded strata are also susceptible to warping due to regolith creep, particularly where gradients are steep. The geological structure has affected the landscape, with some drainage lines following structure planes and cleavages.

Figure 2.1 - Location of Reefton Experimental Area

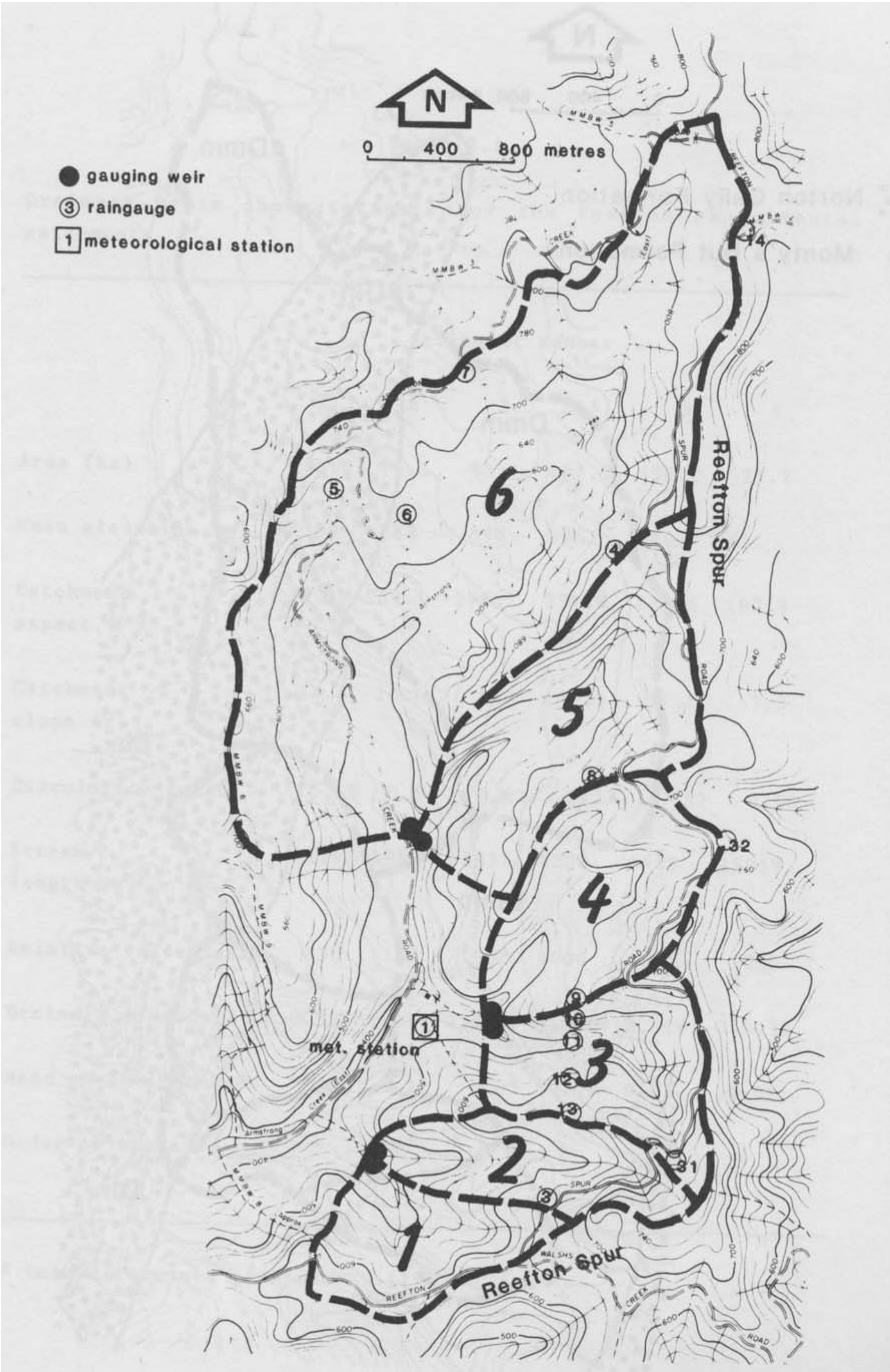

Figure 2.2 - Arrangement of the six experimental catchments

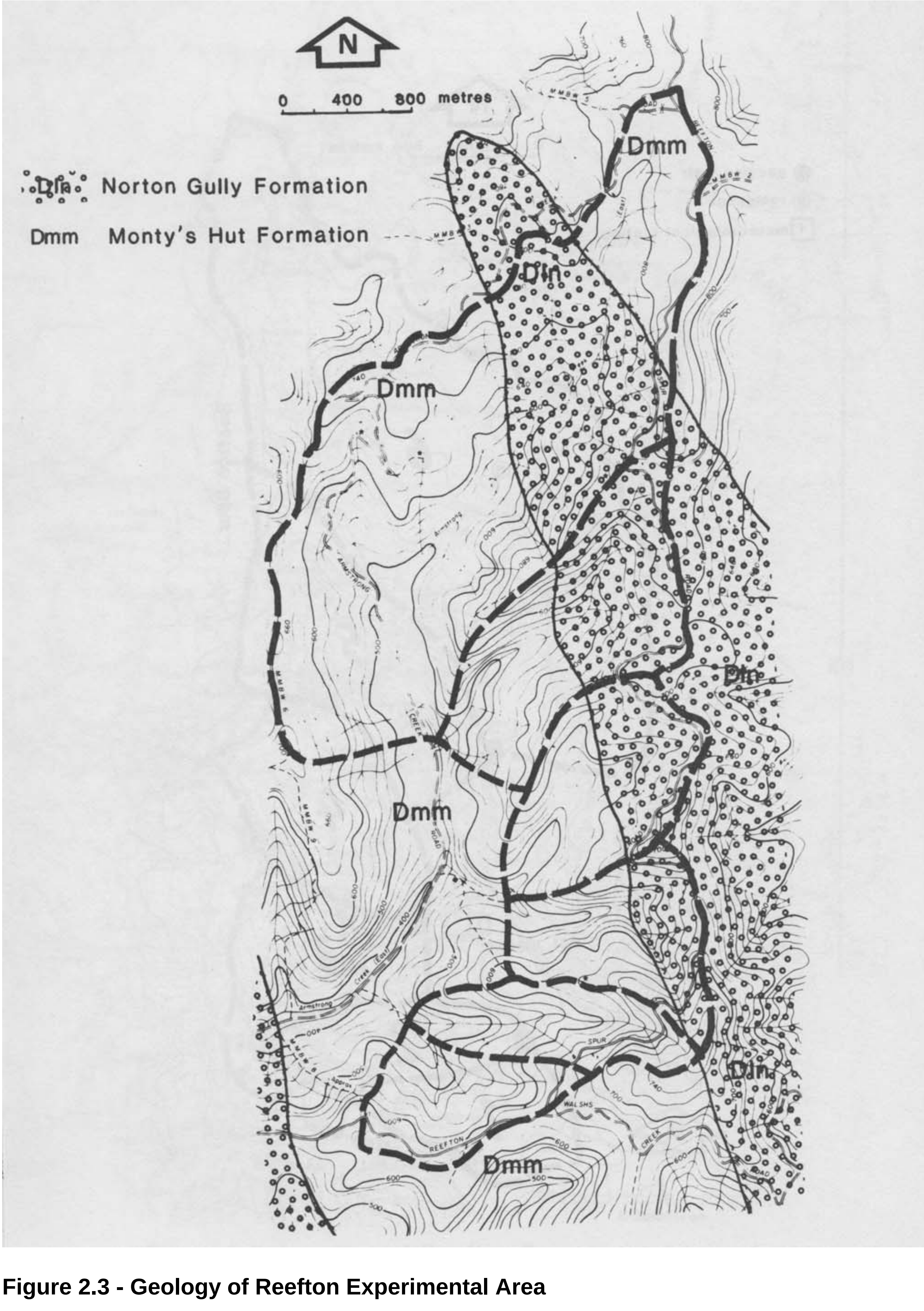

Figure 2.3 - Geology of Reefton Experimental Area

Table 2.1 - Drainage basin characteristics of the Reefton experimental catchments

	Catchment number					
	1	2	3	4	5	6
Area (ha)	70.4	76.1	95.1	107.2	156.2	521.2
Mean elevation (m)	559	588	596	594	640	651
Catchment aspect (0)	341.1	269.1	292.7	231.9	227.5	197.9
Catchment slope (0)	14.4	10.6	9.0	7.5	7.2	3.3
Circularity ratio	0.69	0.54	0.62	0.77	0.52	0.50
Stream length (m)*	4179	2942	3857	4206	6483	19919
Relative relief*	950	1150	900	1000	1000	1200
Drainage density*	0.0059	0.0039	0.0041	0.0039	0.0061	0.0038
Mean channel slope*	0.06	0.12	0.05	0.09	0.05	0.02
Order of basin*	3	2	3	2	3	4

* Data determined by Spurritt (1981)

2.3 Topography

The Experimental Area ranges in elevation from 380 to 840m and slopes are generally moderate to steep (Table 2.2). The only significant plateau in the Area is located in the upper reaches of catchment 6. The streams in catchments 1, 2 and 3 flow in a westerly direction whereas streams in the remaining catchments flow south and south-west. The distinctive ridges that separate the catchments slope gently from the Reefton Spur (Figure 2.2). Data in Table 2.2 are derived from aerial photographs and hence are subject to the normal errors.

2.4 Soils

Rees (1982) has undertaken a survey to distinguish and map the major soil types in the six catchments. Soil samples representative of these soil types have been collected and examined for a number of physical and chemical properties. Particular emphasis has been given to those soil properties known to the important in relation to hydrologic processes. Rees (1982) has identified the following six soil types, with five of them being well represented (Figure 2.4).

Table 2.2 - Proportion (%) of each catchment in four slope classes

Slope Class	Catchment Number						Experimental Area
(0)	1	2	3	4	5	6	
>30	6	8	23	16	9	6	9
25-30	5	9	12	12	13	11	11
18-24	17	21	15	13	16	18	17
<18	72	62	50	59	62	65	63
Total	100	100	100	100	100	100	100

(i) Red gradational (wet) soils

These soils are characterised by brown/red to red mineral horizons with brown organic A horizons of varying depth. The soil depth ranges from a minimum of lm to in excess of 3m. Stoniness is generally less than 5%, appearing mainly as sub-angular pieces of fragmented fine sandstone which is usually partially weathered. Texture grades from an organic silty loam with increasing fine particle content to clay loam and silty clay loam. The surface horizon has a crumb structure which becomes fine blocky with increasing depth. The main A horizon is moderately well structured and the B horizons are well structured. As the structure changes down the soil profile, so does the fabric, changing from "earthy" on the surface and upper horizons to rough ped or smooth ped at depth. The consistency of the soil ranges from loose to soft at the surface and slightly plastic to plastic in the denser B horizon at depth.

(ii) Brown gradational and forest brown (wet transitional) soils.

These soils are characterised by dark organic upper horizons (which may not be as well developed as on the red gradational soils on wetter sites) and brown to reddish-brown sub soils are also characteristic. There is no significant mottling. Soil depth is usually about lm. There are few stones in the upper horizons, hut stoniness increases down the profile. Stoniness is also influenced by topographic position, there being more stones in soils on ridges. Textures are similar to those for the red gradational soils except that, with less developed soils, the lower horizons are light, tending to light-medium clays. Surface organic content is usually high. Surface horizons are weakly structured with an open tilth, but the main A and B horizons are well structured. The consistency ranges from loose at the surface to slightly hard and hard at depth, particularly when dry. However, these soils retain the friable characteristics of the red gradational soils.

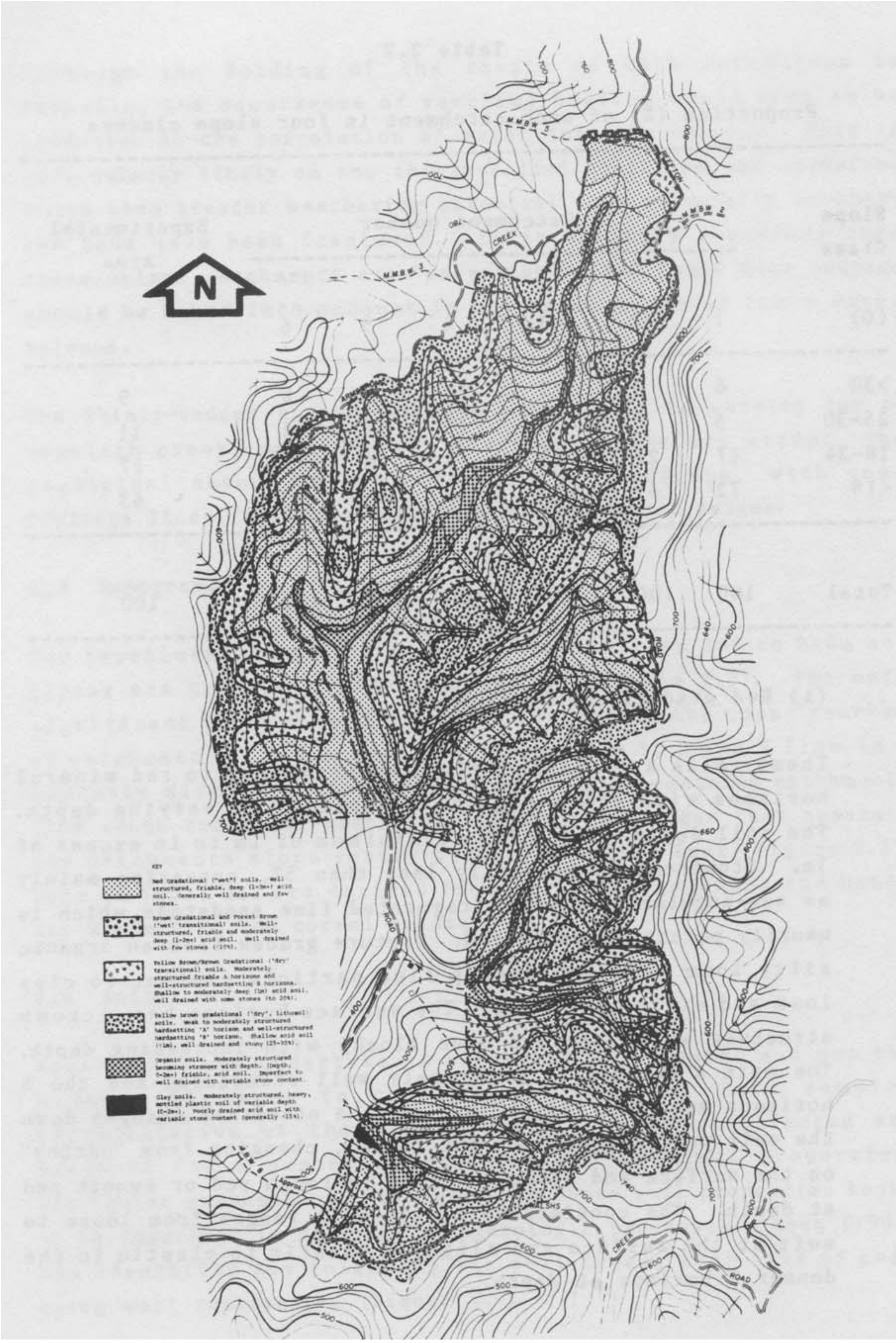

Figure 2.4 - Distribution of soil types

(iii) Yellow brown gradational (dry) soils

These soils represent the driest extreme of soils in the Experimental Area, and are referred to as dry soils. Surface and organic horizons are normally very shallow and overly stony mineral horizons. The upper horizons usually have yellow brown hues and the subsoil has a brown/yellow brown hue. The soil depth is usually between 0.4-1m. The texture of the surface horizon is an organic sandy loam. The A horizons are silty loams, grading to light clay loams and ultimately heavy clay loams, light clays or light-medium clays in the B horizons. The A horizons have a stone content of about 15% (by volume) consisting of sub-angular sandstone up to 5cm diameter. This increases with depth, where stone content is usually 30%. The A horizons are weakly to moderately structured whereas the B horizons tend to be more strongly structured. The consistency generally varies from loose at the surface, slightly hard when dry for the A horizons, to hard when dry for the B horizons. This soil is more hard setting than the other soil types of the Experimental Area.

(iv) Yellow brown/brown gradational (dry) transitional soils

These soils are similar to the dry soils but are usually more developed (i.e. deeper) and have lower topographic positions or are located on wetter ridges and crests. The upper horizons have a greater proportion of organic material and are darker in colour. The lower horizons have a brown hue but are not as pale as the dry soils. Texture ranges from a light organic loam at the surface to silty clay at depth. Stoniness is generally lower than that for the dry soil but is still high, particularly in the lower horizons where a stone content of 20% is common.

Structure varies from weak for the surface horizon to medium to strongly structured at depth. The consistency of the soil ranges from loose at the surface to slightly hard and hard at depth when the soil is dry. This soil type is also hardsetting.

(v) Organic soils

These soils are high in organic matter with varying amounts of clay. They are located in the incised gullies or adjacent to them. The soils are either uniform or gradational, developing some structure with depth, depending on the proportion of clay particles present. They are typically dark in colour and may lighten with depth and increasing mineral content. Stoniness is variable; gully areas normally have a high surface coverage of stones. Although the soils are generally light and transportable, they are stable in water.

(vi) Gley soils

There are few occurrences of gley soils, and these are restricted to gully floors near the weirs. Only one occurrence (in catchment 1) of any significance has been found. It appears to be the result of the topography which has allowed significant deposition. The deposited material appears to he derived from the surrounding dry ridges. The deposits are dark and mottled, indicating a fluctuating and possibly perched watertable. Because of its limited spatial distribution, this soil is not important in the Experimental Area.

The proportion of each soil type in the six catchments is given in Table 2.3. Catchment 1 is the driest catchment, having a very high proportion of dry soil. This differs from catchment 2 where there is a sharp increase in the proportion of wet soil. Catchment 3 has a lower proportion of wet soil than catchment 2. It appears that the proportion of wet soil in a catchment is related to the proportion of southerly aspects and catchment size. Catchment 6 has the highest proportion of wet soil.

Some physical properties of each soil type are listed in Table 2.4. The bulk densities are generally low with little variation between soil types. Though the porosity of the soil is related to bulk density, the macro-porosity varies for each soil type. There is a sharp decrease in macro-porosity with depth in the wet soil. The proportion of macro-pores in the dry soil is less variable through the profile. The porosity of transitional soils is variable depending on the stage of development. For example, well developed humic A horizons on gently sloping ground (i.e. soils subject to less soil loss) will result in higher porosity in the A horizon. This would further he enhanced by a less bulky subsoil for the wet transitional soil. The open structure enhanced by organic material is exemplified by the high proportion of macro-and micro-porosities of organic soils, particularly in the upper horizons.

Table 2.3 - Proportion (%) of the six soil types in each catchment

Catchment Number	Red gradational (wet)	Brown gradational (wet) (transitional)	Yellow brown gradational (dry) (transitional)	Yellow brown gradational (dry)	Organic	Gley
1	13.6	2.5	23.6	52.2	7.0	1.1
2	28.6	17.0	12.6	37.3	4.5	0.0
3	19.8	21.6	21.1	33.4	4.1	0.0
4	37.0	21.2	12.0	24.7	5.1	0.0
5	33.8	18.4	17.3	25.6	4.9	0.0
6	46.7	14.2	11.8	21.9	5.4	0.4

Hydraulic conductivity has been measured in-situ using the shallow well pump-in method of Talsma and Hallam (1980). From 22 sites, 107 results have been recorded for a depth range of 25-55 cm. These results have been plotted on log/probability paper to compare the distribution for each soil type. It has been found that there are similar geometric means for all major soil types. Further, though the distribution plots are generally similar, there is a wide range of hydraulic conductivity values for all soil types indicating spatial variation. The variations are due to internal soil differences, particularly biological activity such as roots and animal activity and stoniness. The geology is also an important factor in determining the ultimate behaviour of water movement in the soil. The values calculated for wet soils are for a combination of A and B horizons while for dry soils values are predominantly for the B horizons due to the shallowness of the A horizons. As well as the closeness of unweathered rock, the high proportion of stoniness in dry soils limits available water capacity and therefore limits to some extent the channels for water movement. Generally dry soils have proportionally lower clay contents than the more deeply developed wet soils, and bulk densities for wet soils are greater at depth. On average, the soils can be classed as having moderately slow hydraulic conductivity, particularly the B horizons.

A trend of increasing infiltration from dry soil areas to wet soil areas has been found, with the transitional soils being intermediate. Likewise, there is an overall lower moisture content for dry soils when compared with wet soils at the three suction pressures applied to indicate saturation, field capacity and wilting point. The moisture content for the dry soil at all suction pressures increases with depth whereas there is a decrease at low suction for the wet soil. A similarity is evident between the organic soil and the wet soil.

The available water capacity (AWC) is important to the study of water balance in a catchment area. The AWC is defined as the difference between field capacity and wilting point. A general trend is evident for the organic soil having the highest AWC (31%) and the dry soil the least AWC (17%) in the A horizons. The trend for the B horizons is similar; wet soils have 18% AWC at depth whereas the dry soils only have 12%. However, in calculating total water capacity for the soils in the Experimental Area, depth of soil and stoniness should be taken into account. Data in Table 2.4 relate only to the earth component of the soil.

Rees (1982) also has examined two indices for the erodibility of the soils in the Experimental Area. These are the Emerson test which indicates the water stability of soil aggregates, and the Erodibility factor (K) which is used in the Universal Soil Loss Equation. The Emerson test indicates that all soils are relatively stable, though dry soils and the gully soils are more dispersive than the wet soils. The Erodibility factor is derived from an equation by nomograph, which takes into account the silt and fine sand proportion of the soil, organic matter content, permeability and structure. Results indicate that the wet soils have a lower potential erodibility for the A horizon, but have slightly higher potential at depth compared with the dry soils. The upper A horizon of the dry soil and the B horizon of the gley soil have moderately high Erodibility factors, though the limitations in deriving the factors should be recognised. For example, high values for organic matter (which is a stabilising factor in the equation) have been discounted due to the limit of 4% organic matter in the equation. Overall, the results suggest that potential for significant erosion exists in the Experimental Area, and that forest harvesting prescriptions need to take this factor into account.

Table 2.4 - Some physical properties for each soil type

Physical property	Horizon	Soil type					
		Red gradational (wet)	Brown gradational (wet transitional)	Yellow brown gradational (dry transitional)	Yellow brown gradational (dry)	Organic	Gley
Bulk Density (g cm^{-3})	A	0.94	0.98	0.90	0.99	0.90	
	A/B	1.20					
	B	1.38	1.22	0.92	1.32	1.31	1.56
Macro-porosity (% by volume)	A	17.5	11.7	20.8	12.2	25.2	
	A/B	7.8					
	B	6.2	13.4	6.6	11.2	18.9	7.0
Micro-porosity (% by volume)	A	47.2	51.6	45.1	50.4	40.5	
	A/B	47.0					
	B	41.6	40.7	59.6	39.0	31.7	34.1
Hydraulic Conductivity (ms^{-1} x 10^{-5}		0.238	0.34	0.2775	0.22		
Infiltration (mm s^{-1})		0.744	0.629	0.360	0.315		
Saturation (% moisture)	A	61.9	55.1	61.6	41.1	70.9	
	A/B	54.8					
	B	52.5	52.8	36.9	48.0	58.5	44.8
Field capacity (% moisture)	A	44.1	43.4	44.4	28.9	45.8	
	A/B	47.1					
	B	46.3	39.3	30.2	36.7	39.6	37.7
Wilting Point (% moisture)	A	18.9	22.2	17.7	11.9	14.7	
	A/B	25.2					
	B	28.1	27.4	22.2	24.4	21.3	21.3

Belin (1978) has determined soil moisture characteristics on 24 samples of five soil profiles in the vicinity of rain gauges 10, 11, 12 and 13 in catchment 3 (Figure 2.2). Samples from the top 10cm of the soil profile show a greater range of moisture contents than samples from lower in the profile, possibly due to the higher organic content. All samples show a tendency to lose a large proportion of available water in the initial 0.005 bar to 1 bar suction range.

Belin (1978) has also studied accumulated precipitation minus evaporation over the period August 1977 to July 1978. She has found that the initial soil moisture deficit at the onset of summer coincides with cessation of runoff. Her results support the concept of a variable source area in close proximity to the stream which contributes to surface runoff. Spurritt (1981) has described the pattern of suspended sediment production in the experimental catchments. Her findings suggest that drainage basin characteristics are responsible for the type and quantity of bedload. She has found that discharge and sediment are strongly related in the long term, but that other factors, e.g., animal activity, become important in the short term. Spurritt (1981) has calculated and partially mapped the source area of suspended sediments in catchment 4. She has indicated the importance of specific source sites, e.g., soil cliffs, soil overhangs and log dams in the stream and has suggested that the tributaries are not perennial.

2.5 Climate

As will be detailed in Section 3, the climate of the Experimental Area has been studied for nearly 20 years. Based on the Reefton Meteorological Station, the average annual rainfall is 1298mm. The wettest months are July, August and September when monthly rainfall usually exceeds 130mm (Figure 2.5). However, on average, at least 50mm of rainfall can be expected for the drier months of summer and autumn. Precipitation is generally in the form of rain with occasional hail. Snowfalls occasionally occur at higher elevations in the Experimental Area, but these are of little hydrological significance.

Average monthly temperature at the Reefton Meteorological Station is shown in Figure 2.6. The hottest month is February with an average temperature of around 18°C, and the coldest month is July when an average temperature of around 7°C can be expected. The mean annual temperature for the Experimental area is 12.2°C. The absolute maximum temperature so far recorded in summer is 39°C, while the absolute minimum temperature is -5°C. Unlike temperature, there is only minor variation in average monthly relative humidity throughout the year (Figure 2.7). The average annual relative humidity is around 75%, and this generally only fluctuates by ± 6%.

The average daily wind speed is shown in Figure 2.8. Wind speed is lowest (28.5 km day -1) in June and highest in December (50.4 km day-1). Evaporation is also lowest in June when 15.6 mm month-1 are lost by this process compared with 115.5 mm month-1 in January (Figure 2.9). The average annual evaporation is 722.0 mm. On average therefore, a surplus of 576 mm (1298 mm rainfall less 722 mm evaporation) is readily available annually for plant use, soil storage and runoff. However, since the rate of evapotranspiration by tree cover can significantly exceed pan evaporation, and since other factors such as deep seepage need to be taken into account, the amount of runoff from the catchments is considerably less than this surplus (Table 2.1).

2.6 Vegetation

A survey to classify, map and describe the vegetation in each of the six catchments, and to assess the quantity, location and extent of the merchantable timber resources in the Experimental Area has been undertaken by Baxter et al (1980). They note that the vegetation is an open forest, dominated by eucalypts, with a three or four tier structure. In some parts of the Experimental Area, there has been considerable change to the vegetation as a result of past logging, and the remaining overstorey in such areas is scattered with shrub species being well developed. With variations in soils, aspect and altitude, the overstorey species vary from dense stands of *E. regnans* on protected south and easterly aspects at higher elevations to *E. sieberi* (silvertop) on ridges and drier northern aspects at lower elevations.

The southern catchments contain mixed species of little commercial value such as *E. radiata* (narrow-leaved peppermint), *E. dives* (broad-leaved peppermint), and *E. sieberi* . Stand top height increases at higher elevations and on the southern aspects where dominant species are *E. cypellocarpa* (mountain grey gum) and *E. obliqua* (messmate) with *E. regnans* becoming important on the protected sites. The northern part of catchment 5 and the upper headwaters of catchment 6 experience a higher rainfall, and the vegetation is ash type comprising *E. regnans* regrowth of 1939 origin whilst in the gullies there are scattered remnants of overmature stands.

There is little evidence of logging since 1939 in catchments 1 to 5 except for a small area in the upper section of catchments 2 and 3 which were logged in the early 1950's.

There has been extensive logging in the higher elevation mixed species and ash type in catchment 6, and most of the merchantable trees have been removed. Logging in catchment 6 was still in progress in 1966 and because of this, there was some doubt as to whether this catchment should he included in the experiment at that time. The main species removed during logging were *E. regnans* and *E. obliqua*. The area was noted for its high percentage of defect compared with other logging areas in the district.

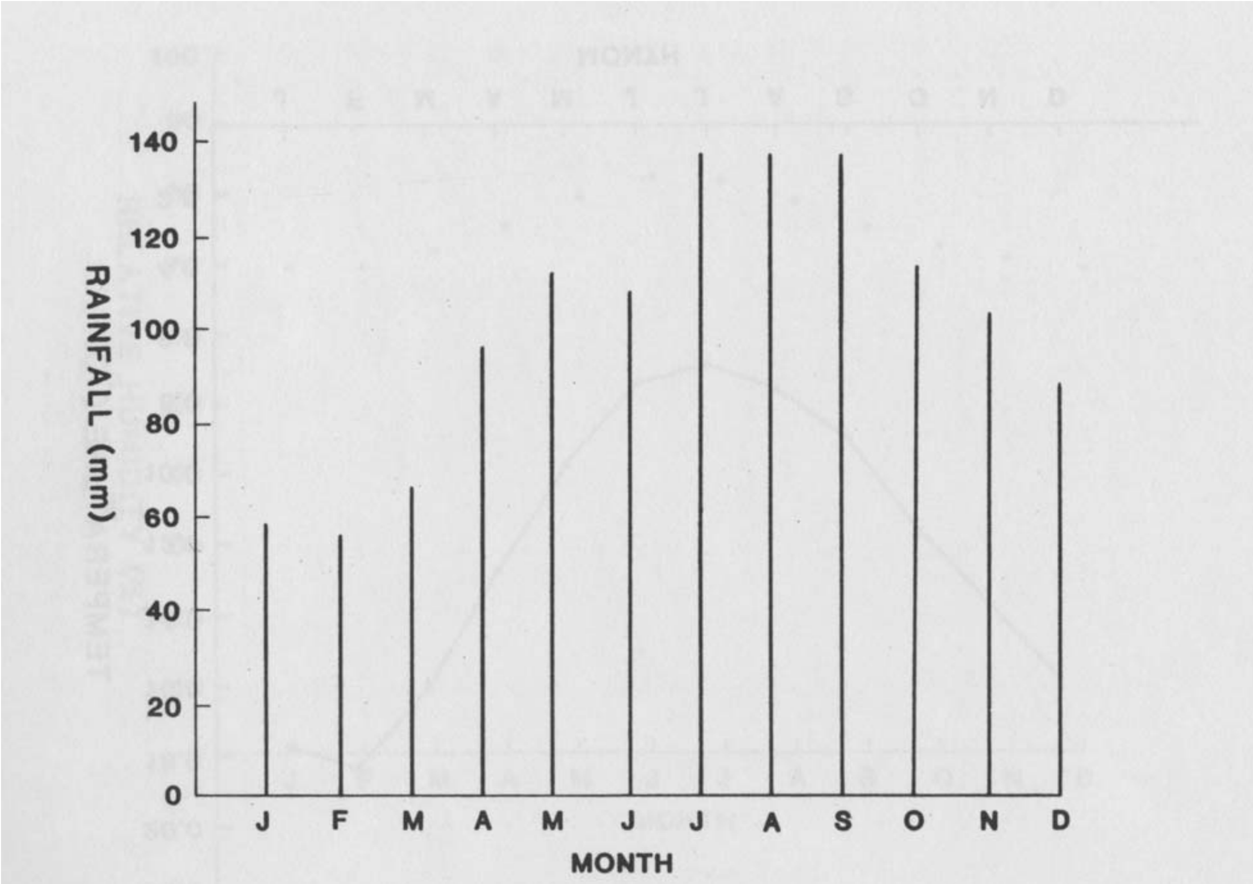

Figure 2.5 - Average monthly rainfall at Reefton meteorological station

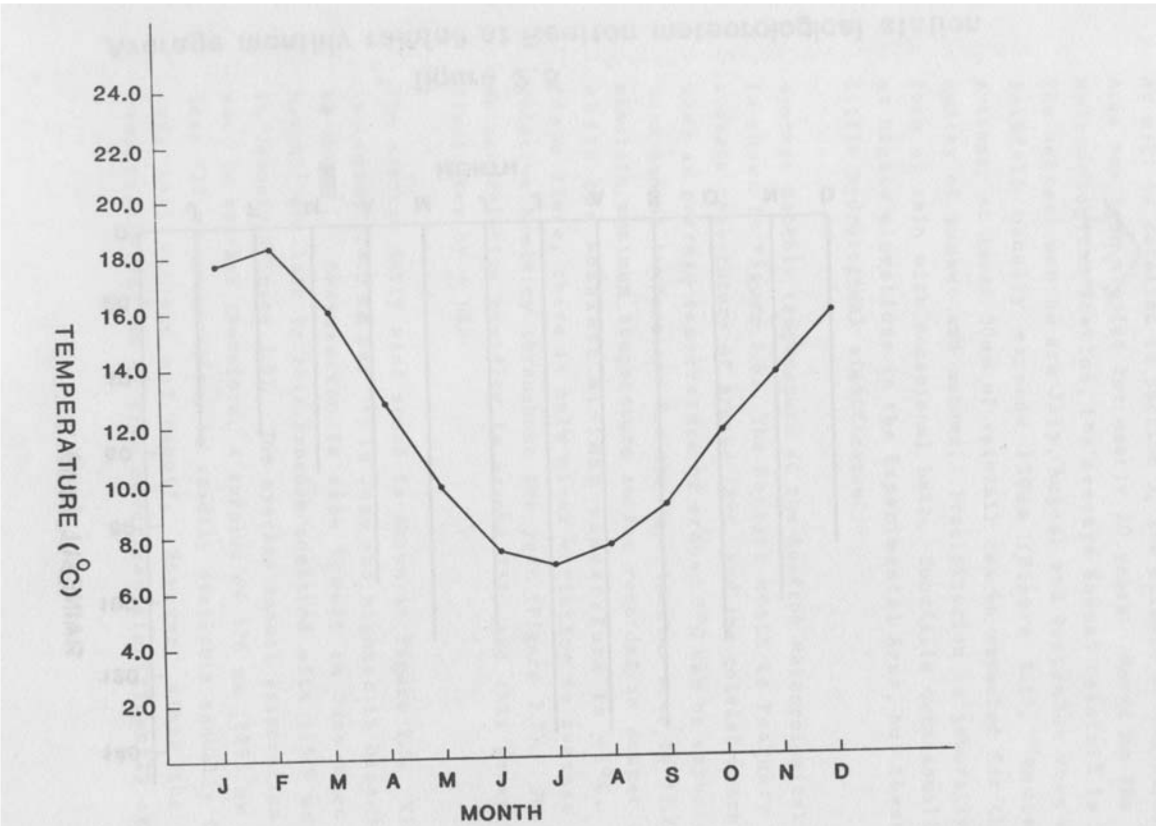

Figure 2.6 - Average monthly temperature at Reefton meteorological station

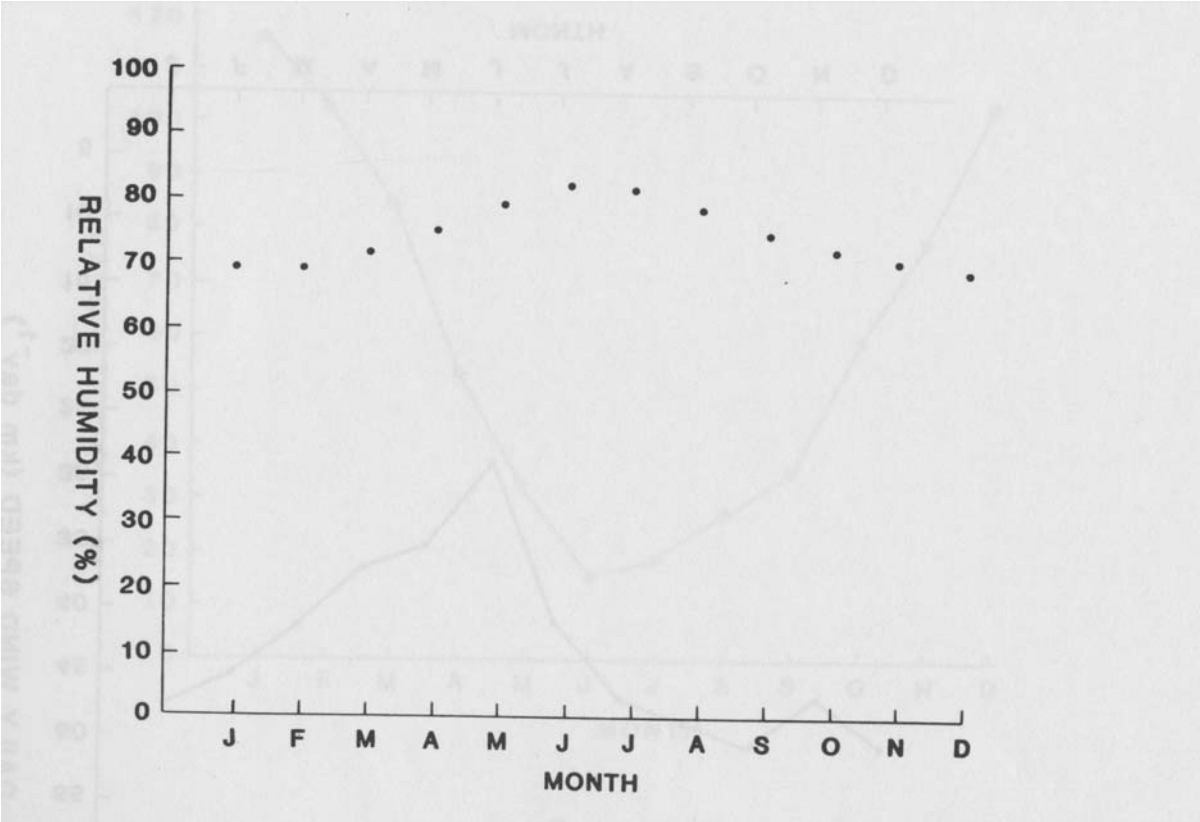

Figure 2.7 - Average monthly relative humidity at Reefton meteorological station

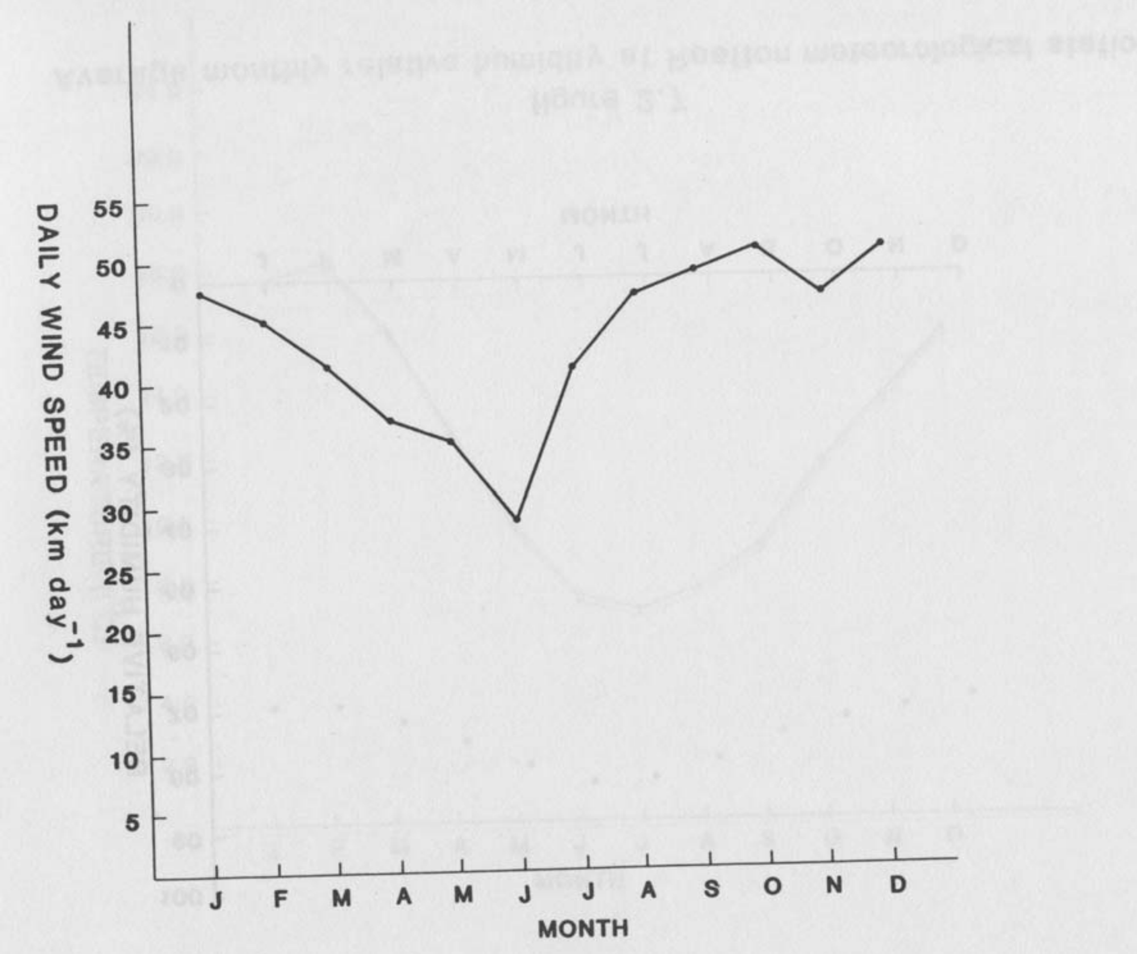

Figure 2.8 - Average daily wind speed at Reefton meteorological station

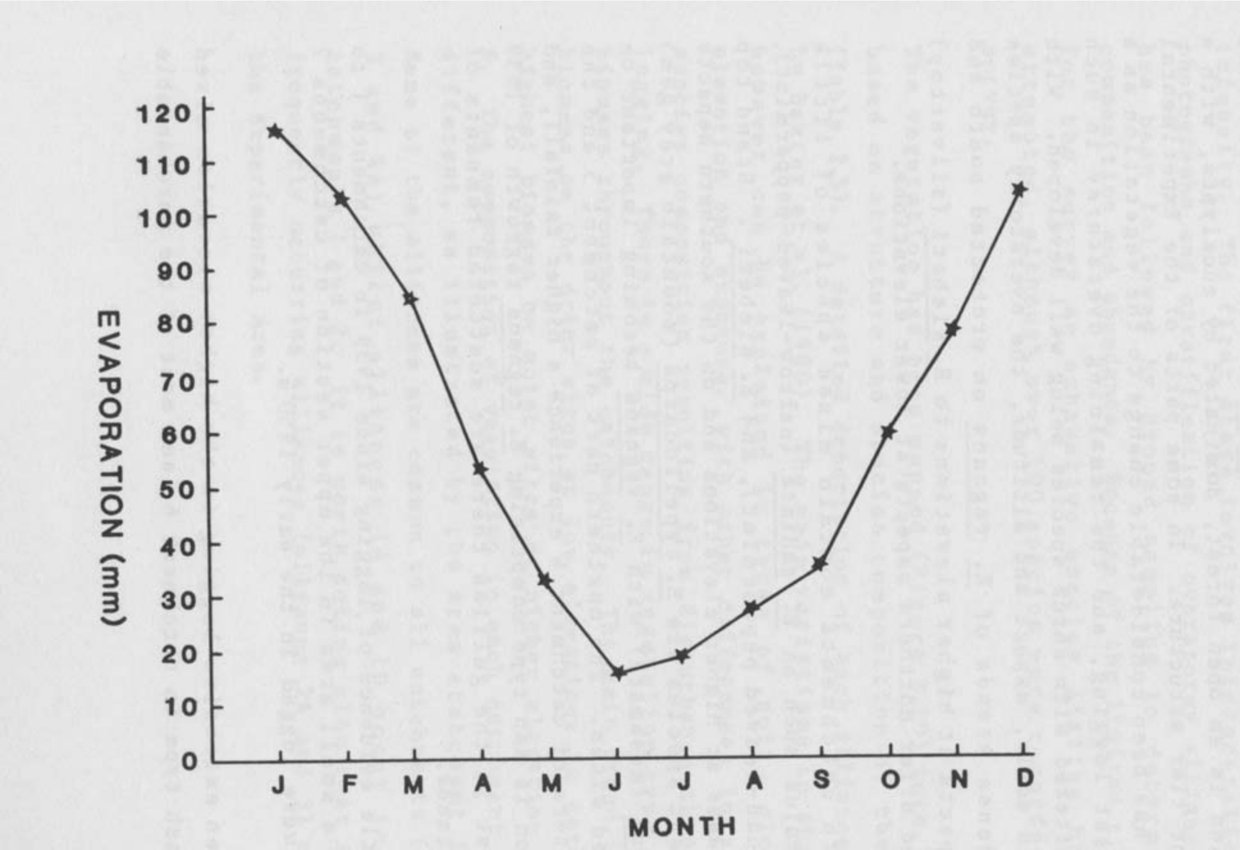

Figure 2.9 - Average monthly evaporation at Reefton meteorological station

The vegetation survey has been conducted at two levels of intensity. The first stage involves interpretation of aerial photographs and stratification of overstorey alliances, and this has been followed by ground sampling to determine species composition and abundance. Because of the limited time available for the survey an exhaustive species listing has not been attempted, although over 100 species were recorded during the survey.

The vegetation has been mapped (Figure 2.10) into 12 alliances based on structure and species composition of the overstorey (Table 2.5). A detailed description of each alliance is provided by Baxter et al. (1980). The main variations in the vegetation however can be explained in terms of soil, slope, aspect, elevation and exposure, with other differences in structure and species composition resulting from disturbance through fire and logging. There is a wide range in vegetation type and level of biomass throughout the catchments. The main trend is for lowest biomass on the drier sites at low elevations in catchment 1 and highest biomass on moist sites at higher elevation in catchment 6. The composition of vegetation in each catchment is thus very different, as illustrated by the area statement in Table 2.6. Some of the alliances are common to all catchments (e.g. alliance 3 and 4A) whilst alliances IA and 1D occur in all except catchments I and 2. It is worth noting also that the two most frequently occurring alliances (alliance 2A and 3) occupy 50% of the Experimental Area.

Figure 2.10 Vegetation survey of experimental catchments

Table 2.5 - Vegetation alliances identified in the Experimental Area

Forest type	Alliance code	Overstorey (major species of tallest stratum)
Mountain ash	1A	E. *regnans*, *E. obliqua*, *E. cypellocarpa* (*E. regnans* regrowth present as understorey)
	1B	*E. regnans*, *E. obliqua*, *E. cypellocarpa* (*E. regnans* regrowth absent as understorey).
	1C	*E. regnans* mature
	1D	*E. regnans* regrowth (1939 origin)
Messmate/gum	2A	*E. obliqua, E. cypellocarpa, E. radiata* (regrowth present)
	2B	*E. obliqua, E cypellocarpa, E. radiata* (regrowth absent)
	2C	*E. obliqua* regrowth
Stringybark/peppermint	3	*E. baxteri*, *E. radiata*
Silvertop	4A	*E. sieberi*, *E. radiata*
	4B	*E. sieberi* regrowth
Peppermint	5	*E. radiata*, *E. dives*
Closed Scrub	6	Gully type vegetation

Table 2.6 - Proportion (%) of each alliance in the six catchments

Dominant overstorey species	Alliance code	Catchment number					
		1	2	3	4	5	6
E. regnans	1A	0	0	7.5	5.4	20.5	8.0
E. regnans	1B	0	4.2	0	0	0.4	13.0
E. regnans	1C	0	0	0	0	0	0.8
E. regnans	1D	0	0	2.2	12.4	17.9	18.8
E. obliqua	2A	0	42.1	24.9	26.1	3.6	42.9
E. obliqua	2B	0	0	0	0	0	2.5
E. obliqua	2C	0	4.5	6.5	0	0.7	0.8
E. baxteri	3	60.5	18.8	26.8	34.4	33.9	7.8
E. sieberi	4A	26.1	30.4	23.6	18.6	18.8	5.4
E. sieberi	4B	0	0	1.0	0	0.4	0
E radiata	5	13.4	0	1.0	0	0	0
Other	6	0	0	6.5	3.1	3.8	0

The understorey vegetation has also been surveyed in some detail by Lavis (1981). Transects have been established in catchments 1, 2, 3 and 4, and quadrats (circular plots with a 5m diameter) then located at 50m intervals (commencing at the reference point) along each transect (Table 2. *E. obliqua* 2.11). Understorey species have been recorded on each quadrat using the procedure outlined by Kershaw (1966). The vegetation on the quadrats has been recorded using the Braun-Blanquet cover-abundance scale. Results for the 81 quadrats are summarised in Table 2.8.

Table 2.7 - Reference points for transects used to survey understorey vegetation in four of the catchments (see also Figure 2.11).

Catchment	Reference point	Bearing of transect
1	Fifth white-road-post 125m south-west of view point B	0° magnetic
1	Northern gatepost on southern edge of catchment 1	90° magnetic
2	SCA rain gauge No. 3 on southern edge of catchment 2	
3	SCA rain gauge No. 9 on northern edge of catchment 3	150° magnetic
4	SCA rain gauge No. 8 on northern edge of catchment 4	130° magnetic

In the survey reported by Baxter et al. (1980), the vegetation alliances listed in Table 2.5 have been used as a basis for assessing the timber resources of the Experimental Area. Only those strata with a stand top height in excess of 27m have been considered to be potentially merchantable for sawlog production. With the exception of the small stand of mature E. regnans in catchment 6 and the stands of E. regnans regrowth in catchments 3-6, all other potentially merchantable stands have been regarded as having either a nil sawlog volume due to previous logging or a very low yield of marginal sawlogs which under normal circumstances would only be utilised in a fully integrated sawlog/pulpwood operation. Therefore, the E. regnans regrowth is the only stratum that has been intensively assessed. Estimates of pulpwood volume for mature and overmature stands (Table 2.10) are based on the area and hence proportion of each alliance in the catchments (Table 2.6) together with average yields derived from a reconnaissance.

Catchments 5 and 6 and, to a lesser extent, catchments 3 and 4 have a number of dispersed stands of E. regnans regrowth of good quality that could be harvested to yield substantial volumes of sawlog and pulpwood (Table 2.9).

Table 2.8 – Abundance — cover of understorey vegetation in catchments 1 to 4 Symbols explained in footnote

Catchment and Quadrat

Species	1 (N Transect)	1 (E Transect)	2	3	4
	11111111	22222222233333333	444444444555555	66666666677777	888888888999999999
	12345678901234567	12345678901234567	123456789012345	12345678901234	123456789012345678
Creepers					
Clematis aristata	+ + +	++ + 1+1	+ +	+++ ++	1++ + + +
Comesperma volubile	+	+ +++ ++		+ + +	
Pandorea pandorana		+ +++ +		+	
Ground Cover					
Viola hederacea	+++ + + +	1++ + +++	+11++++ 1 1	+ ++2 +	++ + + +++++
Gonocarpus tetragynus	+1+++11+++ ++++ +	1+ 111++ ++1+++++	+11+1+ ++1	++ +1++1++	+++1+
Drosera auriculata	+++++1++ ++	+1+ ++ +	+ + ++ +	+ +1+1	
Geranium potentilloides	+	++ 1	+ + +	+ +	+2 + +
Dianella revoluta	+++ +++ +	+++ ++ ++++	1 +	+111 11+	
Poa australis	2 + ++ +	1++11+ ++++1	1++ 1 +++	+ + 1 1 +	+ +
Tetrarrhena juncea	+++11++++11+1++1	11+ ++1111111++ +	11++11++ 11+	12 ++1111 + +	1+ +++ + +++++1+
Acrotriche serrulata		2	2 2	+	
Lepidosperma laterale			+ +	++ + 2	
Small Shrubs					
Acacia aculeatissima	11 ++	++ 1+	1 1	+ 11	
Tetratheca ciliata	+1 1+1+ +++	1 1 + + 1+ 1+	+ + +	1 +11 +	+ 1 +++
Lomatia ilicifolia	+ +	+ + +	+	+ +	
Epacris impressa	+1+ ++1 ++	+ +++ 1+ +1		+1+++	+ +1+
Australina muelleri			+ +++		+
Sambucus gaudichaudiana			+ ++	+	+ +
Amperea xiphoclada	+ 2 1 21	1 1 2		1 +	
Dillwynia retorta	++ ++	11 + ++	+	+	
Correa reflexa		+	1	+ +11	+
Spyridium parvifolium	+ +	+ 1 ++1 +	22 21 3	2 1+222	
Monotoca scoparia	1			1	
Blechnum spp.	3			++	
Polystichum proliferum	1		1 32		21
Goodenia ovata	++11+1111 +	+++1+ ++11 1++	11 +1 + +	+ +1211 +	2+ +11 1 +121
Culcita dubia	43+ 342+3 3	323 332+13 3+	1+	222	3 1 11 32
Pteridium esculentum	212122111+1221+	211112111111111++	+ + ++ 22+	11 +11 1	21+ +221+ +2+221+
Medium Shrubs					
Pimelia axiflora		+ +	+ + 1	+	++ + ++
Daviesia ulicifolia	11+ +++ +	1 + 1 +11	++1	11 + + 21	+ 1 1+
Pultenaea scabra				+	+ +
Pultenaea muelleri					1 ++1 21 +3
Coprosma quadrifida	+ 1+ +	++ ++1	+ +111111	+1+ 1	11 1+ 1 1+11
Olearia phlogopappa		1	+		+
Cassinia uncata	+++	++ ++	+		
Pultenaea juniperina	1121+1+21 11+	1 11111 211+++11	11211 11	1 11+1++1 +	
Cassinia aculeata	++1++++ 1	1+1 + +1 1	111 + + +	1 + 11+	+ +++11
Cassinia longifolia	+		+2 11 2	+ 111 11	+
Acacia mucronata	+++++ 1 +	1 111 ++1	+	1	+ ++
Goodia lotifolia	1	21 1	1 1		+
Polyscias sambucifolius	++ 1 1	2 1		11+	
Acacia verniciflua	+2++22111 +1 1	1 ++1 1111111	113+2 1 1	1 111121111+	+ +11+
Olearia lirata	+++	+ 1	+ ++		1 +++
Banksia spinulosa	++ 1	+ + 11	+ 1		+
Exocarpos strictus	1	+ +		+	+
Hakea sericea		+	3 1	21	
Notelaea ligustrina	1	1	++1++		11 1 + +1
Hovea rosmarinifolia					2321
Tall Shrubs					
Alsophila australis	2 1112 31	1	1111	221	12 + 1+21 11
Dicksonia antartica	2+ 1		1		222
Olearia argophylla	21	1	1112222 +	2 2	+33 1 3221
Bedfordia arborescens			24223323	112	11111 212
Pomaderris aspera	1 4		1241222	2233	2223 233211
Acacia obliquinervia					+11
Acacia melanoxylon			+ +		1
Acacia dealbata	2				1

\+ less than 5% cover, uncommon
1 up to 5% cover, common
2 5–25% cover
3 25–50% cover
4 50–75% cover
5 greater than 75% cover

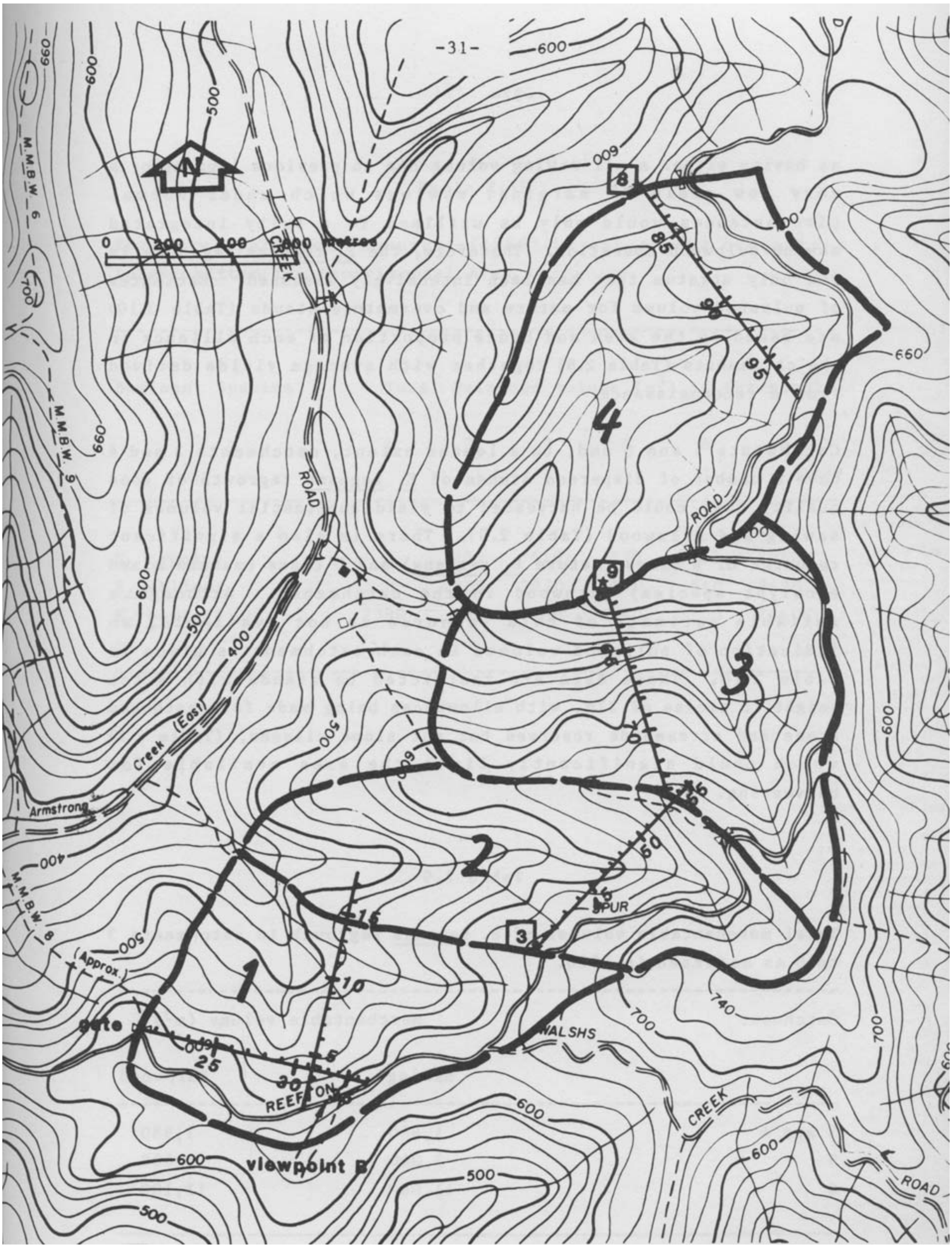

Figure 2.11 – Location of transects and quadrats for understorey vegetation survey

Table 2.9 - Total merchantable volumes of E. regnans regrowth in catchments 3 to 6 as assessed in 1980

Catchment	Merchantable volume (m^3)	
	Sawlog	Pulpwood
3 and 4	1,680	1,980
5	3,040	3,600
6	11,060	13,100

Table 2.10 – Estimated pulpwood resources (1980) in mature and overmature forest within the Experimental Area

Dominant Species	Total Pulpwood volume (m^3) in Catchment					
	1	2	3	4	5	6
E. regnans	0	290	610	530	2960	9940
E. obliqua	0	2850	2270	2270	540	19430
E. baxteri	2380	860	1450	2240	3200	2460