

Table 1  
Site characteristics for all catchments

	Area (ha)	Species	% Area planted	Mean annual rainfall (mm)	*Rain distrib.	Pre-treatment (years)	Forest age (years)	Mean soil depth (m)	BFI	Key references
Traralgon Ck (Vic)	8700	Eucalypt	~70	1472	U	22	19	2.0	0.37	
Redhill (NSW)	195	<i>P. radiata</i>	78	866	W	0	9	1.0	0.39	Hickel, 2001
Pine Ck (Vic)	320	<i>P. radiata</i>	100	775	W	0	11	<1.0	0.26	
Stewarts Ck 5 (Vic)	18	<i>P. radiata</i>	100	1156	W	9	20	<1.0	0.28	Nandakumar and Mein, 1993
Glendhu 2 (NZ)	310	<i>P. radiata</i>	67	1282	U	3	17	1.0	0.64	Fahey and Jackson, 1997
Cathedral Peak 2 (SA)	190	<i>P. patula</i>	75	1436	S	2	20	1.5–2.0	0.66	Scott et al., 2000
Cathedral Peak 3 (SA)	139	<i>P. patula</i>	86	1504	S	6	17	1.5–2.0	0.75	Scott et al., 2000
Lambrechtbos A (SA)	31	<i>P. radiata</i>	82	1134	W	30	19	1.5–2.0	0.78	Scott et al., 2000
Lambrechtbos B (SA)	66	<i>P. radiata</i>	89	1088	W	17	20	1.5–2.0	0.87	Scott et al., 2000
Biesievlei (SA)	27	<i>P. radiata</i>	98	1332	W	10	20	1.5–2.0	0.72	Scott et al., 2000

For \*rainfall distribution, U, uniform; W, winter dominated; S, summer dominated. BFI, baseflow index.

when comparing (5) and (2) would indicate the time term in (6) was required to improve the complete model and is therefore significant, and vice versa.

Due to the constraint that the rainfall and time term must be positive, a one tailed  $t$ -test was applied. The  $t$ -value was calculated as  $F^{0.5}$ , and compared with the critical value for significance at the 0.05 level. The  $F$ -statistic was calculated as:

$$F = \frac{[(SSE_s - SSE_c)/(df_c - df_s)]}{SSE_c/df_c} \quad (7)$$

where SSE is the residual sum of the squared errors, df is degrees of freedom, and the subscripts s and c refer to the simplified model and complete models, respectively.

### 3. Data sets

Daily streamflow data were obtained from 10 catchment studies from southeastern Australia, New Zealand and South Africa. The initial criteria for selection of these catchments were a known vegetation history and streamflow records of good quality. The ideal data sets were those with a lengthy pre- and post-treatment (plantation establishment) flow record with approximately 100% of the catchment converted from grassland or a crop equivalent to plantation. In reality, all these criteria were not easy to satisfy. For example in Victoria, Australia, the best data is from Stewarts Creek, a set of decommissioned research catchments with 9 years of pre-treatment data and 25 years of post-treatment. Here, though, the treatment was a conversion from native eucalypt forest to pine. The assumption made for this data set is that the immediate post-treatment period may be viewed as a non-forested condition. This condition is likely to approximate the ET conditions of pasture or short crops for up to 3 years. Catchment details and treatments are given in Table 1.

All catchments, with the exception of Traralgon Creek, were afforested with pine species, predominantly *Pinus radiata*, with *P. patula* planted at the two Cathedral Peak catchments. Traralgon Creek has only 6% pine, with the remainder eucalypts species, most of which is *Eucalyptus regnans*.