APPENDIX

1. CALCULATION OF ABSOLUTE DENSITY OF INDIVIDUALS MAKING UP A CANOPY LAYER FROM INTENSIVE SITE DATA

For a detailed description of the methodology, see Mitchell (2007).

For each sampled canopy layer at each field site the sum of distances, $D_n$, is:

$$D_n = \sum_{i=1}^{16} \sum_{j=1}^{4} R_{ij}$$

in which

$i$ is a particular transect point (1–16)

$j$ is a quarter at a transect point (1–4)

$n$ is the number of quarters in which a measurement is made

$n_0$ is the number of vacant or empty quarters

$R_{ij}$ is the point-to-plant centre distance at point $i$ in quarter $j$

The mean distance, $\bar{r}$, is:

$$\bar{r} = \frac{D_n}{n}$$

**Case 1. $n_0 = 0$**

The absolute density, $\lambda$, is:

$$\lambda = \frac{1}{\bar{r}^2} \text{ plants m}^{-2}$$

$$\lambda = \frac{10000}{\bar{r}^2} \text{ plants ha}^{-1}$$

**Case 2. $n_0 > 0$**

In this case, a correction factor (CF) is applied. First, it is necessary to calculate the ratio

$$\frac{n_0}{n + n_0}$$

Then, using the look-up table (Table 1 provided in Warde and Petranka 1981), find the CF that applies to this ratio.

The absolute density, $\lambda$, is:

$$\lambda = \frac{1}{\bar{r}^2} CF \text{ plants m}^{-2}$$

$$\lambda = \frac{10000}{\bar{r}^2} CF \text{ plants ha}^{-1}$$
2. CALCULATION OF THE BASAL AREA OF THE TREE LAYERS FROM INTENSIVE SITE DATA

For each sampled canopy layer at each field site the sum of the cross-sectional area of the measured stems, $A_n$, is:

$$A_n = \sum_{i=1}^{16} \sum_{j=1}^{4} \pi r^2 y$$

in which $r$ is the stem radius at 1.3 m (that is, stem dbh/2).

In the case of multi-stemmed individuals, the cross-sectional area of each stem was calculated, and the plant cross-sectional area was calculated as the sum of the areas of the individual stems making up the plant.

The mean plant stem cross-sectional area, $\bar{A}$, is:

$$\bar{A} = \frac{A_n}{n}$$

in which $n$ is the number of quarters in which a measurement was made.

The basal area, $B$, is:

$$B = \bar{A}$$
### Table A1 Description of spatial data layers used for model development and extrapolation.

<table>
<thead>
<tr>
<th>Name or symbol</th>
<th>Layer description</th>
<th>Spatial resolution</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topography and administrative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topo</td>
<td>Topographic position index: calculated from the 9-second digital elevation model</td>
<td>250 m</td>
<td>Gallant and Dowling (2003)</td>
</tr>
<tr>
<td>Land tenure</td>
<td>Australian Land Tenure 1993</td>
<td>1:5 000 000</td>
<td>Geoscience Australia (1993)</td>
</tr>
<tr>
<td>Roads</td>
<td>WA Roads</td>
<td>1:5 000 000</td>
<td>Geological Survey of Western Australia (2007)</td>
</tr>
<tr>
<td>Towns</td>
<td>Population Centres</td>
<td>1:1 000 000</td>
<td>Lawford et al. (1998)</td>
</tr>
<tr>
<td>Map sheet</td>
<td>1:250 000 Map Sheet Index</td>
<td>1:250 000</td>
<td>Geological Survey of Western Australia (2007)</td>
</tr>
<tr>
<td><strong>Climate</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rs</td>
<td>Solar radiation received at the surface, MJ m⁻² yr⁻¹</td>
<td>1 km</td>
<td>Hutchinson (2005)</td>
</tr>
<tr>
<td>P</td>
<td>Mean annual precipitation, mm yr⁻¹</td>
<td>1 km</td>
<td>Hutchinson (2005)</td>
</tr>
<tr>
<td>T_max and T_min</td>
<td>Mean daily air temperature in January (Tmax) and July (Tmin), °C</td>
<td>1 km</td>
<td>Hutchinson (2005)</td>
</tr>
<tr>
<td>W</td>
<td>( W = P - \frac{R_s \rho L}{\rho} ) mm yr⁻¹, in which ( \rho ) is the density of liquid water (~1000 kg m⁻³) and ( L ) is the latent heat of vaporisation of water (~2.45 × 10⁶ J kg⁻¹ H₂O) ( W_{3000} = W + 3000 ) mm yr⁻¹, ( W_{4000} = W + 4000 ) mm yr⁻¹</td>
<td>1 km</td>
<td>Berry and Roderick (2002)</td>
</tr>
<tr>
<td><strong>Vegetation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NVEG</td>
<td>Natural vegetation</td>
<td>1:5 million</td>
<td>AUSLIG (1990)</td>
</tr>
<tr>
<td>PVEG</td>
<td>Present vegetation</td>
<td>1:5 million</td>
<td>AUSLIG (1990)</td>
</tr>
<tr>
<td>MVG</td>
<td>National Vegetation Information System. Australia—Present Major Vegetation Groups—NVIS Stage 1, Version 3.0</td>
<td>100 m</td>
<td>DEWHA (2005)</td>
</tr>
<tr>
<td>MODIS</td>
<td>Normalised Difference Vegetation Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MODIS 16-Day L3 Global 250m (MOD13Q1) satellite imagery</td>
<td></td>
<td>250 m</td>
<td>Paget and King (2008)</td>
</tr>
<tr>
<td>Fire mapping</td>
<td>Landsat MSS, TM and ETM+ satellite data 1972–2002</td>
<td>30 m</td>
<td>Geoscience Australia (2010)</td>
</tr>
<tr>
<td>WA land cover</td>
<td>Landsat WA 2005</td>
<td></td>
<td>Geological Survey of Western Australia (2007)</td>
</tr>
<tr>
<td>Timber cutting</td>
<td>Timber tramlines and cutting areas in the Goldfields region, 1900–75. FD No. 1610</td>
<td>1:500 000</td>
<td>The digitised layer was created from the printed map</td>
</tr>
<tr>
<td>Name or symbol</td>
<td>Layer description</td>
<td>Spatial resolution</td>
<td>Source</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------</td>
<td>--------------------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>Geology</strong></td>
<td>Geology of Western Australia</td>
<td>1:250 000</td>
<td>Geological Survey of Western Australia (2007)</td>
</tr>
<tr>
<td>Lithology</td>
<td>Surface lithology</td>
<td>1:500 000</td>
<td>Geological Survey of Western Australia (2007)</td>
</tr>
<tr>
<td>%OC</td>
<td>Soil carbon concentration of A and B horizons (% C)</td>
<td>1 km</td>
<td>CSIRO (2007)</td>
</tr>
<tr>
<td>Thick&lt;sub&gt;A&lt;/sub&gt;, Thick&lt;sub&gt;B&lt;/sub&gt;</td>
<td>Thickness of A and B horizons (m)</td>
<td>1 km</td>
<td>CSIRO (2007)</td>
</tr>
<tr>
<td>BD&lt;sub&gt;A&lt;/sub&gt;, BD&lt;sub&gt;B&lt;/sub&gt;</td>
<td>Soil bulk density of A and B horizons (Mg m&lt;sup&gt;-3&lt;/sup&gt;)</td>
<td>1 km</td>
<td>CSIRO (2007)</td>
</tr>
<tr>
<td>Thick&lt;sub&gt;AB&lt;/sub&gt;</td>
<td>Thick&lt;sub&gt;AB&lt;/sub&gt; = Thick&lt;sub&gt;A&lt;/sub&gt; + Thick&lt;sub&gt;B&lt;/sub&gt; (m)</td>
<td>1 km</td>
<td></td>
</tr>
<tr>
<td>SOC&lt;sub&gt;A&lt;/sub&gt;</td>
<td>$\text{SOC}_A = \text{Thick}_A \frac{% \text{OC}}{100} \frac{\text{BD}_A}{\text{kg C m}^2 \text{ of ground surface}}$</td>
<td>1 km</td>
<td></td>
</tr>
<tr>
<td>SOC&lt;sub&gt;B&lt;/sub&gt;</td>
<td>$\text{SOC}_B = \text{Thick}_B \frac{% \text{OC}}{100} \frac{\text{BD}_B}{\text{kg C m}^2 \text{ of ground surface}}$</td>
<td>1 km</td>
<td></td>
</tr>
</tbody>
</table>
### Table A2 Summary of explanatory notes for the 1:250 000 series Geological Map Sheets covering the GWW relating to road access, vegetation cover and water.

Quotes are italicised.

<table>
<thead>
<tr>
<th>Map Sheet</th>
<th>Accessibility for survey</th>
<th>Vegetation notes</th>
<th>Water notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Jackson SH5012</strong>&lt;br&gt;Chin and Smith (1981)</td>
<td>Farms occupy a small portion of the southwestern part of JACKSON, and there has been intermittent grazing on parts of the uncleared remainder. Access in the northern portion of JACKSON is poor due to the paucity of roads and tracks and thick vegetation.</td>
<td>The vegetation...is chiefly characterized by open sclerophyll woodland on the red soil slopes and valleys, by thick acacia scrub on sandplains and ironstone ridges, and by saltbush with acacia scrub adjoining saline drainages and lakes.</td>
<td>Prospects for potable shallow groundwater are poor.</td>
</tr>
<tr>
<td><strong>Southern Cross SH5016</strong>&lt;br&gt;Gee (1979)</td>
<td>This sheet is crossed by Great Eastern Highway, Perth to Kalgoorlie railway and Eastern Goldfields water-supply pipeline. The eastern part [that is, the GWW] is mostly uncleared vacant crown land, which has been used for mining and timber gathering.</td>
<td>This eastern part supports heath on sand plains, woodlands in valleys, and halophytes around salt lakes.</td>
<td>No comment</td>
</tr>
<tr>
<td><strong>Hyden SH5004</strong>&lt;br&gt;Chin et al. (1984)</td>
<td>East of the vermin-proof fence, vehicle access is generally poor and is restricted to a few tracks and overgrown cut-lines. However, throughout the Forrestania Greenstone Belt, numerous tracks and cut-lines have been constructed by mining companies during exploration for base metals (particularly nickel), and these provide reasonable access for four-wheel drive vehicles.</td>
<td>Cites Beard (1972)&lt;br&gt;Scrub heath occupies the sandplain ridges; mallee in the middle slope, covering the largest portion of the area; and sclerophyll woodland the lowest ground. In low-lying saline areas, woodland is replaced by Ti-tree scrub while samphire is predominant in hypersaline areas. The heavy soil (Ae unit) of the Forrestania Greenstone Belt is mostly covered by sclerophyll woodland. Cites Beard (1972)</td>
<td>Present day drainage is internal into salt lakes. No large quantities of good quality underground water have yet been located. However, small quantities of good quality water have been obtained from the deepest Quaternary and Tertiary sands on slopes flanking large granite outcrops. Groundwater salinities are higher at greater distances from the recharge area and are mostly too high for agricultural use.</td>
</tr>
<tr>
<td><strong>Kalgoorlie SH5109</strong>&lt;br&gt;Kriewaldt (1967)</td>
<td>No comment</td>
<td>No comment</td>
<td>At present there are some 20 bores and wells within the Kalgoorlie Sheet area that are being used for watering sheep. The prospects of getting good quality underground water in large supplies are very small.</td>
</tr>
<tr>
<td>Map Sheet Explanatory notes, author and year</td>
<td>Accessibility for survey</td>
<td>Vegetation notes</td>
<td>Water notes</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>--------------------------</td>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Boorabbin SH5113 Hunter (1989) Kern (1995)</td>
<td>Mineral exploration and mining co-exist with primary production in the northeast corner of BOORABBIN...land west of the Coolgardie-Norseman Highway have reverted to Crown land. The remainder is vacant Crown land, which was extensively exploited for timber in the first half of this century. Access throughout BOORABBIN is generally poor. Since 1965 the region has been intensively explored, first for nickel and other base-metals and, more recently, for gold.</td>
<td>There is a close correlation between photo-interpreted geology and the six ‘plant formations’ delineated by Beard (1976), since the success of floral species is strongly controlled by soil type.</td>
<td>Good water catchment areas around some large granite outcrops.</td>
</tr>
<tr>
<td>Lake Johnston SI5101 Gower and Bunting (1976)</td>
<td>Access within sheet is generally poor except for areas of mineral exploration activity in the south-eastern corner and Bremer Range. Off-track driving is hampered by dense scrub.</td>
<td>There is a close correlation between the vegetation units and the Cainozoic soil units mapped during the present survey. Both were mapped using aerial photo-patterns that are largely dependent on vegetation.</td>
<td>Poor prospects for groundwater due to low rainfall and high evaporation. Small supplies of stock-quality water possibly in catchments of large granite outcrops. Possible fresh water beneath larger sand dunes.</td>
</tr>
<tr>
<td>Ravensthorpe SI5105 Thom et al. (1977)</td>
<td>The undeveloped northern third of the sheet is easily accessed by numerous cut-lines and tracks.</td>
<td>Much of the area is covered by scrubland heath and woodlands of small eucalypts; in general large trees are rare.</td>
<td>Within the GWW, no developed groundwater supplies except for three abandoned soaks.</td>
</tr>
<tr>
<td>Kurnalpi SH5110 Williams (1970)</td>
<td>Graded roads link the scattered station homesteads to Kalgoorlie. Numerous pastoral station tracks provide access to most of the area.</td>
<td>The amount of vegetation belies the semi-arid nature of the climate. Open eucalypt woodlands which consist mainly of salmon gums, gimlet, and mallee, interspersed with saltbush and bluebush, cover the flat undulating country to the south. Vegetation density increases towards the southern margin of the sheet area.</td>
<td>No comment</td>
</tr>
<tr>
<td>Map Sheet</td>
<td>Accessibility for survey</td>
<td>Vegetation notes</td>
<td>Water notes</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------------</td>
<td>------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Kurnalpi SH5110</td>
<td>Graded roads link the scattered station homesteads to Kalgoorlie. Numerous pastoral station tracks provide access to most of the area.</td>
<td>The amount of vegetation belies the semi-arid nature of the climate. Open eucalypt woodlands which consist mainly of salmon gums, gimlet, and mallee, interspersed with saltbush and bluebush, cover the flat undulating country to the south. Vegetation density increases towards the southern margin of the sheet area.</td>
<td>No comment</td>
</tr>
<tr>
<td>Widgiemooltha SH5114</td>
<td>No comment</td>
<td>No comment</td>
<td>No comment</td>
</tr>
<tr>
<td>Norseman SI5102</td>
<td>The country is easily accessible by road and track near Norseman, in the agricultural area near Salmon Gums, and in the pastoral area of Fraser Range. However, over the greater portion of the Sheet area there are only a few tracks. Travel away from the tracks is possible by four-wheel drive vehicle, but is hampered by dense scrub.</td>
<td>The vegetation ranges from an open eucalypt woodland to a dense scrub (especially in the south). It is composed of various species of Eucalyptus, Acacia, Casuarina, Melaleuca, and saltbush (Atriplex) and bluebush (Kochia). Open grassland with spinifex (Triodia) occurs on parts of the Jimberlana Dyke and the Fraser Range.</td>
<td>No comment</td>
</tr>
<tr>
<td>Esperance SI5106</td>
<td>No comment</td>
<td>No comment</td>
<td>No comment</td>
</tr>
</tbody>
</table>
### Table A2 Continued.

<table>
<thead>
<tr>
<th>Map Sheet</th>
<th>Accessibility for survey</th>
<th>Vegetation notes</th>
<th>Water notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cundeelee</strong>&lt;br&gt;SH5111&lt;br&gt;Bunting and van de Graaff (1977)</td>
<td>Tracks within the sheet are restricted to the western third and eastern margin.</td>
<td>Southwest of Ponton Creek eucalypt woodlands predominate, being gradually replaced by mulga towards the northwest.</td>
<td>The prospects of finding water of stock quality or better on the Cunderlee Sheet are very small.</td>
</tr>
<tr>
<td><strong>Zanthus</strong>&lt;br&gt;SH5115&lt;br&gt;Doepel and Lowry (1970b)</td>
<td>Few tracks over most of the sheet area. Off-track driving is hampered by dense scrub, especially on western part of the sheet.</td>
<td>Open myall (Acacia spp.) scrub on Bunda Plateau. Precambrian geology supports open eucalypt woodland to dense scrub dominated by mallee.</td>
<td>Only two bores near Uranye Rock (of 20 drilled) yielded good quantities of stock water. Others were dry or saline.</td>
</tr>
<tr>
<td><strong>Balladonia</strong>&lt;br&gt;SI5103&lt;br&gt;Doepel and Lowry (1970a)</td>
<td>The main access is from the Eyre Highway. There are only a few tracks over the greater portion of the sheet area. Dense scrub hampers off-track four-wheel-drive travel.</td>
<td>South of the highway, and on the western part of the sheet there is dense scrub 10 to 20 feet high which is dominated by mallee-type eucalypt.</td>
<td>Pastoralists rely on small dams, excavated in colluvium flanking large granitic outcrops, for water storage. There are no bores or wells in the western portion of the Sheet area, but some underground water is likely to be present in the alluviated valleys.</td>
</tr>
<tr>
<td><strong>Malcolm–Cape Arid</strong>&lt;br&gt;SI5107&lt;br&gt;Lowry and Doepel (1974)</td>
<td>No comment</td>
<td>No comment</td>
<td>No comment</td>
</tr>
<tr>
<td><strong>Culver</strong>&lt;br&gt;SI5104&lt;br&gt;Lowry (1970)</td>
<td>The main access is from the Eyre Highway. North of the highway there are numerous vehicle tracks across open plain. South of the highway vehicle access is restricted to a few stony overgrown tracks through dense mallee scrub.</td>
<td>Vegetation consists mainly of blue-bush (Kochia sedifolia), salt bush (Atriplex spp.), and grasses in the northeastern part of the Sheet; mallee-type eucalypt scrub 5 to 20 feet high near the coast; and myall scrub 10 to 20 feet high in other areas.</td>
<td>In a few areas there could be suitable groundwater for sheep (salinities from 12 000 to 20 000 ppm) but not for cattle, as they require salinity less than 10 000 ppm.</td>
</tr>
<tr>
<td>Soil group</td>
<td>Low shrubland</td>
<td>Tall shrubland</td>
<td>Mallee</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------------------</td>
<td>-------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Aeolian loams</td>
<td></td>
<td></td>
<td>E. aff. occidentalis; E. cylindrocarpa; E. eremaphila; E. falcata; E. foecunda; E. gracilis; E. incrassata; E. leptophylla; E. mixed; E. oleosa; E. oleosa over Triodia scariosa; E. pleata</td>
</tr>
<tr>
<td>Aeolian sands</td>
<td>Atriplex vesicaria</td>
<td>Acacia jennerae; Acacia ligulata</td>
<td></td>
</tr>
<tr>
<td>Alluvial</td>
<td>Tecticornia verrucosa</td>
<td></td>
<td>E. aff. decipiens; E. burracoppinensis; E. hypochlamydea; E. leptopoda; E. platycorys; E. tetragona</td>
</tr>
<tr>
<td>Alluvium</td>
<td></td>
<td>Melaleuca aff. preissiana</td>
<td></td>
</tr>
<tr>
<td>Calcareous earths</td>
<td>Cratystylis conocephala</td>
<td></td>
<td>E. cylindrocarpa; E. mixed mallee over Melaleuca; E. transcontinentalis</td>
</tr>
<tr>
<td>Deep calcareous earths</td>
<td>Maireana sedifolia</td>
<td></td>
<td>E. cylindriflora; E. cylindrocarpa; E. gracilis; E. incrassata; E. scyphocalyx; E. spathulata ssp. grandiflora</td>
</tr>
<tr>
<td>Deep sands</td>
<td>Mixed Grevillea spp.</td>
<td>Acacia beauverdiana; Allocasuarina corniculata; Callitris preissii; Callitris preissii ssp. verrucosa; Grevillea eriostachya ssp. Excelsior; Grevillea excelsior; Melaleuca uncinata</td>
<td>E. aff. decipiens; E. burracoppinensis; E. hypochlamydea; E. leptopoda; E. platycorys; E. tetragona</td>
</tr>
<tr>
<td>Fine loamy sands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil group</td>
<td>Low shrubland</td>
<td>Tall shrubland</td>
<td>Mallee</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------------------</td>
<td>-----------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Fine sandy clays</td>
<td></td>
<td>E. diptera</td>
<td></td>
</tr>
<tr>
<td>Granitic loam</td>
<td>Thryptomene australis</td>
<td>Acacia acuminata</td>
<td></td>
</tr>
<tr>
<td>Granitic sands</td>
<td></td>
<td>E. gracilis</td>
<td></td>
</tr>
<tr>
<td>Granitic soils</td>
<td>Acacia acuminata; Acacia quadrimarginea; Acacia sessilispica; Acacia sp. (KRN 7568); Allocasuarina campestris ssp. campestris; Leptospermum erubescens; Melaleuca uncinata</td>
<td>E. grossa; E. loxophleba</td>
<td>Acacia lasiocalyx; Allocasuarina huegeliana</td>
</tr>
<tr>
<td>Granitic light clay</td>
<td>Acacia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gravelly sands</td>
<td>Hakea cf. falcata</td>
<td>Acacia beauverdiana; Acacia signata; Allocasuarina acutivalvis; Allocasuarina campestris ssp. campestris</td>
<td>E. scyphocalyx; 1</td>
</tr>
<tr>
<td>Gritty loams</td>
<td>Hakea pendula</td>
<td></td>
<td>E. capillosa</td>
</tr>
<tr>
<td>Gritty sands</td>
<td>Allocasuarina acutivalvis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gritty soils</td>
<td>Baeckea sp. (KRN 7010)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gypsum soils</td>
<td></td>
<td></td>
<td>E. fraseri</td>
</tr>
<tr>
<td>Light clays</td>
<td>Halosarcia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loamy clay sands</td>
<td></td>
<td></td>
<td>E. effusa</td>
</tr>
<tr>
<td>Loamy clays</td>
<td></td>
<td></td>
<td>E. creta</td>
</tr>
<tr>
<td>Loamy sands</td>
<td>Callitris canescens; Melaleuca uncinata</td>
<td></td>
<td>E. melanoxylon</td>
</tr>
<tr>
<td>Meta-granitic soils</td>
<td>Cratystylis subspinescens</td>
<td></td>
<td>E. loxophleba</td>
</tr>
<tr>
<td>Red cracking clays</td>
<td>Cratystylis subspinescens</td>
<td></td>
<td>E. salubris</td>
</tr>
</tbody>
</table>
Table A3 Continued.

<table>
<thead>
<tr>
<th>Soil group</th>
<th>Low shrubland</th>
<th>Tall shrubland</th>
<th>Mallee</th>
<th>Woodlands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red sands</td>
<td>Acacia quadrimarginea</td>
<td>E. oleosa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saline soils</td>
<td>Halosarcia spp.</td>
<td>Melaleuca uncinata</td>
<td>Melaleuca uncinata</td>
<td></td>
</tr>
<tr>
<td>Shallow calcareous earths</td>
<td></td>
<td></td>
<td>E. griffithsii</td>
<td>Casuarina cristata; E. corrugata; E. fraseri; E. oleosa; E. oleosa – Casuarina cristata; E. sp. (KRN5603); E. stricklandii; E. torquata</td>
</tr>
<tr>
<td>Shallow loamy sands</td>
<td></td>
<td>E. oleosa</td>
<td>E. oleosa; E. transcontinentalis</td>
<td></td>
</tr>
<tr>
<td>Shallow sands</td>
<td>Melaleuca</td>
<td>E. aff. occidentalis; E. pileata; E. redunca; E. transcontinentalis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shallow sandy clays</td>
<td></td>
<td>E. celastoides var. virella</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-saline soils</td>
<td>Halosarcia spp.; Atriplex vesicaria ssp. variabilis</td>
<td>Dodonaea angustissima; Eremophila miniata; Melaleuca aff. cuticularis</td>
<td>E. sp. (KRN 9710)</td>
<td></td>
</tr>
</tbody>
</table>

Eucalyptus is abbreviated to E.
Compiled from field site data published in the records of the Western Australian Museum (Newby et al. 1984).
### Table A4 Relationship between plant formation and soil type in the areas covered by the Boorabbin and Lake Johnston 1:250 000 map sheets.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Vegetation Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Scrub heath</td>
<td>Mostly ~1 m tall; very frequently burnt</td>
</tr>
<tr>
<td>2. Broombush thicket</td>
<td>Up to 3 or 4 m tall; intergrades with scrub heath</td>
</tr>
<tr>
<td>3. Rock pavement vegetation</td>
<td>~3–5 m tall, occasionally 6–8 m; frequently burnt</td>
</tr>
<tr>
<td>4. Mallee and marlock</td>
<td>Mostly 12–20 m tall</td>
</tr>
<tr>
<td>5. Sclerophyll woodland (trees incl. tree mallee)</td>
<td></td>
</tr>
<tr>
<td>6. Halophytes</td>
<td></td>
</tr>
<tr>
<td>Leached sands</td>
<td>Partly open canopy including Proteaceae and Myrtaceae (but no Eucalyptus spp.)</td>
</tr>
<tr>
<td>Shallow sandy soil over laterite, ironstone and gravel, or unweathered granite</td>
<td>Dense shrub assemblage comprising mostly Casuarina, Acacia and Melaleuca spp.</td>
</tr>
<tr>
<td>Soil-less granite outcrops</td>
<td>Lichen and moss, with aquatic plants in pools and shrubs in crevices or soil patches</td>
</tr>
<tr>
<td>Highly saline depressions</td>
<td></td>
</tr>
<tr>
<td>Granite—residual or eluvial</td>
<td></td>
</tr>
<tr>
<td>(i) Red loam</td>
<td>Understorey shrub layer incl. Alyxia, Connesperma, Daviesia, Bremophila, Grevillea, Scaevola, Westringia spp.</td>
</tr>
<tr>
<td>(ii) Leached soils</td>
<td>Understorey tall shrub layer incl. Dodonaea, Melaleuca, Santalum spp.</td>
</tr>
<tr>
<td></td>
<td>Eucalyptus transcontinentalis – E. flocktoniae association. Other trees incl. E. corrugata, E. salubris, E. melanoxylon</td>
</tr>
<tr>
<td></td>
<td>Understorey of mixed heath shrubs</td>
</tr>
</tbody>
</table>
### Table A4 Continued.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Vegetation Type</th>
</tr>
</thead>
</table>
| Hummock grass on red sands  | Understorey shrub layer incl. Melaleuca  
|                            | E. eremophila in association with one or more of: E. oleosa, E. redunca, E. incrassata, E. pileata, E. leptophylla, E. flocktoniae, E. laxophleba  
|                            | Saltbush understorey on alkaline soils  |
| Granite—alluvial            |                                     |
| (i) Light loam              | Sparse understorey can include Eremophila, Acacia, Davesia  
|                            | Tall understorey shrub layer of Melaleuca  
|                            | E. salmonophloia  |
| (ii) Clay-loam              | Sparse understorey can include Eremophila, Acacia, Davesia  
|                            | Tall understorey shrub layer of Melaleuca  
|                            | E. salmonophloia – E. longicornis  |
| (iii) Stiff clay            | Sparse understorey can include Eremophila, Acacia, Davesia  
|                            | Tall understorey shrub layer of Melaleuca  
|                            | E. salmonophloia – E. salubris  |
| (iv) Sandridges             |                                     
|                            | E. aff. striaticalyx-E. leptophylla association with occasional E. salmonophloia  
<p>|                            | Chenopod shrub understorey  |
| Greenstone—residual or eluvial |                                   |</p>
<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Vegetation Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Rocky ridges</td>
<td>Open understorey incl. Cassia</td>
</tr>
<tr>
<td></td>
<td>Open understorey incl. Eremophila, Dodonaea, Acacia spp.</td>
</tr>
<tr>
<td></td>
<td>E. torquate – E. lesoeufii co-dominant. Other trees include E. corrugata, E. clelandii, E. campaspe and Casuarina cristate</td>
</tr>
<tr>
<td></td>
<td>Atriplex (old man saltbush)</td>
</tr>
<tr>
<td>(ii) Deep soil</td>
<td>Understorey shrub layer incl. Alyxia, Connesperma, Davesia, Eremophila, Grevillea, Scaevola, Westringia spp.</td>
</tr>
<tr>
<td></td>
<td>Understorey tall shrub layer incl. Dodonaea, Melaleuca, Santalum spp.</td>
</tr>
<tr>
<td></td>
<td>E. dundasii – E. longicornis; E. lesoeufii – E. oleosa</td>
</tr>
<tr>
<td>Greenstone—alluvial</td>
<td>Sparse understorey can include Eremophila, Acacia, Davesia</td>
</tr>
<tr>
<td>Soils of high base status</td>
<td>Tall understorey shrub layer of Melaleuca</td>
</tr>
<tr>
<td></td>
<td>E. salmonophloia – E. melanoxylon</td>
</tr>
</tbody>
</table>

Species found in vegetation types 1, 2 and 6 can make up the understorey of types 4 and 5 where soil type is appropriate.

Data compiled from Beard (1968).
Table A5 Summary of data obtained from field survey of 21 sites in the GWW during 2005–07.

<table>
<thead>
<tr>
<th>Site number</th>
<th>Survey ID</th>
<th>Canopy layer</th>
<th>Number of observations</th>
<th>Absolute density (plants ha$^{-1}$)</th>
<th>Basal area (m$^2$ ha$^{-1}$)</th>
<th>Mean canopy height (m)</th>
<th>Stdev canopy height (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2005_01</td>
<td>T</td>
<td>52</td>
<td>37</td>
<td>4.90</td>
<td>16.95</td>
<td>3.90</td>
</tr>
<tr>
<td>1</td>
<td>2005_01</td>
<td>S</td>
<td>61</td>
<td>96</td>
<td>no data</td>
<td>4.33</td>
<td>2.43</td>
</tr>
<tr>
<td>1</td>
<td>2005_01</td>
<td>C</td>
<td>64</td>
<td>759</td>
<td>no data</td>
<td>0.60</td>
<td>0.23</td>
</tr>
<tr>
<td>2</td>
<td>2005_02</td>
<td>T1</td>
<td>20</td>
<td>10</td>
<td>1.48</td>
<td>11.99</td>
<td>3.52</td>
</tr>
<tr>
<td>2</td>
<td>2005_02</td>
<td>T2</td>
<td>19</td>
<td>16</td>
<td>no data</td>
<td>2.73</td>
<td>0.92</td>
</tr>
<tr>
<td>2</td>
<td>2005_02</td>
<td>Y</td>
<td>32</td>
<td>330</td>
<td>no data</td>
<td>0.94</td>
<td>0.34</td>
</tr>
<tr>
<td>2</td>
<td>2005_02</td>
<td>S</td>
<td>42</td>
<td>62</td>
<td>no data</td>
<td>2.92</td>
<td>0.67</td>
</tr>
<tr>
<td>2</td>
<td>2005_02</td>
<td>Z</td>
<td>64</td>
<td>2,433</td>
<td>no data</td>
<td>0.55</td>
<td>0.43</td>
</tr>
<tr>
<td>3</td>
<td>2005_03</td>
<td>Z1</td>
<td>28</td>
<td>22</td>
<td>no data</td>
<td>1.26</td>
<td>0.24</td>
</tr>
<tr>
<td>3</td>
<td>2005_03</td>
<td>Z2</td>
<td>64</td>
<td>1,443</td>
<td>no data</td>
<td>0.66</td>
<td>0.11</td>
</tr>
<tr>
<td>3</td>
<td>2005_03</td>
<td>Z3</td>
<td>64</td>
<td>26,120</td>
<td>no data</td>
<td>0.31</td>
<td>0.09</td>
</tr>
<tr>
<td>4</td>
<td>2005_04</td>
<td>Z1</td>
<td>64</td>
<td>136</td>
<td>no data</td>
<td>1.35</td>
<td>0.43</td>
</tr>
<tr>
<td>4</td>
<td>2005_04</td>
<td>Z2</td>
<td>64</td>
<td>3,999</td>
<td>no data</td>
<td>0.61</td>
<td>0.10</td>
</tr>
<tr>
<td>4</td>
<td>2005_04</td>
<td>Z3</td>
<td>64</td>
<td>112,513</td>
<td>no data</td>
<td>0.32</td>
<td>0.08</td>
</tr>
<tr>
<td>5</td>
<td>2005_05</td>
<td>T</td>
<td>49</td>
<td>28</td>
<td>5.74</td>
<td>16.14</td>
<td>2.32</td>
</tr>
<tr>
<td>5</td>
<td>2005_05</td>
<td>M</td>
<td>53</td>
<td>96</td>
<td>2.66</td>
<td>4.85</td>
<td>2.71</td>
</tr>
<tr>
<td>5</td>
<td>2005_05</td>
<td>S</td>
<td>64</td>
<td>295</td>
<td>no data</td>
<td>1.79</td>
<td>0.73</td>
</tr>
<tr>
<td>5</td>
<td>2005_05</td>
<td>Z1</td>
<td>64</td>
<td>1,069</td>
<td>no data</td>
<td>0.75</td>
<td>0.14</td>
</tr>
<tr>
<td>5</td>
<td>2005_05</td>
<td>Z2</td>
<td>64</td>
<td>2,253</td>
<td>no data</td>
<td>0.29</td>
<td>0.09</td>
</tr>
<tr>
<td>6</td>
<td>2005_06</td>
<td>T</td>
<td>58</td>
<td>45</td>
<td>6.04</td>
<td>12.79</td>
<td>3.72</td>
</tr>
<tr>
<td>6</td>
<td>2005_06</td>
<td>C</td>
<td>64</td>
<td>1,682</td>
<td>no data</td>
<td>0.78</td>
<td>0.19</td>
</tr>
<tr>
<td>6</td>
<td>2005_06</td>
<td>Z1</td>
<td>52</td>
<td>49</td>
<td>no data</td>
<td>1.68</td>
<td>0.85</td>
</tr>
<tr>
<td>6</td>
<td>2005_06</td>
<td>Z2</td>
<td>64</td>
<td>1,988</td>
<td>no data</td>
<td>0.35</td>
<td>0.10</td>
</tr>
<tr>
<td>7</td>
<td>2005_07</td>
<td>T1</td>
<td>63</td>
<td>109</td>
<td>8.56</td>
<td>10.27</td>
<td>2.92</td>
</tr>
<tr>
<td>7</td>
<td>2005_07</td>
<td>T2</td>
<td>31</td>
<td>26</td>
<td>no data</td>
<td>6.66</td>
<td>1.71</td>
</tr>
<tr>
<td>7</td>
<td>2005_07</td>
<td>Z1</td>
<td>64</td>
<td>478</td>
<td>no data</td>
<td>1.53</td>
<td>0.39</td>
</tr>
</tbody>
</table>
Table A5 continued.

<table>
<thead>
<tr>
<th>Site number</th>
<th>Survey ID</th>
<th>Canopy layer</th>
<th>Number of observations</th>
<th>Absolute density (plants ha(^{-1}))</th>
<th>Basal area (m(^2) ha(^{-1}))</th>
<th>Mean canopy height (m)</th>
<th>Stdev canopy height (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>2005_07</td>
<td>Z2</td>
<td>64</td>
<td>932</td>
<td>no data</td>
<td>0.71</td>
<td>0.20</td>
</tr>
<tr>
<td>8</td>
<td>2005_07</td>
<td>Z3</td>
<td>64</td>
<td>2,058</td>
<td>no data</td>
<td>0.34</td>
<td>0.09</td>
</tr>
<tr>
<td>8</td>
<td>2005_08</td>
<td>Y</td>
<td>52</td>
<td>50</td>
<td>no data</td>
<td>3.57</td>
<td>1.27</td>
</tr>
<tr>
<td>8</td>
<td>2005_08</td>
<td>Z1</td>
<td>63</td>
<td>304</td>
<td>no data</td>
<td>2.66</td>
<td>0.62</td>
</tr>
<tr>
<td>8</td>
<td>2005_08</td>
<td>Z2</td>
<td>64</td>
<td>2,156</td>
<td>no data</td>
<td>1.21</td>
<td>0.34</td>
</tr>
<tr>
<td>9</td>
<td>2005_09</td>
<td>T1</td>
<td>39</td>
<td>21</td>
<td>2.94</td>
<td>12.84</td>
<td>2.53</td>
</tr>
<tr>
<td>9</td>
<td>2005_09</td>
<td>T2</td>
<td>42</td>
<td>27</td>
<td>1.39</td>
<td>8.61</td>
<td>1.46</td>
</tr>
<tr>
<td>9</td>
<td>2005_09</td>
<td>Z1</td>
<td>64</td>
<td>425</td>
<td>no data</td>
<td>1.60</td>
<td>0.74</td>
</tr>
<tr>
<td>9</td>
<td>2005_09</td>
<td>Z2</td>
<td>64</td>
<td>719</td>
<td>no data</td>
<td>0.73</td>
<td>0.15</td>
</tr>
<tr>
<td>10</td>
<td>2005_10</td>
<td>Y</td>
<td>27</td>
<td>38</td>
<td>no data</td>
<td>3.81</td>
<td>1.07</td>
</tr>
<tr>
<td>10</td>
<td>2005_10</td>
<td>Z1</td>
<td>64</td>
<td>2,252</td>
<td>no data</td>
<td>1.83</td>
<td>0.48</td>
</tr>
<tr>
<td>10</td>
<td>2005_10</td>
<td>Z2</td>
<td>64</td>
<td>19,083</td>
<td>no data</td>
<td>0.71</td>
<td>0.17</td>
</tr>
<tr>
<td>11</td>
<td>2006_01</td>
<td>T</td>
<td>57</td>
<td>124</td>
<td>1.42</td>
<td>7.31</td>
<td>2.97</td>
</tr>
<tr>
<td>11</td>
<td>2006_01</td>
<td>Y</td>
<td>13</td>
<td>12</td>
<td>no data</td>
<td>4.83</td>
<td>3.99</td>
</tr>
<tr>
<td>11</td>
<td>2006_01</td>
<td>S</td>
<td>52</td>
<td>358</td>
<td>no data</td>
<td>1.78</td>
<td>0.40</td>
</tr>
<tr>
<td>11</td>
<td>2006_01</td>
<td>Z</td>
<td>62</td>
<td>523</td>
<td>no data</td>
<td>0.70</td>
<td>0.22</td>
</tr>
<tr>
<td>12</td>
<td>2006_02</td>
<td>T</td>
<td>58</td>
<td>67</td>
<td>6.64</td>
<td>13.22</td>
<td>3.58</td>
</tr>
<tr>
<td>12</td>
<td>2006_02</td>
<td>M</td>
<td>53</td>
<td>58</td>
<td>0.94</td>
<td>4.59</td>
<td>2.33</td>
</tr>
<tr>
<td>12</td>
<td>2006_02</td>
<td>S</td>
<td>59</td>
<td>93</td>
<td>no data</td>
<td>2.63</td>
<td>1.06</td>
</tr>
<tr>
<td>12</td>
<td>2006_02</td>
<td>Z</td>
<td>64</td>
<td>853</td>
<td>no data</td>
<td>1.02</td>
<td>0.28</td>
</tr>
<tr>
<td>13</td>
<td>2006_03</td>
<td>T1</td>
<td>39</td>
<td>19</td>
<td>11.54</td>
<td>14.79</td>
<td>4.17</td>
</tr>
<tr>
<td>13</td>
<td>2006_03</td>
<td>T2</td>
<td>10</td>
<td>3</td>
<td>0.30</td>
<td>8.57</td>
<td>1.25</td>
</tr>
<tr>
<td>13</td>
<td>2006_03</td>
<td>T3</td>
<td>20</td>
<td>11</td>
<td>0.05</td>
<td>3.76</td>
<td>1.48</td>
</tr>
<tr>
<td>13</td>
<td>2006_03</td>
<td>S</td>
<td>62</td>
<td>215</td>
<td>no data</td>
<td>3.37</td>
<td>1.78</td>
</tr>
<tr>
<td>13</td>
<td>2006_03</td>
<td>Z</td>
<td>64</td>
<td>1,887</td>
<td>no data</td>
<td>0.84</td>
<td>0.23</td>
</tr>
<tr>
<td>14</td>
<td>2006_04</td>
<td>T1</td>
<td>38</td>
<td>19</td>
<td>4.16</td>
<td>16.92</td>
<td>4.35</td>
</tr>
<tr>
<td>14</td>
<td>2006_04</td>
<td>T2</td>
<td>39</td>
<td>19</td>
<td>0.77</td>
<td>12.52</td>
<td>2.85</td>
</tr>
<tr>
<td>14</td>
<td>2006_04</td>
<td>T3</td>
<td>14</td>
<td>6</td>
<td>0.00</td>
<td>3.66</td>
<td>1.75</td>
</tr>
<tr>
<td>14</td>
<td>2006_04</td>
<td>M</td>
<td>31</td>
<td>28</td>
<td>0.81</td>
<td>7.65</td>
<td>1.63</td>
</tr>
<tr>
<td>Site number</td>
<td>Survey ID</td>
<td>Canopy layer</td>
<td>Number of observations</td>
<td>Absolute density (plants ha⁻¹)</td>
<td>Basal area (m² ha⁻¹)</td>
<td>Mean canopy height (m)</td>
<td>Std dev canopy height (m)</td>
</tr>
<tr>
<td>------------</td>
<td>-----------</td>
<td>--------------</td>
<td>------------------------</td>
<td>--------------------------------</td>
<td>----------------------</td>
<td>------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>14</td>
<td>2006_04</td>
<td>S</td>
<td>64</td>
<td>337</td>
<td>no data</td>
<td>2.49</td>
<td>0.93</td>
</tr>
<tr>
<td>14</td>
<td>2006_04</td>
<td>Z</td>
<td>64</td>
<td>1384</td>
<td>no data</td>
<td>0.89</td>
<td>0.25</td>
</tr>
<tr>
<td>15</td>
<td>2006_05</td>
<td>T1</td>
<td>50</td>
<td>29</td>
<td>4.80</td>
<td>11.80</td>
<td>2.71</td>
</tr>
<tr>
<td>15</td>
<td>2006_05</td>
<td>T2</td>
<td>28</td>
<td>17</td>
<td>0.58</td>
<td>9.39</td>
<td>1.79</td>
</tr>
<tr>
<td>15</td>
<td>2006_05</td>
<td>T3</td>
<td>10</td>
<td>5</td>
<td>0.02</td>
<td>4.48</td>
<td>2.60</td>
</tr>
<tr>
<td>15</td>
<td>2006_05</td>
<td>S1</td>
<td>45</td>
<td>29</td>
<td>no data</td>
<td>2.44</td>
<td>0.90</td>
</tr>
<tr>
<td>15</td>
<td>2006_05</td>
<td>S2</td>
<td>64</td>
<td>328</td>
<td>no data</td>
<td>0.84</td>
<td>0.29</td>
</tr>
<tr>
<td>16</td>
<td>2006_06</td>
<td>M</td>
<td>7</td>
<td>4</td>
<td>0.07</td>
<td>6.26</td>
<td>1.08</td>
</tr>
<tr>
<td>16</td>
<td>2006_06</td>
<td>S1</td>
<td>64</td>
<td>364</td>
<td>no data</td>
<td>3.57</td>
<td>0.80</td>
</tr>
<tr>
<td>16</td>
<td>2006_06</td>
<td>S2</td>
<td>64</td>
<td>9876</td>
<td>no data</td>
<td>0.93</td>
<td>0.21</td>
</tr>
<tr>
<td>17</td>
<td>2006_07</td>
<td>M</td>
<td>18</td>
<td>8</td>
<td>0.33</td>
<td>7.33</td>
<td>3.29</td>
</tr>
<tr>
<td>17</td>
<td>2006_07</td>
<td>S1</td>
<td>64</td>
<td>470</td>
<td>no data</td>
<td>3.24</td>
<td>0.88</td>
</tr>
<tr>
<td>17</td>
<td>2006_07</td>
<td>S2</td>
<td>64</td>
<td>7707</td>
<td>no data</td>
<td>0.96</td>
<td>0.31</td>
</tr>
<tr>
<td>18</td>
<td>2007_01</td>
<td>T/Y</td>
<td>60</td>
<td>330</td>
<td>3.22</td>
<td>6.50</td>
<td>1.45</td>
</tr>
<tr>
<td>18</td>
<td>2007_01</td>
<td>S</td>
<td>64</td>
<td>2436</td>
<td>no data</td>
<td>2.77</td>
<td>0.64</td>
</tr>
<tr>
<td>18</td>
<td>2007_01</td>
<td>Z</td>
<td>64</td>
<td>1197</td>
<td>no data</td>
<td>0.99</td>
<td>0.31</td>
</tr>
<tr>
<td>19</td>
<td>2007_02</td>
<td>T1</td>
<td>46</td>
<td>26</td>
<td>4.55</td>
<td>12.81</td>
<td>2.23</td>
</tr>
<tr>
<td>19</td>
<td>2007_02</td>
<td>T2</td>
<td>51</td>
<td>7</td>
<td>0.24</td>
<td>10.43</td>
<td>2.21</td>
</tr>
<tr>
<td>19</td>
<td>2007_02</td>
<td>T3</td>
<td>53</td>
<td>11</td>
<td>0.51</td>
<td>4.95</td>
<td>0.99</td>
</tr>
<tr>
<td>19</td>
<td>2007_02</td>
<td>S</td>
<td>64</td>
<td>116</td>
<td>no data</td>
<td>2.70</td>
<td>0.66</td>
</tr>
<tr>
<td>19</td>
<td>2007_02</td>
<td>C/Z</td>
<td>64</td>
<td>564</td>
<td>no data</td>
<td>0.86</td>
<td>0.20</td>
</tr>
<tr>
<td>20</td>
<td>2007_03</td>
<td>T1</td>
<td>60</td>
<td>54</td>
<td>9.11</td>
<td>16.45</td>
<td>2.83</td>
</tr>
<tr>
<td>20</td>
<td>2007_03</td>
<td>T2</td>
<td>49</td>
<td>35</td>
<td>1.26</td>
<td>11.89</td>
<td>2.26</td>
</tr>
<tr>
<td>21</td>
<td>2007_04</td>
<td>Y</td>
<td>50</td>
<td>124</td>
<td>no data</td>
<td>2.10</td>
<td>0.68</td>
</tr>
<tr>
<td>21</td>
<td>2007_04</td>
<td>Z</td>
<td>64</td>
<td>12541</td>
<td>no data</td>
<td>0.79</td>
<td>0.21</td>
</tr>
</tbody>
</table>

T = monopodial tree canopy layer (numbered T1, T2, T3 when there is more than one tree canopy layer). M = mallee tree layer. S = tall shrub layer (incl. Acacia, Melaleuca, Santalum). C = saltbush/bluebush low shrub layer, Y = mallee shrub layer, Z = sclerophyllous (heath) shrub layer.

Basal area estimates are available only for the tree layers. The maximum possible number of observations for a layer at a site is 64 (16 point centres × 4 quarters).
Table A6.1 Biomass and allometric regression equations for Queensland woodland tree/mallee species.

<table>
<thead>
<tr>
<th>Description</th>
<th>n</th>
<th>DBH range (cm)</th>
<th>a</th>
<th>b</th>
<th>R²</th>
<th>RSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mallee (Eucalyptus socialis/E. dumosa combined) (Burrows et al. 1976) (33º53'S, 146º30'E)</td>
<td></td>
<td>2.5–55.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LnY = a + bLnX in which X = circumference at 30 cm</td>
<td></td>
<td>29</td>
<td>-4.1671</td>
<td>2.2620</td>
<td>0.98</td>
<td>0.213</td>
</tr>
<tr>
<td>Total mass (kg)</td>
<td></td>
<td>29</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mallee re-growth (Eucalyptus socialis/E. gracilis/E. leptophylla combined) (Burrows et al. 1976) (33º53'S, 146º30'E)</td>
<td></td>
<td>1.8–23.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LnY = a + bLnX in which X = circumference at 30 cm</td>
<td></td>
<td>30</td>
<td>1.9943</td>
<td>2.4780</td>
<td>0.99</td>
<td>0.165</td>
</tr>
<tr>
<td>Total mass (kg)</td>
<td></td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Callitris glaucophylla trees, Qld (Burrows et al. 2001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>y = a + be^(–x/c) in which x = circumference at 30 cm (cm)</td>
<td></td>
<td>20</td>
<td>–110.512</td>
<td>81.962</td>
<td>0.976</td>
<td>37.393</td>
</tr>
<tr>
<td>y = total above-ground mass (kg)</td>
<td></td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c = –56.704</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Callitris glaucophylla trees, Qld (Burrows et al. 2001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>y = a + be^(–x/c) in which x = circumference at 130 cm (cm)</td>
<td></td>
<td>20</td>
<td>–110.195</td>
<td>83.251</td>
<td>0.989</td>
<td>25.277</td>
</tr>
<tr>
<td>y = total above-ground mass (kg)</td>
<td></td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c = –50.193</td>
<td></td>
<td>0.989</td>
<td>25.277</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Eamus et al. (2000:Appendix).
### Table A6.2 Biomass and allometric regression equations for Queensland woodland shrub species.

<table>
<thead>
<tr>
<th>Description</th>
<th>n</th>
<th>Height range (m)</th>
<th>a</th>
<th>b</th>
<th>R²</th>
<th>RSD*</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Acacia aneura</em> (mulga) shrubs &lt;4.5 m high (Harrington 1979)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LnY = a + bLnX</strong> in which X = shoot height (m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaf (kg)</td>
<td>19</td>
<td>0.2–3.5</td>
<td>-2.589</td>
<td>2.116</td>
<td>0.941</td>
<td>0.476</td>
</tr>
<tr>
<td>Wood (kg)</td>
<td>19</td>
<td>0.2–3.5</td>
<td>-1.736</td>
<td>2.404</td>
<td>0.941</td>
<td>0.5448</td>
</tr>
<tr>
<td><em>Acacia harpophylla</em> (brigalow) (Scanlan 1991)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Y = e^(a+bLnX)</strong> in which X = shoot height (cm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total above-ground biomass (g)</td>
<td>29</td>
<td>0.6–3.2</td>
<td>-4.303</td>
<td>2.150</td>
<td>0.86</td>
<td>0.558</td>
</tr>
<tr>
<td><em>Cassia nemophila</em> shrubs &lt;4.5 m high (Harrington 1979)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LnY = a + bLnX</strong> in which X = shoot height (m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaf (kg)</td>
<td>19</td>
<td>0.6–2.0</td>
<td>-1.867</td>
<td>2.286</td>
<td>0.865</td>
<td>0.392</td>
</tr>
<tr>
<td>Wood (kg)</td>
<td>19</td>
<td>0.6–2.0</td>
<td>-1.310</td>
<td>3.297</td>
<td>0.884</td>
<td>0.494</td>
</tr>
<tr>
<td><em>Dodonae a viscosa</em> shrubs &lt;4.5 m high (Harrington 1979)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LnY = a + bLnX</strong> in which X = shoot height (m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaf (kg)</td>
<td>40</td>
<td>0.2–2.0</td>
<td>-3.940</td>
<td>2.492</td>
<td>0.792</td>
<td>0.9823</td>
</tr>
<tr>
<td>Wood (kg)</td>
<td>40</td>
<td>0.2–2.0</td>
<td>-3.275</td>
<td>3.380</td>
<td>0.884</td>
<td>0.922</td>
</tr>
</tbody>
</table>

* Residual Standard Deviation
### Table A6.2 continued.

<table>
<thead>
<tr>
<th>Description</th>
<th>n</th>
<th>Height range</th>
<th>a</th>
<th>b</th>
<th>R²</th>
<th>RSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eremophila bowmanii shrubs &lt;4.5 m high (Harrington 1979)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \ln Y = a + b \ln x ) in which ( x = ) shoot height (m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaf (kg)</td>
<td>18</td>
<td>0.2–1.8</td>
<td>−3.236</td>
<td>2.586</td>
<td>0.903</td>
<td>0.5448</td>
</tr>
<tr>
<td>Wood (kg)</td>
<td>18</td>
<td>0.2–1.8</td>
<td>−0.259</td>
<td>3.522</td>
<td>0.941</td>
<td>0.5448</td>
</tr>
<tr>
<td>Eremophila mitchelli shrubs &lt;4.5 m high (Harrington 1979)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \ln Y = a + b \ln x ) in which ( x = ) shoot height (m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaf (kg)</td>
<td>18</td>
<td>0.6–5.0</td>
<td>−2.612</td>
<td>2.532</td>
<td>0.828</td>
<td>0.6914</td>
</tr>
<tr>
<td>Wood (kg)</td>
<td>18</td>
<td>0.6–5.0</td>
<td>−1.790</td>
<td>3.002</td>
<td>0.922</td>
<td>0.545</td>
</tr>
<tr>
<td>Myoporum deserti shrubs &lt;4.5 m high (Harrington 1979)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \ln Y = a + b \ln x ) in which ( x = ) shoot height (m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaf (kg)</td>
<td>17</td>
<td>0.2–2.0</td>
<td>−1.535</td>
<td>2.449</td>
<td>0.846</td>
<td>0.6914</td>
</tr>
<tr>
<td>Wood (kg)</td>
<td>17</td>
<td>0.2–2.0</td>
<td>−0.998</td>
<td>3.030</td>
<td>0.923</td>
<td>0.643</td>
</tr>
</tbody>
</table>

Source: Eamus et al. (2000:Appendix).
<table>
<thead>
<tr>
<th>Vegetation Type</th>
<th>Dominant species</th>
<th>State Site</th>
<th>Equation form</th>
<th>$Y = a + bx$</th>
<th>$Y = a + bx$</th>
<th>$Y = a + bx$</th>
<th>$Y = a + bx$</th>
<th>$Y = a + bx$</th>
<th>$Y = a + bx$</th>
<th>$Y = a + bx$</th>
<th>$Y = a + bx$</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heathland</td>
<td>Hakea and Banksia spp. only</td>
<td>WA 30º23'S, 115º30'E</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>Rullo (1981)</td>
</tr>
<tr>
<td>Heathland</td>
<td>Banksia ornata only</td>
<td>VIC. 36º36'S, 141º20'E</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>Ata (1996)</td>
</tr>
<tr>
<td>Heathland</td>
<td>Other woody shrubs (other than B. ornata)</td>
<td>VIC. 36º36'S, 141º20'E</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>Ata (1996)</td>
</tr>
<tr>
<td>Heathland</td>
<td>Hakea and other species</td>
<td>WA 30º23'S, 115º30'E</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>Delfs et al. (1997)</td>
</tr>
<tr>
<td>Heathland</td>
<td>Acacia and Hibbertia spp.</td>
<td>SA 34º21'S, 139º37'E</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>Orell (n.d.)</td>
</tr>
<tr>
<td>Shrubland</td>
<td>Acacia and Eucalyptus spp. social</td>
<td>SA 34º21'S, 139º37'E</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>$Y = a + bx$</td>
<td>Neagle (n.d.)</td>
</tr>
<tr>
<td>Open woodlands (mallee)</td>
<td>Eucalyptus social/oleosa</td>
<td>WA 31º24'S, 117º45'E</td>
<td>$Y = a + b (\ln x)$</td>
<td>$Y = a + b (\ln x)$</td>
<td>$Y = a + b (\ln x)$</td>
<td>$Y = a + b (\ln x)$</td>
<td>$Y = a + b (\ln x)$</td>
<td>$Y = a + b (\ln x)$</td>
<td>$Y = a + b (\ln x)$</td>
<td>$Y = a + b (\ln x)$</td>
<td>$Y = a + b (\ln x)$</td>
<td>Van Schagen (1989)</td>
</tr>
</tbody>
</table>

Table A6.3 Alometric relationships between above-ground biomass and other variables for low-productivity vegetation. Sources: Grierson et al. (2000:Table 2, p. 5; unpublished information).
Table A6.4 Allometric relationships (InBiomass = a + b InDiameter at 30 cm) between above-ground biomass and coarse root biomass with stem diameter for *Eucalyptus populnea* woodlands along a rainfall gradient.

<table>
<thead>
<tr>
<th>Location</th>
<th>Site</th>
<th>Rainfall (mm)</th>
<th>a</th>
<th>b</th>
<th>SE(a)</th>
<th>SE(b)</th>
<th>Mean square error</th>
<th>n</th>
<th>Diameter range (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oakvale</td>
<td>30.92°S, 46.50°E</td>
<td>367</td>
<td>-1.370</td>
<td>2.079</td>
<td>0.443</td>
<td>0.114</td>
<td>0.0391</td>
<td>9</td>
<td>15.0–107.9</td>
</tr>
<tr>
<td>Roma</td>
<td>25.75°S, 148.41°E</td>
<td>602</td>
<td>-2.824</td>
<td>2.581</td>
<td>0.147</td>
<td>0.056</td>
<td>0.0454</td>
<td>10</td>
<td>1.6–51.5</td>
</tr>
<tr>
<td>Rockhampton</td>
<td>23.17°S, 50.56°E</td>
<td>1103</td>
<td>-2.388</td>
<td>2.411</td>
<td>0.327</td>
<td>0.101</td>
<td>0.0967</td>
<td>9</td>
<td>3.2–71.1</td>
</tr>
</tbody>
</table>

Source: Zerihun et al. (2006).

Table A7 Distribution, ecology and wood properties of species used by Justin Jonson to derive allometric equations*.

<table>
<thead>
<tr>
<th>Species name</th>
<th>Common name</th>
<th>Distribution</th>
<th>Ecology</th>
<th>Source (see below)</th>
<th>Basic density kg m⁻³</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Eucalyptus platypus</em></td>
<td>Moort</td>
<td>Albany to Esperance</td>
<td>Southern coastal and sub-coastal plains (B&amp;K). Sandy soils, loamy clay, laterite. Plains, hilly and rocky country (Florabase, <a href="http://florabase.calm.wa.gov.au/browse/profile/5643">http://florabase.calm.wa.gov.au/browse/profile/5643</a>)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><em>E. falcata</em></td>
<td>Silver mallee</td>
<td>In a triangle bounded by Albany-Perth-Esperance</td>
<td>South-west, outside of wetter areas (B&amp;K). Sand over laterite, often with gravel, limestone. Sandplains, breakaways, slight rises, hilltops, valleys, disturbed land, road verges (Florabase)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><em>E. flocktoniae</em></td>
<td>Merrit</td>
<td>Widespread in wheatbelt and Goldfields</td>
<td>Sandy loam or clay, laterite (Florabase)</td>
<td>2</td>
<td>1145, 1074 (820)</td>
</tr>
<tr>
<td><em>E. captiosa</em></td>
<td></td>
<td>Wheatbelt, Albany to Hyden</td>
<td>White or yellow sand. Sandplains, lateritic rises (Florabase)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><em>E. annulata</em></td>
<td>Open-fruited mallee</td>
<td>Southern wheatbelt and southern coastal areas from near Albany to Balladonia</td>
<td>Clay, sandy clay, clay loam (Florabase)</td>
<td>2</td>
<td>959 (750)</td>
</tr>
<tr>
<td><em>E. occidentalis</em></td>
<td>Swamp yate</td>
<td>Southern wheatbelt and sub-coastal areas</td>
<td>Usually confined to wet, clayey depressions (B&amp;K), Sandy or clayey soils. Alluvial flats, low-lying wet areas, around salt lakes, hills (Florabase)</td>
<td>2</td>
<td>776</td>
</tr>
<tr>
<td><em>Allocasuarina huegeliana</em></td>
<td></td>
<td>Occurs from Murchison River and Mingenew south to the south coast and east to Newman Rock, west of Balladonia, WA</td>
<td>Associated with granite</td>
<td>3</td>
<td>885 (700)</td>
</tr>
<tr>
<td><em>Acacia saligna</em></td>
<td></td>
<td>Wheatbelt and southern Goldfields</td>
<td></td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

* The basic density values are estimated for air-dry (12 per cent moisture content) wood.