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# LAonline — Report

## The Australian Garden Selecting plants for a Botanic Garden

Paul Thompson 2008

In 1995 the board of The Royal Botanic Gardens Melbourne appointed the Landscape Architectural Practice of Taylor and Cullity (later to become Taylor Cullity Lethlean) with Paul Thompson as the specialist in Planting Design to design a garden in Cranbourne that 'Celebrated the Australian Flora,' and represented the 'Nature and Culture of Australia'. The brief called for a garden that merges Art and Horticulture to show the splendor and diversity of the Australian Flora.

Here is an explanation of the process for determining what species would be used in the design.

The garden has been developing in stages since the completion of the Masterplan in 1996. In the year 2000 the Design team and client began the process of project review in order to clarify projected costs and scope for stage one construction. Documentation followed. Construction began in 2003 and was opened to the public in May 2006. Currently stage two is being documented. There has been close review and analysis by the design team and the Gardens' client group during each phase of the process during the past twelve years. This writing traces the change and honing of plant selections and the process as a response to client needs, site understanding, increased botanical information and now climate change.

The 25Ha site, a former sand mine sits within precious remnant Heathland that is most of the complete 365 Ha Cranbourne property. The garden has been planned as the principle entry point into the greater site. The internal boundary of the Australian Garden site has a rim of indigenous vegetation some of which has regenerated over the disturbed mining area. The larger central space is sandy with some clay and underlying alkaline coffee rock. The natural high water table of the subterranean aquifer has been incorporated into the design as the level for the major waterbodies.

### Meeting the Brief

Early in 1995 the Landscape Architectural team of Kevin Taylor, Kate Cullity, Perry Lethlean, myself as designer of plantings along with TCL staff and range of other valuable participants began the dreaming of the philosophy and themes that underlay the design. What began as a myriad of nebulous imaginings eventually after a long analytical procedure morphed into three radically different approaches to structuring this space. This design process happened firstly with the core design team then was approved by the Royal Botanic Gardens (RBG) management group. Major stages were presented to an independent RBG consultative group. Some key people have been with this project from the beginning which has proven invaluable. Any adjustments then and now are made during all stages of the designs development and the core planting list modified. Through a collaborative process there is comprehensive testing that stimulates broader understanding by the design team and gardens management staff. The extended knowledge base and varied perspective of everyone involved is turned to advantage to enhance the design. This has been enabling rather than restricting during documentation. The main people with an

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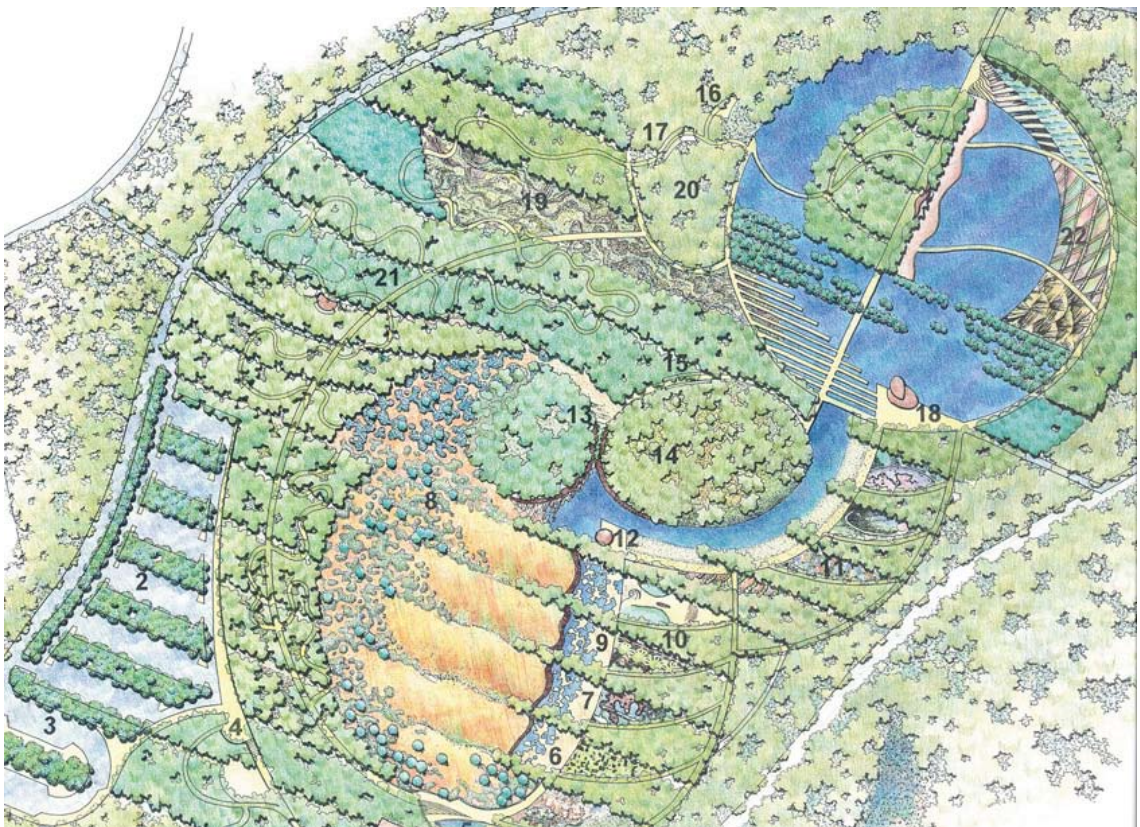
interest in the outcome could see and absorb the complexity and the options. Excitement was maintained throughout the evolution of each stage. The three concept options of the 1996 Masterplan were put to the vote by firstly the client group then a group from staff and interested members of the public. The most popular concept by far was the most radical. This developed to become the broad basis of the design that was opened in 2006. Once the themes and details were revealed by this rather organic process they were rigorously tested and refined into the Masterplan adopted by the Royal Botanic Gardens board.



Between the 1996 Masterplan and the beginning of the revisitation of the design in 2000 client requirements and new criteria for plant selection was to influence the original design and the plant content. New principles of protection of the important indigenous vegetation that surrounds the site came into being. These principles are based on increased standards of protection that follow on from improved community interest and increased scientific advocacy for the conservation of natural diversity. A process of evaluation of the weed potential of every proposed species and form was applied to the list and continues for every proposed plant. At its simplest this means that any plant that has the potential to spread into the surrounding natural vegetation is either to be removed from selection or restricted as to where or how it may be used. During the Masterplan stage we had already decided that we would only use grass species from site and not use species that had already been known to spread freely and prolifically such as *Actinotus helianthi* (Flannel Flower). Here was something that had great limitations on the available plants for the design. Another concern was for hybridization, where species such as *Correa pulchella* may cross with *Correa reflexa* in the adjoining bushland and so produce an unwanted hybrid. Genetic contamination of the natural vegetation is a further condition which is where

plants that are naturally found around or close to the site must be collected nearby. This has meant that any local species we wish to use that naturally is found within the 10 minute geographic grid centered on the Cranbourne site must be collected from that local providence. An example is that the only *Correa reflexa* we can use is the local one. This policy continues to influence selection and has meant that the Marsh Garden in the stage 2 design has been eliminated principally due to potential weediness of many of the species. The procedure has certainly sharply focused the evaluation process and will provide a rich range of information for use elsewhere

With stage two the design has some new objectives. The scientists from the Herbarium suggested inclusion of some Families, Genera and species that can be used to interpret evolution of all plants specifically the important Australian Genera like the Eucalypts. They are also encouraging inclusion of species that show adaptation to particular conditions. There are species that illustrate these elements in stage one. Now it will be possible to articulate these scientific messages more succinctly. The evolution message is clearly found in species of the northern rainforests. In stage two this 'Lush Garden' is a new addition. It is the biggest plant community not previously represented. Now we will have a selection of plants from those rich and leafy places. Selection is concentrating on species that are found in the drier rainforest. Areas around the wettest rainforest have a wide range of species that either grow in dry places or are tolerant of dry. A list was compiled of species that are naturally found in sand. It is principally from these locations that choices have been made. Within this group quick growing 'Pioneer' or 'Nurse' species have been selected to offer protection to slower growing plants in the design. There will be a further range of plants such as ferns and leafy understory added at a future stage as sun and wind protection increases. The need for protection with the lush plants contrasts with the rest of the garden where nearly all plants can be planted in bare open space.



## Beginning Selection

Selection of plant species developed in concert with the evolution of the design became very much part of the testing of the strengths within the ideas. Selection began by firstly reviewing the broad range of species that had previously been trialed on site through examining comprehensive records and remnant plants. There was an extensive list of a large range of species with plantings locations. There were plantings in separate locations on site for both trialing a range of genera and planting of field collections. Examining these plants planted by both the Botanic Gardens staff and the Banksia / Dryandra Study group of the Society for Growing Australian Plants (SGAP) since the mid 1980s were most instructive, particularly those that grew with minimal attention. The SGAP trialed a large collection of Proteaceous species referred to as the 'Special Collections,' which followed plantings of Eastern Banksia forms for scientific examination of growth variation by Alf Salkin.

During the stage one documentation there were personal research visits to large public gardens in other States and nearby to hone selection and improve growth information. We had the great benefit of the eminent Environmental Scientist, Landscape Designer, Marion Blackwell FAILA (Hon) from Western Australia who performed a comprehensive peer review of the proposed plant content. This invaluable analysis added species, raised awareness of special forms, and provided sources and contacts for acquiring plants. Apart from that direct assistance one couldn't help but be inspired by her comprehensive knowledge and critical experience. Having the opportunity to ask questions for clarification or opinion from many others strengthened the decision making. Rodger Elliot AM continues to be most important in a group of informal 'horticultural confidants' that have aided selection. Many 'friends of the flora' with whom I interact have added considerably, particularly when trying to decide if the use of a particular odd plant is viable or a given growth pattern in horticulture is true. Ralph Woodford from Dunoon in northern NSW, a specialist in the re-establishment of rainforest, was most enlightening when reviewing the early lists for the 'Lush' plantings. These conversations continue to be helpful in the discovery of the best forms, where to find something growing or indeed whether an untried species was worth the risk. The overriding question always is, 'Is this group of plants the best representation of our Flora we can have?'

The process for selection initially combined the use of descriptive horticultural literature, botanical texts, nursery catalogues, and personal information. In 1995 when the Masterplan list was prepared we did not have as many references as are now available. The invaluable *Encyclopaedia of the Cultivation of Australian Plants* had only reached Volume six of the nine volume set. It now is to Volume eight and details in excess of 10,000 species. *The Census of Australian Flora* of 1990 was of considerable assistance at the beginning with its charts of plant distribution, locations and scientific family listings. This book that contains 17,590 species is the first such list for 100 years when Baron von Mueller listed 8,839 species. From this reference it was possible to become aware of potential species not usually referred to elsewhere. For plants without horticultural references initial choices were based on occurrences in suitable habitats such as those occurring in sand. When species had a disparate and wide distribution it was surmised that they may suit the first criteriae that they have a good chance of growing out of their natural range. Where possible a wide range of horticultural information was consulted for clarification as to whether they had potential (see reading lists attached). Possible planting patterns emerged as the plant list took shape where particular families of plants such as Rutaceae, Proteaceae, Myrtaceae and other groups appeared to contain many of the most suitable species. Later distillation of

the early lists would aim to try and represent many of the main families as well as the best of the major Genera. Care was taken to include species that are rare and endangered or require protection in the wild, for this is part of the mission of Botanic Gardens.

At the stage of the Masterplan a final refined Data Base of Genera and species totaling 1230 taxa was compiled. Each was classified under many headings, importantly its known or projected height and width for this site. Following the allocation of species to discrete zones or themed areas such as Eucalypt Walk, Mallee Hill etc. one could more easily imagine patterns of plantings. It then became more apparent where extra species or types of plants were needed. Images of some species were compiled to explain the intent to the design team and the client group. These images also act as a reference, aiding ones visual memory during the detailed design phase. Designers need to be sure of a plants character comprising its structural form, its foliage colour and texture when composing a design. It is essential to be able to visualize the mature individual plant then compile those pictures in the mind into a group then the group into the broader landscape. It is then important that the composition is strong clearly defined and will withstand the intrusions of time. Species in this early list immediately informed the need for collection of propagation material, as it was thought that the project would proceed quickly. Flower colour and period were defined on the data base, along with propagation method, need for special collection, whether the plant was to be used for mass use, or for limited display. These definitions and others were a guide to the rest of the design team and the Botanic Gardens staff to more fully understand and envisage the vegetation potential in the detailed design before it was fully developed.



Acacias our biggest genera at present number in excess of 1200 species, most are small growing plants under 1.5metres. Deciding how to best represent this group is a challenge. Many of the largest growing species have been cultivated, so selection is straight forward. Some are eliminated by the Weed Model. The ornamental use of the smaller species of Acacia is not well documented in horticulture. Representation within the Genus Acacia of the distinct groups of foliage and growth character is again a basis for choice. If the garden can have a sound representation of these two genera with the largest number of species it will be well served.

The lower growing species constitutes the largest variety of plant forms in this garden, as in nature. The choices for stage two have been affected by the inclination to increase the range of species with little repetition of those in stage one. There are some exceptions naturally so. Experience of growth in the first stage has been of considerable instruction in what may be successful and what the range of growing conditions may be in stage two. Some very showy species currently few in specimen numbers are very successful and deserve to be exploited fully. With variants in many of our principal genera being common, refining the species list to define superior forms is a continuing task. Better forms are what Nurseries strive to offer. We plan a new garden where these selected Cultivars (or superior Nursery forms) will be featured. It is here that a changing range of the most reliable, most appealing, biggest flowers, longest flowering etc will be seen. Here the home gardener may take note of some that they like. As yet this list is a list in development. It will have plants from a range of categories to suit many domestic needs. There is a wish to be ahead of the best forms available in preference to using those that are well known. There is merit in displaying and tracing the best of the cultivars over time. We will know the answer when Stage two is finished.

## Segments of the Garden

As the design process proceeded with each stage, and as each segment of the garden design develops, so the definition of the species used increases. The stage one design is composed of five precincts, the Carpark, Entry Garden, Rockpool Walk, Arid or Sand Garden and the Eucalypt walk. The carpark of heavy soil is designed to harvest water off of the road surface to water the plantings. Plant selection here is of species that will tolerate the extremes of wet and dry and grow in heavier soil than the rest of the garden. These are mostly Melaleuca, Callistemon, Leptospermum and various tufting species for the drainage lines. On approaching the entry space one finds a large screening band and a clump of Callitris (Native Pines). This conifer character that enframes the entry approach is an unexpected look for Australian plants. Commonly eucalypts would be expected. The progression to the entry is through a forest of visually neutral Allocasuarina (She-oak) softening the approaches to a more verdant leafy surround of the Visitor Centre. Selection overall has to be very particular, to develop a design with certain planned aesthetics, to meet functional needs and varied growing conditions.

The Arid Garden is the largest garden and is planned to contain the greatest diversity, intended to be about 350 species. During stage one documentation it was decided that here it was possible to make the majority of the species plants that naturally occur in the arid zone (which is a large part of total area of Australia). Here the design character called for a dominance of silver or grey plants. This garden is mostly of small growing species both permanent and annual. Some plants are yet to be added as supply and conditions permit. This part of the garden is subdivided into five different spaces the largest being the central

Red Sand Garden where the simple planting is mostly grey saltbush discs and a changing line of daisies. To the south is an intensive garden called the Ephemeral Lake containing small floriferous species that offer an impression of the regrowth of the drainage lines in the dry centre after rain. Leading into this space is a long recessed garden called the Dry River Walk where low free form lines of shrubs cross over each other in a linear organic pattern. These shaped soft hedge-like forms have a myriad of tiny plants at foot. Here the overall tone is blue green to differentiate the larger open space to the north where the shrub layer is mostly grey green or silver. Finding reliable structural plants to suit a particular range of criteria such as in the arid zone can test ones research at times. These plants were selected firstly for foliage texture and colour then secondly for reliable growth that responds to pruning allowing showy smaller species to display beneath. This is typical of the increased design complexity as one moves from Masterplan to final built design and is typical of complexity in nature.

In the Eucalypt Walk there are more complex areas especially in the Fire Zone where the plants are to show some response to fire or in the Rock Garden where the many tiny pretty low plants give an impression of the floriferous dry rocky leached zones that abound in our country. There is a segment in the Eucalyptus Walk where fragrance is the theme. Here fragrance both pleasant and unpleasant is contained either in the flowers, foliage or bark.

There is a very special compact garden called the Weird and Wonderful that will intrigue and delight. This offers plants of unexpected form or habits, plants with odd stories and properties plus special plants with exquisite flowers, foliage or form. Selection for this area has a longer list of exciting species that there is space to use them. Final selection will be most rigorous as the visual design and the practical considerations are tightly entwined. Some listed species that miss being included are likely to be included in the broader garden. The interpretation potential both today and tomorrow is closely connected to the final outcome. This space is the centre of the garden and in so many ways it may be seen as the synthesis of the special nature of our flora.

The stage one Eucalypt Walk is extended in stage two where a selection of typical types of a few large Eucalyptus, Angophora and Corymbia will enframe dense coverings of a rich diversity of lower story plants. Tall species will be found in many other areas of the garden except the regions dedicated to lower mallee Eucalyptus. Nearly half the 1000 or so Gum trees are either low growing or mallee species. These have been sorted through to determine a most successful, representative and distinctive range. Selection has given preference to those that produce a Lignotuber. This is a woody growth at the base of trunks where new growth occurs. This type is thought to be more stable, longer lived and able to be regenerated. Attention has also been given to those that have been cultivated successfully at latitudes close to the Cranbourne site. Most of the lower growing species are from southern Western Australia whilst the taller species in our selections are from the Eastern States. A few species of Corymbia from the north of Australia are marginally possible. The northern Corymbias assist in the story of plant evolution. There are many more beautiful Gum trees that deserve to be in this garden than there is space. Diversity of form and type is key to initial selection. Trunk and foliage character will have as much importance as flowering time and type. Representation of different sub-genera and the geographic spread of Eucalyptus over Australia is another aim.

## The Final Result

Stage two is to be documented by the end of 2008 opening in 2011. The plant data base has been prepared in much the same way as with stage one. The spread sheet has new columns since the stage one list where now plants are categorized and rated according to their imagined long term water requirements. Final selection will be effected by this as will the numbers used and their location in the gardens. Most of the species selection has been completed and is being processed through the weed assessment model. The list repeats very few of the species from stage one as yet. It is most comprehensive yet will evolve each month as once more the detailed design is developed by our team. Currently it is at 1250 taxa and is likely to increase as it did with stage one until the garden is fully planted. Early selection and early indicative numbers is important for the RBG Nursery staff for production of plants.

It requires some discipline for designers not to repeat ones favourites in different areas around the garden. This helps towards making each segment of the broader garden distinctive. It is critically important that spreading many of the same species through the garden doesn't happen in the future. It will require discipline for future managers so the garden is not turned into something other than was intended. As plants grow in stage one intended species are added as they become available. In all segments it could be found that certain forms of planned species are not as suitable to the site as other forms and so may be changed. Some genera such as Grevillea have broad variations in some species which sometimes perform differently in horticulture. Where some are thought not to ever be successful then there is an understanding that quite similar plants are found to preserve the intent of the original design. With the annual or more ephemeral plants selection may be ever-changing as new forms become available and horticultural techniques of mass propagation and management improve.

Honing the selection from the current 23,000 or so species of Australian plants continues throughout the design process until construction is complete. On completion the garden could have something in the order of 3000 species plus cultivars and variants. This compares with about 6,000 held at the more extensive Australian National Botanic Gardens in Canberra rightly conceived as the national collection, and about 3,500 naturally occurring in the State of Victoria. What follows with any changes to the content after the Australian Garden is open depends on the site results and the procedures of the Royal Botanic Gardens Cranbourne. What we know is that more information on naturally occurring plants, nursery selections and hybrids will continue to be available during the 100 year life of this garden. This garden is intended to be an insight into the Australian Flora with strong appeal to the broader public and to people deeply interested in plants. We as the designers hope that the strength of the structural ideas and detailed content within the landscape design will always inspire and instruct visitors to respect, enjoy and work to protect our natural diversity.

## Published References used for the Australian Garden Plant Selection

### Concept Design + Masterplan 1995/96

- Acacias of Australia* Vols 1+2, Marion Simmons, pub Nelson 1981, Viking O'Neil 1988
- Australian Vegetation*, R.H. Groves (Ed), pub Cambridge University Press 1981
- Census of Australian Vascular Plants*, R. J. Hnatiuk pub Aust Gov Publishing Service 1990
- Native Plants,+ Bottlebrushes, Paperbarks and Tea Trees*, Wrigley and Fagg, pub Angus + Robertson 1993
- Flora of Victoria* Vols 1+2, Foreman, Walsh, Entwistle, pub Inkata Press 1993,1994
- Flora of Australia*, Vol 1, A. George (Ed), pub Aust Government Publishing Service
- Flowers and Plants of Victoria and Tasmania*, Cochrane, Fuhrer, Rotherham, Simmons, Willis, pub Reed 1980
- Flowers and Plants of Western Australia*, Erickson, George, Marchant, Morcombe, pub Reed 1973
- Flowers and Plants of New South Wales and Southern Queensland*, Rotherham, Briggs, Blaxell, Carolin, pub Reed 1975
- Guide to the Flowers and Plants of Tasmania*, Mary Cameron (Ed), pub Reed 1981
- Grow What Where*, Aust Plant Study Group, pub Viking O'Neil 1980
- The Grevillea Book* Vols 2+ 3, Peter Olde and Neil Marriot, pub Kangaroo Press 1995
- The Useful Native Plants of Australia*, J. H. Maiden, pub in facsimile Compendium 1975
- Melaleucas*, Ivan Holliday, pub Hamlyn 1989
- Native Trees and Shrubs of South- Eastern Australia*, Leon Costermans, pub 1983
- Native Plants of the Sydney District*, Alan Fairley and Philip Moore, pub Kangaroo Press 1989
- Plants of Western NSW*, Cunningham, Mulham, Milthorpe, Leigh, pub Soil Cons Service NSW 1981
- Shrubs and Trees for Australian Gardens*, Ernest Lord and J. H . Willis, pub Lothian 1982
- The Banksia Book*, A. George, pub A. George 1996
- Eucalypts* Vols 1–3, M. I. Brooker + D. A. Kleinig 1983–2006
- Encyclopedia of Australian Plants* Vols 2–6 and Supplements. R. Elliot + D. Jones, pub Lothian 1982–1993
- Waterplants in Australia*, G. Sainty, S Jacobs, pub CSIRO 1994 3<sup>rd</sup> ed
- Wildflowers of Southern Western Australia*, Margaret Corrick, Bruce Fuhrer, pub Five Mile Press 1996
- Wild food in Australia*, A.B. + J. W. Cribb, pub Fontana 1976
- Many technical pamphlets, Nursery Catalogues and unpublished lists

### Stage One Documentation and Construction 2000/2006

- Arid Shrubland Plants of Western Australia*, A. A. Mitchell, D. G. Wilcox, pub University of WA Press 1998 rev ed
- Australian Native Plants* 4<sup>th</sup> ed , John Wrigley, Murray Fagg, pub Reed New Holland 1996
- Australian Climbing Plants*, D. L. Jones, B. Gray, pub Reed 1977
- A Guide to Plants of Inland Australia*, Philip Moore pub Reed New Holland 2005
- A New Image for Western Australian Plants* George Lullfitz pub George Lullfitz
- Bushfires and Bush Tucker Aboriginal Plant Use in Central Australia* Peter Latz pub IAD Press 1995
- Encyclopaedia of Australian Plants* Vols 7+8, R. Elliot + D. Jones pub Lothian 1997, 2002
- Eremophilas for the Garden*, A.S.G.A.P Eremophila Study Group pub SGAP SA 1997
- Everlasting Daisies of Australia*, Daisy Study Group, pub C.H. Jerram and Ass 2002

*Field Guide to the Wildflowers of Australia's South West*, Jane Scott, pub Cape to Cape Publishing 2002  
*Flora of Victoria Vols 3+4*, Walsh, Entwistle, pub Inkata Press 1996, 1999  
*Flowers of the South Coast and Ranges of New South Wales Vols 1–3*, Betty + Don Wood, pub Woods Books 1998  
*Growing Locals*, Robert Powell, Jane Emberson, pub WA Naturalists Club 1996  
*Hakeas*, Ivan Holliday, pub Reed New Holland 2005  
*Kangaroo Paws and Cats Paws*, Stephen Hopper, pub Dept Cons and Land Management WA 1993  
*Melaleucas*, Ivan Holliday, pub Reed New Holland rev ed 2004  
*Native Plants of Queensland Vols 1+ 2*, Keith A. W. Williams, pub Keith A. W. Williams 1979.1984  
*Native Plants of the Sydney District*, Alan Fairley and Philip Moore, pub Kangaroo Press rev ed 2000  
*Plants of Outback South Australia*, Kutsche +Lay, pub Dept of Water Land and Biodiversity Conservation SA 2003  
*Seldom Seen Rare Plants of Greater Sydney*, Alan Fairley, pub Reed New Holland 2004  
*The descriptive Catalogue of the Western Australian Flora*, Grazyna Paczkowska, Alex R. Chapman, pub Wildflower Society of W. A., W. A. Herbarium, Botanic Gardens+ Parks Authority 2000  
*Useful Bush Plants*, Peter Bindon, pub WA Museum 1996  
*Verticordia*, Elizabeth Pieroni + Margaret George, pub University of WA Press 2002  
*Wildflowers of Victoria*, Margaret G. Corrick + Bruce Fuhrer, pub Bloomings Books  
*Wildflowers of the Nth Coast NSW*, Barry Kemp, pub Reed New Holland 2004

## Stage Two Documentation 2007/2008

*Australian Succulent Plants*, Attila Kapitany, pub Kapitany Concepts 2007  
*Australian Rainforest Plants Nos 1–6*, Nan and Hugh Nicholson, pub 1985–2004  
*Currency Creek Arboretum Eucalypt Research. Vol. 2*, Dean Nicolle, pub Dean Nicolle 2003  
*The Dryandras*, Elizabeth Pieroni + Tony Cavanagh, pub APS Vic and Wildflower Society WA 2006  
*Euclid 3<sup>rd</sup> Edition*, M I Brooker, A V Slee, S M Duffy, J G West, pub Centre for Plant Biodiversity Research CSIRO 2006  
*Eucalypts*, Vol 1 revision by M. Brooker and D.Klienig, pub Bloomings Books 2006  
*Eucalypts of Vic and Tas*, Dean Nicolle, pub Bloomings Books 2006  
*Eucalypts of South Australia*, Dean Nicolle, pub Dean Nicolle 1997  
*Eremophila and Allied Genera*, R. J. Chinnock, pub The Botanic Gardens and State Herbarium SA 2007  
*Gardening with Australian Rainforest Plants*, Ralph Bailey, Julie Lake pub 2001  
*Hakeas of Western Australia*, J. A. Young pub J. A. Young 2006  
*Native Plants of Northern Australia*, John Brock, pub Reed New Holland 2001  
*Ocean Shores to Desert Dunes*, David Keith pub Dept Environment and Conservation 2004  
*Plants of the Channel Country Western Queensland*, Rhondda Alexander pub Channel Landcare Group  
*Sub Tropical Rainforest Restoration*, pub The Big Scrub Landcare Group 1998  
Plus references on the tropical rainforest, catalogues and websites