Plant Patterning across the Swan Coastal Plain

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Aboriginal people: living with the land

Photos: Bronwen Keighery
Drawings: Margaret Pieroni
Selling the Swan 1827
Stirling and Fraser

A version of Stirling’s map
Marri Woodlands

Photos: Bronwen Keighery
Setting context

'Regional' Boundaries
- biodiversity
- planning
- administrative

Study Area
Swan Coastal Plain, south Moore River
Perth Metropolitan Region
Natural Regions

Jarrah Forest: Darling Scarp

Swan Coastal Plain

Photo: Bronwen Keighery
What determines the patterning of the plants on the Plain?

Photo: Bronwen Keighery
Landforms and Soils

• Dandaragan Plateau/Gingin Scarp
• Foothills
• Pinjarra Plain
• Bassendean Dunes
• Spearwood Dunes
• Quindalup Dunes
<table>
<thead>
<tr>
<th><strong>Foothills (Ridge Hill Shelf)</strong></th>
<th><strong>Pinjarra Plain</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yoganup Formation</td>
<td>Guildford Formation</td>
</tr>
<tr>
<td>Cardup Group</td>
<td>Bassendean Dunes</td>
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<tr>
<td>Spearwood Dunes</td>
<td>Bassendean Sand</td>
</tr>
<tr>
<td>Tamala Limestones</td>
<td>Quindalup Dunes</td>
</tr>
<tr>
<td>Sands derived from Tamala Limestones</td>
<td>Safety Bay Sands</td>
</tr>
</tbody>
</table>

Adapted with permission from Fact Sheet 15. The Geology of Perth. Department of Mineral Sands and Energy, WA.
Pinjarra plain/Foothills/Darling Scarp

Photo: Bronwen Keighery
Soils

Sands

Clay

Rocks

Layering of soils/rocks

Photos: Bronwen Keighery
Landforms and Water

Upland

Wetland

Photo: Bronwen Keighery
Winter

Summer

Photos: Bronwen Keighery
Inundation/Waterlogging
Landforms and Patterns

- Dandaragan Plateau/Gingin Scarp
- Foothills
- Pinjarra Plain
- Bassendean Dunes
- Spearwood Dunes
- Quindalup Dunes
- Wetlands (within the Quindalup, Spearwood, Bassendean Dunes or Pinjarra Plain)
Plant Community Patterns

- Vegetation Types (mapped)
- Vegetation complexes (mapped):
  - Plain 38, PMR 26
- Floristic community types:
  - Plain - 66, PMR 58
- Threatened ecological communities (TECs)
  - PMR 17
Vegetation Types

Vegetation units based on vegetation structure, cover and dominant species.

1960’s and 70’s Beard mapped the vegetation types of the Swan Coastal Plain, north of Pinjarra, at a 1:250 000 scale, based on the earlier mapping by Speck. The original extent of the vegetation types is mapped.

1981 Beard produced a map at a 1:1 000 000 scale for the entire area.

1996 Beard’s 1:250 000 maps were digitised (Hopkins et al. 1996)
Low Woodland; *Casuarina obesa*
VEGETATION COMPLEXES

Vegetation complexes are a series of plant communities forming regularly repeating groups associated with a particular soil/landform units.

Heddle et al. 1980 and Mattiske and Havel 1998

Based on vegetation and floristic information from ground surveys (both plots and transects on small scale areas), road traverses, aerial photographs and from previous interpretations of the vegetation.

1 : 250 000 scale for the Swan Coastal Plain

1 : 50 000 the Jarrah Forest

Regional Forest Assessment, mapping of the Bussellton Sheet
FORRESTFIELD COMPLEX: Vegetation ranges from open forest of *E. calophylla* - *E. wandoo* - *E. marginata* to open forest of *E. marginata* - *E. calophylla* - *C. fraseriana* - *Banksia* species. Fringing woodland of *E. rudis* in the gullies that dissect this landform.

Photo: Greg Keighery
FLORISTIC COMMUNITY TYPES

Distinctive floristic assemblages identified on the southern Swan Coastal Plain in Gibson et al. (1994) and DEP (1996).

The presence or absence of individual taxa in standard areas (plots) is used to define floristic groupings based on shared species.

Gibson et al. 44 FCT’s, DEP 66 FCT’s (additional wetlands, Quindalup Dunes)

Threatened ecological communities defined from Gibson et al. (1994)
10m x 10m plots

A large ongoing set of projects involving several hundred people.
How does species richness pattern?

Native species in the typical FCT’s (no plots)

- Foothills/Pinjarra Plain 44 to 66 (90)
- Bassendean Dunes 30 - 67 (80)
- Spearwood Dunes 37- 55 (80)
- Quindalup Dunes 9 - 35 (50)
- Wetlands 11 - 53 (70)
23a Central *Banksia attenuata* - *Banksia menziesii* woodlands

10a Shrublands on dry clay flats - Threatened ecological community

Photo: Greg Keighery
Melaleuca huegelii - Melaleuca acerosa shrublands on Limestone ridges - Threatened ecological community

Spearwood Dunes

Photos: Bronwen Keighery
How do the species pattern?

• Total native species: Plain > 2,000, PMR >1,200

• Native species in the typical FCT’s (no plots)
  - Foothills/Pinjarra Plain 44 - 66 (90)
  - Wetlands 11 - 53 (70)
  - Bassendean Dunes 30 - 67 (80)
  - Spearwood Dunes 37 - 55 (80)
  - Quindalup Dunes 9 - 35 (50)

• Significant species: PMR >170
Common, widespread species are the basis of patterns/habitats

Banksia attenuata

Banksia grandis

Photos: Bronwen Keighery
Common, widespread species are the basis of patterns/habitats: *Banksia menziesii*
Common, widespread species are the basis of patterns/habitats: Jarrah (*Eucalyptus marginata*), dominant south of Yanchep.
Foothills
Significant Flora

Conospermum undulatum

Photo: Greg Keighery
Conospermum undulatum

Perth Airport
Conospermum
?undulatum\texttimes triplinervium
Cyathochaeta equitans

Photos: Bronwen Keighery
Pinjarra Plain

Casuarina obesa

Photo: Greg Keighery
Grevillea curviloba

Photo: Greg Keighery
Grevillea curviloba
ssp. incurva
both taxa

Grevillea curviloba
ssp. curviloba

Photos: A.D. Crawford

Photos: A.P. Brown & J.A. Cochrane
Aquatics

Significant Flora

Photos: Greg Keighery
Bassendean Dunes
Significant Flora

*Stylidium crossocephalum*

Ends of the plant’s geographic range - south

Photos: Bronwen Keighery
Significant Flora

Jacksonia ‘gracillima’

Photos: Bronwen Keighery
Spearwood Dunes

Photo: Greg Keighery
Tuart

*Eucalyptus gomphocephala*

- Endemic to Plain mostly on Quindalups and Spearwood Dunes.
- Isolated occurrences are found along rivers.

Photos: Bronwen Keighery
Significant Flora

*Jacksonia sericea*

Photos: Bronwen Keighery

*Jacksonia ‘gracillima’*
Significant Flora

Plain Limestone

Hills/Foothills

Hills laterite
Quindalup Dunes

Photo: Bronwen Keighery
Callitris preissii
- significant species
- associated with a threatened ecological community
- all current known populations in Bush Forever Sites

Photos: Greg Keighery
Serpentine River
Joshua Brook    Boyanup

Photos: Bronwen Keighery
Thanks to the following

- people for the use of images they have composed - Greg Keighery, Karen Clarke, Jeni Alford and Mark Brundrett.
- FloraBase and AVH Web sites for use of maps
- AND to the hundreds of people who have contributed to the understanding of the natural areas on the Swan Coastal Plain.

Further Information

Further information and most references used in this presentation can be found in Volume 2 Bush Forever (BF). Descriptions of BF Sites are also found in Volume 2. Useful websites related to the BF Project are the Western Australian:

- Department of Planning and Infrastructure (Publications)
- WA Local Government Association (Perth Biodiversity Project, Perth Region Plant Biodiversity Project)