



Background information for teachers

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Introduction

Located in the south of Western Australia, the Swan Region - which includes the Swan Coastal Plain and Darling Range, is within one of 20 world mega-diverse biodiversity hot spots, due mainly to its high floral diversity and richness. Close to 8,000 species are found in this corner of the world alone and 85% of these cannot be found anywhere else in the world, including the rest of Australia! That makes the place where we live very significant, not only locally but also internationally.



List of attachments

Attachment	Purpose
How Did the Soils Form?/ Changing Sea Levels	To introduce students to some of the processes that helped to form the soils on the Swan Coastal Plain and Darling Range. The animated graphic shows how the coastline has changed over time.
Communities of Plants	Introduces the concept of plant communities and how they 'mirror' human communities in their make up.
Bio-What?	Introduces the concept of biodiversity.
Did you know?	Provides general knowledge information.
Funny Names	Introduces students to taxonomy and explains the terms family, genus and species, using cutlery as an example.
What is a salt wedge?	Describes what a salt wedge is and its relevance to the changing levels of salt water in the Swan Estuary throughout the year.
Map of the Swan Estuary	This has been included to help students differentiate between the Swan Estuary and the Swan and Canning rivers.
Imagination	Encourages the use of the senses while reading the written text. (Linked to Quindalup, Estuarine and Swan soils only)
More about....mammals, birds, reptiles, frogs	Provides more specific detail on the faunal groups. For example, information on the different types of mammals is provided (e.g. monotremes, marsupials and placental mammals).
Jokes and activities	A bit of fun with more to come!
Fact Sheets	Intended as a starting point for further research, providing some general information about each species of plant and animal.
Photographs	Colour photographs to help students identify the species included on the site.
What is a	Information sheets with line drawings outlining the identifying features of four plant groups, eucalypts, watties, banksias and kangaroo paws.
Vegetation layers diagram	Helps students to identify a type of plant community, e.g. forest, woodland, shrubland.

Links to the Curriculum Framework

The *Grow Us A Home* website is linked to the Curriculum Framework through a number of learning area outcomes, both directly and indirectly. It also directly supports two of the Curriculum Framework's five underpinning values, namely *Social and Civic Responsibility* and *Environmental Responsibility*.

Overarching Values	
Social and Civic Responsibility 4.2 Community 4.4 Contribution	Environmental Responsibility 5.2 Conservation of the Environment 5.4 Diversity of Species
Overarching Learning Outcomes	
Students use language to understand, develop and communicate ideas and information and interact with others	
Students recognise when and what information is needed, locate and obtain it from a range of sources and evaluate, use and share it with others	
Students select, use and adapt technologies	
Students describe and reason about patterns, structures, and relationships in order to understand, interpret, justify and make predictions	
Students understand and appreciate the physical, biological and technological world and have the knowledge and skills to make decisions in relation to it	
Students are self motivated and confident in their approach to learning and are able to work individually and collaboratively	

Learning Area Outcomes		
Society and Environment	Science	Also links to...
Place and Space	Working Scientifically <ul style="list-style-type: none"> Investigating Communicating Scientifically Acting Responsibly 	English
Investigation, Communication and Participation	Understanding Concepts <ul style="list-style-type: none"> Life and Living 	Maths
Natural and Social Systems		The Arts
Active Citizenship		

Background information on soil types and plant communities

Western Australia's bushland is unique. A combination of ancient soils, climate, geography, topography and flora and fauna have worked to shape its uniqueness.¹ Many of the plants and animals occur nowhere else in the world.

"The different types of vegetation or plant communities found around Perth can be broadly divided according to the region's geographical divisions: the Swan Coastal Plain, the Darling Plateau and the Darling Scarp."²

The Swan Coastal Plain

The Swan Coastal Plain stretches from Gingin Brook in the north to Dunsborough in the south. The eastern boundary being the Darling Scarp and Gingin Scarp. Most of the Perth metropolitan area is located on the Swan Coastal Plain.

The vegetation found across the Swan Coastal Plain is a reflection of changing soil types, how close the groundwater is to the surface and human use of the area over time. However, the major influencing factor is soil type.

The Swan Coastal Plain is relatively flat or, more specifically, "characterised by low relief"³ and rapidly changing soil types from three types of origins: aeolian, alluvial and estuarine.

Aeolian soils

Aeolian soils are windborne, and make up the sands and limestone which is found on the western two-thirds of the coastal plain. They are made from particles washed up by the ocean and then blown by the wind to form dunes. These soils have been divided into the following soil types: Quindalup, Cottesloe, Karrakatta, Bassendean and Herdsman. The word aeolian comes from *Aeolos*, the Greek god of the wind.

Quindalup soils are the white limey sands which occur near the coast, such as those found at Rockingham, Scarborough and Quinns Beach. Quindalup soils form the most recent dunes along the coastline. The plant and animals that live here have adapted to living in very extreme conditions, including constant exposure to prevailing winds, sand blasting and high levels of light intensity as the sun reflects off the sand.

Cottesloe soils are brown or yellow sand with limestone close to the surface, often breaking through to form an outcrop. Fremantle and Neerabup are examples of where this occurs. On this soil type the vegetation is very much

¹ The soil types and plant communities of the Perth metropolitan region. Powell, R and Keighery, B in Managing Perth's Bushlands

² The soil types and plant communities of the Perth metropolitan region. Powell, R and Keighery, B in Managing Perth's Bushlands

³ The soil types and plant communities of the Perth metropolitan region. Powell, R and Keighery, B in Managing Perth's Bushlands

affected by the depth of soil. On the deeper Cottesloe soils tall trees, such as tuart and jarrah, can be found. On the limestone ridges where the soil is shallow, shrublands of lower growing species occur.

Karrakatta soils are yellow sands. Kings Park and Tuart Hill are examples of where you can see this soil type. The vegetation typical to this soil is jarrah. Tuart may also occur along the western edge of the zone, especially if limestone is near the surface. Underneath this canopy layer of tall trees grow banksias, common sheoak (*Allocasuarina fraseriana*) and balga (*Xanthorrhoea preissii*). Below these is an understorey that is rich in species including prickly moses (*Acacia pulchella*), cottonheads (*Conostylis spp*) and Swan River myrtle (*Hypocalymma robustum*).

Bassendean soils are pale grey and characterised by banksia woodlands⁴. Candle banksia (*Banksia attenuata*), firewood banksia (*Banksia menziesii*), are typical, with holly-leaf banksia (*Banksia illicifolia*) found on moist sites. The presence of woollybush (*Adenanthos cygnorum*) can be a useful identifier of this soil type. Banksia woodlands have a very diverse understorey.

Herdsmen soil is found around a series of wetlands and swamps within the Cottesloe, Karrakatta and Bassendean soil types. They are found in low –lying areas where the groundwater is close to the surface, even breaking through in places such as the lakes in Yanchep National Park, Lake Joondalup and Star Swamp in the suburb of North Beach. These wetlands support a range of plants including sedges, paperbarks (*Melaleuca spp*) and flooded gum (*Eucalyptus rudis*).

Alluvial soils

Alluvial soils are formed by the movement of water and can be found on the clay soils on the flat eastern parts of the Swan Coastal Plain. These have been divided into the following soil types: Guildford, Beermullah and Swan. Most of the vegetation on these soils has been cleared for agriculture as they are more fertile and productive than the aeolian sands to the west.

Guildford soils are found in flat terrain and comprise sandy loams over a layer of clay. Kenwick and Middle Swan provide examples. The vegetation is forest and woodland dominated by marri (*Eucalyptus calophylla*). Along the watercourses paperbark (*Melaleuca spp*) and flooded gum (*Eucalyptus rudis*) are found, while in the poorly drained flat areas shrublands, herblands and sedgeland occur.

Beermullah soils are comprised of sand, which is occasionally saline, and loam over clay, which become waterlogged in winter. They are typically found in flat terrain and characterised by salt sheoak (*Casuarina obesa*). Some woodland of marri (*Eucalyptus calophylla*), flooded gum (*Eucalyptus rudis*), wandoo (*Eucalyptus wandoo*) and paperbark (*Melaleuca spp*) can also be

⁴ The soil types and plant communities of the Perth metropolitan region. Powell, R and Keighery, B in Managing Perth's Bushlands.

found. These woodlands are associated with shrublands, herblands and sedgeland similar to those on the Guildford soils.

Swan soils are also comprised of alluvial loam and clay, and are often red in colour. They form the floodplain of the Swan and Canning Rivers found upstream of the Swan Estuary. The vegetation is dominated by woodland and low forest of flooded gum (*Eucalyptus rudis*), freshwater paperbark (*Melaleuca raphiophylla*) and salt sheoak (*Casuarina obesa*). The understorey and vegetation fringing the river include rushes and various shrubs.

Estuarine soils

Vasse, or estuarine soil, is found along the edge of the Swan Estuary and has been deposited in narrow strips to quite broad expanses. The vegetation includes salt marsh and saltwater paperbark (*Melaleuca cuticularis*), mohan (*Melaleuca viminea*), flooded gum (*Eucalyptus rudis*) and freshwater paperbark (*Melaleuca raphiophylla*). Salt sheoak (*Casuarina obesa*) may also be found.

Soils in combination

Southern River is an example of a soil in combination. This forms a zone where, over time, Bassendean sand has been blown eastwards to cover areas of alluvial clay. The vegetation on the higher ground on this soil type is similar to that on Bassendean soils, while along the drainage lines the vegetation is forests of marri (*Eucalyptus calophylla*), flooded gum (*Eucalyptus rudis*) and wandoo (*Eucalyptus wandoo*).

Forrestfield soils are found along the base of the Darling Scarp and form what is called the Ridge Hill Shelf. They are comprised of well-drained sandy and gravelly soils, each of which supports a different type of plant community. On the gravel soils jarrah (*Eucalyptus marginata*), marri (*Eucalyptus calophylla*), wandoo (*Eucalyptus wandoo*) and bull banksia (*Banksia grandis*) can be found, while on the sandy soils low woodlands of jarrah (*Eucalyptus marginata*) grow with an understorey of mixed banksia (*Banksia spp.*).

Darling Scarp

The Darling Scarp supports a rich flora. Its variety of soils, slope and aspect make it a very interesting place. On the slopes shallow soils have formed supporting communities of shrubs and herbs around exposed granite and laterite. Areas where there are deeper soils support woodlands of marri (*Eucalyptus calophylla*), wandoo (*Eucalyptus wandoo*), flooded gum (*Eucalyptus rudis*) and jarrah (*Eucalyptus marginata*).

The Darling Plateau or Range

The Darling Plateau is broadly divided into the uplands, granite outcrops and major valleys and the minor valleys. The uplands are gently undulating with gravelly soils and are forested with jarrah (*Eucalyptus marginata*) and some

marri (*Eucalyptus calophylla*). Beneath the tall trees are smaller trees such as bull banksia (*Banksia grandis*) and common sheoak (*Allocasuarina fraseriana*) as well as a number of species of smaller shrubs.

On granite outcrops a range of shrubs occur in the deeper soils, while many herbs are associated with the shallow soils.

The slopes of the valleys have variable soils and topography and in places granite outcrops are also found. Marri (*Eucalyptus calophylla*) is the dominant tree, with jarrah (*Eucalyptus marginata*) and wandoo (*Eucalyptus wandoo*) also present. Along the creeklines thickets of shrubs occur. Blackbutt (*Eucalyptus patens*), flooded gum (*Eucalyptus rudis*) and paperbarks (*Melaleuca spp*) occur along the flatter valley floors.

Resources

Nurseries		
Name	Address	Contact details
APACE Western Australia	1 Johannah Street North Fremantle	Ph: 9336 1262
Lullfitz Nursery	Caporn Street (cnr Honey Road) Wanneroo	Ph: 9405 1607
Zanthorrea Nursery	155 Watsonia Drive Maida Vale	Ph: 9454 6260
Bennett Brook Community Plant Nursery	This is not a large retail nursery so there may be limits on what plants are available. Specialises in rushes and sedges.	Ph: 9250 3491
Carramarr Coastal Nursery	Mandurah Road Baldivis	Ph: 9524 1227
Men of the Trees	Stirling Crescent Hazelmere	Ph: 9250 1888
Men of the Trees	Elanora Drive Rockingham	Ph: 9527 3142
Ecosystem Management Services	Lot 6 Della Road Noranda	Ph: 9375 3731

Greening Australia (WA) teaching resources

Our Wild Plants: Bushland Activities for Primary School Students.
A comprehensive resource with hundreds of activities for students.
Written by Bronwen Keighery and Janette Huston.
Published in 1994.

Envirokids.
An interactive education package using drama and oral English to convey environmental messages.
Designed for primary years 5, 6 and 7.
Published in 2000.

Perth Plants for Your Garden.
A useful booklet providing information about native plants suitable for use in home gardens.
Produced by Dorothy Redreau, Greening Western Australia, 1996.

Bushland Investigators. Curriculum Support Materials for Primary Schools.
This resource focuses on the development of students' insights and understanding of their local natural environment. Covers junior, middle and upper primary areas.
Written by Judy Fisher, Karen Freeman and Carol Dowling.

Useful References

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University of Western Australia Press

(out of print but available through many libraries)

Powell, R (1990). *Leaf and Branch - trees and tall shrubs of Perth*

Published by Department of Conservation and Land Management (CALM)

Powell, R & Emberson, J (1996). *Growing Local*

Published by the Western Australian Naturalists' Club

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Scheltema, M & Harris, J (1995). *Managing Perth's Bushlands-Perth's bushlands and how to manage them*

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University of Western Australia Press

Rippey, E and Rowland, B (1995). *Plants of the Perth Coast and Islands*

University of WA Press

Bush Books series

Produced by the Department of Conservation and Land Management (CALM)