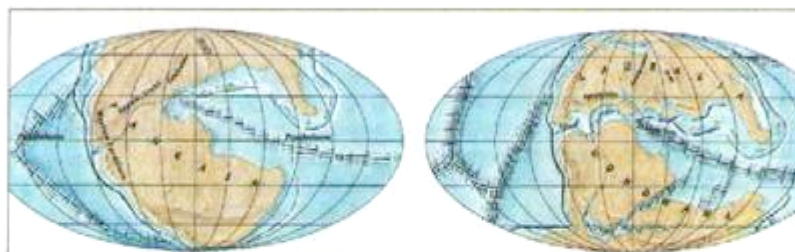
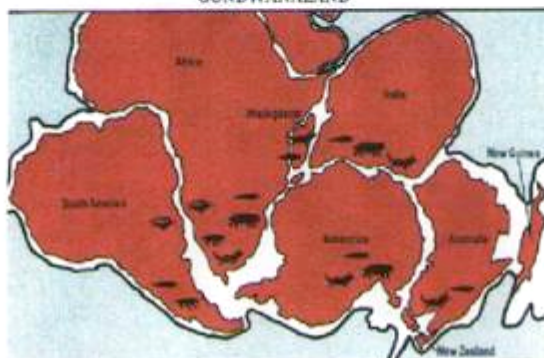


### The Geology of William Bay



GONDWANALAND



Gondwanaland was a land mass some 250 million years ago, formed from a supercontinent named Pangaea, which split into Laurasia and Gondwanaland. Pangaea also included Britain and Europe. Gondwanaland included the continents of Australia, Antarctica, Africa and South America, and Antarctica was joined to Australia at the Great Australian Bight. Australia can be seen in the above map lying on a north-south line. The continents were subject to 'drifting' and about 50 million years ago, Australia broke free from Antarctica and drifted north – a process that continues today and will eventually see Australia merge with Asia.

The south-west coast of Western Australia is typified by granitic rock which, in William Bay's case would have been covered by an overburden of up to 10 kilometres which over aeons (one aeon = 1 000 million years) has been eroded by the elements to expose the granitic rocks we see today eg Tower Hill. Such rocks need great depth of pressure and heat to form.

A geologist from then CALM told the Association at a talk given at Greens Pool that long ago the Denmark area would have been sitting on the North Pole, such had been the movement and drift of continents over time. It has also been recorded that New South Wales was once located at the South Pole.

As briefly outlined in Part 1, The Petrified Forest is a misnomer, and is more correctly known as a 'sand patch'. Around 6 000 years ago, sand-blows covered a burnt Karri forest, the wood rotting away and the spaces left would have been filled with sand and shells, which became limestone shaped into the decayed tree-forms, which were later exposed by winds removing the top sands.

## Topography of William Bay National Park


*courtesy of Dept Environment & Conservation*

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### William Bay National Park



The Denmark district, west of Albany, is a place where the forest meets the sea. The South Coast has no coastal plain. Rather, the granitic and related rocks of the Great Western Plateau reach the Southern Ocean as clifly headlands, with large, rounded outcrops lining the intervening bays.

Sheltered inlets in some South Coast national parks have karri and other forests growing right down to the water's edge. Instead of having forest close to the sea, William Bay National Park has a complex of heathlands. This habitat is of special interest to the botanically inclined, as it contains many common karri forest species. But at William Bay they grow under coastal influences as small shrubs, often with leaves very different in shape and texture from their inland relatives.

Like many South Coast areas, William Bay has high hills of granitic rocks. Light grey, windswept tors give the hill tops a primeval, Stonehenge-like appearance. There are pockets of karri, extensive tracts of peppermint and a host of other tree and shrub ecosystems, all developed on particular soil types. Karri trees grow in loam soil, while the open woodlands of sheoak and a number of eucalypts prefer the grey sandy soils which fill the valleys in between the granitic hills.



On the coast, the granitic rocks are well weathered and rounded, providing spectacular coastal scenery and supporting a peculiar flora. Many such headlands along the South Coast have a thin capping of limestone, adding to the great variety of soil

[http://www.naturebase.net/national\\_parks/previous\\_parks\\_month/william\\_bay.html](http://www.naturebase.net/national_parks/previous_parks_month/william_bay.html) 17/08/2006

types.

The beach at William Bay is narrow, and the sand tossed up by winter storms blows inland to build up high coastal dunes. Some sand dunes have travelled a few kilometres inland before being colonised by dense scrub and trees, to form an undulating row of sandy hills parallel to the coast. At William Bay, extensive tracts of bare, moving sand dunes are still actively burying living stands of karri forest and, as the sand moves, revealing the upper parts of majestic old karri trees, which were once covered by shifting sand.

### Diversity of Plants

It is easy for visitors to become carried away by the spectacular scenery that dominates the park's coastline. However, visitors who take a closer look at the plants will be equally amazed. A great diversity of incredibly different suites of plant species can be encountered over a short distance alongside any road or track.

The road into William Bay leaves the Highway in a mixed forest of low trees and shrubs, and rapidly passes to a small dell dominated by tall karri. The karri forest has a tangled, impenetrable undergrowth of groundcover plants and small shrubs, tall ferns, huge sedges and small narrow trees, such as karri hazel (*Trymalium spathulatum*) and chorilaena (*Chorilaena quercifolia*). The swamp-dwelling ti-tree, the wattie (*Agonis juniperina*) also grows here; it has creamy white flowers.

Closely related to the wattie is the peppermint (*Agonis flexuosa*), a common understorey tree of the karri and the wetter jarrah forests. This is one of the most widespread trees in coastal areas of the south-west and the most common tree in William Bay. Dense thickets of peppermint have colonised the sandy soils closer to the coast. This remarkable species may grow as a tall spindly tree in the forest, where it is away from the relentless sea breezes. However, it is a low, very dense shrub when exposed to constant strong, and often salt-laden, winds. In an undulating coastal environment like that of William Bay, groves of densely-packed peppermints can completely fill the sheltered valleys and depressions, attaining the same heights as neighbouring dune tops, where only shrub-sized peppermints grow. From any hilltop close to Greens Pool you can see swathes of dark green peppermints forming a horizontal canopy, disguising the deep valleys in between.



The shady floor under the tallest peppermints is covered with a carpet of brown leaf litter which is toxic to most other plants. The very common yellow-flowered cutleaf hibbertia (*Hibbertia cuneiformisa*), however, is as much at home here as it is in other South Coastal habitats. You can also see the sword sedge (*Lepidosperma gladiatum*) and a few small, shade-loving shrubs and ground covers.

The stunning Greens Pool at William Bay, where the granitic rocks reach the water, is backed by a narrow beach with steep sandy slopes. On the beach

few plants can survive the ravages of winter storms. A foreigner which has adapted well is the grey-leaved sea spurge (*Euphorbia paralias*), apparently reaching Australia from South Africa some time ago. It is now widespread on beaches between Busselton and Esperance. The sandy cliffs are fragile, and the dense cover may easily give way to allow sand drifts to cover the species-rich coastal heathland.

### Coastal Heath

The heathlands of William Bay are very varied. There are dense thickets of peppermint, heart-leaf poison (*Gastrolobium bilobum*), chorilaena and basket bush (*Spyridium globulosum*) on the sandy soils around Greens Pool. The fertile soils are very rich in organic matter, becoming almost black in winter time. The shrubs are often covered with the clambering, large-leaved lignum (*Muehlenbeckia*) and the rampant creeper old mans beard (*Clematis microphylla*), so-called because after its white petals drop each flower develops a head of fruits with long, bearded hairs. On the ground, in the moist sheltered habitat created by the dense thickets, there are orchids, sundews and the ground-hugging buttercup (*Hibbertia grossulariaefolia*).

The low hills east of the Greens Pool carpark, and above the rounded granitic rocks which reach the water's edge, are capped with limestone. The different soil supports different species, such as parrotbush (*Dryandra sessilis*) and the ground berry (*Acrotiche*). In the almost bare, rounded granitic rock slopes, the bizarre sticky tailflower (*Anthocercis viscosa*), sometimes called dead kangaroo, will grow in crevices with some respite from salt spray. Its common names come from its sticky, foul-smelling flowers, which are large and creamy white, and its sticky leaves.

Where fresh water oozes from the soil mantle and onto the rocky slopes there may be a narrow zone of swamp plants, such as the blue-flowered lobelia (*Lobelia alata*). This species is also found in eastern Australia, New Zealand, South America and South Africa, a reminder that Western Australia was once joined to these lands to form the supercontinent of Gondwana.

Near the William Bay coast, from Greens Pool to Madfish Bay, there are extensive heathlands. Numerous species of shrub grow in the humus-rich sandy soils, or in the shallow clays over the granitic outcrops. Some species are spectacular, such as the coastal banjine (*Pimelea rosea*), which has dense flower heads ranging from pink to red. There are so many heads on the one shrub that the flowers tend to hide the leaves. Another species that grows on the clay soil over granitic rocks is *Kunzea recurva*, with its brilliant pink flowers. It is in these heathlands that one can find many species which also grow in the karri and jarrah



forests further inland. Away from the winds, they can grow as tall shrubs or even small trees.

Unlike its relatives, rope banjine (*Pimelea clavata*), has only small groups of creamy white flowers scattered along its upper stems. Plants of this species growing near the coast are so different from those of the nearby karri forest that they could be mistaken for another species altogether. The coastal variant is a rounded, compact shrub with shorter, darker-coloured and somewhat fleshy leaves. This species is noted for its incredibly long rope-like stem fibres, which are so strong that the fibre from large shrubs was used by Aboriginal people to make fish netting.

Similarly, the curry flower (*Lysinema ciliatum*) is just as common on the sandy flats of the inland jarrah forest, as it is on the west and south coastal heaths. The whole plant has a curry-like odour. This small shrub has few stems, and has a head of white flowers, which are long and covered with modified leaves. At William Bay this species has thick leaves, and larger, more closely packed flowers. Like the coastal variant of rope banjine it too has inland populations with thin leaves and open flowers, and the change can be seen within the national park.

Many of the coastal shrubs of William Bay closely resemble their inland relatives, and can easily be distinguished. However, the common narrow-leaved water bush (*Bosstaea linophylla*), which is a tall graceful shrub with attractive yellow red-tinged flowers inland, grows on the coast as a dense shrub with intense reddish-yellow flowers. *Stackhousia* also looks remarkably different at William Bay. Here, it has fleshy leaves and thick stems, with a denser head of flowers than its counterparts growing under the jarrah trees inland from the bay. The false boronia (*Phyllanthus calycinus*), which is widespread throughout the jarrah forest, also looks notably different on the William Bay heathlands. It too has fleshy leaves and a more compact habit, which has been modified by the salt-laden winds.

Some shrubs are restricted to the coastal heath. Two which are common at William Bay are the light greenish-grey, broad-leaved, compact shrub *Olex phyllanthi*, which is a partial parasite, and the very common beach dweller, native rosemary (*Olearia axillaris*). An unusual-looking plant of the South Coast heathlands is tapeworm bush (*Platysace compressa*). This member of the carrot family has tape-like stems and umbrella-shaped heads of small, creamy flowers. The yellow-flowered coastal daisy (*Senecio lautus*) is also common in the sandy soil near the water's edge.

A characteristic feature of national parks on the South Coast such as William Bay is that flowers may be found here at any time of the year. There is a peak of flowering in spring, but even in the hottest weather flowers can be found, especially in the concealed habitats under the karri trees or under the dense coastal shrubs.

William Bay was named after Sir William Edward Parry RN, a famous British Arctic Explorer and navigator (1790-1855). It was probably named by either Stirling or Roe in the 1830s. Two other features (Parry Inlet and Edward Point) adjacent to William Bay were also named after Parry.

#### **THINGS YOU NEED TO KNOW**

**Where is it?**

15 km west of Denmark.

**Travelling time:**

20 minutes from Denmark, 1 hour from Albany

**What to do:**

Sightseeing, photography, swimming, marine study, bushwalking. Granite boulders and rocky shelves extend for 100 metres or more out to sea along the coast between Greens Pool and Madfish Bay. Sheltered pools, channels and granite terraces inside this reef create a fascinating seascape for beachcombing.

**Facilities:**

Toilets, picnic tables, natural sea pool ideal for family swimming

**Best season:**

Late spring to early autumn

**Tell us about YOUR experience**  
**Visitor Feedback Form**

**Nearest CALM office:**

[Walpole District Office](#)

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### Water Temperatures in Green's Pool

*The following list of temperatures was kindly taken by Member Gary Schwab and recorded by the author to counter a belief in some quarters that the water in Greens Pool was warmer in the Winter than the Summer. That opinion is understandable in light of the fact that the average weather conditions on the south-coast are about a month or so 'behind' standard calendar seasons. Recordings were made at the same location and at the same depth in the water, and to a large extent depend on the behaviour of the Leeuwin Current which can, at occasional times, be somewhat capricious.*

Year	2005	2006	2007
	▼	▼	▼
<i>Summer</i>			
January	NA	18.5C	19C
February	21 degrees Celsius	20	19
<i>Autumn</i>			
March	19	19	21
April	19	19	20
May	19	18	18
<i>Winter</i>			
June	17	18	18
July	16	18	17
August	15.5	16.5	16.5
<i>Spring</i>			
September	16	16.5	16
October	16	17.5	15.5
November	16.5	18	17.5
<i>Summer</i>			
December	17	19	18

## Fungi Forays ex Newsletter number 61 August 2006

### FUNGI FORAYS

A small group began the fungi forays at the beginning of May and continued each week till the end of July. This season, we have been describing fewer specimens but spending more time on distinguishing between the characteristics of fungi which help in accurate identification. Using "keys", we have been noting such things as the way in which gills are attached, spore print colour, presence of a ring or volva, texture of stem and shape of cap amongst other things. Although we are not always able to identify the exact specie, unless the specimen is a well known fungus, we are usually able to key out the specimen to identify the genus. We have photographed the fungi both in the field and as a collection back at the Ranger's House, dissecting the specimens, recording the characteristics and drying them in a dehydrator. The dried specimens will go to the Perth Herbarium for DNA testing and microscopic work. Feedback from the Herbarium will clarify our observations and increase our knowledge and provide a more sophisticated record for the WBNPA.

Katie Syme joined the group for the first few weeks and her enthusiasm for the project stimulated our interest and commitment to the task. Julie Fielder was also a valuable resource who joined us for a few weeks. Julie is now working with Richard Robinson, a well-known mycologist. We had hoped to do more study using the microscope but we found that without someone who had real expertise in this area, we were too short of time and personnel to do so. We were able to borrow a microscope from the Denmark Environment Centre, for which we were very grateful and it is hoped that next year, if we undertake further fungi study, we can find someone to lead and teach us in this side of the work. It would greatly increase our knowledge to be able to routinely view specimens in this way.

However, the small number of committed would-be mycologists who venture out weekly, sometimes in the rain, have covered a lot of ground from Mazzeletti's Track to Lake Byleveld, to the Bibbulman off Madfish Bay Rd, to the forest near the Ranger's House. We can tell a *Cortinarius* from an *Amanita* from a *Russula*. We can instantly recognize a number

of unique looking Boletes, such as *Austroboletus occidentalis* and *Boletellus obscurecoccineus*: we can exclaim over a colourful field of *Hygrocybe polychromas* or *Clavulinopsis aff. aurantia*: nod sagely at a *Dermocybe splendida* or a *Hydnum repandum* or even a *Phellodon aff. niger*. So we're not doing too badly.

For most people, the finding of the fungi is interesting but the minute study of characteristics only appeals to a few. For this reason, we have put together some small field books containing photographs of the fungi we have found and identified this season. It is hoped that people might like to take them with them on walks and try to match up the fungi seen to those in the books. The books are pocket sized and easy to carry. They are also waterproof so that they won't be spoiled if the weather or foliage is damp.

In addition to the small field books, we have put together a study file with lists of fungi seen, descriptions of selected fungi and photographs of many of them. This will be another resource to hold at the Ranger's House for members to access. (I have kept a record of all the photographs on a file in my computer, should it be necessary to reproduce any or to view them on the screen.) The card index which a group of us made in 2004 with descriptions and photographs is also available as a resource at the Ranger's House. We shall also recommend that at least one publication be bought by the Association for use as a resource for future enthusiasts in this field.

This year's project which contains a large number of photographs has been quite expensive to complete. Although we should like to expand the record of species to be found in the park, we should be careful not to duplicate the work already covered so as to avoid unnecessary expense.

Dale Fewings

July 2006



### *DIE BACK NOTE*

The following is passed on to us by Wendy Schwab who has extracted an earlier note prepared by Joanna Young . You may recall that Joanna prepared a talk for the association last year which ended in a successful visit to infested sites and a swim at Boat harbour.

## **The Biological Bulldozer**

### What is happening in the World of Dieback caused by *Phytophthora cinnamomi*?

In recent years there has been far too little action aimed at protecting the last of the "Disease Free"; valuable areas for the maintenance of biodiversity in the long term. Far too few people have appreciated what is being lost and priorities have not been set for management. But of late things have changed and recently the South Coast Regional Initiative Planning Team; the South Coast Regional Natural Resource Management Team has made funds available to put dieback "on the map" in their region and Project Manager Dr Joanna Young seeks community involvement in the project in a number of ways.

The community is being encouraged to:

- Think "disease free". Discourage or avoid taking soil in any quantity into areas of bushland that look relatively healthy or undisturbed.
- Recognise "disease free". Record or note large areas of healthy Banksia woodlands, mallee and heathland communities which may be worthy of more active dieback management to keep them "green"
- To nominate valued areas of disease-free native vegetation for dieback assessment. Field visits and briefings on the disease can be arranged in the SCRIPT region.

With regard to the detail the first goal of the SCRIPT dieback project is to produce a strategic broad scale map of where dieback is impacting on vegetation within the natural resource management region which runs from

see over for 2of 2 >>

Walpole across to Cape Arid east of Esperance. The second goal is to identify areas that are still free of disease, supporting susceptible vegetation which experience conditions conducive to disease.

SCRIPT has just published a pamphlet about the dieback project and a copy can be requested by emailing the SCRIPT office [script@agric.wa.gov.au](mailto:script@agric.wa.gov.au).

Recently WWF and the Dieback Consultative Council have also published a booklet "Arresting Phytophthora dieback, the Biological Bulldozer" which highlights actions needed to protect some of our biodiverse plant communities and ecosystems from dieback caused by *Phytophthora cinnamomi*. The booklet is online at [www.wwf.org.au](http://www.wwf.org.au) and information is provided so copies can be ordered.

#### Recognising Dieback caused by *Phytophthora cinnamomi*

*Phytophthora cinnamomi* is widely distributed throughout the South-west but not many people readily recognise the impacts of this introduced plant pathogen. It is not just a disease of the jarrah forest it is a disease of a great range of ecosystems and plant communities. Positive isolations of the pathogen have now been made from Eneabba in the Northern Agricultural Region, right through the south west corner of the State to the east of Esperance in Cape Arid National Park.

Dying banksias are one of the best indicators of the disease but many other species of the genera listed (below) are also susceptible. When patches of vegetation made up of a diverse mix of species collapse and die, *P. cinnamomi* may well be the culprit. Warm, moist conditions are most conducive to the disease so often plants are seen to collapse and die after summer rain. The disease is often worst in plant communities growing on poor grey sands or poorly drained soil profiles. Even in the jarrah forest disease expression can vary with soil type and profile. Dieback caused by *P. cinnamomi* not only kills plants in the bush, it can kill susceptible species in gardens and orchards including avocados and proteas.

#### Examples of Impact

The disease has ravaged many ecosystems and in some areas where a little of the history is known the last individuals of some susceptible species are dying. There are many examples of the chronic situation from throughout the South-west:

- The understorey of much of the jarrah forest has lost a significant number of susceptible species over a vast area.
- The Stirling Range National Park has been devastated. Both species and communities are now threatened with extinction.
- The once common *Banksia attenuata* is now represented by only a smattering of individuals in the Two Peoples Bay Nature Reserve.

- Thickets of *Banksia quercifolia* once common throughout the South-west and particularly in the woodlands and forest are now hard to find.
- Most if not all natural populations of *Banksia coccinea* are infected. Fine stands of this Albany banksia are very hard to find.
- Cape Le Grande National Park is largely impacted with significant loss of endemic plants including *Lambertia echinata* subsp. *echinata*, as well as its *Banksia spectulosa* dominated heaths.

#### Species of the following Genera of plants are commonly killed by *Phytophthora cinnamomi*

*Adenanthos Andersonia Astroloma  
Banksia  
Hypocalymna Isopogon  
Leucopogon Lysinema  
Macrozamia  
Persoonia Petrophile Pullenaea  
Tetratheca Sphenotoma  
Xanthorrhoea*

#### Web sites with further information

[www.calm.wa.gov.au/projects/dieback](http://www.calm.wa.gov.au/projects/dieback)  
[www.cpsm.murdoch.edu.au/](http://www.cpsm.murdoch.edu.au/) Information on susceptible and resistant Western Australian native plants  
[www.deh.gov.au/biodiversity/threatened](http://www.deh.gov.au/biodiversity/threatened) On the National dieback threat abatement plan  
[www.ngia.com.au/niasa/](http://www.ngia.com.au/niasa/) Information on best practise gardening

#### RECIPE CORNER

This recipe came to me following a tasting at George's BBQ. Thanks Pam. Thanks Wendy from whom the following quote was extracted.

"I know from time to time in the past we have had recipes in the newsletter and I believe the general consensus was that this slice was to die for."

#### Pam's Magic Slice

##### Ingredients

1 ½ cups crushed sweet plain biscuit (for base)  
1 - 395 gm can sweetened condensed milk  
1 cup raisins  
1 cup desiccated coconut  
1 cup almond flakes  
1 cup milk chocolate bits  
75 gm melted butter

NB For further information the Dieback Working Group have produced a first- class booklet: **Managing Phytophthora Dieback in Bushland 2009.**

### FUNDING/ GRANTS and FUNDRAISING

<i>Year</i>	<i>Source</i>	<i>Amount</i>	<i>Use</i>
1998	Coastcare/Coastwatch	\$2 800	Fencing at Greens Pool
1998	WWF for Nature	4 000 )	Fauna Survey
	Donation from H H Kremers	1 000 )	"
1999	Coastcare/Coastwatch	1 000	Fencing at Greens Pool(additional)
2005	Fund-Raising. Cultural Experience by Ranger Hardy Derschow	360	
2005	Dept. Families & Housing, Community Services & Indigenous Affairs	1 583	Water-Monitoring Equipment
2006	Quiz Night	606	
2006	Shire of Denmark	1 000	Digital Camera
2007	Southern Incentive 3	2 330	Dune Rehabilitation
2008	Lotterywest	4 098	Computer & Projector
2009	Dept. Families, Housing, CS&IA	1 024	BBQ Equipment & Furniture