Granite: A Treasury of Plants and Culture

This year's theme builds on the knowledge shared by Wudjari custodians at the last five Wildflower Festivals, integrating First Nations cultural heritage and botanical knowledge of the Esperance region. Granite environments are an important component of Wudjari cultural corridors. They are also botanically rich environments.

Cultural significance of granite to Wudjari People
Jennell Reynolds, Esperance Tjaltjraak Native Title Aboriginal Corporation

Granite outcrops have been culturally significant to Wudjari people for many thousands of years. We did not have maps of country to distinguish boundaries between traditional lands, so we used landmarks such as granite outcrops to determine these boundaries. Our ancestors would also take advantage of the height of these outcrops as lookouts to view people and animals moving across country. These significant landmarks could also have Dreaming stories attached to them like Mandaboornap (Frenchman Peak).

These outcrops harbour an array of cultural plants scattered amongst the granite depending on the depth of soil they grow in. Some plants that inhabit the granite have edible tubers like the Youlk (*Platysace trachymenioides*) and Dgungardgungar (*Thysanotus patersonii*). The Tallyongert (*Hakea clavata*) has edible seeds. Some plants have other uses like the Marro (*Callitris preissii*) which keeps mosquitoes away, and the Moonah (*Melaleuca pentagona*) which can be used for respiratory ailments: leaves can be crushed and inhaled to relieve congestion and stems and leaves can be crushed, heated and applied to the body for aches and pains.

Rock art can often be found at granite sites. These works vary in size and can be painted or engraved on granite. They often depict animals or things in the environment, a significant event in history or something associated with ceremony and the Dreaming. These cultural heritage sites are highly fragile, and are subject to weathering, erosion, vandalism and exfoliation, so need to be protected.

Gnamma (water holes) were essential for our people, not only to help us stay alive, but also as a part of our Dreaming and song lines, integral to the story of how our ancestors used these cultural corridors to move over country. Gnammas were maintained by our ancestors and in some areas gnammas were also made for animals to make this resource more accessible. Our ancestors skilfully excavated gnammas, using fire and water to exfoliate the granite to varying depths depending on use and frequency of need. Gnammas used for human consumption where often capped (had a granite lid). Others intended for animal's use would have a stick placed in them so that smaller animals could have safe access, without drowning and fouling up these precious resources.

Human-made granite cavities were also strategically placed on granite outcrops by our ancestors to house lizards so that when this food source was needed our people knew where to harvest them. Another use for granites was during Makuru season (Winter-June/July) when our ancestors would move away from the coast and seek caves to shelter from the harsh coastal wind and rain.

What is granite?
Ken Mills, Esperance Wildflower Society

Granite is a type of rock formed when molten lava from deep within the earth cools slowly and solidifies deep underground. It contains coarse grains of different minerals. Some of these are dark coloured and some are light, which give it a grainy appearance. Its name comes from the latin word *granum* which means grainy.

Much of Western Australia including the Esperance area is located on an extensive layer of granite bedrock up to 40km thick. In most places this rock is deep below the ground, however it rises to the surface in places where it can be seen as rocky mountains and hills or as flat sheets of rock.

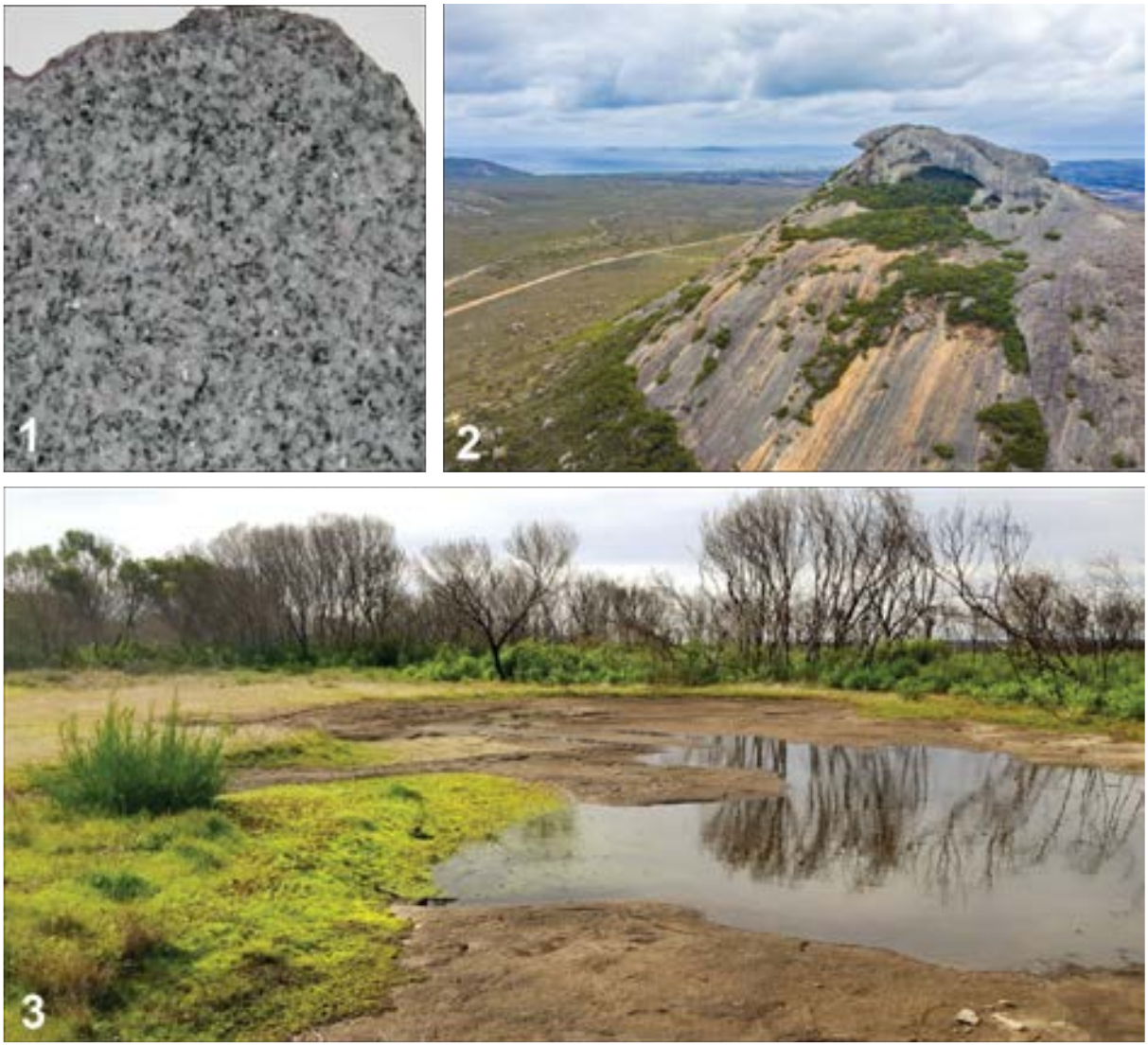

Figure 1. 1–sample of granite rock. 2–steep mountainous granite slopes of Mandaboornap (Frenchman Peak). 3–flat granite sheet at Boyatup.

Plants and granite
In order to survive and grow, plants need soil for their roots to obtain moisture and nutrients, so growing on rocks is difficult. When it rains, water runs off the rocks quickly. During the summer,

the bare rock absorbs heat and gets very hot. If plants are to grow there they need to be really tough and to find ways to cope with such difficult conditions.

Despite this difficult environment, a surprising number of plants have found ways to adapt and benefit from an association with granite. A recently published study of granite formations located in an area extending from Esperance to Kalgoorlie found over 1500 different plant species were present.

One reason for this diversity is that a number of different habitats occur within granite formations. These include bare rock, cracks and crevices, soil pockets, moss beds and run-off areas at the base of granite slopes.

An example of the special adaptions to life on the granite is provided by the resurrection plant *Borya nitida* (Pincusions), a small, rounded shrub that grows in shallow soils on granite slopes. During the dry summer months it goes into a state of hibernation, its leaves turning orange-brown so that the plant appears to be dead. It stays in this condition until rain falls, when it rapidly turns green again and produces clusters of small white flowers. It's spreading stems also trap pieces of debris, adding nutrients to the existing soil (see the first two photos in the Appendix (p7).

Bare rock

This is the most difficult of the granite environments for plants to survive as there is no soil and water from rainfall runs off rapidly. Despite the harsh conditions, one type of organism is able to survive. While not true plants (they are a combination of an alga and a fungus), lichens have a plant-like appearance. They are tightly attached to the rock surface to avoid being blown or washed away (Fig. 2). The algae provide food for the fungi, which in turn extract nutrients from the rocks which are utilised by the algae. They also provide a protective environment for the algae. Neither partner could survive in such a harsh and dry environment without the assistance provided by the other. Lichens play an important role in the granite ecosystem by secreting small amounts of acid which slowly breaks down the rock surface to form soil particles that become lodged in cracks and hollows, eventually providing an opportunity for true plants to become established.

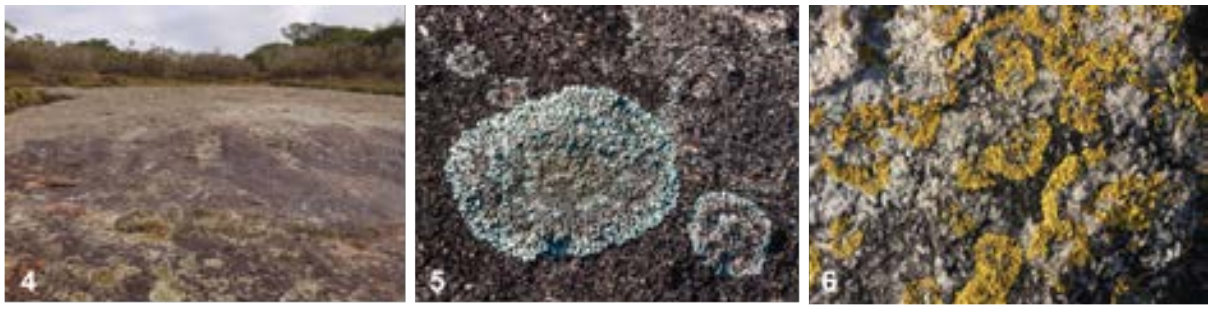

Figure 2. 4—lichen growing on a flat granite sheet. 5 & 6—different lichen species on granite slope.

Cracks and crevices

Cracks in the surface of granite slowing accumulate particles of rock, dust and vegetative material to form a shallow soil. The larger the cracks become the more soil they can hold, and more and larger plants can manage to grow in them.

Even very small cracks can provide an opportunity for surprisingly large plats, such as the small trees on top of Mandaboornap (Fig.3.7). In contrast, other cracks may contain only very small plants such as the Pink Fairy Orchid in Fig. 3.10.

Figure 3. 7–stunted mallee eucalypts on the summit of Mandaboornup. 8–assorted shrubs in rock cracks. 9–*Calothamnus tuberosus* on Kardutjaarnup (Peak Charles). 10–Pink Fairy Orchid *Caladenia latifolia* in a small protected crack. 11–Coastal Hakea *Hakea clavata* on Taylors Rock. 12–Sticky Tailflower *Anthocercis viscosa* on Taylors Rock.

Moss Beds

Where just a few millimetres of soil accumulate in hollows in the rock surface, thick beds of moss can grow. In winter these act like sponges, soaking up water as it flows down the rock. This provides suitable growing conditions for a number of small plants. When these flower in spring they look like a miniature flower garden.

Figure 4. Plants of the moss bed 'miniature gardens'. 13–Redcoats *Utricularia menziesii.* 14–Snail Orchids *Pterostylis sp.* 15–Blue Fairy Orchid *Pheladenia deformed.* 16–Mosquito Orchid *Cyrtostylis robusta.* 17–Pink Bunny Orchid *Eriochilus scaber.*

Soil pockets

Soil pockets occur when particles of rock, soil and plant matter accumulate in depressions in the rock. Where deep depressions occur they are able to support quite large shrubs.

Figure 5. Mallee eucalypts growing in soil that has accumulated in depressions on Taylots Rock. 18—Tjaltjraak *Eucalyptus pleurocarpa.* 19—Yate *Eucalyptus cornuta.*

Rock bases

Plants growing around the base of granite rocks have the advantages of both deeper soil and the runoff of rain that falls on the rock itself. In contrast with other habits associated with granite, the vegetation here is often quite dense, and the number of species present is higher.

Figure 6. 20—Dense vegetation including One-sided Bottlebrush *Calothamnus quadrifidus* and Cauliflower Hakea *Hakea corymbosa,* Boyatup. 21—A carpet of Pink Everlastings *Rhodanthe manglesii,* Kardutjaarnup (Peak Charles). 22—*Taxandria callistachys* among shrubbery at base of Taylors Rock.

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Appendix: Selected Plants of Granite
(Photo credits: Ken Mills)

Resurrection Plant *Borya nitida* (cracks & crevices, moss beds)

Resurrection Plant *Borya nitida* – in summer hibernation state

Sticky Tail Flower *Anthocercis viscosa* (cracks & crevices)

Coastal Hakea *Hakea clavate* (cracks & crevices)

Cape Arid Kennedia *Kennedia beckxiana* (rock bases, scrambling over rocks)

Blue Squill *Chamaescilla corymbose* (moss beds)

Tapeworm Plant *Platysace compressa* (cracks & crevices, soil pockets)	*Stackhousia monogyna* (moss beds, soil pockets)
	
Eutaxia myrtifolia (soil pockets)	Heart Leaf Poison *Gastrolobium bilobum* (soil pockets)
	
Mirbelia granitica soil pockets, rock base)	Baxter's Kunzea *Kunzea baxteri* (Soil pockets, rock base)
	
Calothamnus villosus (soil pockets)	Silver Teatree *Leptospermopsis sericea*
	
Redcoats *Utricularia menziesii* (moss beds)	*Melaleuca globifera* (soil pockets, rock base)