# Six Seasons Journal

# Educators Pack

# Contents

*"Wedjellah* and *Noongar* – we are all here together, this is our country, *Noongar-Wedjellah*. We welcome you here to our country, this is our Moort, you are our Gnaala Moort – we are family, we are one – that Moort means we are one."

**Noongar Elder, Mrs Janet Hayden in Gnaala Karla Booja in** *Working in Partnership* **with Industry and Government, August 2012** (ref 1)

"The complexity of Aboriginal and Torres Strait Islander peoples, the oldest living culture on earth, shouldn't be Australia's secret history, but common knowledge that is shared and celebrated. It's time to acknowledge this truth and pay homage to the people who cared for this land and for themselves for millennia before [European] settlement."

**Common Ground website** (ref 9)

"We are the river, estuary, lakes and ocean people. The images we see today are the same images our Ancestors have seen throughout millenia."

**Noongar Elder, George Walley**

.

## Acknowledgement of Country

The City of Mandurah acknowledges and pays respect to the Bindjareb people, who are the Traditional Owners and First Peoples of this land. We pay respect to the Elders past, present and emerging and acknowledge the continuing contribution they make to the life of this City and this region.

## Introduction

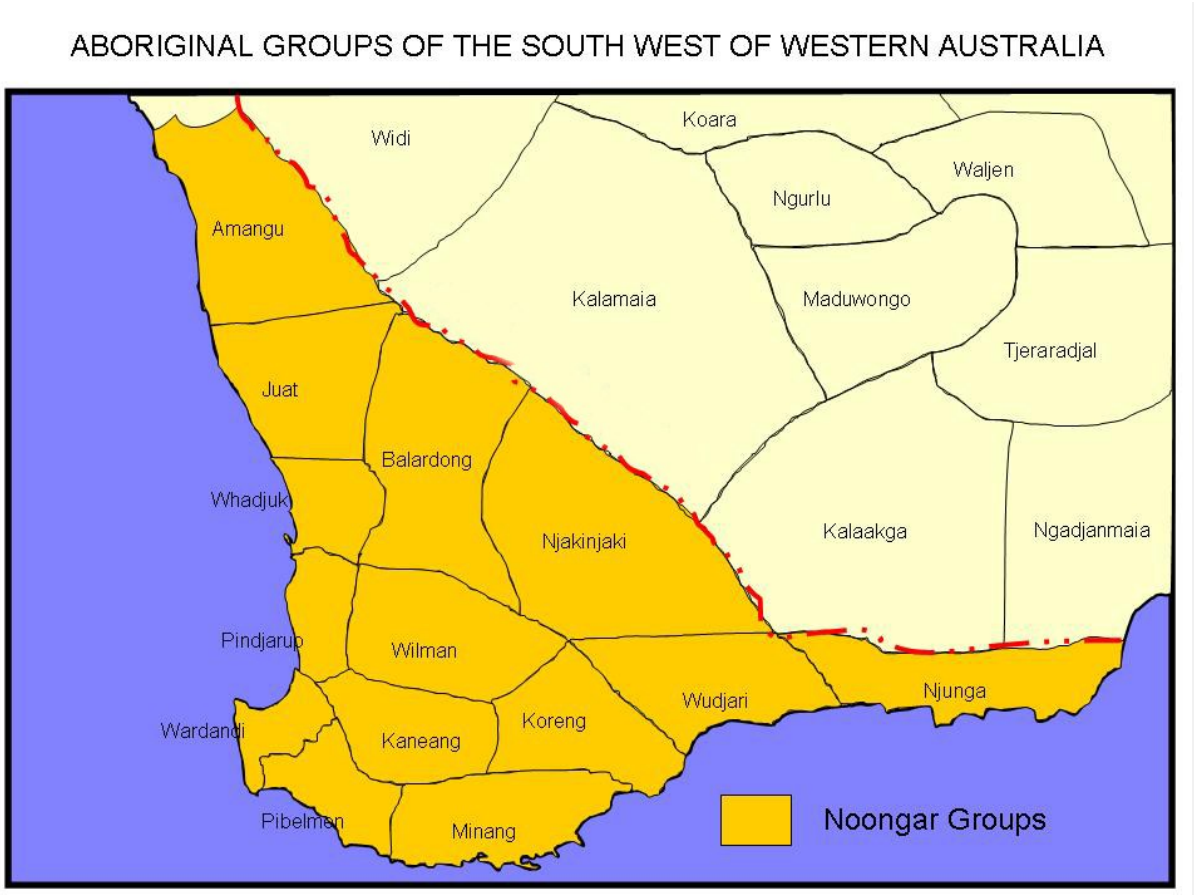
Noongar people have lived in the south-west of Western Australia for more than 50,000 years (ref 27). Noongar country (**boodjar**) provided everything required, including food, medicine, tools and shelter.

According to Noongar historian, Dr Rosemary van den Berg:

> *On the coastal plain, they hunted kangaroo (**yongka**), emu, (**waitj**), possums (**coomarl**), snakes, (land snakes, not water snakes), lizards (**caarda**, and **yoorna**), turtles and their eggs, honey, birds like rosellas, bronze-wing pigeons and ducks and their eggs and the **bardi** grubs, which could be eaten raw or cooked in the coals. Their vegetable and fruit intake included edible tubers, quandong, berries and nuts and a type of grain which could be crushed and made into a damper. The **boyoo** or toxic zamia palm had special treatment before it could be eaten* (van den Berg 2001, p.96) (ref 8).

There was a relatively high permanent population of Noongar people on the Swan Coastal Plain, especially in the areas around the Swan and Murray Rivers. There were probably five or so major communities spread from north to south and focused along the main river estuarine systems (ref 16). Noongar people associated with the collective community of the Murray-Peel region belong to the language group of Binjareb/Pinjarup. These terms translate to "people of the wetlands" (George Walley, pers. com. 2020).

Knowledge (**kaartdijin**) passed down by Noongar people over countless generations reflected the deep spiritual and physical connection to country and to places of significance (ref 39). This knowledge included an understanding of seasonal changes that were closely attuned to the climate and related plant and animal activity (ref 13).






When Europeans arrived in this area in the 1830s, they kept their old seasonal patterns despite the marked differences in climate and other natural cycles. Australia's climatic pattern is opposite to that of Europe because we are in the southern hemisphere. Climatic patterns vary throughout Australia, and these changes affect cycles in plants and animals. (ref 13).

Early colonial observers were confused about Noongar seasonality and how the seasons were demarcated. The number of seasons depended on the individual recorder and geographic region. George Fletcher Moore, referring to the Perth area, proposed a six-season model, each lasting two months:

- *Birak* was the dry time of December and January.
- *Bunuru* covered the late summer and early autumn months of February and March.
- *Djeran* was the name for the period covering April and May.
- *Makuru* was early winter, spanning June and July.
- *Djilba* covered the late winter and early spring months of August and September.
- *Kambarang* was the season of decreasing rain, covering the months of October and November when people came together for social, ceremonial and trading activities.

However, such a regular assignment of seasons, while easy to overlay on the Western calendar, does not allow for the complexity of the system that was developed over many thousands of years of indigenous observation and experience. This point is emphasized by anthropologists Macintyre and Dobson who state that:

> According to George Fletcher Moore's (1842) rigidly defined six-season Nyungar calendar … djeran corresponds to April and May (late autumn). However, its duration would have varied, depending on localised weather patterns and the vagaries of autumn rainfall. It definitely would not have been restricted to such a neat arbitrarily defined two-month season. Nature does not work that way. Moore's six-season model is oversimplified, Western-centric and ethnographically inaccurate. What he has done is to super-impose six indigenous named periods onto the Western-derived twelve-month Gregorian calendar. From a mathematical perspective six divides neatly into twelve, creating six seasons, each of two month's duration. But this theoretical model is flawed. The traditional Nyungar hunter-gatherer-cultivator calendar was based on solar and lunar cycles interlinked with plant, fish, bird and animal phenological breeding cycles (seasons) and sub-cycles (sub-seasons) – not a white man's adapted version of the Gregorian calendar (ref 25).

In addition, Collard (2004) describes the complex inter-connection between Noongar knowledge (**katitjin**) and spirtuality:

> The **katitjin** (knowledge) given to Nyungar by the Waakal or Nyungar Rainbow Serpent included all things connected to our **boodjar**. The Waakal gave us our knowledge about the sacred sites such as Boyagin Rock, Mandikan, Karta Koomba, Pinjarra, Mundaring, Walwalyalup, Waakal Mia, and the Darbal Yiragan or estuary, and our relationship to them. Waakal gave us our knowledge about Nyungar and our relationships, responsibilities and obligations to one another. The Creator gave us our **katitjin** about the animals, plants, bush medicines, trees, rivers, waterholes, hills, gullies, the stars, moon, sun, rocks and seasons, and their interconnectedness in the web of life. Of the six seasons in the Nyungar world four were used for fishing, hunting and gathering, one for law and ceremony, and the other one, the **Nyittiny**, cold times, for new home fires or camping grounds (ref 8).

The Noongar seasonal calendar is founded on thousands of years of indigenous scientific knowledge. As noted by anthropologists Ken Macintyre and Barb Dobson:

> For over 50,000 years the Noongar people of southwestern Australia possessed a complex scientific understanding of the natural world. They were familiar with the phenological breeding cycles and feeding habits of animals, birds, plants, reptiles and fish on which they depended for food. They were probably the world's first astronomers in that they relied on the recurring dark and light constellations in the night sky to reckon time and seasonality. The dark constellation known as the "Emu in the sky" was a highly dependable and seasonally accurate astronomical indicator used by the Noongar to signify the commencement of the "dark season" of winter (**makuru, maggoro, mokker**) (ref 27).
>
> The Noongar people, like other Aboriginal groups throughout Australia, over many thousands of years accumulated a vast database of empirical knowledge founded on direct observations and experiences of the world around them. This knowledge was handed down through successive generations by oral narrative and song. It included

scientific knowledge (ecology, biology, zoology, climatology, astronomy and phenology etc) understood from an indigenous perspective that was often encoded as metaphor in traditional narratives (ref 30).

Without this scientific knowledge, Aboriginal people could not have survived to be the longest continuous living culture in the world (ref 27).

## Aim and Scope

The Six Seasons Educators Pack brings together documented Noongar knowledge, anthropological studies and ecological research, with a focus on the environment and traditional Noongar culture of the Peel Region. The goal is to provide teachers, parents and the community with information about seasonal changes in weather, plant and animal activity in Mandurah and how these are related to the Noongar system of seasons. It is hoped that this knowledge can help build a deeper understanding and appreciation of traditional Noongar culture and Indigenous science.

This document is designed to be used in conjunction with the City of Mandurah's Six Seasons Journal. The Journal encourages children (and adults) to record their observations of local weather, plants and animals over a twelve-month period. By observing the changes taking place in the environment around them, participants may develop a stronger connection to the natural world and become curious about the rich ecology and cultural history of this area.

For convenience the information in this Pack is divided into six seasons of two-month periods, but users are encouraged to make their own judgements about when each season begins and ends, based on their observations and understanding of traditional Noongar knowledge. A range of activities linked to the WA school curriculum are also provided, to support interactive exploration of the local environment and traditional Noongar culture.

It is beyond the scope of this document to deliver information about the spirituality of Noongar beliefs and traditional mythology. The history and politics of colonization and subsequent changes in Noongar culture are also not covered here.

All material in the Pack is gathered from publicly available information and references have been provided to (mostly online) resources. Noongar words have been highlighted in bold font – please note that multiple versions of spelling may apply to translated terms.

This Educators Pack and the Six Seasons Journal are available as a free download for personal and educational use at artspacesmandurah.com.au/cultural-garden

## Birak (approx. Dec – Jan) (early to mid summer)

*The season of the young*

Birak is a season of bright daylight and warmth. During Birak the rains ease up and the hot, dry weather, fueled by easterly winds, begins. The afternoons are usually cooled by the sea breeze from the south-west (ref 24).

During these summer months, a wind known as the "Fremantle Doctor" (**goolamwin** in Noongar) consistently blows from the southwest along the southern half of the west coast, starting between 10 am and 3 pm. It can penetrate as far inland as 100 kilometres. It has this name because it appears to come from the nearby coastal city of Fremantle, and it brings welcome relief from the summertime high temperatures. On days when the wind fails, the afternoon temperatures of coastal suburbs are considerably higher (ref 42).

The Australian Christmas Tree (*Nuytsia floribunda*) is in full bloom now and *Banksia* flowers are still full of colour, although the hot, dry weather reduces the nectar content enjoyed earlier in Kambarang. The scarlet runner (*Kennedia prostrata*) is flowering in the bush, as well as fringed lilies (*Thysanotus*). Plants that can be harvested in this season include wattle (*Acacia*) seeds, the salty pigface (*Carpobrotus*) fruits, *Dianella* berries and snottygobble (*Persoonia*) fruits.

**Traditional Noongar culture**

Water sources were now drying up inland and the Noongar people moved towards the coast. As summer advanced they gathered in greater numbers along the coastal lakes and river estuaries, where mullet, bream, marron and crabs were found ready for harvesting (ref 5, 24, 41).

Noongar elder Gloria Kearing (2015) describes the seasonal habits of turtles:

> *"As kambarang (flowering / spring) is ending and the season heads into birak (the first summer) the water in the binjar is drying up. The turtles head to middle and bury themselves in the mud to wait out the bunuru (hottest time; the second summer)".*

During this time, Noongar people burnt sections of the scrubland and practiced fire-stick farming (ref 41). See below for more information about traditional burning practices.

The operation of the Barragup fish mungah (see Djiran chapter) relied upon the seasonal movements of marine fish up into the rivers. During these drier months the Peel, Harvey and Leschenault Inlets become increasingly saline and are used by marine fish in particular the sea mullet (*Mugil cephalus*) and Australian salmon (*Arripis truttaceus*), known to the Nyungar people as ***kalda*** and ***ngarri***, as a nursery environment after spawning in the oceans (ref 16).

Elders from the Murray group would watch for these fish to arrive in the estuaries and move up into the rivers. They would then reconstruct the Barragup mungah wall, which had been partially demolished each year, or washed away by winter flooding (ref 16).

## Plant Focus : Wattles (*Acacia* spp.)

*Acacia cyclops* pods and seeds

*Acacia saligna* pods and seeds

*Acacia cyclops* and *Acacia saligna* are common local species of wattle that have edible seeds (ref 20). Mandurah's *Acacia* species begin flowering around September, during the Djilba season, continuing into Kambarang. Seeds can be harvested in Birak and Boonaroo (summer months).

Harvesting the seeds depends on the type of pod in each species. For example, the long slender pods of *Acacia saligna* tend to pop open and shed seeds over a relatively short time frame. In comparison, the distinctive seeds of *Acacia cyclops* with their bright red arils are held inside the curly pods for several weeks, allowing a more extended harvest.

It is recommended that edible wattle seeds be roasted prior to consumption, to reduce any anti-nutrients present (ref 23). The seeds can then be eaten whole or ground to add a nutty flavour to breads, cakes or icecream.

In his 2004 paper, Len Collard shares the words of Pindjarup Oral Historian, Dr Richard Walley as he tells us about the traditional significance of the wattles around Murdoch University:

> *Around this campus, you got lots of trees that had a lot of significance to our people, starting from the old wattle. Did you know that the seeds, in the earlier times, were used to grind and make into flour. Also to us, when we were brought up, the wattle was very prominent with bardies, you know. We'd always get the wattle bardies and they were good feeding and the wattle gum was very, very good. You also have, as you go east, the jam trees which have the same thing, the bardies and the gum. I think the jam gum is something we used to look forward to, so there were trees that provided that sort of gum and provided us with the bardies than you have other trees. Cause they provide warmth for the fire. And also the jam gum provided*

*fantastic timber for boomerangs and nulla nullas and those sorts of things, like shields and dallops. So they were fantastic for that* (ref 8*).*

For more information about wattles, visit:

- Wattle Day Association Inc webpage, with information and school resources: http://www.wattleday.asn.au/for-schools/posters-and-brochure-for-national-wattle-day
- For information about traditional Noongar uses of Acacia gum, see "The Sweet Gum – a Nyungar confection" by Ken Macintyre and Barb Dobson: https://anthropologyfromtheshed.com/project/the-sweet-gum-a-nyungar-confection/

## Animal Focus: Snakes and Bobtails

### Snakes

As the weather heats up its time to be on the alert for snakes, as these reptiles are emerging from their winter hideouts (ref 11).

Unlike mammals and birds that can naturally regulate their body temperature, snakes are ectothermic animals – reptiles, and they need external heat sources to warm their bodies. In fact, the level of activity of reptiles is directly related to the temperature of the ground and air. They will gravitate to the warmth of the sun and will lay out in the open, or near warm rocks and surfaces when the sun begins to set, and during the night they will typically go underground where it is warmer. When the climate becomes too cold, they will brumate – a lethargic state somewhat analogous to hibernation, but not the same – in areas near whatever heat source they can find, and then they will become active again when the temperature starts to rise. In areas where temperature fluctuates during the winter season, such as along coast lines, if it becomes warm enough, snakes will venture out on warm days to bask in the sun and to look for food (ref 3).

Snakes are most active now and over the next few months, so take extra care when venturing outdoors particularly near swamps, lakes and bush land. Most snake bites occur when people try to catch or kill the snake. Snakes will normally try to avoid humans, however, people still need to be aware and take precautions such as wearing long pants and enclosed shoes when walking along bush trails (ref 11).

Noongar traditionally caught snakes behind the head, either by hand or with a forked stick, to prevent them biting themselves or their captors. Snakes were placed in a fire and roasted in the ashes (ref 13).

See Fauna Notes – Reptiles in and around the house (ref 12): https://www.dpaw.wa.gov.au/images/documents/plants-animals/animals/living-with-wildlife/reptiles_fauna_note_2017.pdf for more information about common reptiles found in Western Australian backyards, such as tiger snakes, dugites and carpet pythons.

**Bobtails (Yorna)**

The slow moving purple-tongued ***yorna*** or bobtail lizard (*Tiliqua rugosa*) was considered a valuable food and medicine by the Noongar people (ref 29).

Bobtails are one of the most interesting and beneficial native animals which take up residence in suburban backyards. These lizards may look fierce, with their armour-plated body and tendency to hiss and show off their big blue tongues, but they are completely harmless to people and pets. As the weather warms up, bobtails will come out of hiding and move around the suburbs.

To encourage these lizards in the garden, avoid using any chemicals and plant sprawling shrubs, such prostrate Grevilleas, to provide shelter. Additionally, place a few large rocks or old logs around the garden as places to bask and sleep. To provide natural food for bobtails, you can plant native plants such as pigface (*Carpobrotus*), fringe lilies (*Thysanotus* spp.) and *Dianella*, which these animals feed on in the wild.

## Animal Focus : Birds Without Borders

Information courtesy of Peel Harvey Catchment Council:

At this time of year migratory shorebirds come to spend the summer in the Peel-Yalgorup Ramsar-listed system (Ramsar site 482), including the Peel Inlet, Harvey Estuary and surrounding lakes. Shorebirds are the most endangered group of birds in the world. Shorebirds travel approximately 12,500kms from the northern hemisphere to the southern hemisphere along the East Asian Australasian Flyway, which spans from Siberia and Alaska down to Australia and New Zealand, spanning a total of 22 countries and supporting 54 species of migratory shorebirds. All over the world, communities are working hard to try and protect wetland habitats for these birds.

The PYS or Ramsar site 482 represents for many of the birds the final southern destination in the flyway, which is part of the reason the PYS is listed as a Wetland of International Importance under the Ramsar Convention. The Ramsar site (which is made up of the Peel Inlet, Harvey Estuary and surrounding lakes including Yalgorup Lakes, Lakes Mealup, McLarty, and Clifton), provides a home to about 40,000 waterbirds between October and March each year. The PYS supports more than 1% of the entire world population of 14 species of waterbirds.

One of the species that comes to visit our wetlands at this time of year is the Red-Necked Stint, the smallest of the shorebirds that visit Australia. These tiny birds weigh less than a Tim Tam biscuit, around 28 grams, but despite their size they can fly for 4 days with speeds up to 60kmph and cover up to 2,500kms without stopping. During the 20-30 year lifetime of a Red-necked Stint, their travels can add up to over 400,000 km which is further than the distance from the earth to the moon. The red-necked stint can lose up to half their body weight during migration. As a result they need to busily feed to gain weight whilst in Australia. During feeding season these birds can expect to put on anywhere between 30-70% of their body weight to prepare themselves for migration.

In the Peel region our community relies and uses the wetland for tourism, fishing and recreation, but these activities can disturb bird populations. Each day the shorebirds have a narrow window to feed in as the mudflats that form their main feeding area are affected by the tides. It is vital that the birds feed as much as possible and reenergise during the summer to prepare themselves for the gruelling journey once again back to the northern hemisphere. One of the biggest threats to these birds feeding in our local area is disturbance by human activity. We can help by appreciating shorebirds from a distance and making sure not to disturb them when boating, walking, especially walking with dogs who are best kept away from sensitive areas and on leashes near the wetlands when shorebirds are around.

Further information and education resources about Shorebirds:

Illustrations and information about particular shorebirds by zoologist and artist Milly Formby: https://wingthreads.com/meettheshorebirds/
Education packs with shorebird related activities for various ages from BirdLife Australia: https://birdlife.org.au/projects/shorebirds/education

## Animal Focus : Blue Swimmer Crab (*Portunus armatus,* Karil)

The Peel-Harvey Estuary is closed to fishing from 1 September to 30 November each year during which blue swimmer crabs may not be taken. For information about this and other rules regarding minimum size limits and bag limits that must be adhered to, visit the Department of Fisheries: http://rules.fish.wa.gov.au/Species/Index/27
Crabbing season in Mandurah currently begins 1 December. The male blue swimmer crab has the distinctive rich blue colouring on the legs and claws, while the female is usually a mottled brown.

**Excerpts from Blue swimmer crab. 2019. DPIRD (Ref 15):**
In Western Australia, blue swimmer crabs (**karil**) can grow to up to 25 cm wide across the carapace with a claw span of up to 80 cm. They eat small fish and crustaceans, molluscs, worms, and occasionally, algae and seagrass. In turn, they are prey for fish and birds.
By day, they usually hide beneath the sand with only their eyes protruding, then launch themselves at prey. At night they become mobile and search for food.

Blue swimmer crabs begin life as tiny larvae, called 'zoea', which grow and change shape over a four-to-six-week period during early summer. They drift in bays or along the coast up to 80 kilometres out to sea. They are prey for fish and the death rate is high.
The survivors reach shallow nursery areas by late summer. They settle to the sea or estuary bottom and moult (shed their shell) frequently while rapidly growing. They turn into a more crab-like state called 'megalopae'. By autumn, most are crab-shaped. They continue growing rapidly.
During the final moult to reach maturity, females mate for the first time. Most mating takes place in the autumn. Males moult first, so that their new shells have hardened beforehand.

A courting male then catches a female and carries her beneath him for four to 10 days while fending off other males. He helps her to moult then turns her over to mate while she is still soft-shelled. After mating, he continues to carry and protect her for another three-to-four days while her new shell hardens. In southern WA waters, the females retain the males' sperm over winter until their ovaries develop – helped, it's thought, by rising water temperature in spring.
In the ocean, big females mostly spawn in late spring and early summer. Estuarine crabs tend to spawn later in summer, having moved to the sea or estuary mouth during winter rains. Each female produces between 180,000 and two million eggs in a single spawning – and may spawn more than once in a season.
The eggs are fertilised by the stored sperm and, when laid, they attach under the female's abdomen, forming a spongy mass. The term for a female crab carrying egg clusters is 'berried'. The female incubates the eggs for about 18 days. When the embryos inside are mature she shakes the eggs off and they hatch into zoea. A new life cycle has begun.

## Traditional Noongar Knowledge : Burning

During Birak, family groups gathered on their home territories to begin the annual burning practice, using fire to burn sections of the bush in a controlled, local process. They did this by lighting a fire to the underwood and grass, or the dry leaves of the grass tree, and because it was dry, it burnt quite rapidly. It was customary for the owner to be present when his country was put to the torch, and if it was accidentally burnt during his absence, it could cause friction between families (ref 13,21).

Kangaroos and western brush wallabies, flushed from the underbrush by the fire, were speared or knocked over with sticks. Women and children also fired the bush for animals up to the size of bandicoots. As the fires swept through selected patches of bush, many reptile species, such as race-horse goannas, shingle-back lizards, and small marsupials fleeing the flames were killed with clubs and sticks. As soon as the ground fire passed, the group searched the ashes for burnt lizards and snakes, which were collected in great numbers (ref 13).

Using balga trees (*Xanthorrhoea* spp) as fire event markers has shown that prior to European settlement, the average fire interval in the jarrah forest region was 3-4 years. This is constant across the range of jarrah forest, exceptions being along moist or sheltered habitats such as riparian zones and rock outcrops, and tree-less areas with low fuel levels, where the fire interval was longer (Ward 1997; Ward and Sneeuwjagt 1999) (ref 21).

It is now recognised that 'Aboriginal people's land management practices, especially their skilled and detailed use of fire, were responsible for the long-term productivity and biodiversity of this continent' (Bird Rose, 1996). These practices included selective harvesting, organisation of sanctuaries and promotion of regeneration of plants and animals (ref 21).

Roberts articulated the following message given at the Aboriginal Burning and Coexistence Conference in 1998:

> There is an obvious understanding of curing and timing of fire in the Aboriginal community. Aboriginal fires seem to be relatively small in scale, in the order of hectares or tens of hectares rather than hundreds or thousands of hectares, unless there was a known end point such as a large river, the sea or heavy rain. The end result was usually a mosaic burn with some ability to break up the country and avoid large fire fronts. … The term 'scrub rain' is used for dew and is recognised as a factor in burning. The crushing of grass in the palm of the hand is a good indicator of curing. An understanding of clouds patterns, wind direction and strength and day night temperatures all contribute to the decision making process. The implications of burning up hill or down hill and with or against the wind are also mentioned as factors influencing outcomes (ref 21).

Lighting large fires for hunting would have had a twofold effect. For instance, Noongar people would have lit fires to rejuvenate the grass growth that would have attracted the kangaroos and other small native animals. In 1975 Mr. Frank Thompson was interviewed about his memories of fire near the south coast, before the First World War. He said:

> *"You see, the Natives ...they used to burn the budjar every three or four years... when it was burnt the grass grew and it was nice and fresh and the possums had something to live on and the kangaroos had something to live on and the wallabies and the tamars and boodie rat ...It didn't burn very fast because it was only grass and a few leaves here and there and it would burn ahead and... sometimes there'd be a little isolated patch of other stuff that wasn't good enough to burn the time before, but as it burnt along perhaps there might be some wallabies or tamars, those animals didn't run away from fire, they'd run up to it and you'd see them hopping along the edge of the fire until they saw a place where the fire wasn't burning very fierce..."* (Marohasy. J) (ref 21).

Burning fires was not always used on a large scale, the Noongar women always carried a firestick to kindle fires for cooking, hunting and gathering food. They lit the small fires to hunt out food such as bandicoot, snakes and lizards (Hallam 1975). There is also historical evidence of Noongar people doing early burning around berry patches, to protect them from later fires (Hammond 1933), and of Noongar beating out fires with green branches (Stokes 1846) to protect patches, possibly spear shaft thickets (Kelly 2000), which needed a decade or more to grow to a useful size (ref 21).

Burning continued until the end of Boonaroo (early autumn) to reduce undergrowth and bring on the lush growth of grasses and young plants in Djilba (late winter, early spring), which in turn attracted animals later in the cycle (ref 13).

## Activities

Safety and bushcraft

- Discuss how to stay safe in the bush during the holidays. Make a checklist of things to do before you leave home and what to take with you.
- Learn bushcraft skills to navigate, collect water and find shelter.
  The Mandurah Libraries have several books and online resources about bushcraft. Sign up for a free Library card this summer and check out what is available.
- For advice on bushwalking preparation and safety, visit:
  https://www.abc.net.au/news/2016-08-02/tips-to-survive-in-the-bush/7681572
  https://parks.dpaw.wa.gov.au/know/bushwalking

Navigating with the Sun

**Safety note: staring directly at the sun can damage your eyes, even in cloudy weather.**

- Draw a circle on the ground, somewhere outside in the full sun.
- At the start of the day, make a mark on the circle pointing to the sun (= roughly East)
- At the end of the day, make another mark pointing to the sun (= roughly West)
- You can now add North and South compass points to your circle.
- On the Swan Coastal Plain, the coast is on the west, the hills are to the east, Perth is to the north of Mandurah. Which direction is your house?

Controlled burning

- Explore the current and traditional methods of burning native vegetation. How and why was it done in the past by Noongar people?

Wattles (*Acacia*)

- Research the history of uses of wattle in Australia over time.
- Explore the diverse species of wattle in your area. Draw the pods and seeds from different types of local wattles. How can you identify each species by their fruits? The Koolbardi Bidi Garden at Contemporary Art Spaces Mandurah has examples of local species of wattles with edible seeds – pop in and see if they look the same as your plants.
- Visit the Mandurah Dept of Parks and Wildlife Herbarium to learn about local resources for identifying plants. To arrange a visit, contact DPaW officer Will Fowler, 9303 7752.

Snakes and bobtails

- Draw spirals on paper and cut to create a hanging display of snakes.
- Find out about these amazing creatures. Which species of snakes occur locally? How are they beneficial to nature and how can we live harmoniously with them?
- Create a safety poster about snakes and how to treat snake bite.

- Visit the Koolbardi Bidi Garden at Contemporary Art Spaces Mandurah and take a few cuttings of pigface (*Carpobrotus virescens*). Propagate in potting mix over summer and transplant when the weather cools later in the year. This groundcover spreads rapidly and produces large purple flowers, followed by red fruits that will provide a tasty snack for bobtails.

Crabs

- Move like a crab.
- Learn about the blue swimmer crab, their lifecycle and how to catch them. What are the local rules for crabbing and why do we have these rules?

## Boonaroo (approx. Feb – Mar) (late summer to early autumn)

*The second summer, or the season of adolescence*

Boonaroo (or Bunuru) is the hottest time of the year, with little to no rain. Hot easterly winds continue during the day, with the cooling sea breeze, known locally as the Fremantle Doctor (**goolamwin**), continuing to give relief from the heat most afternoons.

Marri trees (*Corymbia calophylla*) are flowering now, with their white flowers offering a sweet treat of nectar. The Noongar word 'marri' means blood, referring to the dark red gum that runs down the bark of the trees. The distinctive marri 'honkey nuts' contain large edible seeds that are an important food source for native birds. Later in the year you will find honkey nuts scattered under the trees, ripped open by the birds for the seeds inside.

On the coast, female *Rhagodia baccata* bushes produce edible red berries now and *Acacia cyclops* seeds can still be collected inside their curly pods. The coastal daisybush (*Olearia axillaris*) flowers in this season, adding its pungent perfume to the beach air.

**Traditional Noongar culture**

The practice of firestick or mosaic burning continued until the end of Boonaroo (early autumn), to reduce undergrowth and bring on the lush growth of grasses and young plants in Djilba (late winter, early spring), which in turn attracted animals later in the cycle (ref 13).

Bulrushes (*Typha*) in dried-up seasonal swamps and lakes were burnt in late summer / early autumn, as an essential step in their cultivation prior to harvest in autumn. It is possible that the feathery seeding flowers of the *Typha* may have been a phenological indicator that it was time to burn the crop. Reasons for burning the *Typha* reed beds were multipurpose: it helped to remove dense dried swamp vegetation that was often inhabited by poisonous snakes such as the tiger snake (**norn**); it provided supplementary protein in the form of animal and reptile by-catch; it was carried out during the non-nesting season for birds; it enabled access to wetland hunting grounds once water levels were replenished; it helped to preserve sufficient open water for waterbirds; it removed dead and decaying vegetative litter and returned nutrients to the soil (ref 26).

At this time large sections of the country were deserted for lack of water. Near the coast and in estuaries, fish made up a large part of the diet of this season, and large assemblies gathered (ref 13).

Summer fishing was popular in the sheltered bays of Mandurah, Fremantle and Albany. Although fish hooks were not used and most fish were speared, other clever methods were also used to catch fish. When shallow pools were found to contain fish, groups of 20 or more women and children would arm themselves with branches of spiky brush such as the Prickly Moses (*Acacia pulchella*) then wade together in a line, to surround the fish and force them into shallow water where they could be easily speared or killed with clubs (ref 13).

*Macrozamia* fruits begin to ripen in February and March in the Perth-Mandurah region. During this season Noongar women prepared these ripe fruits for later consumption by a process of soaking and burying for several weeks (see Plant Focus below).

## Plant Focus : Zamia (*Macrozamia riedlei*)

**Excerpts from Macintyre and Dobson, 2020. The fermented oil fruit of southwestern Australia. (Ref 32)**

The red fruits of the zamia palms, *Macrozamia riedlei* and *Macrozamia fraseri*, begin to ripen in February and March and were harvested by Noongar women when fully ripe. The seed or nut of the *Macrozamia* is toxic and its consumption caused serious illness to early explorers and settlers. Over many thousands of years the Noongar people of south-western Australia developed an effective means of detoxifying and enhancing the nutrient food value of the fleshy seedcoats (sarcotesta), through a process of soaking and burying the seed in an anaerobic environment for several weeks. The end product is an extremely nutritious and favoured food known as **by-yu** (or **kwineen**), rich in oil and carotene, with up to 42% fat content.

*Macrozamia riedlei*. Images courtesy of DPaW volunteers

This process also provided an effective means of short term storage, extending the shelf-life and duration of seasonal consumption of this highly valued perishable food.

The fermented seedcoat was the only part of the *Macrozamia* seed eaten by the indigenous people of southwestern Australia. This is contrary to the practice of indigenous populations in Eastern and Northern Australia who traditionally consumed only the processed carbohydrate-rich kernel, discarding the sarcotesta.

The oily flesh of the *Macrozamia* sarcotesta (**By-yu**) was a much-relished traditional food item during the autumn months. **By-yu** was consumed during the season known as **geran** (or **Djeran**) which is a descriptor literally meaning fat, oil or grease. In this context it may be

viewed as denoting the time of year (approx March--May) when the fat cycle was particularly important to the diet of traditional Noongar hunter-gatherer-cultivators and it was instructing them to put on condition to prepare for the long cold dark lean winter months.

Indigenous food processing has a long tradition of trial-and-error and has undergone thousands of years of testing and fine-tuning, adjusting to localised climatic and environmental conditions in southwestern Australia. Noongar women would have been skilled technologists in the processing and preparation of *Macrozamia* sarcotesta.

**Note: People should not eat *Macrozamia* sarcotesta or seeds because even after processing they may contain residual toxicity or rancidity. (Ref 32)**

## Animal focus – Frogs and Turtles

In Aboriginal taxonomy plant, insect and animal names were often habitat descriptors. In the case of the Noongar word for frogs, the name of the burrowing sand frog **goya** (also **kooya** or **kuya**) is connected to the sandy soil in which it burrows and breeds, known as **goyarra (kooyarra** or **kuyarra**) (ref 28).

Various frogs (**goya, guya** or **wurgyl**) were collected from swamps and shallow lakes throughout the year. But the greatest number were taken in summer when the water in these areas was low. They were dug out of the ground with the aid of a digging stick (ref 13). In traditional Noongar culture the women (**yok** or **yorgas**) hunted the frog (**kooya**) and turtles (**yargan**). The **yok** possessed the expertise necessary for finding and catching freshwater **yargan** or turtles available in the dried-up swamps, pools and other waterways. **Boola yorga**, or lots of women, waded through the water using their toes to detect the breathing holes where turtles were and **gilgee**, or freshwater crayfish, were also caught.

George Grey (1841) describes the activities of Nyungar **yok** who worked the dry waterways:

> The season of the year in which the natives catch the greatest quantity of frogs and freshwater shellfish is when the swamps are nearly dried up; these animals then bury themselves in holes in the mud, and the native women, with their long sticks and their long thin arms which they plunge up to the shoulder in the slime, manage to drag them out. At all seasons, however, they catch some of these animals, but in summer a whole troop of native women may be seen paddling about in a swamp, slapping themselves to kill the mosquitoes and sandflies, and every now and then plunging their arms down into the mud and dragging forth their prey. I have often seen them with ten or twelve pound weight of frogs in their bags (Grey 1841, p.276) (ref 8).

**Kooya** were cooked on a slow fire of coals and ashes and **yok** would hold them in one hand by the hind legs and with an adept pinch of a finger and thumb, remove the lower part of

the frog's intestines. It was then eaten bit by bit from the head to the toes (Hallam 1980, p.46; Collard, Mountford, and Palmer 2000) (ref 8).

Noongar Elder Gloria Kearing recalls memories of the turtles at Rogers' Lake, Barragup:

> *"Well, during summer, because the waters drying up the turtles go into the mud and they go deep down where it's cool. And they leave a little- like an air hole, and right at the bottom of the mud is the real yellow mud, it's really black on top and then because of the air hole the little bit of the yellow mud comes to the top and it leaves a crack in it. So, had to get a long stick and poke it down and you hit the shell, and you can hear the shell and then you dig it out.*
>
> *… I remember watching the turtle, I had this thing about going down to the swamp at a certain time and see the mother turtles coming out, finding a place where they can dig a hole to lay their eggs. And they had a certain way they did it. I used to sit and watch them and they used to go on their back legs and they used to dig a hole around, and then back themselves up, lay all the eggs in it and then cover up, and then sit on top of it with their shell and stamp it down. And we was allowed to get the eggs after a while, I tasted the eggs. But in the turtle egg you can only cook the yolk, the egg itself where- in a chooks egg when you cook it the clear goes white, well the turtle egg doesn't. You can cook it for hours and it won't turn white, it just stays clear, so you only eat the yolk.*
>
> *I can't remember the season, I remember but, it was warm, but when the rain, it'd rain for about a day and that's it, and the next day it'd be sunshine. So it was like they knew it was going to be like that, because what it did was- what my Father used to say, what it done is it made the ground warm so that the eggs could- it worked like an incubator and they can hatch. And then I used to go down when they used to hatch, I used to watch all the baby turtles going down to the swamp. I remember- because, when they come out of their nests some used to run towards the bush, and I used to try and save them by turning them around and heading them to the water. But my Father said, "No, you're not allowed to do that", because that's the reason why the Mother lays so many eggs, because she knows she has to sacrifice some babies for other animals- for their food. So I had to just let them go to where they had to go. And I did an art piece on that, on the turtles. I always do baby turtles all heading to the water, none of them heading away, in my art piece its always going to the water" (*ref 34*).*

## Traditional Noongar Knowledge : Trade and the Mandura

**Excerpt taken from the Kaartdijin Noongar – Noongar Knowledge : Sharing Noongar Knowledge website (ref 40) (see also Collard, 1994 (ref 7):**

> *"So trade in Nyungar country is very, very old, thousands of years old."*

Dr Richard Walley in van den Berg, Collard, Harben and Byrne,
Nyungar Tourism in the South West of Western Australia, Murdoch University, 2005 (ref 40).

Much of the trade that took place between the different Noongar groups was very dependent on the six Noongar seasons. One of the most well known Noongar trade fairs or meeting places was in Pinjarup Noongar budjar. It was known as the Mandura (Mandurah derives its name from this activity) which was a type of fair or meeting place where goods or presents were exchanged amongst the Noongar in the south-west during the Bunuru or summer season. Noongar from different areas brought their goods here for exchange.

Pinjarup Noongar would trade the following items at the Mandura:

- Burdun: a light gidgee, highly prized for the elasticity of the timber.
- Durda-dyer: a skin of a dingo tail, worn on the upper part of the forehead as an ornament.
- Ngow-er: a small tuft of feathers tied to a stick and worn in the hair for ornamentation.
- Niggara: a human hair girdle worn around the waist.
- Nulbarn: a rope-like girdle made from possum hair, wound around the waist and used to carry the kylie (boomerang), tabba (knife), kodja (axe or axe heads) and the dowak (throwing stick). This rope was also used to tie up wounds.
- Tabba: a knife made of sharp pieces of quartz connected to a short wooden stick, as thick as a thumb, by kodja or blackboy tree gum.
- Wilgi: ochre used dry or mixed with grease for protection from the elements such as the sun and flies or mosquitoes. Also used during ceremonies.

Pibelmun Noongar would trade local goods such as:

- Booka/Boka/Bwoka: yongka (kangaroo) skin garment made from several skins of the female kangaroo and used for warmth and protection from the rain in winter.
- Burdun: a light, straight spear made from the mungurn (swamp wattle) collected from the local swamps.
- Choota: A possum or kangaroo skin bag used by the women to carry children or food collected while travelling between campsites.
- Gidgee-borryl: the dreaded quartz edged spear which in post-settlement times was glass tipped. It was up to ten feet long and about one inch in diameter and made from the mungurn (swamp wattle). This spear was made in the Ellensbrook and Wonnerup areas.
- Miro: the name of the south-west spear thrower used by Noongars to propel the aim of the gidjee.
- Weja: emu feathers used as ornamentation at ceremonies.
- Wonna: the women's digging stick was about six feet long and as thick as a broom handle. It was made from peppermint shafts. The wonna was fired for hardness and was used for digging, killing animals and fighting with other women. The wonna was always traded by women at the Mandura.

Yuat Noongar would bring for trade the following items, among others:

- Borryl: quartz used for the sharp edges on the gidgee and tabba.
- Dowak: a short heavy stick used for hunting animals and birds.
- D-yuna: a fighting stick used during wars and in friendly contests.
- Gidgee: a spear about two and a half metres in length.
- Kylie: a flat, curved piece of wood (boomerang) used for hunting animals and birds.
- Miro: a throwing board used by Noongar people to propel the gidgee.
- Wirba: a heavy club traded from the northern areas.

Whadjuck Noongar would bring these items for trade:

- Boka: a kangaroo skin garment used for keeping warm and dry.
- Bo-ye: a rock for kodja, tabba or grinding stones.
- Bu-ruro: a possum hair neck band worn as an ornament.
- Bu-yi: a nut from the zamia plant that once treated, was fit to roast and eat. [1]
- Dardark: a lime white clay used to paint the body at festivals.
- Kodja: a hammer or axe, broad and blunt at one end and sharpened at the other. Made by connecting a short strong wooden handle as round as a thumb, by kadjo or blackboy tree gum to the top of the handle.
- Wilgi: the highly demanded red ochre (Ref 40).

[1] Ken Macintyre (pers. com. 2020) provides an alternative interpretation of bu-yi in this context:

… the term **bu-yi** here is more likely a reference to stone that was not found in the Perth-Mandurah area but was regarded as special or necessary for the production of artefacts or use in ceremonial activities. There was no necessity to trade *Macrozamia* sarcotesta in this part of south-western Australia because it was a common resource or as Grey calls it 'a common stock'. The only reference to trading *Macrozamia* sarcotesta is by Hassell where it was traded from the coast to the inland Jerramungup area where it does not grow. *Macrozamia* fruit was typically undergoing traditional processing in February/ March.

## Activities

Eucalyptus flowers and pods

- Draw the different flowers and fruits of gum trees near your school or home. Try to identify each species.
- An example of a botanical key used to identify common Perth gum trees is here: https://library.dbca.wa.gov.au/static/Journals/080071/080071-21.a.pdf
  Create your own key to identify the different species in your home or school garden. Visit the Mandurah Dept of Parks and Wildlife Herbarium to learn about local resources for identifying eucalypts. To arrange a visit, contact DPaW officer Will Fowler, 9303 7752.
- Use the woody pods in art – dip the end of the pods in ink or paint and stamp circles, glue eyes and legs to make animals.

Marri Ink

- Collect the red gum from the bark of a marri tree (as it flows and hardens over the bark the gum can be removed without damaging the tree). If there is no gum available, collect some fallen marri bark that is still fresh (reddy brown in colour rather than old and grey).
- Place the gum or broken-up bark in a heat-proof container and add a small amount of hot water (a just-boiled kettle is ideal). The gum, or the gum in the bark, will dissolve and colour the water. Allow the mixture to steep and cool, then strain through a cloth and use as an ink (the more water in the mix, the more diluted the colour will be).
- To make a black ink, add some rusty metal to the marri ink and observe the reaction: tannin + iron = black ink. Strain the liquid through a cloth and use.
- **Safety note: exercise caution with hot water around young students and wear disposable gloves when handling rusty pieces of metal.**

Warm colours

- Explore warm colours using paint and fingers to mix. Cut shapes from these paintings to create flames, red-eye wattle (Acacia cyclops) seeds and marri gum. Collect and incorporate natural materials (sticks, leaves, bark, stones) for lines, shapes and texture. Display together to discuss the natural indicators of this season.

Fish Anatomy and rock art

- Make fish drawings or prints, looking at details of the scales and skeleton. Explore and compare skeletons of fish and turtles, discuss internal and external skeletons.
- Research Aboriginal rock art depictions of animals.
  Research Professor Paul Tacon at Griffith University and learn about Australia's rock art heritage: https://www.griffith.edu.au/research/impact/rock-art#longstory
  For more information about Noongar rock art, including the local example at Morfitt's Cave, see
  https://www.researchgate.net/publication/317744391_Rock_art_of_the_Esperance_region_and_its_place_in_the_Noongar_traditions_of_south-west_Western_Australia

Noongar Trading

- Discuss how Mandurah got its name and the different Noongar groups who came to trade. Divide pupils into 4 groups and allocate them each one of the Noongar trading groups. Each group can research then present information about what they would trade at a Mandjar.
- Make flashcards with words from the Mandura trade items – divide into groups from different areas and barter with other students for trade items. Try to draw some of these items, based on their descriptions and uses.

Frogs

- Research the local species of frogs and their lifecycles. This WA Museum webpage provides information, including the calls, of Mandurah's local frog species: http://museum.wa.gov.au/explore/frogwatch/regions/southwest/swan-coastal-plain
- Build a frog pond and surround it with native plants to provide food and protection. Visit this Sustainable Gardening Australia webpage for inspiration and advice: https://www.sgaonline.org.au/frog-ponds/

## Djiran (approx. Apr – May) (mid to late autumn)

*Season of adulthood*

Djiran sees a break in the really hot weather. A key indicator of the change of season is the cool nights with dewy mornings. As the season progresses the nights will become cooler and damper, along with some cool and rainy days. The winds have also changed, especially in their intensity, with light breezes generally swinging from the south-east to south-west (ref 24).

Deciduous trees display their autumn colours and the tiny fruits of the native *Enchylaena tomentosa* are ripe and delicious in this season. Puffball fungi erupt from the ground now and seahares (*Aplysia dactylomela*) begin to appear on the beach. Seahares can be poisonous to dogs so keep your pets away from these and other animals washed up on our shores.

**Traditional Noongar culture**

Djiran was the time to prepare for the long cold wet season to come, when food resources would be more limited and less easily procured due to the adverse weather conditions (ref 25). The consumption of fatty foods such as processed *Macrozamia* sarcotesta helped to conserve and build up energy reserves, along with the root bulbs of the **yanget** (bulrushes), **bardi** grubs, fresh water fish, **kooyar** (frogs), **yakaarn** (turtles) and **quenda** (southern brown bandicoot).

**Mia-mias** (houses or shelters) were repaired and reinforced at this time of year, to make sure they were waterproofed and facing in the right direction in readiness for the cold and wet weather to come (ref 24). Kangaroos were hunted, and kangaroo skins were prepared for winter (ref 41).

### Plant focus : Sheoaks (*Casuarina obesa* and *Allocasuarina fraseriana*)

The name *Casuarina* is derived from the Malay Kasuari and alludes to the similarity between the drooping foliage of some species in the genus and that of the feathers of the cassowary (ref 14).

Sheoaks have a unique leaf structure, in which individual leaves are reduced to small teeth, the bases of which are fused and surround the stem. This gives the leaf-bearing branchlets the appearance of needles and the tree canopies have a fine structure allowing permeability of more light than broad-leaf tree canopies (ref 14).

*Allocasuarina fraseriana - male flowers. Image credit: DPaW Herbarium volunteers*

Sheoak trees are dioecious, with male and female flowers being produced on separate trees. When the male trees flower, the ends of the leaves turn rusty red with pollen. The fruits are woody and round or oval-shaped and edible when young (ref 20).

Noongar women gave birth beneath sheoak trees, on the layers of soft pine needles. Sheoak needles were also used for bedding in the **mia-mias**, and covered with **bookas** (kangaroo skin cloaks) to make a comfortable bed (ref 17).

In his 2004 paper, Len Collard shares the words of Pindjarup Oral Historian, Dr Richard Walley as he tells us about the traditional significance of the sheoaks around Murdoch University:

> *The sheoaks had many different names. The name of the sheoak in our area is called gullee, which is a sort of a strong sheoak. It is prominent for a number of reasons; one is the sheoak boomerang was a special boomerang and when you make a boomerang out of sheoak wood, it was absolutely beautiful. So a lot of the ceremonial boomerangs were made out of sheoak. The other thing about it is the sheoak shield. If you*

*Allocasuarina fraseriana. Image credit: DPaW Herbarium volunteers*

*made it out of the right wood, it was absolutely fantastic and it would be strong. If you made it out of piece that had a little fault in it, it would be brittle and it could just break.*

*…*

*You can actually look under a sheoak tree and there is a natural carpet you can see. It's always a place for people to have a rest and also the fallen needles that come off and cover the ground, as a ground sheet, makes a pleasant place to sit down and talk and eat. I think that is one thing that it's all about. The other thing in the middle of summer, if you're sitting under one, a gentle breeze goes through it and you can hear the whispering of the breeze. It actually talks to you. It made a noise to you like that. You can hear the sound whereas you don't hear that sound through the other trees. You hear them rustling, but you don't hear the whisper that comes through. … someone speaking to you… well, it depends on you, if you want to tap into something, you will listen to that and be a firm believer that the breeze is part of the spirit and people. If they want to speak to you, whether they're loved ones that have recently passed on, or old people or ancestors from years ago, or someone sending you a message. There are many ways to interpret it as a communication line. The wind is a communication line. You can feel that sometimes people walk into a place and feel a cold shiver. The shiver comes from a breeze, or something that has hit them and therefore, there comes the other side where there might be danger, or something that's bad is about to happen. So if you listen to nature, nature gives a lot of signals out, and if you tune in, you can either become a survivor or if there is no danger there, you're cautious so that its like having insurance, I suppose. If nothing happens, so what? But if something does happen, you are prepared and I think that's a good thing about the sheoak. If you sit down, you can listen and if you want to communicate with someone, if you call the spirit or you want to speak to a god or someone in that sort of sense, that's the way to do it, because right throughout history, you will always find people like Confucius and others who say, "We sat under a tree to contemplate". They didn't sit in church, it was under a tree and you'll find that sitting under a tree gives you a lot of answers to things, whether it be an apple falling or whatever. A lot of things have happened under a tree, whether it was lightning that struck it. We still have that connection today and if you embrace that connection, or wisdom, you'll learn a lot more under a tree than in a classroom* (ref 8).

## Plant focus : Bulrushes (*Typha*)

**Excerpts from "*Typha* root: an ancient nutritious food in Noongar culture" by Macintyre, K. and B. Dobson, 2017 (ref 26):**

It is difficult for us to picture the many *Typha* swamps and lakes as they existed in pre-colonial times in the Perth and surrounding districts when they were carefully managed by indigenous cultivation and fire regimes. Today *Typha* is regarded almost as a weed that congests our waterways and is usually controlled by chemical herbicides. In pre-colonial

times it was Aboriginal cultural practices that facilitated the management of *Typha* through fire and cultivation.

*Typha* reed beds were traditionally burnt during late summer / early autumn [see Boonaroo section for discussion of this process]. The roots were then harvested during autumn (late March/ April/ May), when the root is still in its dormancy and before the heavy winter rains cause flooding.

Drummond (1842), Grey (1840) and Moore (1842) recorded the view that April and May were the best months to consume the bulrush roots.
According to a Polish scientific study conducted by Kurzawska et al (2014: 2), the *Typha* rhizome contains a wide range of saccharides including 'glucose, galactose, xylose, mannose, glucuronic and galacturonic acid, arabinose, ribose, fucose, rhamnose and fructose' in addition to starch. Also,

> 'The starch content is constant throughout the year; however, the water-soluble saccharides vary considerably.' (Kuzawska et al (2014:2)

According to Macintyre and Dobson it may have been the sweet-tasting starch that was the motivation behind the traditional Noongar harvest of *Typha* in the autumn season after cultural burning had taken place. This fits well into their summer/autumn food sweetness cycle which included a wide range of flower nectars, gums and root bark which were highly valued energy foods.

*Raw starch-bearing Typha rhizome before processing. Photo by Barb Dobson, Toodyay 2008*

Digging up **yanyett** rhizomes was a labour-intensive task, often commencing after the first autumn rains. If the rains were late the *Typha* remained dormant and the digging season was delayed due to the impenetrability of the dry hardened clay topsoil. The first rains moistened the topsoil making it easier for women to dig out the rhizomes with their wooden **wannas**. Heavy rains sometimes delayed harvest due to flooding.

The **wanna** was a long hardwood crowbar (with a fire hardened point) rounded on one side and flattened on the other. It was an indispensable tool – sometimes used as a weapon – that was individually manufactured, maintained and carried by its female user and even accompanied her to the grave (Nind 1831:47). Grey (1841:292-293) describes how Nyoongar women dug up roots using their **wannas**:

> 'It is generally considered the province of women to dig roots, and for this purpose they carry a long pointed stick, which is held in the right hand, and driven firmly into the ground, where it is shaken, so as to loosen the earth, which is scooped up and thrown out with the fingers of the left hand, and in this manner they dig with great rapidity.'

*An old wooden wanna (digging stick) from the Toodyay area. Photo by Barb Dobson*

Roasting was an essential part of the indigenous preparation of *Typha* rhizomes. Roasting helps to soften the tough fibrous starchy inner portion of the rhizome, making it easier to extract the starchy contents by chewing and/or pounding into a fibrous paste using grindstones. Further, it cooks the raw starch making it more readily digestible and diminishing any toxic and/or bitter compounds. As chewing was probably the most common method of extracting the starch from *Typha* rhizomes, a well-cooked rhizome would be softer on the palate.

Oldfield (1865) describes a scenario (with reference to the Watchandi people living at the mouth of the Murchison River) for satiating hunger whereby the starchy *Typha* roots are first roasted and then pounded until it 'assumes the form of a coherent cake' or manageable mouthful and is then consumed without further cooking.

[C]hewing mouth-sized portions of the roasted and pounded rhizome mixture was probably the way it was consumed at large gatherings. Roasting the rhizomes, pounding and then either drying or baking them into a dry mealy "bread" which Moore (1834)

describes as tasting like 'a cake of oatmeal' may have been practised by smaller family groups and also as a convenient means of short term food storage.

## Animal focus – Kangaroos

Western Grev Kangaroo (*Macropus fuliginosus*) ***Yonga***

This is the one of the largest macropods in Australia, standing approximately 1.3m tall, feeding at night on grasses, shrubs and low trees. It occurs in mobs of up to 15 and was a common source of food for the Noongar people.

As well as a food source, kangaroos provided people with many other things. For example, **yonga** not only provided meat but also **bookas** (animal skin cloaks that were used as the nights became much cooler). Nothing was left; even the bones and sinews were used in the manufacturing of **bookas** and for hunting tools such as **gidji** (spears), **miro** (spear throwers) and **kodj** (axes) (ref 24).

Spearing and trapping were the two main ways of taking kangaroos. In winter the Noongar people took advantage of the wind and rain to hide their approach. To catch kangaroos, a large number of people would surround an area containing animals and close in on them, spearing them as they attempted to escape. In the summer they set fire to the bush and as the kangaroos, dalgytes and wallaroos fled, they were speared. The most common type of traps used were deep pits with tapering sides. These were lightly covered with branches and earth. An animal falling into one of the pits was wedged in by the narrow sides and was unable to get out (ref 13).

As soon as a kangaroo was killed, the two front teeth were taken from the lower jaw. These were used to sharpen spear points. The end of the tail was taken in the mouth and the tip bitten off. The sinews were pulled out, bound round a stick and dried for use in stitching cloaks (**wokka, bwok, bwoka, booka, doorloop**) or tying barbs onto spears. For example, the **mero** (spear thrower) had a hook of kangaroo tooth or wood lashed to one end with sinew from a kangaroo's tail (ref 13).

### Cloaks

> *"But with the kangaroo, that was probably one of the most important things to the Noongars because they used to use the skin. Like I said, they used to skin the kangaroo and either peg it to a tree or just peg it down along the ground with the fur down and the skin up. And once it dried off they used to get a [broken] bottle and just you know, all the bits of – oh, didn't look too good so they'd scrape it all off… They used to scrape the kangaroo skin like that."*
> Peter Farmer snr, oral history, SWALSC, 2011. (Ref 38)

**Excerpt from Hammond, J. E. (1933). *Winjan's people : the story of the South-West Australian Aborigines*. Imperial Printing Co Perth (Ref 19):**

The chief garment of the natives of the South-West was the "Bouka" or kangaroo skin cloak. A "bouka" would be made from one to three skins according to the size of the skin and the size of the wearer. It was worn like a blanket, hanging as low as the knees.

The skins were prepared in this way: After the kangaroo had been skinned the skin was pegged out in the usual way and left until half dry. Then it was smeared all over with grease. Using a small, keen-edged stone, the native would then scrape it until it was quite flexible, occasionally working it with grease. When finished it was as pliable as any tanned rug. In making the "bouka", the chosen skins would be laid side by side on the ground and the adjoining edges would be trimmed with a sharp stone so that they met evenly. All other edges were left untrimmed. The trimmed edges were sewn together with kangaroo sinew.

The sinew was obtained from the tail of the kangaroo in this way:
After the tail had been cut off, it would be nicked deeply all round about three inches from the base. This three-inch butt would be seized and broken and wrenched away from the rest of the tail, pulling the sinews with it. They would get a dozen or eighteen sinews of the full length of the tail by this means.

The sewing was done by pricking holes in the skins with a wooden needle of the size and shape of an ordinary pencil and then pushing the sinews through with the fingers. The stitches were from a quarter to three-eighths of an inch apart and looked like some sort of blanket stitch.

The "bouka" was worn with the fur inside, and clasped around the neck like a shawl and fastened in front with a kangaroo bone as a pin. A hem of over three inches would be turned outwards at the top so that the fur and not the edge of the leather rubbed against the wearer's neck. In very cold weather they used to travel wrapped up in the "bouka" like this; and they would also carry under their cloak a lighted "mungyt" (banksia cone) to help keep them warm. The glowing "mungyt" would also prove useful for kindling a fire when they halted.

In warmer weather they might wear the "bouka" with one shoulder left bare; and if they were carrying weapons the men might also leave one arm free.

In hot weather the men discarded the "bouka" and wore a small apron of feathers, or else a small animal skin hanging from their girdle of twisted fur. At corroborees they put on a special apron, perhaps as we might put on a clean collar to go to a party. (Ref 19)

Online examples of bookas:

WA Museum website:
http://museum.wa.gov.au/research/collections/anthropology-and-archaeology/aboriginal-cultures-collection/booka-kangaroo-skin

Boorloo Boodja Facebook site:
https://www.facebook.com/LostWadjuk/photos/pcb.2072773556199726/2072773482866400/?type=3&theater
https://www.facebook.com/LostWadjuk/photos/pcb.2072773556199726/2072773436199738/?type=3&theater
https://www.facebook.com/LostWadjuk/photos/a.314106752066424/2081725021971246/?type=3&theater
https://www.facebook.com/LostWadjuk/photos/a.314106752066424/2058370157640066/?type=3&theater

## Animal Focus : Bardis

**Excerpts from Macintyre and Dobson, 2017 The puzzle of the bardi grub in Nyungar culture.** (Ref 25).

There are over 15 different Nyungar names for mostly undetermined edible grubs. These are the ***barde*** (or ***bardi, bardie, bardee, badee, bader, bada, berda, barit, bert, burrtt, paarde-paattt***), ***boo-yit, boodjark*** (or ***budjark***), ***paaluk*** (or ***paluk***), ***changut, woolgang*** (or ***wulgang***), ***iular, kurrang*** (or ***gurang, cooranga***), *pari* (or ***pere***), ***nargagli, wandona***, (or ***wandunu***), ***marn-duk*** (or ***mundark***), ***bejenup, marign, marnung*** and ***mutarnuk***.

Most of these are "descriptors" that convey information about the habitat, ecological indicators, life cycle stage, seasonality, means of procurement and nutrient content of these larval foods. In traditional [Noongar] taxonomy and nomenclature the same animal (or plant) may have a number of different names, depending on which aspect or product is being described, for what purpose and at what season.

> '*Our mob used to find good eating grubs in the blackboy, gum tree and wattle. We been eating bardi since the Dreamtime. The old people knew when to find them. After the first rains. Better than beef they reckoned.'* (Greg Garlett, Nyungar Elder 2000).

Australian linguists Dixon et al (2006: 101-102) define ***bardi*** as:

> 'The edible larva or pupa of the beetle *Bardistus cibarius*, or of any of several species of moth, especially *Trictena atripalpis* (formerly *Trictena argentata*). The beetle larva bores into the stems of grass-trees, eucalypts and acacias, and the moth larva is found underground, feeding on roots of eucalypts and acacias. The name is also applied to *Abantiades marcidus*. Also called bardi grub.'

Grey (1841: 276, 289) describes how **barde** grubs were often 'roasted tied up in a piece of bark' in the same way that they cooked fish, including whitebait. This method was called "**Yudarn dookoon**," or "tying-up cooking." He states:

> 'A piece of thick and tender paper bark is selected, and torn into an oblong form; the fish [grub] is laid in this, and the bark wrapt round it, as paper is folded round a cutlet; strings formed of grass are then wound tightly about the bark and fish [grub], which is then slowly baked in heated sand, covered with hot ashes; when it is completed, the bark is opened, and serves as a dish; it is of course full of juice and gravy, not a drop of which has escaped.'

**Bardi** collecting was a seasonally based activity carried out by men and women, although women and children were mostly responsible for the labour intensive task of digging out the grubs from the roots of trees using their **wannas** [digging sticks]. Men would often consume grubs opportunistically while out hunting for larger game, such as possum or kangaroo, as noted by Grey (1841), and also Hammond (1933:40-41) who states:

> 'As he walked along, with his eyes alert, the native could tell, too, which trees had opossums in them and which trees or blackboys would have grubs. According to the chance of the day he might turn aside to get an opossum from a tree, or to get some handfuls of bardie grubs, which might be eaten raw as a snack by the wayside.'

Grey (1841: 93) documents an anecdote that gives us a further clue as to when barde were in season. On 20th April 1837 when returning to Perth in an undernourished condition, he was fed generously by his Aboriginal guide Imbat, who, taking pity on him, had said:

> "You are thin," said he, "your shanks are long, your belly is small … "I know how to keep myself fat; the young women look at me and say, Imbat is very handsome, he is fat – they will look at you and say, He not good – long legs – what do you know? where is your fat? what for do you know so much, if you can't keep fat? …'and I know how to make you fat," – began stuffing me with frogs, barde, and by-yu nuts.'

Imbat was imparting his cultural wisdom by telling Grey that without fat on his body, he would not be considered "handsome" and would not survive the coming winter, let alone his journey back to Perth. This was not an idle comment but was based on a tried and tested cultural imperative.

Grey was being fed **barde** during the season known as **djeran** the duration of which varied but was approximately from late March to late May/ early June, depending on weather patterns and flora, fauna and avifauna life cycles. Larvae such as the cockchafer were active during **djeran** (mid-late autumn) and they contained essential fats that were critically needed by the Nyungar hunter-gatherer-cultivators to build up condition.

**Larvae farming**

The classic notion of hunter-gatherers as nomadic, opportunistic foragers relying solely on the vagaries of nature to sustain themselves is misleading. The Nyungar like all other Australian Aboriginal groups had a great knowledge of plant and animal phenological breeding cycles to the point where seasonally reliable resources were managed or "farmed" to mitigate against catastrophic food stress.

Grey's (1841:289) comments [below] confirm that by breaking off the tops of selected *Xanthorrhoea* the Nyungar were able to accelerate the decay of the plant and create a raising medium for the cultivation of wild insect larvae. This was a form of natural and sustainable resource management that could be viewed as an early form of insect husbandry or farming. Grey (1841) writes:

> 'Until the top of the tree is dead, it is not a proper receptacle for these animals, the natives are therefore in the habit of breaking off the tops of the grass-trees on their land at a particular season of the year, in order that they may have an abundance of this highly prized article of food. If two or more men have a right to hunt over the same portion of ground, and one of them breaks off the tops of certain trees, by their laws the grubs in these are his property, and no one else has a right to touch the tree. No mistake on this point can occur, for if the top of the tree dies naturally it still remains in its original position, whereas a native who thus prepares the tree knocks it off altogether….' (Grey 1841: 289)

We speculate that the indigenous practice of insect larvae farming as practiced by the Nyungar would have evolved over many thousands of years of empirical observation whereby the natural life cycle processes of beetles and moths were observed and their larvae randomly procured from dead and decaying *Xanthorrhoea*. By means of intervention they were able to hasten the natural cycle of insect production and increase resource productivity. The anthropogenic firing of the country played an important part in the long-term management of this food resource by stimulating seed germination and regenerating new growth as a future medium for larvae-farming purposes.

## Traditional Noongar knowledge: Barragup Fish Mungah

**Excerpts from Gibbs, M. 2017. An aboriginal fish trap on the Swan Coastal Plain : the Barragup mungah (Ref 16).**

During the drier months the Peel, Harvey and Leschenault Inlets, as well as the lower reaches of some of the other river systems, become increasingly saline and are used by marine fish as a nursery environment after spawning in the oceans (Lenanton 1984). The first flood of fresh waters from the winter rains then flushes these species, in particular the sea mullet (*Mugil cephalus*) and Australian salmon (*Arripis truttaceus*), known to Nyungar people as **kalda** and **ngarri**, respectively, back down into the lower reaches of the rivers (Moore 1884: 38, 66).

The exploitation of this onrush of fish was the purpose for which the Barragup mungah was constructed, and the determining factor by which the Murray people timed the beginning of the annual gathering.

The Barragup weir was constructed in the lower reaches of the Serpentine River, … 2.5 km from the Peel Inlet estuary into which it discharges. The most detailed physical descriptions of the weir are from Jesse Hammond (1933: 46), who appears to have seen the structure as early as the 1860s:

> To make this trap they chose the narrow neck of the river, at Barragup on the Serpentine, where the water was up to about four feet in depth. A wicker fence was built across the stream, completely closing it from bank to bank, except in the centre, where a small opening was left. Through this opening a race was constructed by driving two rows of parallel stakes in the riverbed. The bottom of the race was filled with bushes, until there was only about eight inches of clear water above the bushes for the fish to swim through. On either side of this race was built a platform, about two feet six inches below the top of the water. On these platforms the natives stood to catch the fish as they swam through the race. The fish were caught by hand as they passed over the bushes and were thrown to natives who were waiting on the bank to receive them.

All sources agree that the Barragup gathering occurred after the first winter rains (Paterson 1896: 289; Hammond 1933: 46), or more accurately after the first rains in autumn (Bates 1985: 251).

Invitations were sent by messenger and message stick to relatives, friends and allies along the coast, as well as to some inland groups. Some form of organization must have been behind the process of moving to Barragup, as Bates (nd V, lc) noted that 'contingents generally arrived within a few days of each other'. It is possible that the messengers also acted as guides, to co-ordinate movements.

As one of the major ceremonial events on the Swan Coastal Plain, Barragup seems to have attracted hundreds of people, although there are no specific figures given. Hammond (1933, 1938) considered it as important as the annual gathering at Bailup, further to the south-east, which included over 300 people at its ceremonies.

One clue is from Hammond's description of the organization of the campsite near the mungah. As was usual for meetings between different Aboriginal groups, they camped apart, with their huts located in the direction of their homeland, which is also noted specifically for Barragup by Bates (n.d. V, lc). Hammond described the campsite as having consisted of approximately 30–50 '**mia-mias'** (huts), with an average of six in each (suggesting between 180 and 300 people), covering over half an acre of ground.

The group controlling the Barragup weir performed the **Ngarri Maia** (salmon song), asking the **Demma Goomber** (Great Grandparent or totem ancestor) to ignore cries from the fish, and to help the people with their fishing instead.

When all the camps are pitched … the oldest member of the **ngarri borungur** (salmon totem kin) begins the '**Ngarri Maia**', the words of which are as follows;

> **Ngarri bi ngarri**
> **neana mooga**
> **koort beet, beet-al-wa**
> **kalbarn yaa wadarn**

As the old man chants these words he makes many motions with his hands in imitation of the movements of the salmon. He shows the fish rushing through the incoming waters, gliding onwards to its **kalleep** (fire or home). Then the various motions of spearing it, hitting it with a **kaili** (boomerang), or driving it into the shallow waters of the estuary are gone through thoroughly by the singer, who now and then utters a kind of a kissing sound, or a 'brrrrr' to represent the rushing of the fish through the narrow waters of the rivers on their way upstream.

Now he is seated by the small opening left in the weir, and makes the motion of catching and killing the fish as it forces its way through the narrow gap, pretending to make a great heap as the song goes on. He is joined in the song and movements by other elders present, until presently every initiated **borungur** is singing and imitating the actions of the fish.

All around the singer the visitors are seated listening to the song … but although they know the song by constant repetition, none of the visitors take any part in it, nor will they take part in the actual fishing, or rather in the catching of the fish at the small weir openings the next day, for only the **kaleepgur** can catch **ngarri**. (Bates n.d. V, lc)

As suggested by Bates' description of the **Ngarri Maia**, only the members of the salmon totem, the **kaleepgur** (people of that country, cf. Grey 1840), were allowed to operate the **mungah**. There was a belief that the fish 'knew' the **ngarri borungur** (salmon totem kin) and would not be disturbed by them. However, they would become frightened and leave the area should a stranger attempt to collect the fish.

The weir was watched night and day by both men and women, with a system of shifts that were relieved after a certain period of time (Paterson 1896: 289; Hammond 1933: 46). There was a belief that if any fish escaped through the **mungah**, they would tell all the other fish, who would then avoid the trap (Hammond 1933: 46; Stranger 1972).

As a result of this, thousands of fish were caught at the weir, and whatever could not be eaten would be thrown back into the river after two or three days.

According to European observers, the **Mungah** lasted from one to three months, depending on severity of the winter weather. During this time, a wide range of activities were arranged. As well as ritual performances, social life dominated the Barragup gathering. Generally, an effort was made to conduct the gathering in an amicable atmosphere, since the occasion was supposed to be lighthearted and enjoyed by its participants.

Dancing, singing and ceremonies were carried on by all the assembled tribes while the visit lasted. Sporting and competitive athletic events were a feature of Barragup, with men and women showing off their prowess.

Aside from those recorded by European observers, a range of other sacred and public ceremonies and rituals must have been held at Barragup. Unlike most gatherings along the Swan Coastal Plain it was regular with a large and diverse representation from other groups and a range of ritual expertise and potential participants.

Hammond (1933) speaks of the older men meeting at large gatherings such as Barragup to discuss matters of law, a type of council that made important decisions about the distribution of people, punishments for offences, approval for betrothals and initiations, as well as matters of ritual.

Given the structure of the mungah, only a dozen or so individuals of the Murray community (the largest group of participants) were occupied with food collection at any one time. This allowed the majority to take part in the ceremonies and social activities. Furthermore, the abundant supply of fish ensured that there was no apparent haste during the gathering, so that many ceremonies could be completed at the one event.

Barragup was known as a significant mandjar or trade gathering (Bates 1985: 332; cf. Brady 1845; Grey 1840: 89). Moore (1884: 49) described a mandjar as:

> A sort of fair which takes place between the Aborigines, where inhabitants of different districts meet to barter with each other the products of their respective countries.

The name of Mandurah, presumably based on an original name something like 'mandjar-up', or place of the mandjar, preserves the significance of the Murray-Serpentine confluence for these major gatherings.

## Activities

Mookaroo is coming!

- Use a rain gauge to measure increasing rainfall in this and coming seasons.
- Discuss the transition in weather that occurs now and the preparation Noongar people needed to make for the cooler months ahead. Compare to our modern life – how do the changing seasons affect what we do?

Wind observations (outside)

- Look at the tree tops - are they moving?
- Feel the wind on your skin.
- Throw a small handful of dry sand up a little way in the air (not as high as heads) - which way does it blow?
- Draw a circle on the ground. With a compass (eg compass app on a mobile phone) mark N S E W on your circle. Stand in the centre of the circle and throw some sand straight up in the air - which way does it move? - how far does it go? - compare different things: sand, grass, a honkey nut - can you measure the relative strength of the wind from day to day?
- The wind is described by the direction it is coming from, so a Southerly wind will blow sand to the N point of the circle, in a north direction. The wind is named for the origin of the force, not the destination.

Barragup Fish Mungah

- Locate the Fish Mungah on a map. Track the Serpentine River from the hills to the ocean and explore the ecology of sea mullet.
- Work individually or in groups to research and make a diorama/model of the Barragup Fish Trap. Use natural and recycled materials. Ref link: http://museum.wa.gov.au/research/records-supplements/records/aboriginal-fish-trap-on-swan-coastal-plain-barragup-mungah
- In the tradition of Noongar message sticks, use dried or paper leaves to create invitations to friends and family to attend a presentation of student Six Seasons work and serve fish-themed food.
- Research other examples of Noongar fishing technology. For example, the Albany stone fish traps: https://museum.wa.gov.au/sites/default/files/FISH%20TRAPS%20IN%20THE%20SOUTH-WEST%20OF%20WESTERN%20AUSTRALIA.pdf
- For information about Aboriginal fishing techniques, read Bruce Pascoe (2018), *Dark Emu : Aboriginal Australia and the birth of agriculture*.

Sheoak (*Casuarina*) trees

- **Note: sheoaks can be a favourite spot for kangaroos to lie under, potentially making these sites inhabited by roo ticks. For advice on tick prevention and treatment, visit** https://www.healthdirect.gov.au/tick-bites
- Spend some time sitting under (or near) a sheoak (*Casuarina*) tree. Listen to the wind in the branches. Write a poem in response to this experience.
- Draw the structure of sheoak leaves and research the traditional Noongar uses of sheoaks.
- Paint the woody sheoak fruits in a range of colours to create a counting set, with each colour representing a different unit of measurement.

## Mookaroo (approx. Jun – Jul) (winter to early spring)

*Season of fertility*

Mookaroo (or Makuru) is the coldest and wettest time of the year. The winds turn to the west and south, and cold fronts that have till now brushed the lower south west coast begin to cross further north. You might hear reports now of snow on the peaks of the Stirling and Porongurup Ranges. Inland water resources, rivers and lakes are replenished (ref 13, 24).

In contrast to the grey skies, the bush is full of colour in Mookaroo. Purple *Hardenbergia* and white *Clematis* flowers scramble over other plants, creating a spectacular display. *Templetonia retusa* (cocky's tongues), the floral emblem of the City of Mandurah, begins flowering now, adding a splash of red.

Storms wash up many interesting seaweeds, corals and ocean animals on the beach during this season. Some of these creatures contain toxic substances so stay safe and learn how to identify them – this beachcombers field guide is a good starting point: http://www.fish.wa.gov.au/documents/education/beachcombers-field-guide.pdf

**Traditional Noongar culture**

This was a good time of the year to move away from the coast and stay warm in the **mia mia** (shelter) next to the **karl/kaarla** (fire). As the inland waterways and catchments started to fill with clean, fresh water, people were able to move about their country with ease and so their food sources changed from ocean, estuarine and lake foods to protein-rich land animals, in particular the grazing animals such as the **yonga** (kangaroo) (ref 24).

During the winter months, when trails showed fresh on the damp ground and the fall of rain masked a man's approach, the kangaroo was tracked by solitary hunters. Later in the season, when the family groups began to congregate, they co-operated to drive kangaroos along paths into pit traps lined with pointed stakes, or into brush entanglements where they could be readily killed with clubs and spears (ref 13).

Mookaroo is also a time for a lot of animals to be pairing up in preparation for breeding in the coming season. Upon the lakes and rivers of the South West, you'll also start to see a large influx of the **maali** (black swan) as they too prepare to nest and breed (ref 24).

### Plant focus – Grasstrees (*Xanthorrhoea*)

Grasstrees are species of the plant genus *Xanthorrhoea*, also known as **balga** in Western Australia. Grasstrees occur only in Australia.

The name *Xanthorrhoea* is derived from the Greek words 'xanthos' meaning yellow and 'rhoia' meaning flowing. This refers to the resin flowing from the flowering spear (ref 13).

Grasstrees are often very long-lived; some are estimated to be 350-450 years old. Studies of species that develop tall trunks indicate that increase in trunk height is mostly slow, about 0.8-6 cm per year, but this varies depending on the species and on local growth conditions (ref 36).

*Resin flowing on grasstree flower stalk*

Fire may stimulate the flowering of some grasstree species. However, every year some grasstrees flower regardless of whether they have been burnt. Fire rarely kills grasstrees because the tightly packed leaf-bases on their trunks protect the living tissues deeper inside (ref 13).

The impressive spear can grow up to 4 metres long and 6 cm thick. Thousands of buds are tightly packed on the top two thirds of the spear and open into white flowers in mid to late spring. After flowering, the spear produces beak like capsules which release shiny black seeds in summer and autumn (ref 13).

After flowering the spear dries but remains upright for one or two years before crashing to the ground. Only one spear is produced on each crown of foliage. If two are seen, it is a sign that the trunk is beginning to divide (ref 13).

Grasstrees teem with wildlife. Insects, mammals and lizards shelter among the mass of leaves. Honeyeaters and large numbers of insects are attracted to the flowering spear. When the spears begin to fruit, the larvae of weevils and other beetles burrow in and eat the forming seed. Twenty-eights (also known as Port Lincoln or ringneck parrots) pluck out the young green fruit in the older grasstrees (ref 13).

When the grasstree dies, fungi and wood-boring beetle larvae enter the decaying trunk and eventually the core disintegrates, leaving a cylinder of leaf-bases. This 'shell' makes an excellent home for snakes and lizards and a range of native rodents and small marsupials (Barb Dobson, pers. com.).

Noongar people used the grasstree in many ways:

With some effort, leaves can be pulled from the crown and a small amount of nourishment can be obtained by chewing the soft, white bases. Each flower on the stem produces a large, glistening drop of nectar. If you can beat the birds to these, they can be licked from the spike. The flowers can be soaked to make a sweet drink. The **bardi** grubs which live in the grasstree were favoured tucker (ref 13).

Grasstree resin was taken from the trunk and used as a binding agent for tool making. To make the glue, a combination of resin, charcoal and kangaroo scats were mixed together and heated. The resin was used to glue stones, wood, and other materials together. A **mia** (shelter) was made from grasstrees. The spears were used as frame poles and the leaves bound tightly together to form a strong, waterproof thatch. The leaves were also used as bedding (ref 13).

The dead trunks make excellent firewood which readily catch alight. The Nyoongars made torches from grasstree spears. These were used when hunting fish at night (ref 13).

Donna Rioli is a Whadjuck/Ballardong Noongar and gives an insight to the value of this resource:

> *"In the past Noongar used the long green parts of the bush for their **mia mia** (huts) to shelter them from the weather. Noongar also laid them on the ground in their **mia mia** to rest or sleep on. Inside the trunk part of the **balga** bush you can find its sticky sap which is a resin like substance. The resin could be combined with **yonga** (kangaroo) droppings and other substances and heated over the fire to make a type of glue. This glue was used when it was still fairly warm to fix a sharpened stone to a piece of **boorn** (stick or wood) to make a **koitj** (axe), or the resin was attached to a piece of **boorn** and used for lighting fires. Another use for the resin was for tanning **yonga** skins to make a **booka** (clothing garment). Noongar also used the **balga** bush for **merenj** (food), they used to dig down to the white shoots which can be found at the bottom of the grass. Even today the **balga** bush is important to Noongar for lighting fires whether it is in their homes or when they go out to the bush for nourishment, katitjin (knowledge) and spiritual rebirth or to simply participate in cultural activities. As you can see the **balga** bush provides many uses for the Noongar people and this is why I like to paint them". (Rioli, 2007)* (10)

## Animal focus : Black Swans (Maali)

Black Swans are entirely black except for the white outer flight feathers of the wings, with an orange to dark red beak. The white eye becomes red during breeding season. The cygnets (chicks) are covered with light grey down. Males grow about 1.3 metres long and females grow to 1.2 metres. Females also have slightly shorter necks than males. Black Swans have a trumpet-like call. The birds primarily feed on submerged aquatic vegetation, but will also consume invertebrates associated with it. They can also graze pasture close to water (ref 10).

Black Swans frequent lakes, rivers, estuaries and swamps. Breeding may occur throughout the year but is often limited to February-May in the north and May-September in the south. Black Swans are ready to breed at 18 months of age and most breed before their third year. While older birds generally bond permanently with one partner, younger birds may pair up for only a short time, breed then desert the nest, leaving the other partner of either sex to care for the young. After leaving, the deserter will often mate again and females may

produce up to four broods in one year. Nests are constructed of mounds of vegetation on reeds, islands or in tall bushes near water. Usually five to six eggs are laid but there can be as many as nine. Eggs are pale green or dullish green-white, and slightly lustrous. Black Swans moult every year after breeding season and are unable to fly during this period. They often gather on open lakes in large numbers (ref 10).

Black Swans breed in Mandurah estuary. Traditionally, when swan feathers began appearing on the lakes and waterways, it became obvious that swans were beginning to moult and would be easier to catch. Together the Noongar women and children would drive the swimming birds across open water of the lake or river to the men, who waited, concealed, for the birds to come within reach (ref 13).

## Animal Focus : Emus (*Dromaius novaehollandiae*) Wetj, Waitch

The name 'emu' is not an Aboriginal word. It may have been derived from an Arabic word for large bird and later adopted by early Portuguese explorers and applied to cassowaries in eastern Indonesia. The term was then transferred to the emu by early European explorers to Australia (ref 2).

Nyungar people traditionally hunted and harvested animals and plants when they were at their fattest. Emus were primarily hunted in winter when they had accumulated significant body fat reserves to sustain themselves through the breeding season, in particular the two month incubation period when the male stays on the nest (ref 25).

Nesting takes place in winter. The male and female remain together for about five months, which includes courtship, nest building and egg-laying. The nest consists of a platform of grass on the ground, about 10 cm thick and 1-2 m in diameter. The large eggs (130 mm x 90 mm) are laid at intervals of two to four days. These are dark bluish-green when fresh, becoming lighter with exposure to the sun. The shells are thick, with paler green and white layers under the dark outer layer (ref 2).

Once incubation begins, the female wanders away and leaves the male to perform all the incubation. The male incubates the eggs without drinking, feeding, defecating or leaving the nest. During this time, eggs often roll out of the nest and are pulled back in by the male (ref 2).

Emus also provide a valuable service in natural plant propagation, when they eat the larger fruits of many bush tucker plants and disperse the seeds through their droppings. “The emu is a very large bird, the largest extant in Australia, and so it is able to swallow and disperse seeds – often within fruits of large-seeded plant species that would not readily be dispersed by smaller birds or other animals,” says Professor Neal Enright from the School of Environmental Science at Murdoch University (ref 37).

Without any teeth, emus eat by "gulping and digesting" and have an appetite for tasty native foods like quandongs (*Santalum acuminatum*), emu plum (*Podocarpus drouynianus*), native cranberries (*Astroloma* spp.), **geebungs** (*Persoonia* spp.), sandalwood kernels

(*Santalum spicatum*), the fleshy fruits of *Macrozamia* sp. (**by-yu**) and the tiny lemony-tasting fruits of the coast beard-heath (*Leucopogon parviflorus*). This, combined with their long legs and fast pace (their home range exceeds more than 50 kilometres), means that emus can disperse fruits that are palatable to humans over long distances (ref 37).

Another fascinating element of emu poo is how it can be collected and eaten as a snack. Quandong fruits carry an oil-rich kernel inside its pitted stone, which is very high in fatty acids. The stone, which looks a bit like a brain, is impossibly hard to crack open. When an emu digests a quandong, however, it softens the shell, and its droppings leave a ready supply of easily opened quandong nuts (ref 37).

## Traditional Noongar Knowledge : Fire

Fire was perhaps the Noongar people's most useful and precious resource, used in tool and artefact production, in food preparation and cooking, for hunting and driving game, for warmth, and for signaling. The camp fire provided comfort and company (ref 13).

In his book, *Winjan's People*, Hammond records a traditional method of fire making:

> In making fire the natives used two pieces of wood. One would be a piece of soft wood with a split in it, and the other a stick with a blunt point. The split in the soft piece would be stuffed up with fine dry grass or something similar; the point of the stick would be placed in the split and the stick would be spun around, something like a drill, by rubbing the stick vigorously between the hands to make it spin. In a few minutes the heat caused by the friction would set light to the grass (ref 19).

**Excerpt from Macintyre, K. and B. Dobson. 2018. Some notes on *Banksia* useage in traditional Noongar culture. (ref 28):**

Plants often have more than one [Noongar] name depending on what aspect or function of the plant or plant product is being described and at what season.

The *Banksia* has a number of descriptor names depending on which of its products is being referred to, at what season and for what purpose. For example, **mangite** and **bool-galla** describe two different usages of the *Banksia* cones: **Mangite** refers to the nectar-laden flowers and the sweet nectareous beverage made by steeping it in water during the "**mungyte backan-een**" (**mungyte** – eating season, Grey 1840: 71) whereas **Bool-galla** literally translates as 'plenty fire' (**bool**, plenty + **kalla**, fire), 'lots of fire,' 'many fires' 'or 'the tree of many fires' or as one senior Noongar Elder once described it to us as 'the fuel tree.'

Dried *Banksia* cones (**beara kalla**) and bark (**djanni**) were a readily available and plentiful source of fuel, tinder and warmth throughout the year. They were also sometimes used as torches at night, as were the dried flower stems of the **balga** (grass tree, *Xanthorrhoea*).

Ignited *Banksia* bark (**djanni**) and cones were commonly used as portable fire sticks by Noongar people as a source of light and warmth and a ready means of igniting their campfires when moving around their country. In the cooler months the fire sticks or "**kalla**

**matta**" (fire leg, walking fire) were carried under their **bwokkas** (kangaroo skin cloaks) as a portable source of body warmth.

Grey (1841: 267) writes:

> 'In general each woman carries a lighted fire stick, or brand, under her cloak and in her hand.'

Moore (1842) stresses the importance of the lighted **djanni** (*Banksia* bark):

> 'In cold weather, every native, male or female, may be seen carrying a piece of lighted bark, which burns like touch-wood, under their cloaks, and with which, and a few withered leaves and dry sticks, a fire, if required, is soon kindled. A great part of the fires that takes place in the country arise from this practice of carrying about lighted **Djanni**. In the valleys, even in summer, the air is chill before sunrise.' (Moore 1842:20)

The large cones of the Bull *Banksia* (*Banksia grandis*) were favoured. Nind (1831 in Green 1979: 21) observed in the Albany area that:

> 'Every individual of the tribe, when travelling or going to a distance from their encampment, carries a fire-stick, for the purpose of kindling fires, and in winter they are scarcely ever without one under their cloaks, for the sake of heat. It is generally a cone of *Banksia grandis*, which has the property of keeping ignited for a considerable time. Rotten bark, or touchwood, is also used for the same purpose. They are very careful to preserve this, and will even kindle a fire (by friction, or otherwise) expressly to revive it.'

## Traditional Noongar Knowledge : Mia Mias

While **mia-mia** is a universal word for traditional shelters, the local Noongar term for permanent structures is **kaalaak**, while more temporary shelters are known as **kwornt** (George Walley, pers.com. 2020).

In his book, *Winjan's People*, Hammond records observations on mia-mias:

> The **mia-mia** was a hut that covered about three-quarters of a circle, the other circle being its opening. The opening was always on the lee side, away from the wind. The **mia-mia** was about five feet high and from five to seven feet across the centre. In building it, a frame was constructed of straight sticks, the thick ends of which were stuck in the ground, the thin ends then being brought together at the top and tied together with "**banjin**" bark (the bark of a kind of scrub), or else with the long, thin leaves stripped from the zamia palm. This frame of sticks would then form a dome. Lighter sticks were tied crossways on the dome at every few inches from bottom to top, and over this was placed a covering of paper bark, rushes or fine scrub. When finished, the **mia-mia** was quite watertight and no wind could get through it (ref 19).
>
> When the natives had been travelling and decided to pitch a camp, the women would build a **mia-mia** at the place chosen. This was always women's work. If they

came to an old camping ground they would renovate the old **mia-mias** and use them (ref 19).

Sometimes you would find a camp of only one **mia-mia** and sometimes you would come to a place where there was quite half an acre of ground with huts scattered over it. At the "**mungur**" at Barragup I have seen from thirty to fifty **mia-mias** in one camp. All would be facing one way – away from the weather, that is, to the east. There would be from three to seven people in each, and I suppose the average was about six, with about as many dogs. As far as I could make out they slept in families, men and women being in the same hut (ref 19).

Three Aboriginal men outside a **mia-mia** near Coolgardie 1903 – click link to see image: https://purl.slwa.wa.gov.au/slwa_b4538102_4

## Activities

Swans and other local waterbirds

- Explore the colours and patterns of local bird eggs. Play with various art techniques (straw blowing, sponging), edicol dye and ink to create egg paintings. Display your eggs in their natural habitat made from organic and recycled materials.
  WA Museum egg collection: http://museum.wa.gov.au/explore/galleries/explore-our-egg-collection
- Research the birds that live in the Mandurah area. Birdlife Australia resources:
  https://birdlife.org.au/images/uploads/branches/documents/WA-19a_mandurah.pdf
  https://birdlife.org.au/images/uploads/branches/documents/WA-19b_mandurah.pdf
- Discuss the importance of protecting these nests from pets and feral animals.
  Check out the Happy at Home website, a cat owner education program:
  http://www.southwestgroup.com.au/natural-resource-management/happyathome/?mc_cid=8546766045&mc_eid=e14b4c5870
- Research the ecology of swans. Why was breeding/moulting time a good time to catch swans?
- Discuss why it was so important to the long term survival of the Noongar people to catch and eat animals in an energy-efficient and sustainable way.

Natural adaptations

- How do emus help seed dispersal and germination?
- Research other adaptions in local plants, to help them survive in the Australian environment e.g. responses to fire, beach *Spinifex* seedheads spread by the wind and waves.

Mia-Mias

- Make a mia-mia (full scale or miniature), using natural materials. Compare and contrast this traditional Noongar structure to contemporary housing.

- Use this structure as a focal point for reading stories about Noongar culture.

Fire

- Collect old Banksia cones and add red cellophane flames. Use these firesticks to explore traditional Noongar skills.
- Why was fire so important to the Noongar people?

Animal tracks

- Click on the link learn how to identify and make animal tracks: (see pages 66-69): https://www.dpaw.wa.gov.au/images/documents/get-involved/n2n/schools/excursions/Exploring%20Woodlands%20With%20Nyoongars.pdf
- Smooth the sand on a track near a bush reserve or native garden in the afternoon and come back the next morning to see if any tracks have been left. Try to identify what animal might have left these marks.

## Djilba (approx. Aug – Sep) (late winter to early spring)

*Season of conception*

Djilba is a transitional time of the year roughly coinciding with August-September, with some very cold and clear days combining with warmer, rainy and windy days and the occasional sunny day or two (ref 24).

*Xanthorrhoea* (grasstrees), *Agonis* (peppermint trees), *Acacia* (wattles) and *Banksia* trees begin to flower in this season. *Hardenbergia* and *Clematis* climbers are still flowering. Plants with edible underground tubers start to push up new leaves in forested areas, indicating where a valuable food source can be found. The bright red fruits of the quandong (*Santalum acuminatum*) begin to ripen towards the end of Djilba, an important food source for thousands of years through to today.

**Traditional Noongar culture**

During Mookaroo and early Djilba, the winter period, the Noongar people could utilize their inland hunting areas, as the seasonal water supplies in the drier areas of their territory were thought to be reliable (ref 13).

> *"Wattle should be out soon. When that wattle come out you know it's a good time to go bush. Djerung. Fat. All fat and djerung*."
> Joe Northover, oral history, SWALSC, 2008 (Ref 38)

Possums were hunted at this time, for then the tell-tale grains of sand from damp paws adhered to scratches on the trunks of trees to betray the animals' refuges. Throughout spring there was an abundance of roots, birds, eggs, young birds, edible grubs, lizards and other small reptiles (ref 13).

As Djilba progressed, it was a time of transition for the Noongar people too. With the warmer weather, the people moved from their inland hunting areas once again towards the coast.

(Nind 1831):

> As Mukuru progressed into Djilba, kangaroo, quenda, emus and possums were hunted. 'They begin to return to the coast about September or October, and at this season they chiefly subsist on roots. In calm weather, however, they procure a few fish.' (ref 21).

### Plant Focus: Edible Roots

**Excerpts from "Roots of contention : Noongar root foods and indigenous plant taxonomy". Macintyre, K. and B. Dobson, 2019. (Ref 30):**

In Noongar taxonomy the edible orchid tuber known as **djubak** derives its name from its kidney shape (**djubo** or **djuba**, meaning kidney + **ak**, pertaining to). These tubers were consumed in spring, according to ethnohistorical sources.

*Djubak - kidney shaped tuber of the leek orchid (Prasophylum). Photo by Barb Dobson, 2008.*

**Djubok** (or **djubak**) is an indigenous body part metaphor referring to the often kidney-shaped tubers across a number of species and genera including *Thelymitra* (sun orchids), *Pterostylis* (greenhoods), *Prasophylum* (leek orchids), *Pyrorchis nigricans* (red beaks), *Microtis* sp. and others.

Nind (1831: 35) describes how the stem and tuber of **tuboc** was consumed:
'The **tuboc** is of the tribe Orchideae: it is very pleasant eating, when roasted. In the early part of spring it throws up a single stem, hollow, and similar in appearance to that of the onion, but is mucilaginous, and sweetish to the taste. This also is eaten.'

**Kara (cara, karhrh, karr)**

Indigenous plant names would have been collectively understood within the localised group. If plants shared similar and culturally significant characteristics, they would have been grouped together. This is probably the case with ***cara***, which Drummond (1842) records as white edible roots.

When we showed the photograph (on the right) of the thickened roots of *Burchardia* (milkmaid) to Aboriginal Elders from the Perth area and asked them what they thought the name ***cara*** meant, they said: "the tuberous roots resembled a spider (***kara***)."

*Kara- spider-like thickened roots of Burchardia congesta (Milkmaids). Photo by Barb Dobson 2010.*

Our research suggests that ***kara*** and ***karr*** are regional and dialectical variants of the same term which collectively refers to root vegetables that share similar characteristics in the indigenous plant food taxonomy.

To the Western observer these root foods (*Burchardia, Caesia, Dichopogon*) may look different but within an indigenous utilitarian context they would have been grouped together if they were similarly identified, utilised and consumed, possibly at the same time of year.

According to senior Noongar spokespersons from the Perth area these types of root foods were generally consumed raw, had a crunchy texture and were often sweet and watery (ref 30).

*Dichopogon sp. tubers*

***Haemodorum*** **(Bohn, borne, bhon** (red roots), also known as **meerne, meen, mean, mene, matje, madja, djakat, brigo, gwardyne, ngoolya, djanbar)**

These plants are commonly known as "bloodroots" because of their distinctive blood red coloured roots.

The etymology of the term ***bohn*** is uncertain. It may derive its meaning from ***boorn*** meaning tree, wood, stick or "stick of wood" depending on recorder. The erect flower stalk or woody spike is a distinctive feature of this plant and after senescence when the plant enters into dormancy (summer) the "stick" is the only remaining visible indicator of the below ground food source (ref 30).

*Haemodorum spicatum bulb - image credit Barb Dobson*

Drummond (1842) cites the famous botanist Dr. Lindley:

'The whole [*Haemodorum*] genus is of the greatest importance to the natives, for from any one or other of the species they can, at any time, and in any place, where they are likely to be, produce a meal of nutritious food with very little trouble.' (Drummond, 10th August 1842, Letter No. 6 to the Inquirer).
All species had edible bulbs which were eaten sometimes raw but mostly roasted. The roasting in wood ash helped to remove the often bitter and hot peppery taste.
Moore (1842:12) describes **bohn** (or **bohrn**) as:
'A small red root of the *Haemodorum spicatum*. This root in flavour somewhat resembles a very mild onion. It is found at all periods of the year in sandy soils, and forms a principal article of food among the natives. They eat it either raw or roasted.'

## Animal focus – Australian Magpies (Koolbardi)

**Excerpts from the "Australian Magpie" website: https://www.animalspot.net/australian-magpie.html. (Ref 1):**

Magpies normally live up to 25 years and are diurnal, heard caroling from very early in the morning. They have a complex social structure, and usually move around in flocks. Though the group can just consist of a pair, or a small family, it might as well reach up to 20 members or more.

The Australian Magpie is omnivorous, and feast upon invertebrates like snails, spiders, earthworms, millipedes, scorpions, and insects including beetles, moths, caterpillars, cockroaches, ants, and larvae. They also consume bigger animals like frogs, skinks, mice as well as figs, walnuts, grain, tubers, etc. Australian magpies favor sunflower seeds over other seeds.

The nesting season of these birds is between August and October. The female usually does all the work including selecting the nest site, gathering nesting materials and building the nest, laying and incubating the eggs. The nest of these birds is a platform of twigs, sticks, wires, etc. The bowl-like interior is lined with hair and grass to keep it soft. They build their nests at up to 15 meters above the ground in the outer branches of trees.

They lay 1 to 6 eggs per clutch that takes around 3 weeks for incubation. The females also feed the young birds, once they are hatched. The hatchlings are fed by the birds in the nests for almost 4 weeks. However, within 2 years, the parents force the juveniles to leave the territory. The young birds would then join a new group which can count up to more than 80 members of adolescents and evicted juveniles. Sooner or later, they eventually manage to get a place in some new territory and grow up to adult breeding birds.

These birds are infamous for their typical attack on humans (and even other animals) that happen to enter their territories, especially during breeding seasons. 99% of these attacks are done by the male birds that guard their nests. The attacking season usually lasts for 4 to 6 weeks, until the chicks fledge, during which time these birds are extremely aggressive. However, during other times of the year, they usually stay calm.

## Animal Focus : Fairy Terns (*Sternula nereis)*

Fairy Terns are a threatened species protected under the federal government Environment Protection and Biodiversity Conservation Act 1999.

They are a delicate, white bird with a black cap on top of their head and orange-yellow bill and legs. Fairy Terns are smaller than most terns at almost half the size of a Silver Gull.


*Fairy Tern with chick - image credit Claire Greenwell*

Much like humans, Fairy Terns like to migrate to Mandurah from late spring to early summer to fish in the estuary and surrounding coastal areas. Some years, if we are lucky, they also choose to nest and raise chicks in Mandurah.

Unfortunately, much of the Fairy Tern's original habitat has been developed and there are now only a few suitable breeding sites remaining. To support this threatened species a nesting sanctuary was established in the Mandurah Ocean Marina in 2017.

The Fairy Tern nesting season runs from September-February, and there are three local sites preferred by the birds: the Mandurah Fairy Tern Sanctuary, Boundary Island, and Nairns. During this time, we ask for your support in helping us create a safe space for this threatened species to nest and raise the next generation of Fairy Terns, which is critical to their overall survival.

For more information about Fairy Terns, visit:
https://d3n8a8pro7vhmx.cloudfront.net/ccwa/pages/188/attachments/original/1531104929/CONS_192_Tern_manual_complete_updated.pdf?1531104929

**To be involved in the Fairy Tern Citizen Science project and record sightings during their nesting season, visit:**

https://www.mandurahmatters.com.au/fairy-tern-nesting-season-2020

## Traditional Noongar Knowledge : Cootas

**Reproduced from Boorloo Boodja, Facebook, 18 April 2019. (Ref 4):**

Noongar women's hold-all carry-bags, were known generally as the ***coot*** or ***goot*** in the south-eastern Noongar nations, and ***coota***, ***goota, goto, koto*** or ***kooda-kooda*** in the south-west and northern Noongar nations.

From Rev, J. Smithies; January 1841:

> 'The women have one small bag made of kangaroo skin with a sling to throw over the shoulders, in which they carry their little child. They also have a sort of household bag, made in the same way and of the same material, carried on their back. They use this to carry ***wilgie*** and other household goods from place to place so that wherever they are they can make their home.'

George Grey, 1839:

> 'A child or two sits in bags upon their mothers' shoulders, and in the deep recesses of these mysterious bags they carry a variety of articles.

The contents of a Noongar woman's bag may include the following items:

1. A flat stone to pound roots with;
2. Earth to mix with the pounded roots; [2]
3. Quartz, for the purpose of making spears and knives;
4. Stones for hatchets;
5. Prepared cakes of gum, to make and mend weapons and implements;
6. Kangaroo sinews to make spears and to sew with;
7. Needles made of the shin-bones of kangaroos, with which they sew their cloaks, bags, etc.;
8. Possum fur to be spun into waist belts;
9. Shavings of kangaroo skins to polish spears etc.;
10. The shell of a species of mussel to cut hair etc.;
11. Noongar knives;
12. A Noongar hatchet (***kodj, kodja***);
13. Pipe-clay;
14. Red ochre, or burnt clay;
15. Yellow ochre;
16. A piece of paperbark to carry water in;
17. Waistbands and spare ornaments;
18. Pieces of quartz which the Noongar doctors have extracted from their patients, and thus cured them from diseases; these they preserve as carefully as Europeans do relics.
19. *Banksia* cones (small ones) or pieces of a dry white species of fungus to kindle fire with rapidly and to convey it from place to place;
20. Grease, if they can procure it from a whale, or from any other source;
21. The spare weapons of their husbands, or the pieces of wood from which these are to be manufactured;
22. The roots, etc., which they have collected during the day.

From Ethel Hassell; published in her book 'My Dusky Friends':

'Waymen's shoulder bag or ***coot*** was constructed from a young male kangaroo's skin doubled up at the hind legs which formed the band around her neck. The head part formed the flap to cover the mouth of the ***coot*** and the sides were securely sewn together with kangaroo-tail sinew. In the ***coot*** were all Waymen and Wynne's household goods.'

'To pass the time I asked Gimbuck to show me the contents of her kangaroo-skin bag (***coot, goota, coota, goot***) – I had been dying to see what was in it. After demurring a little she took it off and emptied it out onto the grass. As far as I can remember it contained the following:

- Two needles – these were made from the shin bone of a kangaroo (***yonger***) which is a solid piece of bone, very hard with no marrow. The needles were about 18 to 20 centimetres long and 2 centimetres wide. One side of the needle was flat, the other was rounded. The rounded end was sharpened on a flat piece of stone and the other end was squared. The needle had no eye.
- A bundle of dried sinews from kangaroos' tails. These were rolled into a ring with an end drawn through to keep them in place just as we roll up a piece of thick twine.
- Her tap (***daab, dabba***) or knife. This was longer than a man's tap. It was a round piece of hard, well-seasoned wood with a lump of gum at the end into which was firmly embedded the front tooth from the lower jaw of the ***yonger***. The tooth, a beautiful ivory, was placed sideways so as to get the greatest width and rubbed between two stones to make a very sharp edge. It was used for skinning, scraping and cutting any sinews. I have seen women skin a ***yonger*** with one of these knives as rapidly as a man with could do it with a steel knife.
- Her ***cobal*** [A pouch made from the stomach (***cobal, gobble***) skin of a possum] half-full of fur and her ***werpul*** or spinning sticks.
- Evidently a wonderful treasure, a flattish, water-worn stone about the shape of a broad-bean and about twice as big – a meteorite, I fancy. I turned this over a few times and asked what it was. She explained it was a rain stone she had found the day before near the bed of the river… '

[2] In the https://anthropologyfromtheshed.com/project/geophagy-the-earth-eaters-of-lower-southwestern-australia/ Ken Macintyre and Barb Dobson explain that Noongars were known to mix the roots of the bloodroot (***bohn, born, meen, mynd***) with pipe clay, or nutrient-rich earth from the insides of white ant nests to prevent diarrhoea resulting from eating the plant. Use of white clay containing ka olin (hydrous aluminosilicate) for its antidiarrheal properties was also noted amongst Aboriginal peoples of the Northern Territory and in certain parts of tropical Queensland.

## Activities

### Magpies

- Research magpie behaviour. Find out what they eat. Why do they swoop in this season? Create a poster or presentation about your findings.
- Make a magpie nest:
  - Construct a magpie nest from chicken wire and sticks.
  - Line it with dry grass, feathers and other soft materials.
  - Make paper mache or air-dry clay eggs for the nest.
  - Magpie eggs are blue or green with brown blotching, so paint the eggs a mix of blue and green, flick brown paint to add the splotches.
  - Make a set of flash cards with images and words for natural magpie food, and another set with junk food and rubbish. Ask the students to identify which card should go into the nest for the baby birds, and which should go in the bin. This activity encourages responsible feeding of wild birds.

Cootas (bags)

- Think about the contents of the Noongar women's cootas. Try to infer the purpose of each object.
- Survey the significant women in the lives of the pupils in the class. Ask them to list 20 things they would carry in a bag to feed and support the family. Compare and contrast the contents.

Edible Roots

- Many of the fruit and vegetables we buy in shops originally came from wild plants. Compare the edible roots of local native plants to root crops we eat today.
- What cultural practices did the Noongar people use to encourage sustainability and how does this compare to contemporary farming practices?

Make your own botanical inks

Explore the colours of nature by making your own natural inks from flowers. Harvest weeds or plants from your home or school garden and leave the flowers in the bush for the birds and insects that need them. Test different techniques to see which work best for each type of flower. Here's a few examples to get you started:

- Wattle/red geranium/purple petunia flowers – fill a heatproof bowl with the flowers and cover with boiling water. Leave to steep for a few hours.
- *Hardenbergia* flowers – these flowers hate heat so put them in a ziplock bag and freeze them then either press between sheets of paper for a purple print, or pour a little cold water over the frozen flowers and mash with a spoon to release the purple ink.

## Kambarang (approx. Oct – Nov) (mid to late spring)

*The season of birth*

A definite warming trend is accompanied by longer dry periods and fewer cold fronts crossing the coast. Throughout millenia, this is the time of year to enjoy the coastal lifestyle of south-west Western Australia.

This is wildflower season and the bushland in Mandurah explodes with colour. Orchids and lilies are flowering, as well as *Dianella*, *Billardiera, Kennedia* and *Carpobrotus* (pigface). *Banksia* flowers are ripe and full of sweet nectar. White flowers of the peppermint (*Agonis flexuosa*), paperbark (*Melaleuca*) and jarrah (*Eucalyptus marginata*) trees are dominant in the landscape and the wattle (*Acacia*) pods are beginning to fill with seeds. The Australian Christmas tree (*Nuytsia floribunda*) also starts to flower in this season.

Grey (1840: 71) records '***kum-bar-ung*** as:

> 'the season which follows "jilba," and is followed by that of "Berok," (about October) "***Mun-gyte backan-een***," the ***mungyte*** eating season.'
> The ***mungyte*** season was the time of 'coming together' for ceremony and celebration. It was the time of *Banksia* flowering, parrot breeding and the de-pouching of young kangaroos (ref 28).

Female blue swimmer crabs commence their spawning in this season, through to mid-summer. Each female produces between 180,000 and two million eggs in a single spawning – and may spawn more than once in a season. Fishing regulations prohibit the taking of undersized and egg-carrying ('berried') crabs to ensure a sustainable population.

**Traditional Noongar culture**

As the weather warmed up, the Noongar people moved closer to the coast. The sign to return to the coast at the end of Djilba and on into Kambarang (October and November) was the flowering of the Western Australian Christmas tree (*Nuytsia floribunda*).
In the coastal heathlands many different berries and fruits were now collected, particularly those of the quandong (*Santalum acuminatum*), native cranberry (*Astroloma* spp), and snottygobble fruits (*Persoonia* spp).

Especially sought after at this time was *Dioscorea hastifolia*, a yam which was cultivated and harvested by digging using a long '**wanna**' (digging stick). The crown or head of the yam was re-planted in the hole or pit to ensure that a new crop of yams would grow for the next season. Yams were also harvested (and the head replanted) in late autumn, providing an essential and predictable carbohydrate food source. (The native yam grew from Shark Bay in the north to the Murray River in the south) (ref 33).

Other edible tubers were also harvested during Kambarang (see the Djilba chapter for more information about local edible tuberous plants).

The season also brought a natural increase in game, some of which were trapped by being herded into trampled brush where they became tangled and were easy prey to armed hunters surrounding the scrub. Hunting also focused on the swamps and wetlands where freshwater crayfish and edible frogs were caught by hand in the shallows, and freshwater tortoises were easily caught in the dwindling pools. These delicacies were roasted in the ashes of camp fires (ref 13).

## Plant Focus : Banksia nectar

The following paper discusses the traditional harvest timing and use of *Banksia* flowers for nectar.

**Excerpts from Macintyre K. and B. Dobson 2018 Some notes on *Banksia* useage in traditional Noongar culture (Ref 28):**
*Banksia* nectar, often referred to as 'honey', was commonly known as **mangite** (or **mangitch, mangyt, mungitj, mangaat, moncat, mangaitch, mungyt** etc) or **nguk** (**ngok** or **ngook**).

Although Banksias flower from September to January, traditionally a taboo was placed on consuming nectar from immature flowers as these contained chemicals that made it unpalatable and possibly toxic. By late December/early January Banksia nectar supplies would have greatly diminished owing to the dry, hot, windy weather.

Birds and other animals were traditionally used as food-ripening indicators. In mid-late Spring the parrot tribe begin to feed on the rich, nectar-bearing flowers, advertising the ripeness of these flowers for human procurement. The association of parrots (Psittaciformes) and possums with flowering Banksia is well acknowledged in Noongar traditional mythological narratives.

Ripe vs unripe *Banksia* flowers:


Unripe Banksia flowers. Image credit B. Dobson


Ripe Banksia flowers. Image credit B. Dobson

Grey (1840: 71) records the *mungyte* – eating season or what he records as "*mun-gyte backan-een*" as *kum-bar-ung* 'about October.'

It would seem that late October/ November was the beginning of the nectar-eating season in the Perth area. This was the time when the flowering cones of *B. grandis* (Bull Banksia) and *B. attenuata* (slender Banksia or candle Banksia) were coming into nectar-production. The quantity of nectar production and timing of collection depended on a number of factors including the *Banksia* species, unseasonal weather events in the preceding months or years, fire history, geographic locality, soil type and whether the *Banksia* consumption taboo had been properly observed.

The earliest observation and recording of indigenous people in Western Australia collecting nectar from Banksia is provided by Nind (1831 in Green 1979: 33) at King George Sound:

> 'When the different species of *Banksia* first come into bloom, they collect from the flowers a considerable quantity of honey, of which the natives are particularly fond, and gather large quantities of the flowers (**moncat**) to suck. It is not, however, always to be procured; the best time is in the morning when much dew is deposited on the ground; also in cloudy, but not wet weather.'

The flowers also attract insects that are in turn predated upon by insectivorous birds and animals, such as the tiny pygmy possum and mouse-like marsupials.

**Harvesting *Banksia* cones**

Grey (1840: 83, 91) refers to ***kal-ga*** as the stick for hooking down or pulling down the flowering *Banksia* cones. He refers to this stick as the '***mungyte***-bringing agent' or "***mungyte bur-rang midde***" (p. 59).

Moore (1842:38) likewise records the name of this hooked stick as ***kalga***:
'A crook. A stick with a crook at each end, used for pulling down the ***Mangyt***, or *Banksia* flowers.

*Kalga - Banksia flower-gathering hook. Courtesy of the National Museum of Australia.*

## Plant focus : Christmas Tree (*Nuytsia floribunda*)

**Excerpts from Macintyre, K. and B. Dobson. 2019. Traditional significance of *Nuytsia floribunda* ("moojar" or "kaanya tree") (ref 31):**

Elders reported that few people today understand the significance of the **moojar** tree (*Nuytsia floribunda*) commonly known as the Western Australian Christmas tree. They said that the **moojar** was regarded as "highly spiritual" because it was associated with the spirits of the dead who according to the 'old people' "camped" on the branches and flowers of the tree on their way to **Kurannup** – the land of the ancestors across the Western ocean. They said to us: 'We don't like to go near this tree.'

The cultural significance of *Nuytsia floribunda* is well established in the early ethnohistorical records. Daisy Bates in an article in *The Australasian* (1926 in Bridge 1992: 150) refers to it as the "ghost tree" and in a later publication (1938) "the tree of souls." Her Noongar informants call it the **moojarr** or "**Kaanya** Tree" (**kaanya**, meaning recently departed soul). Bates emphasises that this tree was sacred to all Bibbulmun people throughout southwestern Australia from Jurien Bay to the east of Esperance.

*Nuytsia floribunda in full bloom.*

Like all Noongar terms there are variant spellings for the term **moojar**. These include **mooja, moodja, moojarr, moodjar, mudjarr, mutyal, modjar, mutyal, mutdhoor** and others depending on the recorder. The meaning of this descriptor term **mooja** is uncertain; however, we would suggest that it means the same as "**mootcha**" that is, prohibited or forbidden.

There are conflicting views in the popular literature as to the edibility of the **moojar** gum. Some anecdotal accounts, including those on social media refer to the edible sweet sticky gum of *Nuytsia* as tasting very sweet and "yum."

When we asked Elders during a bushland survey in the northern metropolitan area of Perth whether the gum was used as a food or material glue, they said they had never heard of the gum being used for any purpose. Most responded by saying that the gum was hard to find

and no one they knew had tasted it. … A number of years later one of us (Ken) tasted a sample of *Nuytsia* gum in the natural bushland at Beeliar (south of Perth). He sampled it with the utmost caution in case it contained potential toxins. Ken reported that it did not taste sweet but was somewhat acrid and unpleasant (ref 31).

## Animal focus : Migratory Birds

Migratory birds begin to arrive at Mandurah's wetlands in October each year. The birds follow their annual migration along the East-Asian Australasian Flyway from as far away as Alaska and Siberia to our Ramsar-listed Peel-Yalgorup Wetlands (Ramsar Site 482). This trip, made by 5 million migratory birds every year, stretches across 22 countries and covers up to 15,000 km.

Approximately 55 migratory species breed in the northern hemisphere's summer before escaping winter and travelling south to feed at the southern hemisphere's wetlands. The populations of more than 40% of migratory species using the flyways are declining.

With the flyway extending across the most densely human populated parts of the world, migratory birds face extreme pressures. Internationally, natural habitats such as wetlands are under enormous pressure from reclamation, deforestation, climate change and other human impacts.

Every year over 20,000 of these migratory, as well as resident, shorebirds make their summer homes in the Peel-Yalgorup System's Ramsar listed wetlands. Feeding on the mudflats and near shore waters, these shorebirds include the Red-necked Stint, Eastern Curlew and Bar-tailed Godwit.

Each year during this season, the Peel-Harvey Catchment Council supports BirdLife Australia in training citizen scientists in the identification of shorebirds in preparation for Australia's largest single Citizen Science Event – the National Shorebird Count, held in January each year.
For more information visit: www.birdlife.org.au and www.peel-harvey.org.au

For more information on the Peel-Yalgorup Ramsar Site:
https://www.dpaw.wa.gov.au/images/documents/conservation-management/wetlands/ramsar/peel-yalgorup-ramsar-site-ecd-with-disclaimer.pdf (ref 18)

https://www.bushlandperth.org.au/wp-content/uploads/2018/01/Peel_Yalgorup_MP.pdf (ref 35).

## Traditional Noongar Knowledge: Tracks (Bidis)

Traditional owner the late Fred Collard describes how Nyungar move around with the seasons.

> *They used to do their annual little trip, they used to go around to all the different towns, moving around with the seasons in the early days. Visiting the different little towns, moving around with the season and the season was all about where the food line was, not about walkabout. But mostly following the food line.* ***Wedjelas*** *misinterpreted that; they say Nyungars went walkabout and I used to say no, they gone about looking for food and following the seasons (*ref 6*).*

A number of tracks were used when moving from one place to another, especially those connecting permanent water sources. One such track went from Perth and followed the north side of the river to North Fremantle, at which it crossed the river and continued on to Bibra Lake. This track and others followed onto Mandurah and Pinjarra and continued on down south to Busselton and Albany (ref 22).

In his 2004 paper, Len Collard shares the words of Pindjarup Oral Historian, Joe Walley as he provides an insight into ***moort*** and ***boodjar*** of the Pindjarup people through the oral histories passed on to him.

> *"First, I want to talk about what I was told about the Pindjarup Nyungar and their tracks coming through Pinjarra and Ravenswood. They had a crossing just down at McKay's corner. The track crosses over there and comes to a clay pit area where there is a water hole and a camping area where Nyungar used to stay. It takes a while to travel around there. Opposite, near Lake Gorgerup, to where we are sitting, they travelled through Lake Gorgerup, went right up the lake side and travelled back, keeping to the north eastern lakes, crossing between Lake Gorgerup and what is known as the Black Lake. Coming back into Willies Lake and then into Black Lake. Crosses there and comes onto a road that was put in by the Shire. That road is Mulga Drive and it takes you through all the swamps. The first little swamp is known as Black Swan Lake, no, I'm not sure. Maybe Joondalup Lake, starting off to what is known now as Pagononi's Swamp further over. A spring is there where they stopped and got their water, caught their turtles and continued on from there to Black Swamp, near Pagononi Place. This is heading north going towards Fremantle from Pinjarra and then they went to Pagononi's Lake. There is a graveyard there, back onto Pagononi's Swamp Road. The first two Aboriginals were buried there many years ago. I don't know if it had anything to do with the conflicts with Thomas Peel. He used to live a half a mile west of these graves. These Nyungar travelled that way through to Hansley Swamp followed through into Warriup Swamp. They kept to the east side of those swamps while they travelled north. They travelled through there, although they had to split up once they passed Hansley Swamp. They went through the other side, west to Rockingham and around. Some of them went the other way, because of the different times of the season. Some went back inland. There is a swamp there where the kangaroos came into the Medina/Kwinana area" (Walley, J. 2002).* (Ref 8).

Fish and other marine life were plentiful in the **wardan** or the sea, the **darbal** or estuary, **beelya** or rivers, and **pinja** or swamps all along this coastal strip. According to Pindjarup Oral Historian Joe Walley:

> *The Pindjarup Nyungar used to follow the lakes or water chain from Pinjarra, right through where Murdoch University now stands, to Walyalup or Fremantle. It was a seasonal run for the Nyungar, from Pinjarra to Ravenswood, past Lake Gorgerup, Black Lake, Pagononi's Swamp, Hansley Swamp and Warriup Swamp and past Thompson's Lake (Walley, J. 2002).*
> *Then the Pindjarup Nyungar made their way up past Bibra Lake and North Lake, Mandogalup Lake and Booragoon Lake. All this area teemed with bird and marine life like fish, turtle, swamp hens, gilgies, ducks and swans (Drake and Kennealy 1995; Collard 2002). Between the Murray River and the Swan River, Nyungar followed the seasonal food chain and lived a healthy and leisurely lifestyle, much like those who lived around the Swan River region did and in other parts of Nyungar territory in the south-west.* (Ref 8).

## Activities

*Banksia* flowers

- Observe the individual flowers on a *Banksia* cone opening over time. How long does it take to fully open? Write a detailed description of this process and accompany with a sketch/watercolour painting.
- Write a procedure for safely collecting nectar without damaging the tree.
- Find out about the local insects, birds and animals that also feed on *Banksia* nectar. Can you see any signs of their presence? Draw or describe what you see.

Noongar bidi (paths)

- In the Educators Pack, Pindjarup Oral Historian Joe Walley describes a traditional Noongar bidi along the Swan Coastal Plain. On a map, try to follow this path – how much is still bushland? If the average walking speed is 5km/hr, how long would it take to walk this path and back again?
- Look for bidis around your school, where people have worn a track in the grass or bush from constant use. Where do they start and finish? Create a contemporary bidi map for your local area.

Mood-ga (*Nuytsia*, Australian Christmas tree)

- Research the cultural significance of the Mood-ga tree to the Noongar people.
- Why is it known as the Australian Christmas tree?
- How does this plant obtain its food?

Playing with shadows

**Safety note: staring directly at the sun can damage your eyes, even in cloudy weather.**
We can follow the movement of the Sun as it rises in the East and sets in the West each day (and therefore work out the compass points) by observing shadows outside. No shadow = something blocking the sun (buildings, clouds).

- Go outside and look for shadows falling onto flat concrete
- Draw the outline of the shadow with chalk
- Re-draw the shape of the shadow throughout the day.
- Which direction is the shadow moving? How does it change? Why?
- Take it in turns to draw your partner's shadow throughout the day, standing at the same spot each time.

## Important Noongar cultural sites around Mandurah

The information below is from the *Our Knowledge, Our Land* website. Visit this website to use the interactive version of this map, and listen to oral histories from Noongar elders of the Peel Region. https://www.ourknowledgeourland.com.au/


**BILYA COUNTRY STORY TRAIL MAP**

# Bilya Country Story Trail

The Bilya Cultural Trail sets out 13 important sites to commemorate places of historical and cultural interest to the Mandurah Bindjareb community.

## 1. Winjan's Camp (Yaburgurt Kaaleepga Reserve)

George Winjan (also known as Yaburgurt) was a key Bindjareb leader. He was born probably around about the time when white people first came to Western Australia in 1829, and was a child at the time of the Pinjarra massacre in 1834. It is said that he actually witnessed the massacre which he later described in the following words:

> "They rush camp: they shoot-em man, shoot-em gins, shoot-em picanninies and they shoot-em dogs too.' (quoted by Richards 1993: 8)

It is believed his mother was killed at Pinjarra along with his brothers Ballong and Carriegem and many other Bindjareb people.

Winjan lived around Mandurah and Pinjarra all of his life until his death on 28 March 1915. He and other Noongar people often used to camp around this area, all down this side of the estuary at a time when it was all bush land. Here they could camp in peace, and take on work that was offered by the new arrivals.

This monument is to his memory, and goes back to a time when Winjan made his camp near this spot.

## 2. Warrungup Springs

Near this place are two important Noongar sites, one called Warrungup Springs, the other called Morfitt's Cave.

One of the early colonial explorers Henry Bunbury wrote about the riches of the area and its high population in 1834:

> 'There were several signs of people being very numerous in the neighbourhood … owing to the facility of obtaining fish, a wholesome and plentiful food. Numerous and well-beaten paths near the banks of the estuary indicated the constant presence of considerable numbers … many deserted huts.' (Hallam 1979: 68)

The late Mr. Joe Walley (respected elder) said of the area:

> [The springs is] … "a three spring underground stream that comes out … about sixty metres in front of us to the south … this was used mainly for the women's campin' area. We go back west from here behind us about a hundred metres and we'll start coming in to bush food, … all sorts … of bush food. … That indicates the camp here just over the north side of where the sand banks and the estuary is where … they've been dragging out the bushes, specially berrin bushes we call it. … everything around it, it shows it's a good campin' place. They had the fresh water, they had the food. They cut back west over there a mile and a 'alf and there in amongst the … quandongs … it was just like

walkin' into Coles shop. Further up in the other cave at Morfitt's Cave it's called … that's part of a law cave or initiation."

### 3. Lake Clifton

Lake Clifton and the Yalgorup National Park was part of the traditional lands of a man called Galyat (Calyute). His traditional lands stretched all the way from Mandjoogoordap around the Harvey Estuary and to Lake Clifton.

Galyat was a strong old leader who became a familiar face to the early settlers of the Swan River Colony.

Noongar people continued to use and camp in the area around Lake Clifton for many years. This shallow and salty lake was a place where it was always possible to catch food and was a convenient stopping place for people travelling along the old paths between the Swan River, Mandurup and the Leschenault Inlet further south.

In 2003 Joe Walley talked about the significance of the thrombolites to the Noongar traditional owners:

"In my language it is called the Wagyl shell, the shell of old Maadjit, the Wagyl that came through from the history after laying her little ones there. As they wandered down they went through south and some went east and created the rivers. When she had lost them she went from the Estuary in through and came up here, which is now known as ... Lake Clifton."

### 4. Old Bunbury Road Crossing, Harvey River

The Old Bunbury Road follows an old Aboriginal track where traditional owners used to walk between the place now called Pinjarra and other places such as Lake Clifton and the Harvey Inlet and further south.

Traditional owners would camp and get fresh water because it was where the Harvey River turned from fresh into salt water. Nearby were places to fish jilgie (fish) in the river.

Joe Walley remembered:

"The Aboriginal people ... used this very well for the water food and resource as it travelled through and past, stayed. ... they camped on the west side."

### 5. Herron Point

Joe Walley, continuing his story of this area said,

"I spent a fair bit of time ... cutting bean sticks out through here, even as a kid when my father used to live about half a mile off the estuary side here ... it was a very, very important place to the Aboriginal people. This is where they cross into Egg Island going onto the islands over there. The furtherest one was very important to the Aboriginal people, the elders anyway, the men. They had their ... annual meeting there ... to define the laws for the people that is travelling through. ... While they were in session they

could never be annoyed or crept up on because they had water all around them. Also in points going back west here and ... south, south-west ... there are still little freshwater springs through there".

### 6. Pinjarra Massacre Site

At the time of settlement, the Bilya ('river') Bindjareb Noongars were made up of three family groups with main camps in what are now the Mandurah, Pinjarra and North Dandalup areas. They were part of a broader network of Noongar people who had lived across the Southwest corner of Western Australia from at least 40,000BC, connected to one another by ceremony, trade and social relationships.

The site is significant because of the massacre of Aboriginal people that took place on 28 October 1834.

More information available at the Pinjarra Massacre Site webpage:
https://web.archive.org/web/20130418013809/http://pinjarramassacresite.com/

### 7. Pinjarra (Murray River)

This part of the river features strongly in Noongar accounts of the area, including Warrkal (snake) sites, places where people used to (and still) camp, fish and swim. It features places known as 'the log', which has traditional significance and was also a place where many kids learned to swim and fish, and Wilson's Rock, another very significant place for the Noongars of the area.

### 8. Murray Bend

Looking over the river, the visitor can see a large area of open ground — in this vicinity it is said that there was an ancient corroboree ground.

Many Noongars from Pinjarra and Mandurah have fond memories of Murray Bend as a place they used to come and camp. They used to walk along the river, as Lesley Morrison remembers,

> "we knew every inch of that river. Nearby was a freshwater spring where it was always possible to get water. People used to camp and fish around here for days at a time, and it was also possible to ford the river near this point. People used to walk here from Pinjarra and were also employed at farms around the area such as 'Jim Jam' and Creaton', two of the earliest.
>
> One of the great characters of Murray Bend and Ravenswood was a woman called `Dolyup'.
> Dolyup was an old woman ... they reckoned she was a long way over the century — she could have been 130 — 140 — and she was skinny! Got around in a blanket ... she was outstanding in her looks — and she was the boss! ...she was the boss of her tribe — here — she ruled the lot of them!" (1993: 462)

### 9. South Yunderup

This area was a land rich with food resources, including turtles, goanna, fish and birds, and was (and remains) a very popular camping and visiting place. Visitors can be encouraged to walk around and look at the river as there are walk trails already developed. They can also visit Yunderup Point and walk out to the mouth of the Murray, where there is a great view of the inlet. This was also (and remains) a popular crabbing place.

The South Yunderup area was a very popular camping place for Noongar people of the region and the many visiting groups travelling through the land for trade, ceremonial and social reasons and had done so since time immemorial.

All the islands around the mouth of the Murray are well known to Noongars and still carry Noongar names — Yunderup, Woorallgarook, Ballee, Meeyip, Coolenup, Jeegarnyeejip.

When he was young, the late Frank Nannup remembered how they would camp anywhere near water, along the river or near the wetlands along the river.

> "If we went bush, we made sure we camped next to a spring or a soak or a windmill."

He would often go back to the same camp site year after year,

> "because everything would be there, water, wood, food. When there was plenty of bush around we could camp anywhere."

The Yunderup area was a bountiful land, with plenty of fish, crabs and bird life, as well as bush food.

### 10. Turtle Lake

This was a place where people came to camp and hunt, and in particular catch turtles at certain times of the year.

### 11. Black Lake and Nambeelup Lake

In the vicinity is an important men's meeting place. In addition, it was an important bean pole cutting place, a fishing and hunting place and a stop on the walk route between Mandurah and the Serpentine farmlands. It is a place of plenty with very large numbers of birds and crabs.

David Nannup records that

> "This where the fish lay their eggs when they're going upstream, to come down. They go through here to Serpentine River. Some of the bream mainly, they were the best, black bream. Sometimes you come here, see all that water there full of swans, another time it's all cranes."

David remembers many times camping around Black Lake and Nambeelup while they were fishing or cutting bean poles from the abundant tea tree. They remember carrying their catches of kangaroo over the shallow parts of the lake on their shoulders, taking the long walk back to Dandalup across the country.

### 12. Mungah on the Serpentine

The site is now covered by water and the stones that once formed the base of the fish mungah on the bottom of the river bed are not visible from the surface. This is one of the most important ceremonial and historic sites in the region and was the scene of a yearly gathering of Noongar people from all around the region for the annual mullet catch. The Barragup mungah had existed for many generations and each year saw a huge gathering of Noongar people from all over the larger area assembling for the annual mullet catch.

The white fishermen who came to the Mandurah area in the nineteenth century believed that the fish mungah represented a threat to the industry and broke it down, but each time it was carefully rebuilt by the Noongars. In 1890, the Fisheries Department decided that the mungah should be finally destroyed on the grounds that it was 'perfectly destructive of fish life'.

An Aboriginal leader named Billy Dower complained about this and when the Governor of Western Australia Sir Gerald Smith visited Mandurah, he told him that the mungah had been used by his people for generations and was essential for the well-being of the Noongars of the area. As reported in the pages of The West Australian.

He asked on behalf of himself and his companions that the white man, after taking the blacks' patrimony and after depriving them of their hunting grounds to make pasture for their cattle, should not be allowed to despoil them of their method of catching fish, by which they subsisted and which require patient labour to create. The mungah had been built twice and each time marauding white men had broken it and cast their nets for the mullet (19.10.1897)

### 13. Lake Goegrup

Visitors can follow these trails around the lake, and read some of the commemorative signage which describes the natural history and Indigenous heritage of the place. Even though the place is now surrounded by suburbia, it is easy to imagine a time when this was a bush place valued as a ceremonial and camping place by traditional owners and visitors alike. This was another bountiful place for Noongar people, a place where they could camp near to fresh water, and cook their food.

The late Frank Nannup emphasized that Lake Goegrup is very significant to Aboriginal people. There are

> “a lot of artefacts there ... the stuff that they make spears out of and a lot of stones ... a bit of a grinding stone ... where the camps were. It's laying everywhere ... it gives

the impression that the Aboriginal people were here in quite a few numbers for a number of years."

Nannup said that Lake Goegrup was traditionally owned by a mob called the Burragup people who, while closely related to the other family groups in the area, identified and had primary responsibility for this area, and 'used to travel around the Barragup lakes which was where they lived.'

## Additional Resources for Educators and Parents

**Narra Gunna Wali** https://www.narragunnawali.org.au/
Provides practical ways to introduce meaningful reconciliation initiatives in the classroom

**Noongar Language Centre** https://noongarboodjar.com.au/
Noongar books, language learning packages and online resources.

**Our Knowledge, Our Land** https://www.ourknowledgeourland.com.au/
Interactive map of local cultural sites and oral histories from Noongar elders of the Peel Region.

**Anthropology From The Shed** https://anthropologyfromtheshed.com/
Research blog from anthropologists Ken Macintyre and Dr Barb Dobson.

**Yaburgurt pack** https://www.ourknowledgeourland.com.au/gallery/yaburgurt-memorial-educational-resources/

**Mandjoogoordap Dreaming Tours** https://www.mandurahdreaming.com.au/
Mandurah Aboriginal cultural experiences, custodian ceremonies and cultural awareness training.

**Winjan Aboriginal Corporation** https://www.facebook.com/winjancorp/
Not-for-profit community cultural centre based in Mandurah, providing Noongar cultural services, Aboriginal input into decision making, and community services to Aboriginal people in the Mandurah area.

## References


(1) Animal Spot. (2020). Australian Magpie. https://www.animalspot.net/australian-magpie.html

(2) Australian Museum. (2018). Emu. https://australian.museum/learn/animals/birds/emu/

(3) Black Snake Productions. (2017). What happens to snakes during the winter season? http://blacksnakeproductions.com.au/what-happens-to-snakes-during-winter-season/

(4) Boorloo Boodja. (2019). Facebook post, 18 April 2019. https://www.facebook.com/269624376514662/posts/1601713126639107/?extid=8veipazdcGNPRmCW&d=n

(5) City of Cockburn (?). (n.d.). Birak. Nyungar wardan katitjin bidi – derbal nara website. https://www.derbalnara.org.au/six-seasons/birak-dec-jan-

(6) City of Cockburn (?). (n.d.). Six seasons – Nyungar life on the Coastal Plain. Nyungar wardan katitjin bidi – derbal nara website. https://www.derbalnara.org.au/SixSeasonsontheCoast.pdf

(7) Collard, L. (1994). A Nyungar interpretation of Ellensbrook and Wonnerup Homesteads. Edith Cowan University for the National Trust of Australia (WA).

(8) Collard, L. et al. (2004). Nidja beeliar boodjar noonookurt nyininy: a Nyungar interpretive history of the use of boodjar (country) in the vicinity of Murdoch University. https://www.derbalnara.org.au/NIDJABEELIARBOODJARNOONOOKURTNYININY.pdf

(9) Common Ground website. (n.d.). Knowledge and sustainability. https://www.commonground.org.au/learn/knowledge-and-sustainability

(10) Dept of Biodiversity, Conservation and Attractions. (n.d.). Fact sheet: Black Swan (*Cygnus atratus*). https://www.dpaw.wa.gov.au/images/documents/conservation-management/riverpark/fact-sheets/Fact%20sheet%20-%20black%20swan.pdf

(11) Dept of Biodiversity, Conservation and Attractions. (2013). Snakes on the Move. https://www.dpaw.wa.gov.au/news/item/314-snakes-on-the-move

(12) Dept of Biodiversity, Conservation and Attractions. (2017). Fauna Notes : Reptiles in and around the house. https://www.dpaw.wa.gov.au/images/documents/plants-animals/animals/living-with-wildlife/reptiles__fauna_note_2017.pdf

(13) Dept of Conservation and Land Management (1998). Wallace, K. and J. Huston (ed). Exploring Woodlands with Nyoongars : Teaching activities for Primary and Secondary Schools. https://www.dpaw.wa.gov.au/images/documents/get-involved/n2n/schools/excursions/Exploring%20Woodlands%20With%20Nyoongars.pdf

(14) Dept of the Environment and Energy. (2017). NVIS Fact sheet : MVG 8 - *Casuarina* forests and woodlands. https://www.environment.gov.au/system/files/resources/2edcda80-d9b7-49d4-9e97-36236b91e9f9/files/mvg8-nvis-casuarina-forests-and-woodlands.pdf

(15) Dept of Primary Industries and Regional Development. (2019). Blue swimmer crabs. http://www.fish.wa.gov.au/species/blue-swimmer-crabs/Pages/default.aspx#:~:text=Distribution%20and%20habitat,entire%20lives%20in%20the%20bay.

(16) Gibbs, M. (2017). An aboriginal fish trap on the Swan Coastal Plain : the Barragup mungah. http://museum.wa.gov.au/sites/default/files/SuppWAMuseum_2011_79_004to015_GIBBS.pdf

(17) Green Skills Inc. (n.d.). Plants of Denmark's Walk Trails : Traditional Noongar Uses. https://web.archive.org/web/20170712131022/http://www.greenskills.org.au/pub/pamph/plants.html

(18) Hale, J. and R. Butcher. (2007). Ecological character description of the Peel-Yalgorup Ramsar Site, Report to the Department of Environment and Conservation and the Peel-Harvey Catchment Council, Perth, Western Australia. https://www.dpaw.wa.gov.au/images/documents/conservation-management/wetlands/ramsar/peel-yalgorup-ramsar-site-ecd-with-disclaimer.pdf

(19) Hammond, J. E. (1933). Winjan's people : the story of the South-West Australian Aborigines. Imperial Printing Co Perth.

(20) Hansen, V. and J. Horsfall. Noongar Bush Tucker : Bush food plants and fungi of the south-west of Western Australia. 2019. UWA Publishing.

(21) Harben, S. (n.d.). Literature review for Avon Basin Noongar heritage and cultural significance of natural resources. Murdoch University. https://www.wheatbeltnrm.org.au/sites/default/files/knowledge_hub/documents/RTKlitweb_0.pdf

(22) Hughes-Hallett, D. (2010). Indigenous history of the Swan and Canning rivers : student placement work : Curtin University. https://d1y4ma8ribhabl.cloudfront.net/wp-content/uploads/2013/07/indigenous-history-of-the-swan-and-canning-rivers.pdf

(23) Kah Yaw Ee et al. (2013). Effects of roasting on the characteristics of Australian Wattle (*Acacia victoriae* Bentham) seed and extracts. International Journal of Food Properties, 16:5, 1135-1147. https://www.tandfonline.com/doi/full/10.1080/10942912.2011.578271

(24) Kooyar wongi. (2020). New & Katitjin. https://www.kooyarwongi.com.au/news-katitjin/

(25) Macintyre, K. and B. Dobson. (2017). The puzzle of the bardi grub in Nyungar culture. http://anthropologyfromtheshed.com/project/the-bardi-grub-in-nyungar-culture/

(26) Macintyre, K. and B. Dobson. (2017). *Typha* root: an ancient nutritious food in Noongar culture. https://anthropologyfromtheshed.com/project/edible-roots-typha-bulrush/

(27) Macintyre, K. and B. Dobson. (2018). Indigenous science. https://anthropologyfromtheshed.com/indigenous-science/

(28) Macintyre, K. and B. Dobson. (2018). Some notes on *Banksia* useage in traditional Noongar culture. https://anthropologyfromtheshed.com/project/the-consumption-of-banksia-nectar-in-traditional-noongar-society/

(29) Macintyre, K. and B. Dobson. (2018). Will this ancient succulent herb reveal a medical miracle? https://anthropologyfromtheshed.com/project/will-this-ancient-succulent-herb-reveal-a-medical-miracle/

(30) Macintyre, K. and B. Dobson. (2019). Roots of contention: Noongar root foods and indigenous plant taxonomy. https://anthropologyfromtheshed.com/project/roots-of-contention-noongar-root-foods-and-indigenous-plant-taxonomy/

(31) Macintyre, K. and B. Dobson. (2019). Traditional significance of *Nuytsia floribunda* ("moojar" or "kaanya tree"). https://anthropologyfromtheshed.com/project/traditional-significance-of-nuytsia-floribunda-mooja-or-kaanya-tree%EF%BB%BF/

(32) Macintyre, K. and B. Dobson. (2020). The fermented oil fruit of southwestern Australia. https://anthropologyfromtheshed.com/project/macrozamia-ancient-oil-fruit/

(33) Macintyre, K. and B. Dobson. (2020). Yam lands: the mystery of a holy landscape. https://anthropologyfromtheshed.com/project/indigenous-yam-cultivators-of-southwestern-australia/

(34) Mandurah Community Museum. (2007). Oral history transcript of Noongar Elder Gloria Kearing. Indigenous Oral history Project.

(35) Peel-Harvey Catchment Council. (2009). Peel-Yalgorup system Ramsar site management plan. https://www.bushlandperth.org.au/wp-content/uploads/2018/01/Peel_Yalgorup_MP.pdf

(36) Royal Botanic Gardens and Domain Trust Plant. (2009). PlantNET: Genus Xanthorrhoea. https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=gn&name=Xanthorrhoea

(37) SBS. (2019). From poo to plate: how emus help produce Australia's best native foods. https://www.sbs.com.au/food/article/2018/07/03/poo-plate-how-emus-help-produce-australias-best-native-foods

(38) South West Aboriginal Land & Sea Council. (2020). Food. Kaartdijin Noongar – Noongar Knowledge website. https://www.noongarculture.org.au/food/

(39) South West Aboriginal Land & Sea Council. (2020). Homepage. Kaartdijin Noongar – Noongar Knowledge website. https://www.noongarculture.org.au/

(40) South West Aboriginal Land & Sea Council. (2020). Language. Kaartdijin Noongar – Noongar Knowledge website. https://www.noongarculture.org.au/language/

(41) The Wetlands Centre. (2020). The six seasons of the Nyoongar calendar. https://www.thewetlandscentre.org.au/blog/the-six-seasons-of-the-nyoongar-calendar/

(42) Wikipedia. (2020). Fremantle Doctor https://en.wikipedia.org/wiki/Fremantle_Doctor

# Acknowledgements

Cover image artwork: Giaan Bartley

Contributors:

The Six Seasons Journal and Educators Pack has been developed in collaboration with the Mandurah community, with contributions from Noongar elders, researchers, teachers and young artists.

CASM would like to thank George and Lee-Anne Walley, Barbara Pickett, Elsie Ugle and the Winjan Aboriginal Corporation for their support and assistance with cultural content.

We would also like to thank Barb Dobson and Ken Macintyre, Peel Harvey Catchment Council, the Mandurah Herbarium volunteers and Boorloo Boodja for their generous contributions to the content.

Special thanks to educators Nikki Irwin and Susan Titshall for assistance with curriculum activities.

The Six Seasons Journal features artwork created by the talented young people of Mandurah. We would like to thank Cindy Wright, Raquisha Kearing and the Young Yorgas and RT Kids artists for their participation in this project:

Jade Cooper
Jordon Cooper
Layla Wehi
Peta Phillips
Elise Phillips
Bonnie Hall
Latiesha Walley
Savannah Hannakampf
Kelsie Josephs
Kyziah Josephs
Sharna Nelson
Xanthe Turner
Giaan Bartley
Alyssa Greay
Abigail Thomas
Chloe Gaw
Brooklyn Dicker
Slade Ryland
Benjamin Saj
Dominika Sajova
Chloe Craig
Bodhi Hosking
Addison Zanik
Hannah O'Keeffe
Lukas Raymond
Jayde Franks
Aurora Cucow
Emily Beeson
Amy Stockdale
Juliana McDonnell
Eden Chung
Haylee Patchett
Samantha Samuels
Hannah Paton
Mia Hart
Lilli Hunt
Oriana Campbell
Sierra Campbell
Bethany Paton
Zaph Hind