Aboriginal culture and food-landscape relationships in Australia

Indigenous knowledge for Country and landscape

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Introduction

The ancestors of the contemporary Aboriginal people first arrived in Australia over 50,000 years ago (Clarke, 2003; Malaspinas et al., 2016), and during their long occupancy as semi-sedentary hunter-gatherers on this environmentally diverse continent they developed the means to survive several major shifts in both geology and climate. This landscape has successfully sustained many culturally and linguistically diverse Aboriginal communities, who possessed strict protocols for foraging and maintaining food harvesting limits (Clarke, 2007; Mulvaney and Kamminga, 1999; Tindale, 1981). The subsistence strategies employed were those that were capable of supporting Indigenous communities without the need for food importation (Pascoe, 2014; Pryor, 2014). In good years when there was a sufficient surplus, neighbouring groups were invited ‘on Country’ to feast and to hold joint ceremonies (Clarke, 2007; Jones, 1997; Wettenhall et al., 2010).

While many foraging practices have been decimated since European colonisation of the Australian landscape (especially outside of northern and central Australia), contemporary Aboriginal people believe that the conservation of knowledge concerning their former food sources is important for maintaining their identity (Butler et al., 2012; BMECBMRG, 2010; MAC, 2017; Woodward et al., 2012; YRNTBC, 2011).

Today, the emergent wild bush food market being developed by commercial grower groups (with government support) has selected only a few of the many species that Aboriginal foragers once used (Altyerre-ipenhe et al., 2011; Cherikoff, 2000; Clarke, 2012), the core species of which are listed in Table 3.1. There is also interest in cookbooks in this realm (Bruneteau, 1996; Cherikoff, 1994; Fielke, 2017; Mayall, 2014; Olive, 2006; Outback Chef Store, 2017; Robins, 1997; Weatherhead, 2016).

Scholars have argued that the Aboriginal impact on the Australian environment over the tens of thousands of years of dwelling is such that there were few, if any, true wilderness areas when Europeans arrived (Flannery, 1994). There is an ongoing academic debate within Australia concerning the role of Aboriginal people in managing the Australian environment. Historian Gammage (2011) has controversially called Australia the ‘biggest estate on earth’, arguing that Aboriginal people culturally manipulated the landscape through regulated vegetation burning practices in order to create a sophisticated, successful, and sensitive...
Table 3.1 Plant species being developed for the wild bush food market.

<table>
<thead>
<tr>
<th>Species</th>
<th>Origin</th>
<th>Parts Used</th>
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<tbody>
<tr>
<td>Lemon myrtle (Backhousia citriodora)</td>
<td>subtropical rainforests of Queensland</td>
<td>leaf and oil</td>
</tr>
<tr>
<td>Anise myrtle (Backhousia anisata)</td>
<td>subtropical rainforests of northern New South Wales</td>
<td>leaf and oil</td>
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<tr>
<td>Elegant wattle seed (Acacia victoriae)</td>
<td>southern arid regions</td>
<td>seed</td>
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<tr>
<td>Bush tomato (Solanium centrale)</td>
<td>Central Australia</td>
<td>fruit</td>
</tr>
<tr>
<td>Davidson plum (Davidsonia species)</td>
<td>subtropical/tropical east coast of New South Wales and Queensland</td>
<td>fruit</td>
</tr>
<tr>
<td>Riberry (Syzygium leuhamani)</td>
<td>subtropical rainforests of northern New South Wales and coastal Queensland</td>
<td>fruit</td>
</tr>
<tr>
<td>Kakadu plum (Terminalia ferdinandiana)</td>
<td>tropical northern Australia</td>
<td>fruit</td>
</tr>
<tr>
<td>Muntries (Kunzea pomifera)</td>
<td>southeast South Australia and western Victoria</td>
<td>fruit</td>
</tr>
<tr>
<td>Lemon aspen (Acronychia acidula and A. oblongifolia)</td>
<td>eastern ranges of Australia</td>
<td>leaf and oil</td>
</tr>
<tr>
<td>Desert limes (Citrus glauca)</td>
<td>arid inland regions of eastern Australia</td>
<td>fruit</td>
</tr>
<tr>
<td>Finger limes (Citrus australasica)</td>
<td>subtropical/tropical east coast of New South Wales and Queensland</td>
<td>fruit</td>
</tr>
<tr>
<td>Quandong (Santalum acuminatum)</td>
<td>southern arid regions</td>
<td>fruit</td>
</tr>
<tr>
<td>Mountain pepper (Tasmannia lanceolata)</td>
<td>wet forests of south-eastern Australia</td>
<td>leaf and berry</td>
</tr>
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</table>

Source: Clarke, 2012; Ryder and Latham, 2005; Ryder et al., 2009

farming regime that was quickly erased with colonialism, questioning why we cannot learn from this regime and appropriate some of these lessons.

Archaeologists, such as Hiscock (2014), have been critical of Gammage’s model of Aboriginal relationships with the environment, claiming that it is too static and ignores the evidence of constant change across space and time. As a part of his critique, Hiscock has argued that since the beginning of the Holocene, major economic reorganisations are known to have occurred in certain parts of Australia. For instance, over the previous 1000 to 3000 years, the intensive earth mound building activities in the western Victorian wetlands appears to represent both an expanded emphasis for the exploitation of resources such as short-finned eels (Anguilla australis), underground plant foods, marine plant foods, and shellfish, as well as an increased sedentism. In the same period elsewhere on the continent, Hiscock has concluded that Aboriginal foragers along the northern coastline forced greater mobility because their intensive exploitation of the mollusc beds was being challenged by mangroves colonising what had earlier been open beaches. For scholars, merit and argument lie in acceptance of either Gammage’s description of Aboriginal people as ‘farmers’ who were locked into a particular human/environment relationship, or Hiscock’s model of hunter-gatherers maintaining their flexibility in order to respond to environmental change, both seasonal in terms of annual cycles and long-term in the case of climate change.

This chapter surveys Australian Aboriginal culture and its unique food-security paradigm, explains hunting and gathering protocols, examines how and why several of the food-sharing events occurred and then gives examples of the key food types that were harvested. It offers an alternate insight as to how this generational Indigenous knowledge is being and could be further utilised today in Australian landscape architecture, planning, and landscape management practice.

**International context of Indigenous traditional food resource access**

Indigenous peoples’ terrestrial and aquatic wild food fisheries are gaining increased recognition and acknowledgement globally arising from the drafting and signing of Indigenous-relevant international
agreements, relating to the environment, fisheries and human rights, and evolving fisheries management approaches. For example, in terms of freshwater and saline fisheries, the Food and Agriculture Organisation’s (FAO) Code of Conduct for Responsible Fisheries (CCRF) encourages parties:

> When deciding on the use, conservation and management of fisheries resources, due recognition should be given, as appropriate, in accordance with national laws and regulations, to the traditional practices, needs and interests of Indigenous people and local fishing communities which are highly dependent on fishery resources for their livelihood.

*(FAO, 1995, 2015)*

To aid this policy, the FAO published an operational guide for the CCRF designed for Indigenous fishing communities and other people working with those communities to guide all stakeholders in interpreting the CCRF in the light of associated UNESCO human rights instruments on Indigenous peoples’ rights (FAO, 2009).

A core UNESCO document is the 2007 *United Nations Declaration on the Rights of Indigenous Peoples* that articulates that Indigenous peoples have a right to use, develop, and control resources associated with their traditional territories; see in particular Articles 25–29 (UN General Assembly, 2007).

Another example is the 1992 *Convention on Biological Diversity* that recognises that a special relationship exists between Indigenous peoples and biodiversity and therefore encourages all signatory parties to conserve and respect components and values of that relationship pertaining to traditional knowledge and the customary use of biological resources (Secretariat of the Convention on Biological Diversity, 2005).

Increased recognition of the interests and rights of Indigenous peoples, land and fisheries management and deliberations have expanded from simple Western science-informed consideration of biological and technological information to include in such plans the needs and aspirations of the people who rely upon terrestrial and aquatic bush foods and/or fishing for their livelihoods and wellbeing (Rettig et al., 1989). A key aspect of such a consideration is the provision of traditional terrestrial and aerial bush foods and saltwater and freshwater aquatic bush foods and fishing access for Indigenous peoples (Davis and Jentoft, 2001; Pinkerton, 1989). Understanding the characteristics of traditional terrestrial and aquatic bush foods and fisheries – in particular the species harvested – is fundamental to ensuring that policy and management initiatives are aligned to address desired customary and livelihood outcomes for Indigenous ‘fishers’ and other stakeholders (see for example Hamilton and Walter, 1999; Menzies and Butler, 2007).

As an example, through the lens of fisheries as a source of traditional foods and customary practices in Australia, Aboriginal and Torres Strait Islander freshwater and saline fisheries (Indigenous fisheries) are acknowledged as one of three distinct sectors, along with the commercial and recreational sectors of industry. Yet legal recognition of this fact in Australia commenced some 30 years ago, and is intertwined with the developing recognition of Indigenous fishing rights and provisions under the Australian *Native Title Act 1993* (Peterson and Rigsby, 2014; Smyth et al., 2010). In the absence of a general national or state-level legislative framework for establishing Indigenous fishing rights in Australia, unlike in countries (such as Canada, USA, and New Zealand) where hunting and fishing rights of Indigenous people are specified in regional treaties, legal and policy determinations about the rights of Indigenous Australians to access traditional hunting and fishing resources were and are often subject to legal arguments regarding common law and native title in the context of parochial, jurisdictional legislation (Australian Law Reform Commission, 1986; Sweeney, 1993). Aboriginal Corporations, together with Aboriginals and Torres Strait Islander people have successfully demonstrated the need to recognise Indigenous traditional saltwater and freshwater fishing rights, that these are directly integral to customary rights, as validated in landmark Mabo (1992) High Court of Australia decision led by *Mabo, Passi*, and *Rice* of the Meriam people (from Mer/Murray Island) in the Torres Strait, that recognising native title in Australia for the first time. While this has led to the granting of fishing rights to Indigenous traditional owners in some parts of the country (e.g., the ‘Blue...

In terms of freshwater and saline fisheries the assumption is that this realm pertains to fish, eel (Hall et al., 1990; McNiven and Bell, 2010), and shellfish resources. There is an increasing awareness that seaweed also offers bush food and medicinal properties (Clarke, 2008a, 2008b; Donovan and Van Oploo, 2015; Lee, 2010; Sanderson and Di Benedetto, 1998; Thurstan et al., 2018; Werner, 1992).

Another example is the historical use and harvesting of Bogong Moths (*Agrotis infusa*) (Flood, 1996, 1980).

At the state level, the Australian leader in advancing Indigenous rights of access and policy guidance has been New South Wales (NSW). In 2002, the NSW State government launched the first Indigenous Fisheries Strategy (IFS) in Australia, to encourage the “practical recognition of the traditional and cultural fishing heritage of Aboriginal people and communities, including their access to and use of the fisheries resource” (NSW Department Primary of Industries, 2002: 2). The National Indigenous Fishing Technical Working Group in 2004 proposed the following set of principles on Indigenous fisheries for application across all jurisdictions in Australia to guide the development of Indigenous fishing strategies:

- Indigenous people were the first custodians of Australia’s marine and freshwater environments and that Australia’s fisheries and aquatic environment management strategies should respect and accommodate this.
- Customary fishing is to be defined and incorporated by Governments into fisheries management regimes, so as to afford it protection.
- Customary fishing is fishing in accordance with relevant Indigenous laws and customs for the purpose of satisfying personal, domestic or non-commercial communal needs. Specific frameworks for customary fishing may vary throughout Australia by reference, for example, to marine zones, fish species, Indigenous community locations and traditions, or their access to land and water.
- Recognition of customary fishing will translate, wherever possible, into a share in the overall allocation of sustainably managed fisheries.
- In the allocation of marine and freshwater resources, the customary sector should be recognised as a sector in its own right, alongside recreational and commercial sectors, ideally within the context of future integrated fisheries management strategies.

The NSW government amended the *Fisheries Management Act 1994* (FMA) in 2009 to formally acknowledge Aboriginal cultural fishing by inserting a new objective in the Act that states:

- To recognise the spiritual, social and customary significance to Aboriginal persons of fisheries resources and to protect, and promote the continuation of, Aboriginal cultural fishing.

Other changes to the FMA included provisions to vary species bag limits in order to meet Aboriginal cultural needs (Smyth et al., 2010).

**Aboriginal Australia**

In the mythology of Aboriginal Australia, it was tradition that spirit ancestors in the Creation made all the plants, animals, and people, and then gave the country meaning by shaping it and establishing the law
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(Clarke, 2003). Most archaeologists today believe that the ancestors of modern Aboriginal people first arrived in Australia between 45,000 and 60,000 years ago during a period of low sea level (Mulvaney and Kamminga, 1999; Hiscock, 2007). There are difficulties when attempting to establish the population size of Aboriginal Australia when Europeans first arrived, but it is estimated that it may have been in the order of about 500,000 in the late 1700s (Taylor, 2005).

Across the continent in excess of 250 distinct languages (and up to 700 dialects) were spoken, and due to the impact of European colonisation most of these are now endangered, threatened, or extinct (McConvell and Thieberger, 2001). An interactive map of Indigenous Aboriginal language, tribal or nation groups is accessible at www.aiatsis.gov.au/explore/articles/aiatsis-map-indigenous-australia, which assists in communicating language and group habitation patterns across the Australian continent.

While the Australian landscape was seen through the eyes of the early European explorers as ‘wilderness’, it was historically humanised by its Indigenous inhabitants (Clarke, 2003). The Euro-centric definition of ‘wilderness’ parallels the colonising British assertion, that was subsequently enshrined in Australian colonial and post-Commonwealth legislation and legal judgements up until the Mabo and Others v Queensland (No. 2) (1989) judgement by the Australian High Court, that the Australian continent was terra nullius; a ‘land of no-one’. Both ‘wilderness’ and terra nullius when applied to Australia are now redundant and inaccurate across all disciplines and jurisdictions. The High Court concluded that the doctrine of terra nullius, which imported all laws of England to a new land, did not apply in circumstances where there were already inhabitants present – even if those inhabitants had been regarded at the time as ‘uncivilised’. Thus, English law was applicable where the land was barren and uninhabited, and could not be applied where an existing people were settled. The Court’s conclusion was that existing customary laws, that were present at the time of United Kingdom settlement, and thus that any Indigenous land rights which had not been extinguished by subsequent Crown grants continued to exist in Australia’s lands and waters.

Additionally, the Australian landscape, at the time of European settlement, was the oldest continuing cultural landscape. Under UNESCO’s definition of ‘cultural landscapes’, a large portion of which still demonstrates the “combined works of nature and humankind, they express a long and intimate relationship between peoples and their natural environment”, native foods are and often an integral, still respected, and harvested as part of this continuity of occupancy, warranting World Heritage registration (UNESCO, 2017a). Such evidence is demonstrated in the registrations of Uluru-Kata Tjuta National Park (UNESCO, 2017b) and Kakadu (UNESCO, 2017c) regions in Northern Territory, and what may be forthcoming for the Budj Bim region in Victoria (Laurie, 2017; Wright, 2017).

For Aboriginal Australians, their land was layered with cultural and social meanings developed through their long occupation of their respective Country’s (lands and waters and skies and its air). They are united by their consciousness that saw (and continues to see and perceive today) their Country as being full of the places and objects that their spiritual ancestors had created (Clarke, 2003; Rose, 1996). The physical manifestation of that Country is the Australian landscape; night sky, day sky, land surface, below land, its waters, and the air within. Thus, Country is/was four dimensional, and it was not limited to the terrestrial landmass or ‘landscape’ of the Australian continent to which the Western definition of ‘land’ implies, nor to the immediate area physically inhabited by Aboriginals groups at the time of European colonisation. Thus, to an Aboriginal, everything in their Country is alive and everything is embodied in relationships, whereby the past, present, and future are one, and where both spiritual and physical worlds of Country interact (Clarke, 2014b, 2015a; Rose, 1996). The Dreaming is an ongoing celebration and reverence for past events: the creation of the land, and the creation of people. Stories have been given to and vested in Aboriginal peoples from the Dreaming, everything comes into being through the expression or journey through story, and the Dreaming is the ancestors. All things exist eternally in the Dreaming; the Dreaming is alive. The individual is born to Country, not just in Country but from Country, and his or her identity is inextricably and eternally linked to the Dreaming (Clarke, 2003; Rose, 1996).
Rose (1996: 7) suggests that:

In Aboriginal English, the word ‘Country’ is both a common noun and a proper noun. People talk about Country in the same way that they would talk about a person: they speak to Country, sing to Country, worry about Country, and long for Country. People say that Country knows, hears, smells, takes notice, takes care, and feels sorry or happy. Country is a living entity with a yesterday, a today and tomorrow, with consciousness, action, and a will toward life. Because of this richness of meaning, Country is home and peace: nourishment for body, mind and spirit; and heart’s ease.

Seasonal cycles were integral to this understanding of place, and as hunter-gatherers, Aboriginals knew their Country’s seasonal cycles and responded to them (Clarke, 2009; Heyes, 2010).

Much has changed for Australia’s Indigenous peoples since British colonisation began in 1788, resulting in an invasion of their respective Countries militarily, economically, environmentally, by disease, and through wildlife and human assimilation strategies and actions. Temperate and coastal regions have received the heaviest impacts and disturbances from colonisation. Aboriginal population levels have now recovered from the sharp decline during the colonial period, but there are increasingly questions about percentage of ‘Aboriginality’ given inter-breeding and inter-marriage that implicated all populations on the continent.

In 2011, the estimated resident Aboriginal and Torres Strait Islander population in Australia was 669,900 people, representing 3% of the total Australian population. Between 2001 and 2011 the Aboriginal and Torres Strait Islander population increased by 2.3% (from 534,700 people) per year on average, compared with 1.5% for the total Australian population. The population of Aboriginal and Torres Strait Islanders is projected to increase to between 907,800 and 945,600 people in 2026, at an average growth rate of between 2.0% and 2.3% per year. (ABS, 2014). Increasingly, Indigenous Australians are living in urban and nearby rural areas (Biddle and Yap, 2010). Today, over 33% of Australia’s land surface is owned by Aboriginal people with up to 75% having declared Indigenous interests through legal processes, such as land rights and native title (National Native Title Tribunal, 2016). Much of Aboriginal-controlled land is in areas marginal to European-style agriculture, which favours temperate regions.

**Foraging practices**

In Aboriginal Australia there were two main categories of food recognised by foragers: animal and vegetable (Clarke, 2003; Pascoe, 2014; Pryor, 2014). The job of collecting food for the small foraging band was divided by gender (also see Chapter 5). In general, women focussed on gathering plant foods, shellfish, seaweed, ground insects, and small burrowing animals, while the men fished and hunted more mobile animals, such as wallabies (*Macropus* sp., *Petrogale* sp., *Lagostrophus* sp., *Lagorchestes* sp., *Dorcopsis* sp., *Onychogalea* sp., *Wallabia* sp., and *Thylogale* sp.), kangaroos (*Macropus* sp.), and emus (*Dromaius novaehollandiae*). Protein meat sources included insects, crustaceans, shellfish, fish, eels, reptiles, birds, and mammals. Aboriginal people utilised a wide variety of terrestrial and aquatic plant parts: fruits, seeds, nuts, sporocarps (seed-like growths on ferns), foliage, stems, galls, gums, leaf exudates, roots, rhizomes, tubers, and fungi (Gott and Conran, 1991; Zola and Gott, 1992). The foraging for both animal and plant foods was highly seasonal. In some areas the proportion of animal food in the overall diet varied through the year from being a major source to a minor one. When available, animal food was generally highly desirable, over more reliable terrestrial and aquatic plant food sources, which were either less palatable or more time consuming to prepare (Clarke, 2008a, 2015b, 2017; Ens et al., 2014a, 2014b, 2017; Gott, 1983, 2008; Gott and Conran, 1991; Jones, 1993; Latz, 1995, 1999; Rose, 1996, 2005; Schnierer and Egan, 2016; Tindale, 1977, 1981; Zola and Gott, 1992).

The diversity of terrestrial and aquatic wild food available to Aboriginal foragers across Australia was enormous when compared to the restricted range of horticultural foods brought out by the first European
colonists (Clarke, 2008a). For instance, ethnobotanical research in the temperate region of the South East of South Australia has found historical evidence that local Aboriginal people utilised at least 32 plant species as food, with the analysis of studies from similar nearby areas suggesting a further 38 species were also used (Clarke, 2015b). The true figure for the number of plant foods would have been higher still, with many other plant species used medicinally and for making artefacts. In parts of Australia that have a higher diversity of plant species, such as the Tiwi Islands in the tropics of the Northern Territory, the total number of available plant foods is even greater (Puruntatameri et al., 2001).

The seasonal abundance of certain food sources allowed for a surplus to be produced for trade and provided an opportunity for visiting kin from neighbouring areas to share in a feast. Due to their economic and political importance, Aboriginal people actively managed and protected these resources. For instance, individual Golden Wattle (*Acacia pycnantha*) trees that exuded large quantities of edible gum during the warmer seasons were regarded as the property of particular Aboriginal clans across western Victoria among people such as the *Gunditjmara* (Dawson, 1881; Dearnaley, 2014). In the Coorong area of the Lower Murray in South Australia, fruit gathered from Muntries (*Kunzea pomifera*) by Ngarrindjeri peoples was made into flour-based cakes for eating later during the southern winter and for trading in exchange for weapons and toolmaking stone (Tindale, 1981). In south eastern Queensland and adjacent north eastern New South Wales, the seasonal availability of the nut from the Bunya Bunya Pine (*Araucaria bidwillii*) brought in Aboriginal groups from a wide area to hold ceremonies (Maiden, 1889; Petrie and Campbell Petrie, 1932; Smyth, 1878; Swan, 2017). Plant foods had a social importance that went beyond subsistence.

Aboriginal hunters and gatherers needed to know where in the landscape they needed to be in order to make most of the food when it came into season. Aboriginal people possessed calendars that were specific to their *Country*, ranging from four to seven seasons in some temperate and desert areas, to as many as nine in parts of the Australian tropics (Altyerre-ipenhe et al., 2011; Clarke, 2009; FAT and WMAC, 2004; Heyes, 1999; Jones, 2002; Jones et al., 1998; PV and GMTOAC, 2015; Woodward et al., 2012). This variability in seasonal calendars was determined by a number of factors, which included such things as wind direction, star movements, and the flowering of certain terrestrial or aquatic plants. For example, at Marion Bay on Yorke Peninsula in South Australia, the prolific flowering of the Black Teatree (*Melaleuca lanceolata*) was a sign for the *Narangga* people that the Yelloweye Mullet fish (*Aldrichetta forsteri*) were soon to come to the coast in large numbers (Davies, 1952, cited in Clarke, 2007). Here, initiation ceremonies were held at this time to take advantage of a seasonally abundant food source, which was required to support a large number of visitors.

Some of the food gathered was eaten while on the move, while the bulk was taken back to the main camp at the end of the day for cooking and eating by the rest of the band. Older people controlled the food distribution, which was determined by age, gender, and kinship obligations. For instance, on the Eyre Peninsula of South Australia, a colonist observed that game was divided up by the band so that men ate the adult male animals, the women ate adult female animals, and children ate small animals (Wilhelmi, 1861). In this way, foraging success was shared within the group. Apart from periods of hardship, such as brought on by prolonged drought and disease epidemics, Aboriginal people generally ate well due to the diversity of seasonally available foods and maintained a rich diet of plant and animal foods free of artificial sugars, alcohols, preservatives that are common in today’s diet and also prevalent in Western diets at the time of Australian colonisation (Dawson, 1881; Gott, 1983, 2008).

Managing resources

Australian foragers were able to minimise their impact upon the landscape by dispersing themselves thinly and by maintaining a nomadic lifestyle, whereby they constantly moved according to season (Clarke, 2003; Dawson, 1881; Gammage, 2011; Jones, 1969). Aboriginal people actively manipulated the environment to extract long-term benefits for food production. For example, in south eastern Queensland, foragers...
collected edible marine mollusc borers from the waterlogged timber, and these were then thrown back into the sea for harvesting again next season (McCarthy, 1957). Aboriginal people also routinely replanted undersized tubers and other plant fragments to encourage the food growth (Pascoe, 2014). For instance, a European explorer on the central coast of Western Australia recorded in the late nineteenth century that Aboriginal people gathering the Warran (*Dioscorea hastifolia*) roots would “invariably re-insert the head of the yams so as to be sure of a future crop” (Gregory, 1887: 131).

As an example, Colonial Protector of Aborigines in Victoria, James Dawson (1881) wrote that:

> Of roots and vegetables they have plenty. The muurang (Murnong) [*Microseris lanceolata*] which somewhat resembles a small parsnip, with a flower like a buttercup, grows chiefly on the open [Western District] plains. It is much esteemed on account of its sweetness, and is dug up by the women with the muurang pole. The roots are washed and put into a rush basket made on purposes and placed in the oven in the evening to be ready for the next morning’s breakfast. When several families live near each other and cooks their roots together, sometimes the baskets form a pile three feet high.

(*Dawson, 1881 in Zola and Gott, 1992: 6–7*)

On the western plains near Melbourne in Victoria there was once an extensive system of mounds that Wadawurrung and Wurundjeri peoples had created by their ‘accidental gardening’ when digging up Yam Daisy (or Murnong) (*Microseris lanceolata*) tubers (Batey, 1909–10, cited in Frankel, 1982; Gott, 1983). The gatherers would have realised the effect they were having on the numbers of edible roots in the ground. The act of digging would have assisted in the dispersal and replanting of undersized tubers, which could then be collected in the same season the following year. It also helped prepare the soil for plant growth. Aboriginal people were aware of the impact of their foraging upon the local environment, with their experiences and understandings being the basis of their traditional ecological knowledge (TEK) that was handed down through the generations (also see Chapter 2).

Early explorers or ‘Aboriginal Protectors’ Mitchell (1839), Stapylton (1971), Robinson (Clark, 1990), and Dawson (1881) wrote extensively of their period observations of these practices being applied by Aboriginals across the Western District landscape that Clark (1988, 1990), Clark et al. (1987), Jones (1993) and Kiddle (1962) have anthropologically or ethno-ecologically synthesised and narrated, and Rolls (1969) applied in the Pilliga of NSW. In contemporary writings, Gammage (2011), Gott (1983, 2008), Gott and Conran (1991), Zola and Gott (1992), Clarke (2003, 2007, 2008a, 2008b), Bindon (1996), Bonney (2007, 2010), Isaacs (1987, 1996), Latz (1995, 1999), Pascoe (2014), Werner (1992), and Kenneally et al. (1996) have all recorded the fabric, medicinal, edible, and material uses that Australian terrestrial and aquatic plant species were historically put to by Australian Aboriginals, drawing upon both contemporary and period sources.

This is the realm of ethnobotany that involves the applied science of the role and potential of plants through the lens of Indigenous communities. While plants were integral to feeding communities, their harvesting was dependent upon the fire management of the Australian landscape. While plants are often first thought of as a food source, for Aboriginal communities plants also offered signals as to changes in the season, medicinal aids and cures, materials for implements and artefacts, materials for clothing and basketry, and – depending on their properties and attributes – could be traded between communities and shifted around Australia. Given the longevity and formality of some agricultural practices – such as sowing/harvesting and baking grain 15,000 years before the Egyptians – there is particular significance in the history and practices of Aboriginal activities (Pascoe, 2014; Pryor, 2014).

Apart from the gathering of plants, deep ecological understandings were also fundamental for hunting and fishing. Knowledge of the food consumed by game species made their capture easier. For instance, at Borroloola in the southwest Gulf of Carpentaria region, Karrwa hunters constructed bough shelters in large Emu Apple-trees (*Owenia acidula*) to enable them to spear from above any unsuspecting Emus (*Dromaius*...
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...novae-hollandiae) that came to eat the fallen fruit (Bandaluka et al., 2003). At Daly River, south of Darwin, Aboriginal fishers stood under Cluster Fig trees (Ficus racemosa) growing over water, in order to spear fish attracted by the fallen fruit (Marrfurra, 1995).

Across Australia, Aboriginal people constructed large fish-traps, or aquaculture systems, using wood and stone, and built weirs from the earth to help them catch fish. For instance, at Tae Rak (Lake Condah) in Gunditjmara Country in western Victoria, there were large and extensive trench constructions that were used to draw the Short-finned Eels (Anguilla australis) out from the swamps (Flood, 1983; EHA, 2011; Hall et al., 1990; McNiven and Bell, 2010; Wettenhall et al., 2010). By altering the water flow, foragers controlled fish movement and made it easier to catch them in large wicker baskets. Fish-traps were typically placed strategically in mangrove inlets or the mouths of tidal creeks to catch fish returning to the sea with the outgoing tide. Fish poisons based on plant materials were also widely used in lagoons and other relatively small bodies of water (Hamlyn-Harris and Smith, 1916; Webb, 1959).

In terms of freshwater and saline aquatic food resources, traditional fishing practices still occur in a parts of New South Wales for many Aboriginal communities, particularly the Wiradjuri peoples (Schnierer and Egan, 2016). Such practices continue both customary and livelihood practices – and involve fish – and thus impact upon NSW fishery policies and governance regimes. The species harvested include more than 150 species of fish and invertebrates, over 90% of which are also harvested by commercial and recreational fishers (Schnierer and Egan, 2016).

In the subtropics of northern Australia, Aboriginal people had labour-intensive practices for the preparation of cycad (Cycas sp.) nuts, which involved grinding them into a pulp that was then thoroughly washed and leached before it was cooked into damper (Clarke, 2008a; Levitt, 1981). While having the status of a staple food, it is highly toxic without laborious preparation, although it was considered good to eat as damper when travelling and was often stored in this form for use during ceremonial events when large groups converged at one camp. In Central Australia, strips of kangaroo flesh were dried on hot stones for putting aside (Tonkinson, 1978). The skins of several species of Solanum sp., which Europeans call ‘desert raisins’ or ‘bush tomatoes’, were dried and skewered on sticks for later use, at which time they were soaked in water or ground into a paste. Across the arid zone there was a widespread practice of storing excess grass seed and Nardoo (Marsilea hirsuta) fern sporocarps (Clarke, 2003; Tindale, 1977), and very careful management of potable water resources (Bayly, 1999; Magarey, 1895). Extra food, when properly prepared and contained, not only prolonged the period when particular food types would be used, but also provided a surplus for trade. Aboriginal people used their ceremonies to help maintain the abundance of economically and culturally important plants and animals (Howitt, 1904; Strehlow, 1947).

Historical records from the early colonial period indicate that Aboriginal people often burnt the vegetation in order to drive animals for hunting (Clarke, 2003; Gammage, 2011; Gott, 2005; Hallam, 1975; Jones, 1969). Fire was also used to open up the landscape by removing the understorey, which allowed easier travelling and promoted the future growth of grass for game species, such as kangaroos and wallabies. Aboriginal people also preferred not to walk through dense prickly thickets if they could avoid it. Many of the plant foods eaten by Aboriginal people benefited from the opening of understorey and the build-up of ash. Although some Aboriginal burnings were random and directed at flushing out game, others were more structured. In the southern Gulf of Carpentaria region, Yanyuwa people actively managed their hunting territories with fires, the first starting in the early dry-season (Baker, 1999). Before starting a fire the permission of the traditional owner was required. Here, a ban was imposed on hunting in the Country of a person recently dead, which would have enabled game to increase in numbers (Baker, 1999). It has also been suggested that hunting prohibitions in Country around sacred sites also serves as a refuge for game species (Newsome, 1980).

An archaeologist has described the Aboriginal manipulation of the environment through the use of fire as ‘fire-stick farming’ (Jones, 1969). A form of ‘proto-agriculture’ was attributed to Aboriginal people who used their ecological knowledge in this manner to deliberately bring about changes favourable to their
hunting and gathering practices. The shell mounds of northern Queensland, created by the build-up of cooking fire remains from Aboriginal camps, are places that favour the establishment of vine forests (Cribb et al., 1988; Mulvaney and Kamminga, 1999). To local Aboriginal people, the plant resources associated with the shell mounds include foods, medicines, and raw materials for artefact making and the construction of shelters.

**Commercialising native bush food**

Today, the Australian native bush food industry occupies a niche market that is expanding both nationally and globally (Clarke, 2012; Graham and Hart, 1997; Phelps, 1997), and is associated with terrestrial plant foods rather than aquatic plant foods (Lee, 2010; Sanderson and Di Benedetto, 1988; Werner, 1992). It is based upon foods from a small range of Australian indigenous plant species, most of which formerly sustained Aboriginal hunter-gatherers and were used as emergency foods by European explorers and settlers (Clarke, 2008a). There are 13 plant species which are the mainstay of the contemporary Australian native bush food industry, and these have been targeted for further research and development (Clarke, 2012; Graham and Hart, 1997; Ryder and Latham, 2005; Ryder et al., 2009). These are all species new to horticulture, and out of a vast number of species that were previously utilised by Aboriginal people only these are being considered for development because they already possess definable farm-gate or wild-harvested values (see Table 3.1). They are predominantly fruits and condiments, and their elevation and acceptance has largely been hindered by Western predilection and cultural entrenchment of conventional Northern hemisphere foodstuffs.

The native bush food network, as an industry, involves wild harvesting, growing, processing, value adding, catering, and spin-off guiding/tour businesses. Most of the raw material is processed in south-eastern Australia and then distributed through outlets in the capital cities. While other plant species have potential for future development, it considered that the market is not yet mature enough to support more variety. Market success with the 13 main native bush foods may well encourage a second wave of research and development involving other species. The preceding list excludes the macadamia nut (*Macadamia integrifolia*), which due to its early horticultural development is not considered part of the contemporary Australian native bush food industry. Perhaps the only commercially successful terrestrial species mass cultivated to date in Australia, macadamia nuts have been grown in plantations since the late nineteenth century, including extensively overseas, and in Australia alone is the basis of an industry estimated to be worth AU$14 million annually (Robins, 2007).

The full economic impact of the Australian terrestrial and aquatic native bush food industry upon Indigenous communities is difficult to quantify, as it is still a developing industry. While the wild harvest provides an opportunity for Aboriginal people with access to Country to benefit economically, there are major challenges for the development of economically and environmentally robust Indigenous businesses (Cunningham et al., 2009a, 2009b). These include the need for joint ventures between Aboriginal communities and commercial operators at various points in the food chain. Also important is the branding and certification of the foods, in order to protect intellectual property rights of TEK. Such highlights the ongoing challenge of Western economic models and their unsuitability to Indigenous landscape practices and traditions, that include questions like ‘Is it more important to get people on country than an economic return?’

While the shift from the wild-harvest sourcing of terrestrial and aquatic native bush foods to cultivated supplies decreases the risk of variable supply for the native bush food chain, it is claimed that it has preferentially benefited non-Aboriginal producers. There is a risk of Aboriginal involvement being displaced as species move from wild harvest to cultivation, which is of concern to the whole industry because Aboriginal participation brings authenticity and integrity to its product (Clarke, 2012). Native animals, such as crocodiles (*Crocodylus* sp.), short-finned eels (*Anguilla australis*), kangaroos, emus, and muttonbirds (*Ardenna* sp.), have also been commercially hunted for food, but as with Australian species of fish and shellfish, they
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are part of a market that is already well established, and with some Aboriginal involvement (Wilson et al., 1992). Among the sources of wild animal foods are exotic species, such as rabbits (*Oryctolagus cuniculus*), camel (*Camelus dromedaries*), goat (*Capra aegagrus*), horse (*Equus* sp.), water buffalo (*Bubalus* sp.) and pigs (*Sus* sp.) that are primarily hunted in tropical northern Australia.

Present-day climate change, which is much faster than ever before, presents a range of problems for Aboriginal communities who are trying to become more involved in the emerging native bush food industry (Low Choy et al., 2013). A major impediment is the lack of financial support and access to professional advice to develop businesses, while also adapting to climate change. A solid business plan is essential when acquiring and maintaining legal control of unique varieties of plant foods growing on Aboriginal managed land. In many cases, Aboriginal communities are having their land assets deteriorate environmentally due to the effects of climate change (especially land erosion, invasive plant, and animal species). Interfering with their plans are the restrictive controls by government land management authorities, such as being denied the right to regularly burn *Country* to mitigate the threat of wild fires and encourage the growth of plant foods. Changes in timing of cycles for plant flowering and animal breeding, coupled with rising temperatures and decreasing rainfall, plus the more favourable conditions for the spread of plant diseases, weeds, and pests would all impact negatively on the indigenous food network (see Indigenous Food Systems Network, 2017).

Aboriginal people operating at the supply end of the native bush food network are potentially the most exposed to the impact of climate change, through requiring much more economic support to adapt. Aboriginal-run businesses at the restaurant and catering end in cities are likely to fare better, as they are less exposed to environmental conditions and already source many of their food ingredients from non-Indigenous businesses within the industry.

**Applying traditional ecological knowledge (TEK)**

Traditional ecological knowledge (TEK), or ‘Indigenous biocultural knowledge’ as used by several by natural resource management researchers (Berkes et al., 2000; Ens et al., 2014a, 2014b, 2015, 2017; Woodward et al., 2012), or ‘phenology’ by environmental scientists (Keatley et al., 2013; Noormets, 2009; Schwartz, 2013), has an earlier platform in landscape architecture research (Jones, 2002; McHarg, 1966, 1969; Seddon, 1979). While phenology involves the study of periodic plant and animal life cycle events and how these are influenced by seasonal and inter-annual variations in climate, as well as habitat factors (such as elevation), TEK research engages Aboriginal knowledge to service natural resource management objectives. The former lacks Indigenous cultural perspectives and acceptance of their knowledge whereas Indigenous biocultural knowledge research has incorporated this cultural perspective including recognising movements, land management, and harvesting activities, and an explanation of being. TEK research offers benefits to the disciplines of architecture, planning, and landscape management/architecture in Australia in framing a design and or planning strategy that is informed by the attributes of that landscape, that *Country*. This framing is underpinned by a vision through a lens of often tens of thousands of years of occupancy, use, management and respect, rather than the Western constraints of a Gregorian calendar and quadripartite seasonal structure and conventional 5–20 year length management planning and design aims, objectives, and policy making protocols.

While TEK research is increasingly commonplace in land use planning, land management planning, landscape architecture, natural resource management, and interpretative research and practice applications across northern Australia, because of the ease of accessing Aboriginal knowledge and engagement, Aboriginal seasons and TEK have been little researched in Australia’s south-eastern landscapes. Yet, this information offers much potential to enrich the disciplines of architecture, planning, and landscape management/architecture in south-eastern Australia for both conventional and Indigenous consultancy engagements and projects.
Aboriginal seasonal calendars represent significant Indigenous biocultural knowledge translations. Aboriginal seasonal calendars provide mental structuring devices, fluid and oral in their form, that contain multiple announcements, signals, and cultural obligations as to land management, stewardship, and occupancy traditions and relationships. They are unwritten management plans in their own right that can have direct applicability into Western land management regimes. In Kakadu and Uluru Kata-Tjuta National Parks, the respective Yolngu (or Yolŋu) and Arrernte seasonal calendars structure Commonwealth-approved national park management plans and each apportioned season determines what set of landscape management actions to prepare for and action, and it foreshadows regular post-action activities (Australia, 2010, 2016). The logic of this approach has also informed more recent uniquely structured and drafted management plans for the Gunditjmara of south-western Victoria (Parks Victoria et al., 2015), the Bunya people of the Bunya Bunya Mountains in south-eastern Queensland (BMECBMRG, 2010), the Yarurnu peoples (YRNTBC, 2011) of the Broome region, and the Murujuga people (Murujuga Aboriginal Corporation, 2016) of the Pilbara in Western Australia.

To Aboriginal people, seasons may comprise five to seven temporal segments, each with a different time band, and fluid commencement dates whereby both time and date are linked to environmental variables that do not adhere to the Western-adopted mathematically precise Gregorian calendar (Summer, Winter, Spring, and Autumn). In addition, dates and/or times of commencement and cessation are determined by variable natural events or agencies, and have little to do with human acts; time is thus determined by the environment in contrast to being determined by fixed temporal measurable Western parameters. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) has devised, in conjunction with respective communities, various seasonal calendars (e.g. Guurnumang (Larabja), Walmajarri, Ngadjju, Ngan’gi, Wagiman, Gooniinyandi, MalakMalak, Matnga) across the Arnhem Land region, in their northern Australian research that influence their conclusions and recommendations to the ecosystem sciences (including Indigenous engagement, fire and climate science, and fisheries and wetlands management) by this knowledge (Bauman, 2006; Ens et al., 2014a, 2014b, 2015, 2017; Rose et al., 2002). In some remote regions, attempts are being made to reinstate the human control of the fire regime, by utilising some Aboriginal burning techniques (Yibarbuk et al., 2001). Ecologists and government land managers are increasingly recognising the potential of TEK in the management of country (Ens et al., 2014a, 2014b, 2017). The future of the Australian environment will rely heavily upon its Indigenous environmental managers (Altman et al., 2007; Ens et al., 2014b).

Comprising ‘Indigenous biocultural knowledge’ in the ecosystem science and management discipline, these seasonal models incorporate plant, aquatic and terrestrial animals, fire, climate, drought, flood, and astronomical information (that could be termed a ‘spectrum of knowledge’) drawn from Aboriginal sources and corroborated by contemporary Western science (Rose, 2005). While scientific acceptance of this knowledge for northern Australia is now academically documented (Butler et al., 2012; Ens et al., 2014a, 2014b, 2015; Keatley et al., 2013; Prober et al., 2011; Rose, 2005; Woodward et al., 2012), little research on the topic has been entertained in south-eastern Australia.

In Wurundjeri Country, naturalist Reid (1995) suggested that six seasons are prevalent in the middle Yarra Valley of Melbourne, naturalist Jameson (1996) proposed an analogous six seasons hypothesis, and botanist Entwisle (2014) has proposed a five-season hypothesis for Melbourne, of which all three scenarios are based upon cyclical ecological patterns with little direct Wurundjeri engagement nor the full scope of the Indigenous biocultural knowledge spectrum used in the CSIRO investigations. The latter, however, was explored by Jones et al. (1997) for the upper Yarra Valley (Jones, 2002), informed by Wurundjeri elders, concluding that there were seven seasons and two additional variables, and this thesis underpins the cultural design of Museum Victoria’s multi-peer award-winning Forest Gallery (Jones et al., 1998).

For western Victoria, the Gunditjmara have conceptualised their seasons (Wettenhall & The Gunditjmara People, 2010) which have been directly incorporated into the Ngootyoong Gunditj Ngootyoong Mana South West Management Plan (Parks Victoria et al., 2015) being the first use of ‘Indigenous biocultural knowledge’.
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for a Victorian state-approved land management plan. Western science and conventional land use planning regimes in Australia have been highly influenced by the theory and practice of northern hemisphere land management science, which take no account of the generational knowledge held by Australia’s Aboriginal peoples. This knowledge is and can be well summarised in respective region-specific seasonal calendars. Gammage (2011) and Rose (2005) have argued for a translation of Aboriginal seasons as being essential for re-awakening of Australian land management. This overarching argument is evidenced in Attenbrow (2002, 2010) who has argued for strengthening Gadigal (Sydney) Country understanding, D’harawal elder Aunty Fran Bodkin in articulating the D’harawal: seasons and climatic cycles (2008) as a land management platform, and Clarke (2009) in calling for a greater appreciation of the Ngarrindjeri Country of The Coorong. This argument is also expressed by Walsh and Mitchell (2002) in ‘Planning for Country’. The magic of this ‘science’ has been applied in the Yawuru cultural management plan for the Broome region (YRNTBC, 2011), in the Ngootyoong Gunditj Ngootyoong Mara South West Management Plan for the Gunditjmara (PV et al., 2015), in the Mununjala Cultural Management Plan (MAC/MLSU, 2017) in the Pilbara, as well as in the Bunya Bunya Mountains in the Bonye Bu’ru Booburran Ngmmunge (2010), that as Indigenous-devised and expressed integrated land/sea/water management plans have been accepted as valid Western-styled management plan tools by their respective Indigenous and state government entities. Research by Huntington-McBurney (2000) for Narangga Country of the Yorke Peninsula, Heyes (1999, 2010) and Jones (1999, 2002, 2005, 2010) for Kaurna Country of the Adelaide Plains (with direct support from Kaurna Elders and representatives) established an innovative landscape architecture-based research focus in Adelaide; this new knowledge was applied in the award-winning Australian Aboriginal Gallery of the South Australian Museum (Clarke, 2009, 2014a; Ens et al., 2015).

Food and the Australian Indigenous perspective

What is increasingly clear is that Australian Aboriginal knowledge of plant foods is intimately interwoven in their traditional ecological knowledge. Removing parts of this knowledge means that the larger picture and tapestry deteriorates. Re-invigorating, re-thinking, and refreshing that knowledge is an integral part of both healing past landscape despoliation actions as well as rekindling parts of knowledge integral to custodial responsibilities. Respecting, embracing, and harnessing this knowledge offers new insights as to how to alternatively ‘harvest’ the Australian landscape responsibly, but also to bring to the ‘table’ alternate food options, food management regimes, and a new way of appreciating and engaging with the Australian landscape and its psyche.

The salient themes are that respecting a Country-specific Aboriginal lens, through comprehending traditional ecological knowledge, Country nomenclature and place names, seasonal calendars, and a deeper mapping and research appraisal of the ethnobotany of a Country (or Country’s) and its peoples, offers a remarkable botanical encyclopaedic resource that can better inform conventional Western practices.

Acknowledgement

We would like to acknowledge the Aboriginal and Torres Strait Islander peoples of Australia’s lands and waters who are the Traditional Owners of these lands and Country’s. We would also like to pay our respect to the Elders both past and present of these Nations and extend that respect to other Aboriginals and Torres Strait Islanders.

Further reading

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