

# The distribution, chronology and significance of late Holocene aged stone-based structures on Pitta Pitta Country, western Queensland

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## Abstract

There is considerable discourse around the timing of Australia's interior colonisation and whether environmental or technological impacts pushed people into occupying more arid environments. However, the general scarcity of rockshelter sites and the limited amount of research undertaken to date in central western Queensland has meant this region has only been peripherally considered in such debates. It is well recognised that, by the time Europeans began documenting lifeways in the region in the late 1870s, central western Queensland had given rise to complex and thriving Aboriginal societies, despite the boom-or-bust nature of its seasonal cycles. One of these is the Pitta Pitta people, who had a pivotal role in a vast trade network that traversed the Lake Eyre Basin, extending north to the Gulf of Carpentaria. The Pitta Pitta are also seemingly unique in that, as far as available data suggest, they are the only group in western Queensland to have used stone in their construction of gunyahs (huts), despite similar environmental and geographic conditions in adjacent areas to the east (Diamantina National Park) and south (Mithaka Country). Here we describe 70 stone-based huts spread across four site complexes on Marion Downs Station and use these to underpin discussions about Pitta Pitta lifeways in the late Holocene.

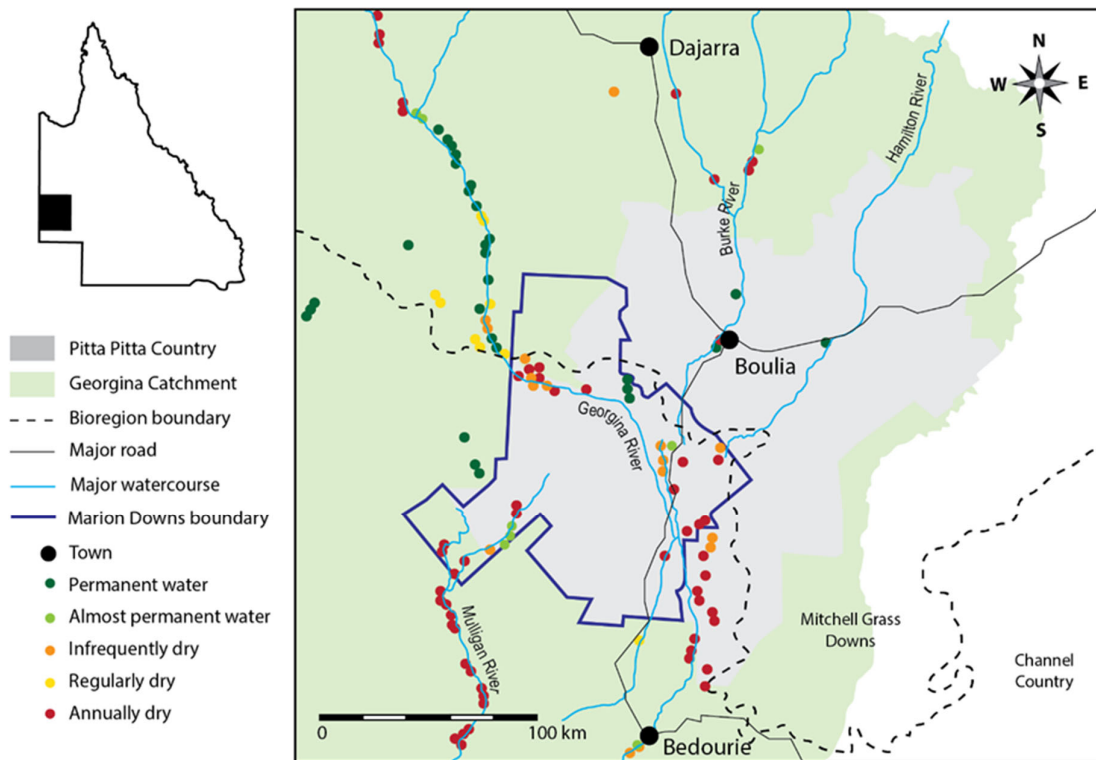
## Introduction

Perhaps best known for the expansive pituri trade networks that were operational at the time of European incursion in the latter half of the nineteenth century (e.g. Cox 1881; Davidson et al. 2005; McBryde 1987; Mulvaney 1976), the region of central western Queensland has more recently garnered renewed attention for its architectural tradition of stone-based hut structures known only through archaeology (Davidson et al. 1989; Maloney et al. 2022; Ritchie 1996; Wallis et al. 2017, 2021). Consisting of low courses of local stone positioned around a cleared circular area sufficiently large to accommodate at least one person inside, such features have previously been found in clusters of up to 17 in the area south of Boulia (Figure 1), where they have been dated from the Late Holocene (Wallis et al. 2021). They have been variously interpreted by archaeologists as a response to changes in Aboriginal behaviour associated with contact with outsiders (Davidson et al. 1989:18), as an Indigenous building tradition (Wallis et al. 2021), and/or as seasonal accommodation for ceremonial purposes (Maloney et al. 2022; Wallis et al. 2021).

More contentiously, historian Bruce Pascoe (2014:17,18,76,78), used the term 'house' to describe these and other examples of Aboriginal dry stone architecture in various parts of Australia in his book *Dark Emu: Black Seeds: Agriculture or Accident?* Suggesting there was an 'astonishing amount of reference to stone houses and other structures' across Australia, Pascoe further equated their presence with the existence of sedentary or semi-sedentary 'villages' reliant on agriculture, igniting much subsequent debate (e.g. Keen 2021; Porr and Vivian-Williams 2021; Sutton and Walshe 2021). Although not claiming that all Aboriginal groups were engaging in agriculture and sedentism to the same extent, Pascoe (2014:78) nonetheless

argued that large populations in several areas of Australia, including the Channel Country of western Queensland, were 'manipulating the environment and husbanding plants to produce surplus food of such great quantity that populations could lead more or less sedentary lives in the vicinity of their crops'. Pascoe's sources for central western Queensland were limited, although he did refer in passing to the cluster of stone structures reported by Davidson et al. (1989) on Marion Downs and similar structures at Hilary Creek, seeing both groups of huts as evidence to support his propositions about sedentism (Pascoe, pers. comm., 2018). Further south, around Birdsville, Pascoe (2014:76) suggested there were 'villages' of people living in the desert who were managing 'food dispersal, plant crops, and harvesting and storing grain'. A lack of archaeological evidence to support his argument was explained away because the 'destruction of both the grasslands and villages was swift' (Pascoe 2014:86).

The sporadic archaeological attention that central western Queensland has received to date (excepting Barton 2001; Border and Rowland 1990; Davidson 1983, 2008; Davidson et al. 1989, 1991, 2004, 2005, 2018; Hiscock 1988; Kelly 1968) has certainly contributed to Pascoe's ability and readiness to make such claims. Partially in response to the Dark Emu debate, this paper substantially expands the known dataset for stone-based hut structures in central western Queensland, demonstrating that they are more abundant than has previously been reported. In doing so we provide further evidence with which to examine the complexity of late Holocene Aboriginal lifeways and cultures in this region of Queensland. Specifically, we present data on 70 stone-based hut structures from four discrete site complexes located on Marion Downs Station, 60 km south of Boulia in the traditional country of the Pitta Pitta people (Figure 1).



**Figure 1. Central western Queensland study area showing the boundary of Marion Downs Station and the status of water bodies (water status is drawn from Silcock 2009).**

We argue that the stone-based hut features on Marion Downs Station contribute to a better understanding of lifeways in the arid interior and therefore to larger debates around Aboriginal movement, population density, settlement, and subsistence in the Late Holocene. The varying environments and resources across Australia require selective resource management, such as a more sedentary lifestyle or regular seasonal movement (cf. Gould 1968). Sedentism is associated with the reliability of, access to, and abundance of, resources, along with high population densities (Lourandos 1980:249). The first response to the depletion of a resource in an area for fisher-gatherer-hunters was to move onto the next area of abundance. In desert areas with low primary productivity, water had a spatiotemporal distribution that influenced the movement of both people and animals (Smith 2013:12). Bird et al. (2016:11477) argued that arid areas were:

not necessarily a barrier either to habitation or to transit [rather it was] the duration of inundation, the connectedness of water at times of inundation, and the location of permanent water in the landscape that dictate[d] where, and for what length of time, humans could reside in or transit through most of interior Australia.

The Marion Downs stone-based hut structures constitute a vital, yet still largely unknown, strand in the complex and changing story of human occupation of the arid zone and human response to change. They also refute any equation between the construction of stone architecture and the presence of sedentary or semi-sedentary ‘villages’ reliant on agriculture (cf. Pascoe 2014). Here we use the term ‘village’ advisedly since the incorporation of subjective concepts of place when labelling archaeological features (Clarke 1994:2)

means that terms such as ‘house’ or ‘village’ can become imbued with unintentional and unexamined meanings. The word ‘house’ is Eurocentric and, without adequate evidence for domestic occupation, such a term is an unsupported interpretation rather than a useful descriptive term. The definition of ‘villages’ and ‘settlements’ is particularly important because both concepts are Eurocentric in origin and have wider implications for the interpretation of the lifeways and subsistence practices of Aboriginal groups. In this paper we adopt Memmott’s (2007:331) definition of a village as:

a permanent camp occupied for all of the significant part of the seasonal year, with house structures and materials as well as domestic tools and artefacts left in situ by their owners and maintained periodically as required [that is] often associated with substantial seasonal harvest of food as well as dependable sources of fresh water that could sustain people for several months or longer.

A settlement is a place of residence for a group of people for any period they choose, be it a short-term ‘camp’ or a more permanent ‘village’ (Memmott 2007:327).

### The Central Western Queensland Study Area

Pitta Pitta country straddles the Mitchell Grass Downs and Channel Country bioregions. Lying within the Georgina Catchment of the Lake Eyre Basin, the main watercourse is the Georgina River, running through the centre and down the eastern extent of Marion Downs and consisting of more than 36 tributaries. As a highly braided watercourse that covers wide expanses of the plains country, after the rains have passed the flooded landscape of the Georgina retracts to a series of usually permanent waterholes (see Figure 1).

Without the influence of groundwater across the Georgina Catchment there would be only four truly permanent waterbodies (Silcock 2009:14, 2010). At the Marion Downs homestead, annual rainfall ranges between 200–372 mm, though every 10–20 years this doubles to around 600 mm, while at other times it declines to <100 mm (BoM 2021). Temperatures range from 22.9°C to 38.6°C, with the predominant wind pattern being a stiff south to south easterly breeze (BoM 2021).

Like elsewhere in Queensland, the study region was affected by colonialism and ‘frontier’ violence. Although pastoral activity on the northern reaches of the Georgina River (then known as the Herbert River) began in the 1860s, the first pastoral runs on the Burke River and its tributaries were established in 1877 (Goodwood Station) and 1878 (Buckingham Downs Station), with confrontations following shortly thereafter (Davidson et al. 2018). At the heart of the violence was the Native Mounted Police (NMP) force, a paramilitary government organisation charged with patrolling the frontier to protect European interests (Richards 2008). The first NMP station locally was along the Diamantina River (established 1876), followed in 1878 by a camp on the Burke River, ~80 km to the north of Marion Downs (Burke and Wallis 2019). The cessation of this camp in 1884 suggests that within six years local Indigenous resistance had been broken. Beyond the NMP, European influence on Aboriginal groups through violence, displacement and disease would have impacted Aboriginal ceremonies and religious life, denying access to important sites and resource-rich areas and dispersing large gatherings (Reynolds 2006:103). The response by Aboriginal groups to the changes wrought by the NMP and European settlement varied, but there is little doubt that the decimation and displacement of Aboriginal populations caused massive upheaval to traditional lifeways in the region (e.g. Davidson et al. 2019). Communities were forced to decide whether to continue living off their land, where resources were being depleted, or move to fringe camps around European settlements, becoming dependent upon Europeans for survival (Letnic 2000:299; May 1983, 1994; Reynolds 2006:160).

### Previous Research on Stone-Based Hut Structures in Central Western Queensland

To date, the only dedicated research on stone-based Aboriginal huts in the region has focussed on Marion Downs Station, despite wider archaeological work in the surrounding region on non-stone-based huts to the south on Mithaka country (Westaway et al. 2021) and along the Coopers Creek (Robins 1981), the Mulligan River, and Sylvester Creek (Kelly 1968). Research east into Diamantina National Park failed to reveal any hut structures, stone-based or otherwise (Simmons 2007). To date, the only known examples of such dry stone architecture appear to be spatially restricted to Pitta Pitta country.

Drawing on archaeological data, Wallis et al. (2017, 2021, see also Maloney et al. 2022) reported on two sites (the Airport Site and Hilary Creek) containing clusters of stone-based huts that had been initially documented by Davidson et al. (1989; see also Ritchie 1996). The remnants of these huts comprise low (15–30 cm high) walls built in C-shapes from local stone. The height of the stone component was not sufficient to suggest this material served as walls per se, but more likely formed a structural base to support a wooden

superstructure. Sometimes the interiors contained remnants of the collapsed wooden frame, predominantly miniritchie (*Acacia cyperophylla*) and gidgee (*Acacia cambagei*) branches. Across central west and southwest Queensland these two species were the materials of choice for gunyahs, typically covered with locally available grass or other vegetation.

Such huts were argued by Wallis et al. (2017, 2021) to have been domestic in nature and built by Aboriginal people to a deliberate pattern, being positioned to afford protection from inclement weather and, at Hilary Creek, adjacent to ceremonial stone arrangements. Wood from the collapsed superstructure of the huts, and excavated charcoal and shell at Hilary Creek, returned radiocarbon ages of occupation from 285 cal BP and abandonment by 114 cal BP (Wallis et al. 2021:2), providing the first absolute age estimates for Aboriginal architectural traditions in central western Queensland. Yalarrnga man Lance Sullivan named the specific Aboriginal group occupying the Hilary Creek site as Ringu Ringu (a dialect of Pitta Pitta; Blake 1979) and noted they were central to the maintenance of several major songlines and boys’ initiation ceremonies (Wallis et al. 2021:17).

Ethnographic and ethnohistoric sources for central western Queensland provide no further illumination on such structures since none refer to the use of stone in Aboriginal construction techniques. An anonymous newspaper correspondent in 1877, for example, described how Aboriginal huts on the Burke River near Boulia were made:

they scoop holes in the sand hills about two feet deep, make a frame of sticks about four foot high, cover it over with long grass, then bank the sand up all over it very thickly, and except for its red appearance you would take these residences for a lot of big bee hives. They can be seen an immense distance when at all elevated. They keep the loose sand warm in the huts all day by keeping a fire alight, and as many as can wedge in (regardless of size or sex) do so at night, coil up in the loose sand, and dream of lots more grass seed cake (Anon. 1877:3).

Likewise, Walter Roth (1910) provided detailed descriptions of huts used seasonally around Boulia. He reported that the materials used in the construction of both *kurau-i* (summer) and *annakadyi* (winter) huts typically included wood, vegetation and sometimes sand or mud. Summer structures were constructed from saplings covered in grass, bushes and mud, while winter structures had a similar basic composition but with the addition of excavated floors (Roth 1910:58–60). It is not possible to know whether Roth’s omission of the use of stone in such structures was due to the absence of such material or a failure on Roth’s part to notice it. If an omission of observation, it would be in keeping with his failure to recognise other significant Aboriginal sites in the region, including rock art in the Selwyn Ranges and an obvious ceremonial stone arrangement on the only road between Boulia and Cloncurry (Davidson 2008:127–128, 130; Wallis et al. 2021). Pitta Pitta people today suggest that Roth did not travel much beyond the Australia Hotel, where he resided, and the Boulia racetrack (Trevina Rogers, pers. comm., 2021). It may also be that he was aware of the presence of such structures but considered them to have been influenced by European dry stone walling building techniques and so therefore not ‘traditional’ and worthy of discussion.

## Methods

Collaborative fieldwork with the Pitta Pitta Aboriginal Corporation members on Marion Downs Station was designed to expand on the previous studies by Wallis et al. (2017, 2021) and Davidson et al. (1989). It involved non-destructive investigation of stone-based hut complexes identified fortuitously during pastoral-related activities by station manager Robert Jansen. Targeted pedestrian ground surveys by four to eight team members were conducted for several kilometres extending away from the complexes along adjacent watercourses to confirm the number and extent of stone-based huts and associated features. This was also supplemented by drone, plane and helicopter reconnaissance. Ground surface visibility was excellent at the time.

Criteria were developed to systematically and consistently determine whether a structure was cultural in origin and provide a means to distinguish huts from natural features, such as plant rings, termite pavements, scalds and other geomorphological formations. These criteria included that the structure:

1. Was approximately circular in shape and distinguished by a margin of rocks typically >10 cm in diameter.
2. Had an interior that was clear (or mostly clear) of larger rocks.
3. Was at least 1 m in diameter (i.e. sufficiently large to accommodate at least one person inside the structure).
4. Possessed a visible gap in the rock structure that could have served as an entrance.
5. Was associated with other archaeological materials, such as stone artefacts, hearths, stone arrangements and/or midden material. In addition, the presence of wood lying in the clear central area was a strong indicator of collapsed superstructure, though this was only occasionally present owing to various taphonomic influences.

Structures assessed to be cultural were further categorised as belonging to one of five types (following Wallis et al. 2021:3–4) (Figure 2):

**Type 1** – Collapsed wooden superstructure present, with a central circular area generally clear of any rocks and a tightly structured circumference of substantial foundational stones (defined as >10 cm maximum diameter).

**Type 2** – No wooden superstructure, a central circular area generally clear of any rocks and a diffuse circumference of larger foundation stones.

**Type 3** – No wooden superstructure, a central circular area generally clear of any rocks and lacking any circumference of larger foundation stones.

**Type 4** – No wooden superstructure, central circular area covered in gibber, and a clear circumference of mostly diffuse large rocks.

**Type 5** – No wooden superstructure, very diffuse circumference of mostly small rocks, patchy central floor area.

All features were documented using systematic recording forms and terrestrial photography, alongside aerial and oblique photography using a Phantom 4 Pro drone operated by LAW. Scale plans of each structure were drawn in Adobe Illustrator using the captured aerial imagery as a base.

Five samples of gidgee (*A. cambagei*) from collapsed superstructure in the interior of some huts were collected for accelerator mass spectrometry (AMS) radiocarbon dating at Australia's Nuclear Science and Technology Organisation (ANTSO) facility at Lucas Heights. The outer sapwood and bark were targeted to minimise the 'old wood' effect (after Schiffer 1986). Dates were calibrated in OxCal using the 2020 southern hemisphere calibration curve SHCal20 (Hogg et al. 2020). Because of the pastoral history of the area, any dates later than 1877 were considered 'post-contact', despite the likely gradual diffusion of contact influences (disease, material culture, stories, etc) both before and after this date.

## Results

Beyond the previously described Airport and Hilary Creek site complexes, four new locales with stone-based hut structures were identified during the study: Horse Paddock 1 (MDHP1), Hamilton Creek Paddock 1 (MDHCP1), Bellevue Paddock 2 (MDBP2 and MDBPE2) and Cooramarina Creek 1 (MDCC1) (Figure 3). Summary information about the huts in each complex are provided in Table 1, while the spread of different hut types is provided in Table 2. Information about all individual huts is provided in the Supplementary Material.

The number of huts recorded per complex ranged from 13–20 (Table 1). The average internal area of a hut was 3.48 m<sup>2</sup>, with the Horse Paddock 1 huts being the largest, at an average of 4.37 m<sup>2</sup>, and the Bellevue Paddock 2 huts being the smallest (average = 2.61 m<sup>2</sup>).

### *Horse Paddock 1*

Horse Paddock 1 (MDHP1) is a complex located about 500 m southwest of the Marion Downs Station homestead (Figure 3). It is positioned on the southern side of an ephemeral creek and contains 19 stone-based huts and at least 30 heat retainer hearths spread over an area of 1.4 ha (Figure 4). This complex has been slightly disturbed by horse and cattle pads, and it is possible that an aligned station access track may have impacted the southwestern portion of the site.

Like the nearby Airport Site (Davidson et al. 1989; Wallis et al. 2017), Horse Paddock 1 contains abundant post-contact materials, indicating occupation of this site into the nineteenth and twentieth centuries. More than 50% of the post-contact artefacts recorded are metal, including such items as four-hole trouser buttons, horseshoes, cans, match boxes, wire, building and horseshoe nails, knife blades, buckles (plain and decorative) and two purse frames (Supplementary Table 2). Shell buttons (of the two and four holed variety) also occur, as well as ceramic objects, including pieces of smoking pipes and Prosser buttons. A variety of different coloured glass was recorded, including black, aqua, light aqua, purple, olive green, and colourless. One flake, one core and another possible flake, all of black glass, were also identified, their morphology reflecting deliberate flaking (see Perston et al. 2022). Stone artefacts were also present at a number of the huts.



Figure 2a. MDCC1 Hut 3 – Example of Type 1 hut.



Figure 2b. MDHAMP1 Hut 9 – Example of Type 2 hut.



Figure 2c. MDHP1 Hut 17 – Example of Type 3 hut.

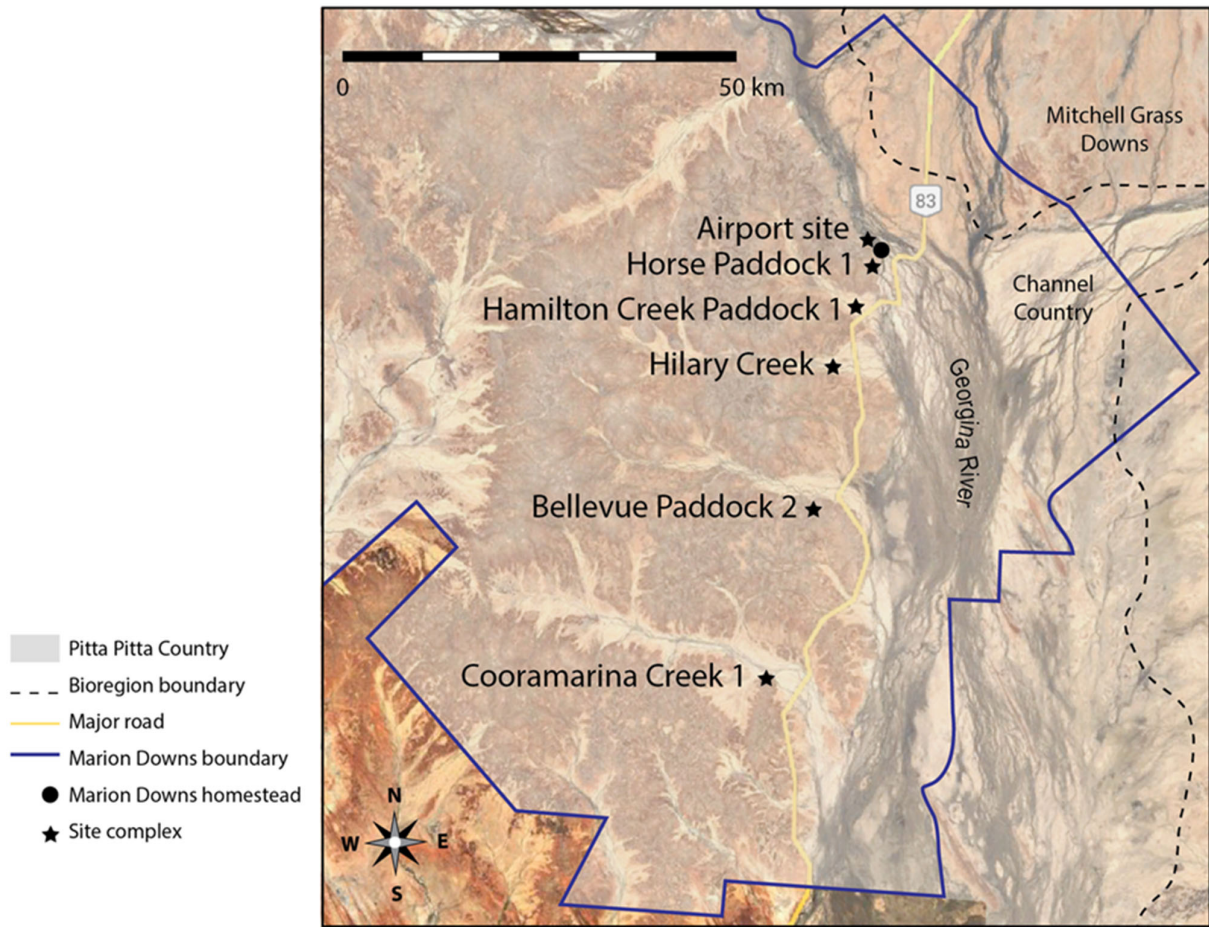


Figure 2d. MDBP2 Hut 14 – Example of Type 4 hut.



Figure 2e. MDHAMP1 Hut 2 – Example of Type 5 hut.

Figure 2. Example of five hut types recorded at Marion Downs Station. Following Wallis et al. 2021:3–4. See also Supplementary Information S1-S70.



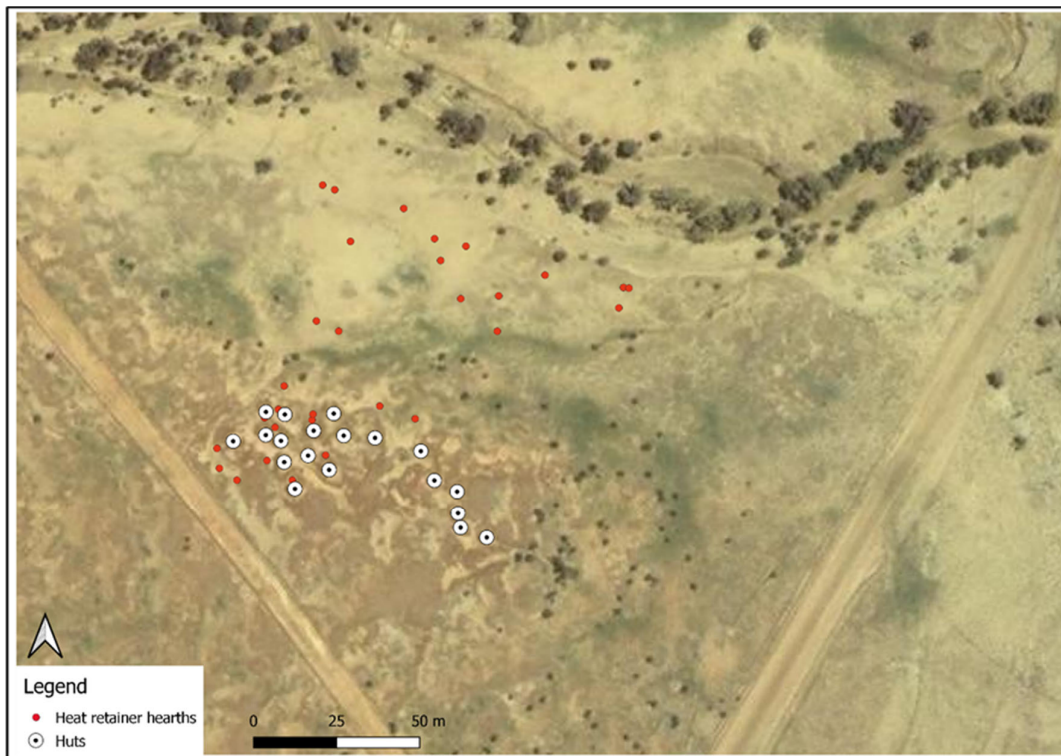
**Figure 3. Location of site complexes with stone-based hut bases on Marion Downs Station. The Airport and Hilary Creek sites were reported previously, while the other four sites are newly described herein.**

**Table 1. Summary measurements from recorded stone-based hut structures on Marion Downs. (\*9/20 huts had no external diameter; #10/18 huts had no external diameter).**

Location	Number of Huts	Average External Diameter (m)	Average Wall Height (m)	Average Wall Thickness (m)	Average Internal Area (m <sup>2</sup> )	Orientation of Opening (°)
Horse Paddock 1	19	5.2	0.17	1.48	4.37	310-10 (NW-N-NNE)
Hamilton Creek Paddock 1	20	3.6*	0.12	1.06	3.33	140-10 (SE-W-N)
Bellevue Paddock 2 and East 2	18	3#	0.15	0.86	2.61	250-33 (WNW-N-NE)
Cooramarina Creek 1	13	4.3	0.27	0.93	3.61	300-35 (WNW-N-NE)
Average	18	4.03	0.18	1.08	3.48	250-22

**Table 2. Number and percentage of hut types across the four recorded site complexes on Marion Downs Station.**

Location	Type 1	Type 2	Type 3	Type 4	Type 5
Horse Paddock 1		10 (53%)	7 (37%)	2 (11%)	
Hamilton Creek Paddock 1		5 (25%)	12 (60%)		3 (15%)
Bellevue Paddock 2		7 (39%)	5 (28%)	6 (33%)	
Cooramarina Creek 1	4 (31%)	3 (23%)	1 (8%)	5 (38%)	



**Figure 4. Plan of Horse Paddock 1 on the southern side of an ephemeral creek.**

### *Hamilton Creek Paddock 1*

Hamilton Creek Paddock 1 (MDHCP1) is located on the northern side of a small ephemeral creekline about 7 km southwest of the Marion Downs Station homestead (Figures 3, 5). The area slopes slightly towards the creek and is exposed to strong south and southwest winds. Structures and extensive stone artefact scatters were identified on two gibber patches, but no archaeological materials or structures were identified on other gibber patches along the same creekline, even though there were no obvious differences between them.

Twenty stone-based hut structures were recorded at Hamilton Creek Paddock 1, most in a poor state of preservation, making it difficult to confidently discern the exterior boundary of almost half of the huts. Beyond the huts, the sandy area to the west of the main gibber patch contained a large circular stone arrangement and at least three heat retainer hearths. Additional smaller stone arrangements (comprising stone piles, arcs and lines) were present on the main gibber patch itself, as well as on adjacent gibber patches immediately north. There were no post-contact artefacts present at Hamilton Creek Paddock 1. However, the site contained a large number of flaked stone artefacts (predominantly silcrete). Despite the evidence of abundant cattle pads winding across the site and the poor state of hut preservation, the complex retained evidence for relatively undisturbed knapping events, with numerous conjoins identified during the reconnaissance survey.

### *Bellevue Paddock 2*

The Bellevue Paddock 2 (MDBP2) complex is located approximately 32 km south of the Marion Downs Station homestead, separated into an eastern and western part by a north-south running ephemeral creek (Figures 3, 6). Twelve huts were present on the western side of the creek (MDBP2)

and a further six on the eastern side (MDBPE2). Unusually, one hut had a rockpile positioned within it. The MDBP2 complex also contained at least 32 stone arrangements of various sizes and morphologies on the eastern margin of the creek, with eight smaller stone arrangements identified on the western side of the creek. The huts and stone arrangements on both sides of the creek were associated with abundant flaked stone artefacts, and a rare, complete, though fractured, grindstone was located outside one of the huts (Figure 7). Beyond a single metal trouser button found on the eastern side of the creek, no post-contact materials were observed at this complex.

### *Cooramarina Creek 1*

The Cooramarina Creek (MDCC1) complex is located on the southern side of a well vegetated ephemeral creek approximately 55 km southwest of the Marion Downs Station homestead (Figure 3). Standing water was identified 3 km west of the site at the time of recording (June 2021), during an austral winter associated with a protracted La Niña event. There is a slightly higher ridgeline about 1 km south of the site, while the site features sit on a gentle slope. There is severe erosion through the central portion of the western-most cluster of huts, which is beginning to impact the margins of some of the huts and enhances their raised appearance.

Thirteen stone-based huts were recorded at Cooramarina Creek: Huts 1–9 were clustered at the western end of the complex and Huts 10–13 some 500 m to the east (Figure 8). Hut 5 was significantly larger than other huts recorded and formed a double-arc; it likely represents the remains of two overlapping structures, although they were recorded as one in the field (Figure 9). This complex was the only site of the four recorded on Marion Downs Station to contain remnants of a collapsed wooden frame.



**Figure 5. (Top) Aerial view of the Hamilton Creek Paddock 1 site, facing west. Note the circular hut bases in the foreground on the gibber, and the presence of other gibber patches in the background (the latter did not contain huts). (Bottom) Aerial view highlighting some of the stone-based structures.**

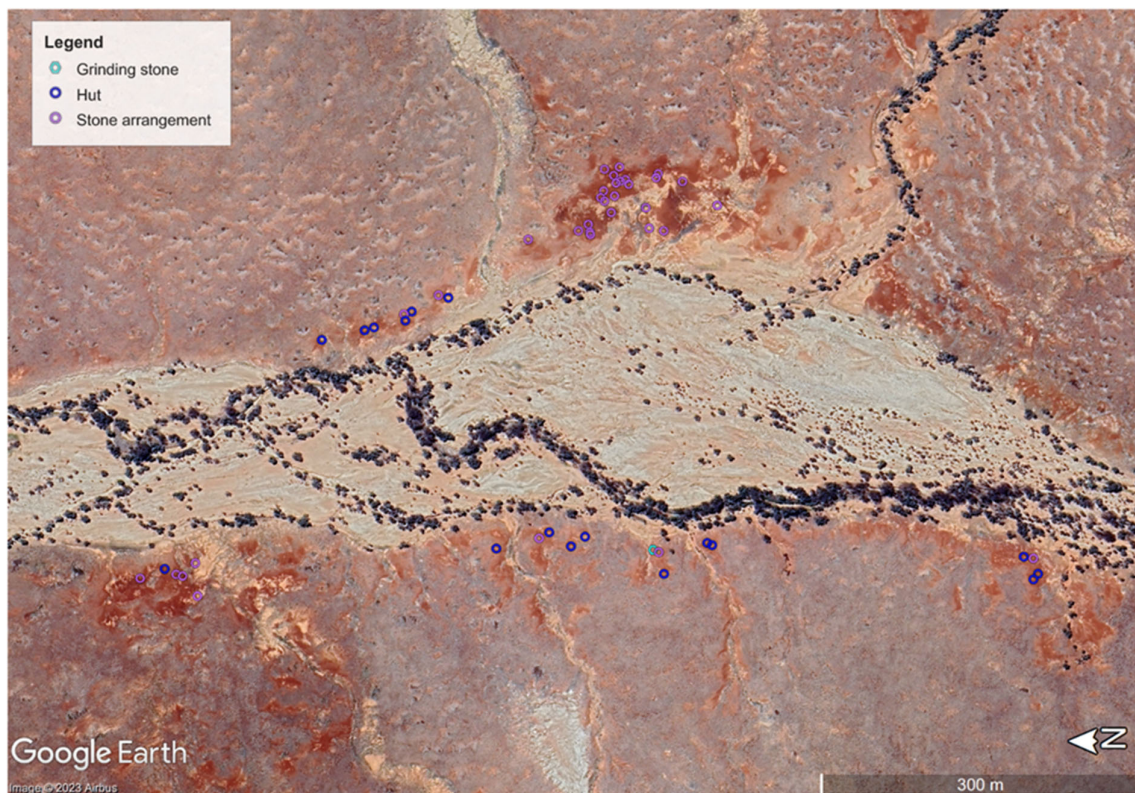


Figure 6. Plan of the Bellevue Paddock 2 complex. Note north is to the left of view.



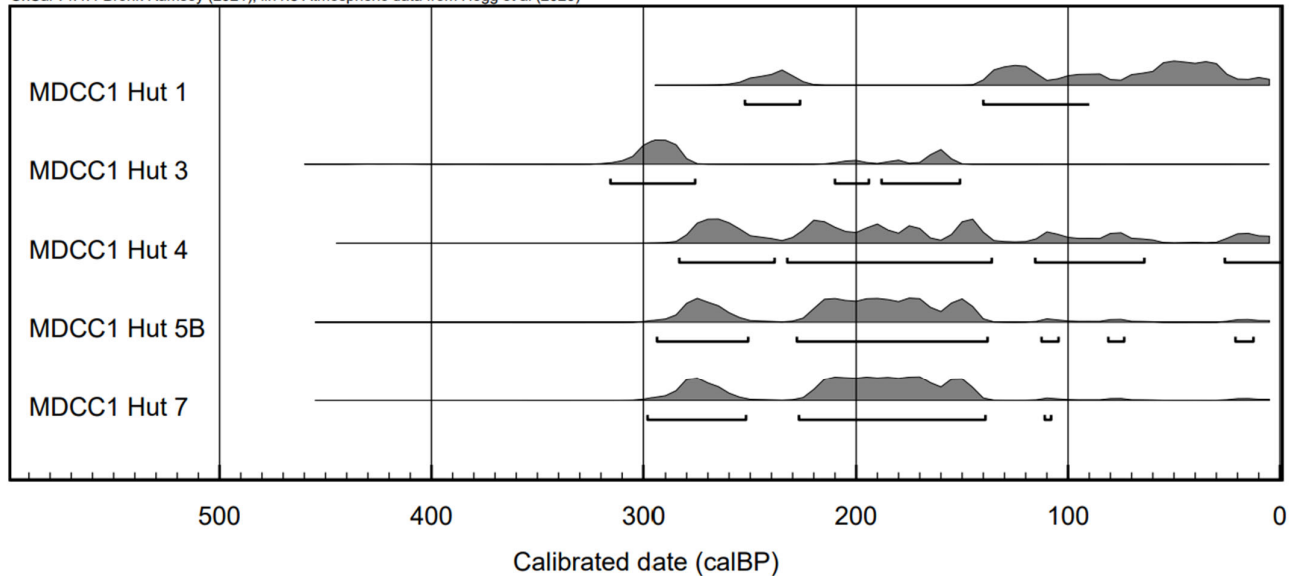
Figure 7. A refitted broken grinding stone located outside Hut 5, on the western side of the Bellevue Paddock 2 complex.



**Figure 8. Plan of the Cooramarina Creek 1 complex.**



**Figure 9. Aerial view of Hut 5 at the Cooramarina Creek 1 complex.**



**Figure 10. Radiocarbon dating results using OxCal (v.4.4) (Bronk Ramsey 2009) and SHCal20 calibration dataset (Hogg et al. 2020).**

Discrete clusters of mussel shell (*Velesunio ambiguus*) were recorded associated with the huts in the western cluster, eroding from a subsurface context. No post-contact artefacts or heat retainer hearths were identified. Instead, flaked silcrete and occasional chert artefacts were abundant around the eastern cluster of huts, with smaller numbers recorded around the western cluster. Six fragments of grinding stones were recorded, three in each cluster, indicating resource processing. Three stone arrangements were also recorded at the eastern extent of this complex. The presence of the collapsed superstructure remains may suggest a more recent construction date for Cooramarina Creek 1 than the other complexes, though such an interpretation is confused by the absence of any contact period materials which might otherwise be expected if the site was occupied more recently.

### Radiocarbon Dating

Five huts at the Cooramarina Creek 1 complex had wood available from which to obtain radiocarbon dates. Wood samples were taken from the outer wood of the collapsed gidgee branches within the stone-based huts (Figure 10, Table 3). Two of the samples returned one-sigma calibrated age-ranges which may extend into the post-bomb period (Huts 1 and 4), though the lower tail of the calibration curve indicates that these could be pre-contact huts. Two further samples (Huts 5B and 7) returned two-sigma calibrated age-ranges that may extend into the post-bomb period. Only the sample collected from Hut 3 fell entirely within the pre-contact period.

The absence of post-contact material at Cooramarina Creek 1 suggests these structures were built and occupied in the pre-contact period, although it may also be possible that older branches were used in the structures, especially given the difficulty of harvesting or breaking up tough gidgee wood. Similarly, while the Hamilton Creek Paddock 1 and Bellevue Paddock 2 sites contained no material suitable for radiocarbon dating, they may tentatively be assumed to be from the pre-contact period owing to the absence of any non-Indigenous materials or artefacts.

### Discussion

#### *The Antiquity of Occupation in Central Western Queensland*

The dates from Cooramarina Creek 1 echo the results from Hilary Creek and the Airstrip site (Wallis et al. 2021, unpublished data). All radiocarbon determinations from the Hilary Creek site fell within the last 300 years (Wallis et al. 2021:5-7) and radiocarbon dates from two fragments taken from collapsed timber superstructures in huts at the Airstrip site place use of these features in a similar period –  $151 \pm 27$  BP ( $265-0^*$  cal BP) and  $189 \pm 25$  BP ( $282-0^*$  cal BP) (Wallis unpublished data). Such age determinations, and the associated artefact assemblages, provide our only frames of reference for the other, undated complexes reported here (Horse Paddock 1, Hamilton Creek Paddock 1, Bellevue Paddock 2), and there is no compelling reason to suggest the latter are anything other than Late Holocene in age. This accords with the other available evidence from the broader region. In the late 1980s Hiscock (1988) dated a cache of tulas recovered along Mucklandama Creek (a tributary of the Burke River, north of Marion Downs) to less than 1000 years. Likewise, in Mithaka country further to the south, gunyahs returned Late Holocene ages (Westaway et al. 2021), stone arrangements indicated a minimum construction age of between AD 1959 and 1981 (Kemp et al. 2022), and aeolian infill of a quarry pit at Ten Mile B was dated to  $2130 \pm 820$  BP (GU65.2) (Westaway et al. 2021). The latter was argued by Westaway et al. (2021) to be associated with stone extraction activities and represents the oldest archaeological age estimate in the region thus far.

**Table 3. List of radiocarbon dates from stone-based hut structures at MDCC1 \*May extend out of range.**

Sample ID	Material	Lab. No.	$\delta^{13}\text{C}$ (‰)	Conventional Age (years BP)	Calibrated Age (68.3%) (cal BP)	Calibrated age (95.4%) (cal BP)
MDCC1 Hut 1	Wood	OZAK67	-23.3±0.1	115±25	240–232 (5.2%)	253–227 (11.9%)
					137–115 (18.2%)	140–0* (83.6%)
					93–85 (4.4%)	
					69–25 (40.4%)*	
MDCC1 Hut 3	Wood	OZAK68	-22.4±0.2	270±20	305–281 (55.5%)	316–276 (66.2%)
					166–157 (12.7%)	210–194 (5.6%)
						188–151 (23.6%)
MDCC1 Hut 4	Wood	OZAK69	-21.6±0.3	195±25	280–252 (20.2%)	284–239 (24.4%)
					227–168 (34.7%)	233–136 (50%)
					155–140 (10.5%)	116–64 (13.5%)
					111–108 (1.4%)	26–0* (7.5%)
					78–75 (1.4%)*	
MDCC1 Hut 5B	Wood	OZAK70	-26.4±0.1	215±25	280–268 (11.1%)	295–251 (22.4%)
					218–167 (49.4%)	228–138 (70.5%)
					156–147 (7.8%)*	112–105 (0.8%)
						81–74 (0.8%)
						21–13 (0.9%)*
MDCC1 Hut 7	Wood	OZAK71	-29.0±0.2	220±25	281–272 (8.4%)	298–253 (22.3%)
					216–167 (52.5%)	227–140 (73.1%)*
					156–149 (7.3%)*	

While the absence of older age estimates in central western Queensland may in part be an artefact of research activity to date, it does beg the question of whether this region may not have been occupied until more recently. We know that the contemporary El Niño-Southern Oscillation (ENSO) pattern was established in the mid-Holocene (Donders et al. 2007; Shulmeister and Lees 1995), and Turney and Hobbs (2006) argued on the basis of analysis of >700 radiocarbon age estimates that there was a substantive increase of activity at inland Queensland sites coincident with the onset of modern ENSO activity. The specific environment of the Channel Country is suited to highly mobile groups, with expansion in years of high rainfall and retreat to reliable, spring-fed water sources in drier years. La Niña conditions improve local water availability and weather conditions, bringing cooler day time temperatures, increased rainfall, and an earlier monsoon onset, resulting in water flowing earlier in the season (Kotwicki and Allan 1998:269). The resulting increase in resources likely meant that people could remain in one area for longer and rely on local food and water sources for greater periods than was possible during dry or El Niño years. Testing such models in central western Queensland, however, will require research programs designed explicitly to consider such questions, and target old landforms to ascertain whether they contain old sites. Without this it remains to be determined not only how old the trading routes associated with pituri might be, but also when this challenging environmental region, with its boom-or-bust decadal seasonal cycles, might have first been used by people and if that was, indeed, linked to the onset of the modern ENSO cycle. Given the paucity of organic material directly associated with most stone-based huts recorded to date, questions of chronology

could be fruitfully directed towards the thermoluminescence or radiocarbon dating of heat retainer hearths, and optically stimulated luminescence (OSL) dating of hut bases and stone arrangements.

### ***The Distribution and Function of Stone-Based Huts, and the Question of ‘Villages’***

The physical attributes of the 70 huts recorded in this study are broadly comparable to other, similar features at the Hilary Creek and Airstrip sites on Marion Downs Station, particularly in terms of location, size, and orientation. The Horse Paddock 1 site, in fact, bears a remarkable similarity to the Airstrip site, which is only 1.5 km to the northwest. Except for there being no collapsed superstructure preserved at Horse Paddock 1, both sites have similar artefact assemblages, featuring a wide array of post-contact materials. Given their proximity to the Marion Downs homestead, it seems likely both served as fringe camps for Aboriginal families working on the station in the late nineteenth and early twentieth centuries. The use of traditional hut structures by an Aboriginal workforce would have saved station owners the cost of constructing workers’ quarters, but also enabled Aboriginal labourers to retain familiar elements of older lifeways. Further, the presence of an endemic building tradition that created robust circular dwellings would have precluded the need to incorporate European materials, such as hessian, iron and hewn timber, into their construction, or adopt square or rectangular building footprints.

Owing to the small hut sizes and ephemeral nature of local water sources, Wallis et al. (2021:16) concluded that the Hilary Creek complex was likely occupied by small groups of

people for only brief periods of time. The Cooramarina Creek 1, Hamilton Creek Paddock 1 and Bellevue Paddock 2 complexes have similar internal hut sizes to Hilary Creek (i.e. 3.22 m<sup>2</sup>) and are likewise not adjacent to permanent water, suggesting they too sustained smaller occupation groups for limited periods. This contrasts with possibly larger groups at the Airstrip and Horse Paddock sites, where hut structures were larger, a more reliable water source was located, and the station homestead was a source of rations if traditional food sources were scarce. As with Hilary Creek, Cooramarina Creek 1, Hamilton Creek Paddock 1 and Bellevue Paddock 2 were all associated with stone arrangements, hinting that, while they themselves were domestic in terms of providing shelter, they may have been used for such while other, non-secular activities were being undertaken close by.

Across all Marion Downs complexes, most huts are of a size that would have allowed them to house at least one individual, with possibly up to four, depending on the size of individuals. If the complexes were occupied concurrently, with an average of three people in each hut, groups could range from at least 30–60 individuals. However, there is no *a priori* reason to think that all the huts in each complex were occupied concurrently, nor that all complexes were occupied concurrently. In fact, the differing levels of deterioration of huts within and between complexes suggest that each was occupied at a different period and that only some huts in each complex were occupied concurrently. This means it is difficult to estimate population densities from the huts alone. There is no indication that any of the huts recorded so far on Marion Downs were deliberately destroyed. The destruction of Aboriginal huts could occur for a variety of reasons (disease, death, spiritual), often with fire which could leave tell-tale archaeological indicators (cf. Memmott 2007:187; Roth 1910:56). The lack of evidence for deliberate destruction suggests that the Marion Downs huts were abandoned either voluntarily or through coercion, perhaps because of changing land-use patterns associated with declining population and the rise of pastoralism restricting the movement of people traditionally for trade, ceremony, and resource procurement.

### ***Comparison to Other Australian Structures***

Some parallels can be observed between the hut sites in central western Queensland and those at Lake Condah in southwest Victoria (Builth 2004; Clarke 1991; Coutts et al. 1977) and on islands off the coast of Western Australia (Blundell 1975; McDonald and Berry 2017; O'Connor 1987, 2007). Shape-wise the structures in all locations are U- or C-shaped. The rocks of Lake Condah, Rosemary Island and Marion Downs are round, while High Cliffy and Rankin Islands utilise rectanguloid rocks, owing to the peculiarities of geology in each location. This shape impacts the height of the structures, with Marion Downs, Rosemary Island and Lake Condah structures being classified as stone-based hut structures due to their lower base height, while those on High Cliffy and Rankin Islands could be classified as stone-walled structures due to their significantly increased height (0.60–1.2 m). Internal hut size across all known hut sites is similar, ranging from ~3–5 m<sup>2</sup>, with some outliers (~7m<sup>2</sup> at some huts at Rosemary Island and Lake Condah) (Brien 2021; McDonald and Berry 2017; Wesson 1981:32). The surrounding environments for these structures impacted their construction and use. Lake Condah's environment was resource rich, leading towards longer-term occupation on the

stony rises for eel catching, while in Western Australia marine resources were available but freshwater was limited. Various interpretations for the High Cliffy, Rosemary Island and Rankin Islands structures have included space demarcations, windbreaks, and protection from inclement weather (Blundell 1975; McDonald and Berry 2017; O'Connor 2007).

### **Conclusion**

This paper presents new data relating to the construction and chronology of Aboriginal domestic architecture in central western Queensland, Australia. A total of 70 stone-based hut structures from four site complexes on Marion Downs Station in Pitta Pitta country were recorded, increasing the known number of such features in this region to just over 100. Wood from the remaining frames of some of these shelters was dated to the very Late Holocene, with only one dated to the pre-contact period. This very late date range connects the construction, use and abandonment of these structures with wider post-contact influences, threats and pressures placed on Aboriginal people within the last 200 years. The identification of extant stone arrangements at the Hamilton and Bellevue Paddock sites provides some evidence that these locales were not destroyed outright, suggesting instead that it may have been denial of access, or the removal of people through violence and disease, that led to their abandonment.

The structures at Horse Paddock 1 and the Airport site are larger and clearly domestic in nature, probably associated with fringe camps for the Aboriginal workforce on the station in the nineteenth and twentieth centuries. The proximity of stone arrangements at Cooramarina Creek, Hamilton Creek Paddock and Bellevue Paddock, like at Hilary Creek, suggest that the smaller huts at these locations were more likely to be associated with ceremonial events. The occupation pattern of ceremonial sites would be different to domestic sites, possibly occupied by smaller groups seasonally or only for very short durations, depending on the type of ceremonies being held.

The occupation of these complexes through a significant part of the seasonal year is extremely unlikely, given restricted access to consistent freshwater outside of a boom year and the absence of domestic materials at most of the complexes. This precludes them from being classified as a 'village' according to Memmott's (2007:331) definition, let alone semi-sedentary 'villages' *sensu* Pascoe (2014). Such propositions, we argue, are not generally applicable in central western Queensland for several reasons. The short-lived, ephemeral water sources that dominate the Channel Country and Mitchell Grass Downs for most of the year, except following La Niña events, do not support abundant resources suited to the establishment of large populations or sedentism. Nevertheless, this did not prevent rich and complex cultural, trading and ceremonial relationships from being established. Inferring the presence of environmental manipulation, plant husbandry and food surplus creation is a step even further beyond, that cannot be substantiated by existing archaeological data (see Keen 2021; Sutton and Walshe 2021; see Porr and Vivian-Williams 2021 and replies).

This project has contributed to our understanding of the occupation of the arid zone by contributing distinctive evidence for temporarily occupied structures. In addition to this, it provides further clarity around alternate social and residential patterns in arid areas that have been ignored in Pascoe's (2014) modelling. These stone-based hut structures in Pitta Pitta country intimately connect Aboriginal people

with their ongoing use of, and connection to, this semi-arid environment, offering a greater understanding of past Aboriginal lifeways, specifically adding this unique Pitta Pitta architectural style to the wider understanding of Aboriginal building traditions across Australia.

## Supplementary Materials

Supplementary Table S1. Summary information about huts recorded at Horse Paddock 1, Hamilton Creek Paddock 1, Bellevue Paddock 2 and Cooramarina Creek 1.

Supplementary Table S2. Marion Downs Horse Paddock artefacts.

Supplementary Figures S1–S70. Marion Downs huts Type 1, Type 2, Type 3, Type 4 and Type 5 aerials and illustrations.

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## References

Anonymous 1877 Burke River. *Telegraph* 8 October, p.3.

Barton, H.J. 2001 Mobilising Lithic Studies: An Application of Evolutionary Ecology to Understanding Prehistoric Patterns of Human Behaviour in the Simpson Desert, Far Western Queensland. Unpublished PhD thesis, University of Sydney, Sydney.

Bird, M.I., D. O’Grady and S. Ulm 2016 Humans, water, and the colonization of Australia. *Proceedings of the National Academy of Sciences of the United States of America* 113(41):11477–11482. <https://doi.org/10.1073/pnas.1608470113>

Blake, B. 1979 Pitta-Pitta. In R.M.W. Dixon and B. Blake (eds), *Handbook of Australian Languages*, pp.182–242. Canberra: ANU Press. <https://doi.org/10.1075/z.hal1.07bla>

Blundell, V.J. 1975 Aboriginal Adaptation in Northwest Australia Unpublished PhD thesis, University of Wisconsin, Madison.

Border, A. and M.J. Rowland 1990 The Mitchell Grass Downs Biogeographical Zone (Queensland): A Heritage Resource Assessment. Unpublished report to Heritage Branch, Queensland Department of Environment and Heritage and the Australian Heritage Commission.

Brien, E. 2021 In Stone and Wood: The Distribution, Chronology, and Significance of Built Structures of Pitta Pitta Country, Western Queensland. Unpublished BA(Hons) thesis, School of Humanities, Languages and Social Sciences, Griffith University, Brisbane.

Bronk Ramsey C. 2009 Bayesian analysis of radiocarbon dates. *Radiocarbon* 51(1):337–360. <https://doi.org/10.1017/S0033822200033865>

Builth, H. 2004 Mt Eccles lava flow and the Gunditjmarra connection: A landform for all seasons. *Proceedings of the Royal Society of Victoria* 116(1):165–184.

Burke, H. and L.A. Wallis 2019 *Frontier Conflict and the Native Mounted Police in Queensland Database*. DOI: <https://doi.org/10.25957/5d9fb541294d5>

Bureau of Meteorology (BoM) 2021 *Climate Data Online (Weather station 038003)*. Retrieved 20 August 2021 from <http://www.bom.gov.au/climate/data/index.shtml>.

Clarke, A. 1991 Lake Condah Project Aboriginal Archaeology: Resource Inventory. Melbourne: Aboriginal Affairs Victoria.

Clarke, A. 1994 Romancing the stones: The cultural construction of an archaeological in the Western District of Victoria. *Archaeology in Oceania* 29(1):1–15. <https://doi.org/10.1002/arco.1994.29.1.1>

Coutts, P.J.F., D.C. Witter and D.M. Parsons 1977 *Impact of European Settlement on Aboriginal Society in Western Victoria*. Melbourne: Aboriginal Affairs Victoria.

Cox, J.C. 1881 Notes on some of the habits and customs of Australian Natives in Queensland. *Proceedings of the Linnaean Society of New South Wales* 5:633–636. <https://doi.org/10.5962/bhl.part.15898>

Davidson, I. 1983 On the edge of the Simpson: Recent additions to understanding of prehistoric artefact distributions in arid Australia. *Australian Archaeology* 17:27–37. <https://doi.org/10.1080/03122417.1983.12092907>

Davidson, I. 2008 Ethnological studies and archaeology of north west central Queensland. In R. McDougall and I. Davidson (eds), *The Roth Family, Anthropology, and Colonial Administration*, pp.121–132. Walnut Creek, CA: Left Coast Press.

Davidson, I., H. Burke and S. Mitchell 1989 Archaeological Sites in Northwest Central Queensland: A Report to the Australian Heritage Commission. Unpublished report to Australian Heritage Commission.

Davidson, I., H. Burke, L.A. Wallis, B. Barker, E. Hatte and N. Cole 2018 Connecting Myall Creek and the Wonomo. In J. Lydon and L. Ryan (eds), *Remembering the Myall Creek Massacre*, pp.100–111. Sydney: NewSouth Publishing.

Davidson, I., H. Burke, L. Sullivan, L.A. Wallis, U. Artym and B. Barker 2019 Cultural conflict in text and materiality: The impact of words and lead on the northwest Queensland colonial frontier, Australia. *World Archaeology* 51(5):724–740. <https://doi.org/10.1080/00438243.2020.1711153>

Davidson, I., N. Cook, M. Fischer, M. Ridges, J. Ross and S. Sutton 2005 Archaeology in another country: Exchange and symbols in north-west central Queensland. In I. Macfarlane, M.J. Mountain and R. Paton (eds), *Many Exchanges: Archaeology, History, Community and the Work of Isabel McBryde*, pp.103–130. Aboriginal History Monograph 11. Canberra: Aboriginal History.

Davidson, I., I. Tarrago and T. Sullivan 2004 Market forces. In V. Donovan and C. Wall (eds), *Making Connections: A Journey along Central Australian Aboriginal Trading Routes*, pp.12–23. Brisbane: Arts Queensland.

Davidson, I., R. Cliff and T. Sullivan 1991 Burke River Pipeline. A Survey of the Impact on Archaeological Sites. Unpublished report to Cyprus Gold Australia Corporation.

Donders, T.H., S.G. Haberle, G. Hope, F. Wagner and H. Visscher 2007 Pollen evidence for the transition of the eastern Australian climate system from the post-glacial to the present-day ENSO mode. *Quaternary Science Reviews* 26(11–12):1621–1637. <https://doi.org/10.1016/j.quascirev.2006.11.018>

Gould, R.A. 1968 Living archaeology: The Ngatjatjara of Western Australia. *Southwestern Journal of Anthropology* 24(2):101–122. <https://doi.org/10.1086/soutjanth.24.2.3629417>

Hiscock, P. 1988 A cache of tulas from the Boullia district, western Queensland. *Archaeology in Oceania* 23(2):60–70. <https://doi.org/10.1002/j.1834-4453.1988.tb00188.x>

- Hogg, A., T. Heaton, Q. Hua, J. Palmer, C. Turney, J. Southon, A. Bayliss, P.G. Blackwell, G. Boswijk, C.B. Ramsey, C. Pearson, F. Petchey, P. Reimer, R. Reimer and L. Wacker 2020 SHCal20 Southern Hemisphere calibration, 0–55,000 years cal BP. *Radiocarbon* 62(4):759–778. <https://doi.org/10.1017/RDC.2020.59>
- Keen, I. 2021 Foragers or farmers: *Dark Emu* and the controversy over Aboriginal agriculture. *Anthropological Forum* 31(1):106–128. <https://doi.org/10.1080/00664677.2020.1861538>
- Kelly, J.D. 1968 Hut sites, rock engravings, stone arrangements, and tjurunga. Mulligan River, Queensland. *Mankind* 6(11):563–566. <https://doi.org/10.1111/j.1835-9310.1968.tb00333.x>
- Kemp, J., J. Olley, J. Stout, T. Pietsch and Mithaka Aboriginal Corporation 2022 Dating stone arrangements using optically stimulated luminescence and fallout radionuclides. *Geoarchaeology* 37(3):439–449. <https://doi.org/10.1002/gea.21902>
- Kotwicki, V. and R. Allan 1998 La Niña de Australia – Contemporary and palaeo-hydrology of Lake Eyre. *Palaeogeography, Palaeoclimatology, Palaeoecology* 144(3–4):265–280. [https://doi.org/10.1016/S0031-0182\(98\)00122-9](https://doi.org/10.1016/S0031-0182(98)00122-9)
- Letnic, M. 2000 Dispossession, degradation and extinction: Environmental history in arid Australia. *Biodiversity & Conservation* 9:295–308. <https://doi.org/10.1023/A:1008913826686>
- Lourandos, H. 1980 Change or stability?: Hydraulics, hunter-gatherers and population in temperate Australia. *World Archaeology* 11(3):245–264. <https://doi.org/10.1080/00438243.1980.9979765>
- Maloney, T.R., L.A. Wallis, I. Davidson, H. Burke, B. Barker, D. Melville, G. Jacks and Y.L. Perston 2022 Lithic technologies from a stone hut and arrangement complex in Pitta Pitta Country Queensland, and the detection of social learning in archaeology. *Australian Archaeology* 88(2):180–199. <https://doi.org/10.1080/03122417.2022.2082001>
- May, D. 1983 *From Bush to Station: Aboriginal Labour in the North Queensland Pastoral Industry, 1861–1897*. Studies in North Queensland History 5. Townsville: History Department, James Cook University.
- May, D. 1994 *Aboriginal Labour and the Cattle Industry: Queensland from White Settlement to the Present*. Studies in Australian History 13. Cambridge: Cambridge University Press.
- McBryde, I. 1987 Goods from another country: Exchange networks and the people of the Lake Eyre Basin. In D.J. Mulvaney and J.P. White (eds), *Australians: A Historical Library Australians to 1788*, pp.253–273. Broadway: Fairfax, Syme and Weldon Associates.
- McDonald, J. and M. Berry 2017 Murujuga, northwestern Australia: When arid hunter-gatherers became coastal foragers. *The Journal of Island and Coastal Archaeology* 12(1):24–43. <https://doi.org/10.1080/15564894.2015.1125971>
- Memmott, P. 2007 *Gunyah, Goondie and Wurley: The Aboriginal Architecture of Australia*. St Lucia, QLD: University of Queensland.
- Mulvaney, D.J. 1976 “The chain of connection”: The material evidence. In N. Peterson (ed.), *Tribes and Boundaries in Australia*, pp.72–94. Social Anthropology Series 10. Canberra: Australian Institute of Aboriginal Studies.
- O’Connor, S. 1987 The stone house structures of High Cliffy Island, north west Kimberley, WA. *Australian Archaeology* 25:30–39. <https://doi.org/10.1080/03122417.1987.12093123>
- O’Connor, S., L. Zell and A. Barham 2007 Stone constructions on Rankin Island, Kimberley, Western Australia. *Australian Archaeology* 64:15–22. <https://doi.org/10.1080/03122417.2007.11681845>
- Pascoe, B. 2014 *Dark Emu Black Seeds: Agriculture or Accident?* Broome: Magabala Books.
- Perston, Y., L.A. Wallis, H. Burke, C. McLennan, E. Hatte and B. Barker 2022 Flaked glass artifacts from nineteenth-century Native Mounted Police camps in Queensland, Australia. *International Journal of Historical Archaeology* 26:789–822. <https://doi.org/10.1007/s10761-021-00624-5>
- Porr, M. and E. Vivian-Williams 2021 The tragedy of Bruce Pascoe’s *Dark Emu*. *Australian Archaeology* 87(3):300–304. <https://doi.org/10.1080/03122417.2021.1991378>
- Reynolds, H. 2006 *Other Side of the Frontier: Aboriginal Resistance to the European Invasion of Australia*. Sydney: UNSW Press.
- Richards, J. 2008 *The Secret War: A True History of Queensland’s Native Police*. St Lucia, QLD: University of Queensland Press.
- Ritchie, M. 1996 Marion Downs Cultural Heritage Sites. Unpublished report to North Australian Pastoral Company.
- Robins, R. 1981 Four Aboriginal dwelling sites in southwest Queensland. *Australian Archaeology* 12:79–90. <https://doi.org/10.1080/03122417.1981.12092802>
- Roth, W.E. 1910 North Queensland Ethnography. Bulletin No. 16. Huts and shelters. *Records of the Australian Museum* 8(1):55–66. <https://doi.org/10.3853/j.0067-1975.8.1910.934>
- Schiffer, M.B. 1986 Radiocarbon dating and the “old wood” problem: The case of the Hohokam chronology. *Journal of Archaeological Science* 13(1):13–30. [https://doi.org/10.1016/0305-4403\(86\)90024-5](https://doi.org/10.1016/0305-4403(86)90024-5)
- Shulmeister, J. and B.G. Lees 1995 Pollen evidence from tropical Australia for the onset of an ENSO-dominated climate at c. 4000 BP. *The Holocene* 5(1):10–18. <https://doi.org/10.1177/095968369500500102>
- Silcock, J. 2009 Identification of Permanent Refuge Waterbodies in the Cooper Creek and Georgina-Diamantina River Catchments for Queensland and South Australia: Final Report. Unpublished report to South Australian Arid Lands Natural Resource Management Board.
- Silcock, J.L. 2010 Experiencing waterholes in an arid environment, with particular reference to the Lake Eyre Basin, Australia: A review. *Geographical Research* 48(4):386–397. <https://doi.org/10.1111/j.1745-5871.2010.00642.x>
- Simmons, A. 2007 Life in a Corridor: An Archaeological Investigation of the Diamantina Channel Country, A Western Queensland Corridor. Unpublished PhD thesis, School of Social Science, The University of Queensland, Brisbane.
- Smith, M.A. 2013 *The Archaeology of Australia’s Deserts*. New York: Cambridge University Press.
- Sutton, P. and K. Walshe 2021 *Farmers or Hunter-Gatherers? The Dark Emu Debate*. Melbourne: Melbourne University Publishing. <https://doi.org/10.2307/jj.1176863>
- Turney, C.S.M. and D. Hobbs 2006 ENSO influence on Holocene Aboriginal populations in Queensland, Australia. *Journal of Archaeological Science* 33(12):1744–1748. <https://doi.org/10.1016/j.jas.2006.03.007>
- Wallis, L.A., B. Barker, H. Burke, M. Dardengo, R. Jansen, D. Melville, G. Jack, A. Pagels, A. Schaefer and I. Davidson 2021 Huts and stone arrangements at Hilary Creek, western Queensland: Recent fieldwork at an Australian Aboriginal site complex. *Queensland Archaeological Research* 24:1–47. <https://doi.org/10.25120/qar.24.2021.3799>
- Wallis, L.A., I. Davidson, H. Burke, S. Mitchell, B. Barker, E. Hatte, N. Cole and K.M. Lowe 2017 Aboriginal stone huts along the Georgina River, southwest Queensland. *Queensland Archaeological Research* 20:1–8. <https://doi.org/10.25120/qar.20.2017.3584>

Wesson, J. 1981 Excavations of Stone Structures in the Condah Area, Western Victoria. Unpublished Masters Preliminary (partial fulfillment) thesis, Division of Prehistory, La Trobe, Victoria.

Westaway, M.C., D. Williams, K. Lowe, N.J. Wright, R. Kerkhove, R. Silcock, J. Goringe, J. Miskiewicz, R. Wood, R. Adams, T. Manne, S. Adams, T. Miscamble, J. Stout, G.D. Wrobel, J. Kemp, J. Hendry, M. Goringe, B. Goringe, K. Lander, S. Goringe, I. Andrews and M. Collard 2021 Hidden in plain sight: The archaeological landscape of Mithaka Country, south-west Queensland. *Antiquity* 95(382):1043–1060. <https://doi.org/10.15184/aqy.2021.31>

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