



A 6-foot deep mystery: The 1961 excavation at Cave Cliffs Rockshelter (Warne's Cave) on the Murray River, South Australia

Craig Westell, Amy Roberts, Ian Moffat, Marc Fairhead & River Murray and Mallee Aboriginal Corporation

To cite this article: Craig Westell, Amy Roberts, Ian Moffat, Marc Fairhead & River Murray and Mallee Aboriginal Corporation (08 Dec 2023): A 6-foot deep mystery: The 1961 excavation at Cave Cliffs Rockshelter (Warne's Cave) on the Murray River, South Australia, Transactions of the Royal Society of South Australia, DOI: [10.1080/03721426.2023.2288972](https://doi.org/10.1080/03721426.2023.2288972)

To link to this article: <https://doi.org/10.1080/03721426.2023.2288972>



© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 08 Dec 2023.



Submit your article to this journal [↗](#)



Article views: 406



View related articles [↗](#)



View Crossmark data [↗](#)

A 6-foot deep mystery: The 1961 excavation at Cave Cliffs Rockshelter (Warne's Cave) on the Murray River, South Australia

Craig Westell ^a, Amy Roberts ^a, Ian Moffat ^a, Marc Fairhead ^a
and River Murray and Mallee Aboriginal Corporation^b

^aArchaeology, College of Humanities, Arts and Social Sciences, Flinders University, Bedford Park, South Australia; ^bc/o South Australian Native Title Services, Adelaide, Australia

ABSTRACT

This article reviews and analyses documented reports about the Aboriginal site variously reported in the literature as Cave Cliffs Rockshelter and Warne's Cave located on the Murray River in South Australia. The site is also considered in relation to broader historical and archaeological contexts. Numerous inconsistencies within the documentation are explored including: 1) The traditional Aboriginal narrative/s attributed to the rockshelter; 2) The nomenclature assigned to the rockshelter; 3) The nature of the archaeological investigations at the rockshelter (and personnel involved); and 4) The outcomes of the archaeological research, including the housing of any collected assemblage/s. The results of recent archaeological surveys of the site (including geophysical investigations) are also reported and opportunities for potential future work are outlined. Given the nature and context of the site, we argue that the site should have been afforded significantly more respect and recognition than reflected in the level of documentation and informal nature of excavations.

ARTICLE HISTORY

Received 16 September 2023
Accepted 24 November 2023

KEYWORDS

Murray River; rockshelter; geophysics; aboriginal; archaeology

Introduction

In August 1963, *The Murray Pioneer* (Anon, 1963) published an article (Figure 1) describing an archaeological excavation within a rockshelter at Cave Cliffs, a spectacular limestone escarpment fronting the Murray River downstream of Overland Corner in South Australia (SA) (Figure 2). The article had been written two years after the excavation and was based on information seemingly provided by Norman Tindale, of the South Australian Museum (SAM). According to the article, two trenches had revealed a stratified archaeological deposit including faunal remains and combustion features continuing to a depth of almost two metres. Despite the apparent archaeological value of the site, this article appears to be the only published account of the excavations.

CONTACT Craig Westell  craig.westell@flinders.edu.au  Archaeology, College of Humanities, Arts and Social Sciences, Flinders University, Bedford Park, South Australia

© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

"THE MURRAY PIONEER", Thurs, Aug. 8, 1963

Historic Cave in Cave Cliffs Near Devlin's Pound

Near Devlin's Pound, at the locality known as Cave Cliffs, there is an historic cave, of which our Overland Corner correspondent has supplied some interesting details.

Overland Curr., Aug. 4. Many years ago an old Aborigine, a surviving member of the now extinct Adelaide tribe, related a legend to Mr. N. D. Tindale, anthropologist at the SA Museum, which indicated the possibility of finding a cave in the Upper Murray in which natives had camped for long periods.

Firesticks

Briefly, the legend stated that after each winter, when all the firesticks had been extinguished by rain the tribe obtained fresh fire from another tribe who kept a fire burning in a cave during the winter. From the description given it was judged that the cave was situated in the vicinity of Overland Corner, next to the River on its north side.

The cave is near the base of limestone cliffs adjacent to the River near Devlin's Pound about six miles downstream from Overland Corner. It can only be approached with difficulty by car or on foot from the eastern side and then the River must be at a low level, since a lagoon joins the River not far from its entrance. The cliffs are about 120 feet high in the area and present a fine view, particularly where the River flows against them (see photo).

Old Track

A little east of the cave are some steep creeks and the nearest has the remains of an old track following it up to the high ground above the River.

As many old stone implements have been found near this track it could have been made by natives long ago.

The cave is better termed a rock shelter, since it is only 40 feet wide, 60 feet in length and 15 feet high at its mouth. The walls are yellow fossiliferous limestone and since soft, hold masses of carved names, initials and dates, including: Johnson 1910, W. A. Carvoso 1933, D. A. McBain 1930, A. L. Spencer February 6, 1937, Les Smith 1926, Bill Sheppard, Cobocoga, J. A. Smith 1926, E. Hall 1934, J. Peterson 1934, C. Her 1911, and more recently N. Spencer, G. E. Adamson 1947, K. Kieeman 1960 and R. O. Fox.

Nests in Roof

The roof of the cave is covered with the mud nests of swallows and wasps, partly weathered out fossil corals, oysters, sea urchins and shells and an old "canoe" tree stands at the entrance.

The formation of the cave is obvious. Each side wall is a joint plane (tension crack in the rock) and the roof is a hard, more resistant limestone layer. At one time the River ran against the cliffs and washed out and dissolved the stone at normal river level, causing a large limestone block to fall out from between the joint planes, and the harder limestone layer.

Undercutting of the cliffs is still occurring nearby and some large

rockfalls can be seen lying in the River at the base of the cliffs (see photo).

In 1961 two excavations were made in the floor of the cave to see if it had been occupied by natives in the past.

The first excavation was made at the rear of the cave near the base of a large fall of rock from the roof.

Human Habitation

The first 27 inches of this hole yielded silt and other flood debris, some recent animal bones and nondescript pieces of flint. A little charcoal and mussel shell remains indicated at least some native occupancy. Thereafter a sequence of layers proved beyond doubt human habitation over a long period. A profusion of mussel shells, ashes and some bones were encountered. Unfortunately repeated falls of rock from the roof during the past hampered digging, distorted the habitation layers and finally terminated further digging at 72 inches.

A second hole was then dug near the entrance and yielded the following sequence of layers. (The first 64 inches were

dug out using pick and shovel and the remaining data obtained from samples taken by a post hole borer used at the bottom of the bit).

12 inches - Flood deposits. At least five major flood layers were evident, fine sand, rounded pebbles of limestone.

Twelve to 39 inches - Thick ash, charcoal, mussel and small shell layer containing many flints brought in by natives. On one side of the hole a burnt, compressed layer was cut. Several bones were found.

Thirty-nine to 53 inches - Thick ash, charcoal and shell continued, without, however, any sign of bone, but a greater number of burnt limestone rocks and pebbles.

Fifty-three to 1031 inches - Stiff grey, black and brown clay with variable amounts of charcoal, mussel shells and burnt limestone. Roof fall material increased toward the end of the hole, which finished on firm limestone assumed to be the floor of the cave.

All the material taken from the holes was

searched for bones, stone implements and any other items of interest.

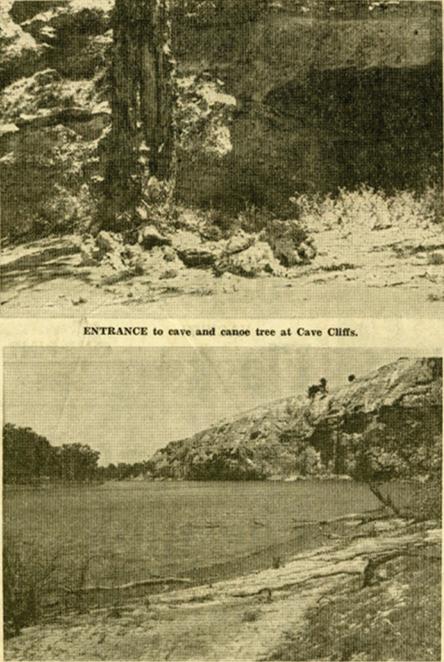
Examined at Museum

The stones or rock fragments which appeared as though they could be native implements or flakes from them were washed and carefully examined at the SA Museum in order to ascertain the cultures responsible for the layers and hence the approximate age of them. Unfortunately not one rock of dozens examined could be classified as a native artifact.

All the bones collected were animal bones and no two of them came from the same animal.

However, by comparing the thickness of the deposits (nearly eight feet resulting from human activity) with those of excavated rockshelters near Mildote, their age could date back the order of five or six thousand years at least. Since charcoal is plentiful in the sequence dating by radio active carbon determination would fix age and further work in this direction is contemplated for the future.

Mr. Tindale thinks that there are many more ancient campsites to be found in rock shelters along the River, and in time by careful study more will be learnt of the Aboriginal cultures which existed in the ten or so thousand years before whites settled in Australia.



CAVE CLIFFS, eight miles down stream from Overland Corner, taken during low river, 1961.

Figure 1. The Murray Pioneer article (Anon., 1963) describing Cave Cliffs Rockshelter and 1961 excavations.

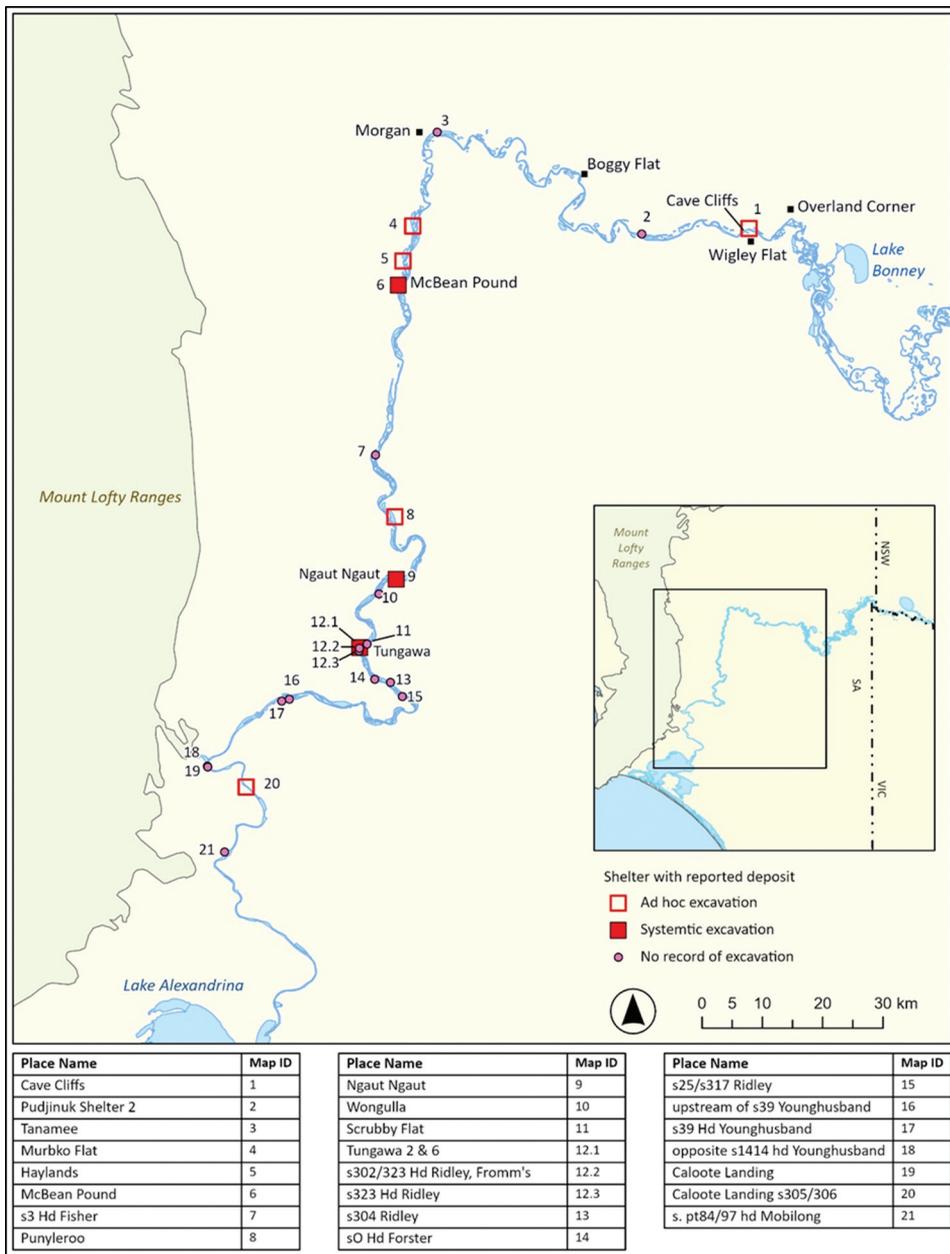


Figure 2. The location of Cave Cliffs Rockshelter and other places mentioned in the text. Also shown are the locations of other rockshelters along the Murray River in SA that have been reported to contain archaeological deposits.

Unfortunately, it provided scant detail about the method of excavation, the site stratigraphy, or the curation and analysis of the excavated materials.

The cursory reporting of the Cave Cliffs site is curious on several points. Tindale’s prolific publication record had included detailed accounts of his prior work at the Ngaut

Ngaut Rockshelter (Devon Downs) (Hale & Tindale, 1930; Tindale, 1957), work which had demonstrated the value of well-preserved rockshelter sequences in providing invaluable insights into Holocene Aboriginal lifeways on the river. Indeed, this work had been foundational to archaeological practice and theory in Australia (Roberts & Mannum Aboriginal Community Association Inc, 2012). Some of the earliest use of radiocarbon dating in Australia would be subsequently applied to the Ngaut Ngaut shelter sequence (e.g. Broecker et al., 1956). The excavations at Cave Cliffs also occurred within a year of the publication of the results of the Tungawa Rockshelter No. 2 (Fromm's Landing) excavation conducted by John Mulvaney (1960) and presented a clear opportunity for a comparative commentary. Ultimately, the Cave Cliffs excavation would represent one of the last archaeological excavations conducted at any rockshelter on the Murray River in SA with the exception of a small-scale and largely unpublished excavation at McBean Pound in 1962 by Graeme Pretty of the SAM (Pretty, 1977a, p. 289, 1988:S38) and follow-up work conducted at Tungawa Rockshelter No. 6 in 1960 and 1963 (Mulvaney et al., 1964).

In this paper, we present the results of work undertaken to more fully document, evaluate and contextualise Cave Cliffs Rockshelter. This work forms part of a collaborative research project being undertaken between the River Murray and Mallee Aboriginal Corporation (RMMAC) and Flinders University. Site recording methods included a thorough survey (including total station, scarred tree and historical inscription recording) as well as geophysical investigations, which were undertaken to develop a better understanding of the nature of the rockshelter's geomorphology and to attempt to locate the original excavation trenches. A review of archival material enabled us to confidently associate the excavations at Cave Cliffs with an entry in Tindale's field journals entitled "Sam Warne's Wigley Flat Excavation" (Tindale, 1961–1965, pp. 807–815) and led to the (re)discovery and cataloguing of several bags of material that were excavated in 1961 and are currently housed at the SAM.

Location and setting

The name "Cave Cliffs" refers to a 1.5 km stretch of sheer limestone escarpment overlooking the Murray River in the area opposite from Wigley Flat, 9 km downstream of Overland Corner (Figures 2 and 3). According to Tindale (1974), this area falls within the traditional territory of the Ngawait people, although we acknowledge that such "boundaries" are not definitive and that numerous other iterations exist in the ethnohistorical literature (see Roberts et al., 2021). The RMMAC's membership is primarily made up of the descendants of apical ancestors who originated from Aboriginal groups occupying sections of the Murray River corridor and adjoining mallee country, including the Ngawait region. These descendants continue to maintain deep spiritual and physical connections to their River Country (see Roberts et al., 2017, 2023).

The bounding cliff-lines of the gorge are formed in fossiliferous limestone and calcareous sandstone of the Nor West Bend Formation and older Murray Group sediments (Firman, 1971). The cliff forms the northern side of a 40 m deep, bedrock constrained gorge (the Murray River Gorge) that contains the Murray River and a narrow (~1 km wide) floodplain. The shelter is situated at the eastern end of the escarpment at a point where the river directly impacts the base of the cliff (Figure 3).



Figure 3. (Left) view looking west (downstream) along the Cave Cliffs escarpment from outside of the shelter and (right) a view looking north from the river to the shelter entrance (2 May 2022).

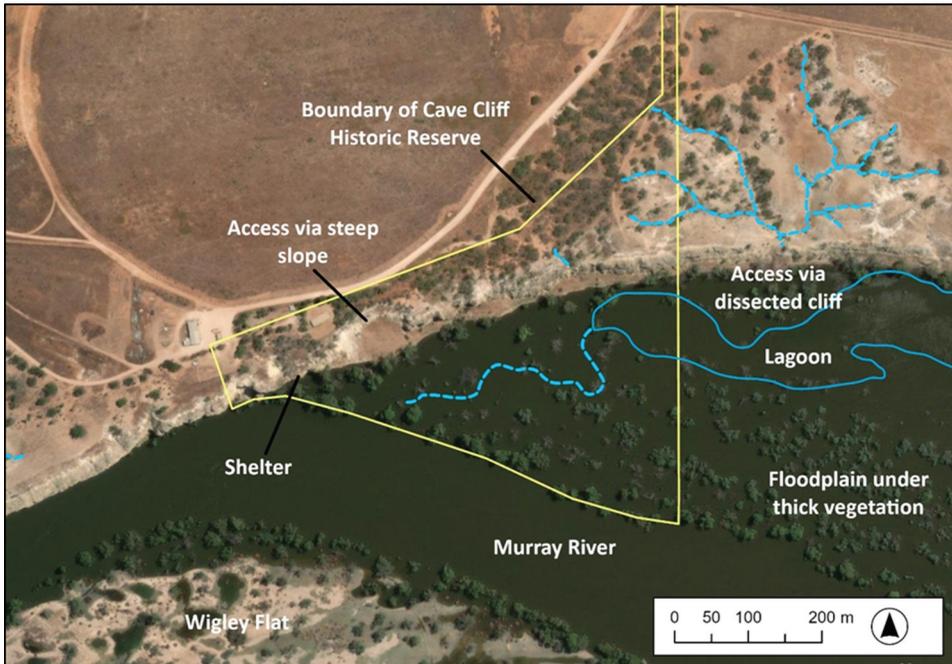


Figure 4. An annotated aerial image of the area surrounding Cave Cliffs Rockshelter.

The river trends away from the cliff upstream (east of) the rockshelter where it is separated from the cliff by a narrow floodplain (600–700 m wide) containing a shallow lagoon and a series of flood runner channels (Figure 4). The geomorphological setting of the rockshelter is typical of this section of the Murray River Gorge, though the development of rockshelters of similar scale to the Cave Cliffs feature is, however, seemingly rare. The nearest comparable extant shelter occurs ~20 river km downstream at Pudjinuk

(Figure 2) and no analogous shelters occur upstream in SA (see Roberts et al., 2018; Roberts et al., 2019).¹ Caves and rockshelters occur more frequently within the lower Murray River Gorge downstream of Morgan (see Figure 2). As such, the Cave Cliffs shelter represents a locally unique archaeological record in an area otherwise dominated by open context sites (see for example Westell, 2022).

The rockshelter, together with a scarred river red gum (*Eucalyptus camaldulensis*) and shell middens along the rim of the cliff are contained within a Crown Reserve that was formerly managed by the National Trust of SA as the Cave Cliff Historic Reserve (Figure 4). Access to the rockshelter is by boat or via a steep descent from the cliff top across a scree slope adjacent to the shelter or an ephemeral gully ~400 m further to the east.

A history of reporting

Historical context – rockshelter recordings, personnel and personalities

Public interest in Aboriginal history and archaeology along the Murray River has always existed on some level, reflected, for instance, in the popular writings of the Naturalist movement in the 1920–30s (Archer Russell, 1921a, 1921b, 1923, 1924; Bellchambers, 1931). The SAM routinely acquired cultural materials from locations on the river from the early 1900s, both directly by museum personnel and via public donations. An estimated 305 individual locations are represented in the 2,262 line-entries in the SAM collection catalogue that can be confidently provenanced to the river between Renmark and Wellington. The majority of entries [1,907, ~84%] relate to ancestral remains. This figure is probably a small percentage of the total number of locations and the volume of material collected by the public along the river. A timeline for the SAM collections, as summarised in Figure 5, indicates a higher trend in public donations from the mid-1960s through the early 1970s, and potentially during the late 1930s.

Tindale and other SAM personnel were actively involved in survey, site recording and material collection along the river from the 1920s. As summarised in Table 1, the majority of Murray River shelters that are reported to contain archaeological material

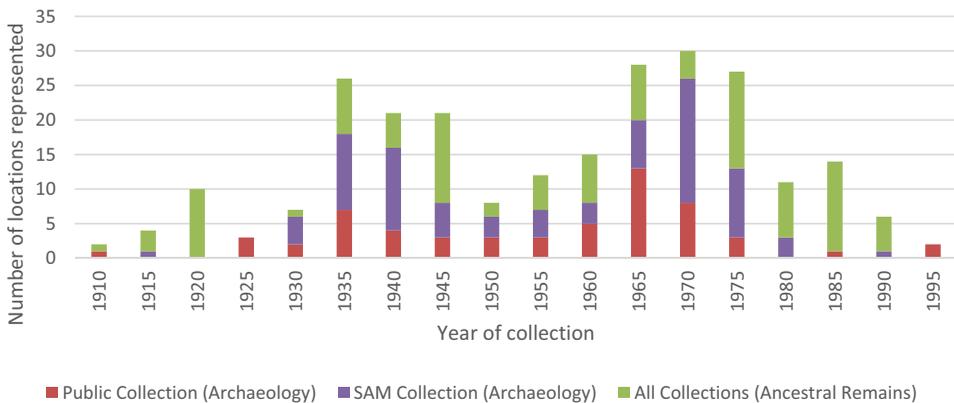


Figure 5. A timeline for the collections of archaeological and ancestral remains from the Murray River held by the South Australian Museum.

Table 1. Summary details of rockshelters along the Murray River reported to contain archaeological deposits. Descriptions are based on summaries of the original reporting.

Map ID	Site Name	Reference(s)	Year	Description	Excavation detail	¹⁴ C
1	Cave Cliffs/ Wame's Cave	Tindale (1961–1965, pp. 807–815)	1962	'Quite large' cave with occupation debris excavated in two trenches in 1961 to a maximum depth of 2.1 m. Several horizons of freshwater mussel shell and abundant ash. Also refers to partially buried engraving on wall. Detail provided for Trench A includes a rough section drawing showing lensed ash and shell features.	Shovel trench with minimal control or record. Rough section drawing and general description of assemblage only.	Sample taken but no record of result.
2	Pudjinuk Rockshelters Nos 1 & 2	Anon. (1963) Tindale (1961–1965, pp. 807–815); see also Roberts et al. (2019); Roberts et al. (2018)	1963 1962	Further detail provided on stratigraphy in Trench B, including upper layer (SU1) of flood-derived material, (SU2) ash, shellfish and unspecified bones, (SU3) thick ash, shell and burnt rock, and (SU4) clay with charcoal, shell and burnt rock to hard bedrock at 2.6 m depth. Potentially stripped out by flooding. Description includes profile drawings, description of engraved art and impact of flooding as described by D.B. Mack (see Tindale 1961–1965:801). See also see also Roberts et al. (2019); Roberts et al. (2018) for research on petroglyphs and historical inscription assemblages.	n/a	n/a
3	Tanamee	Boehm (1939) Boehm (1943)	1939	Refers to traditional narrative. Shelter measuring 50 ft with overhang of 10–11 ft and height of shelter at the front 4 ft 8 in.	n/a	n/a
4	Murbko Flat	Pretty (1977b, p. 64) Tindale (1940–1956, pp. 612–613)	1977 1961	Describes 'very thick' carbon deposit. Report by R. Teusner to Tindale describing 'dug' shelter on cliff ~50 ft above floodplain measuring 45 x 10 ft, with 4 ft of deposit and as much as 1800 cubic ft of debris. The inner part of the cave had been 'dug' with partly preserved woven rush found at 8 inches depth. Several burials were also exposed by Teusner. SAM collection G/2595 relates to this site but no detail is available.	n/a Ad hoc excavation by Teusner but no detail is available. Tindale planned to visit the site but there are no records of this.	n/a n/a

(Continued)



Table 1. (Continued).

Map ID	Site Name	Reference(s)	Year	Description	Excavation detail	¹⁴ C
5	Haylands	Sheard (1928); see also Pretty (1977b)	1928	Shelter measuring 27 x 8 ft with floor composed of ashes, 'debris' and freshwater mussel. Four sections were obtained to a maximum depth of 66" with sterile sand overlying layers of ash and shell. Two additional shelters to the north containing occupation deposit were also noted but no descriptions are provided.	Probing/auger conducted to a maximum depth of 66" with a rough section drawing shown based on this sampling.	n/a
6	McBean Pound	Pretty (1977b, p. 289)	1962	Refers to 'test excavation' but provides only limited information (see Paton below).	No detail available, though presumed to be formal excavation.	n/a
		Pretty (1988)	1988	Refers to McBean Pound shelter and provides radiocarbon ages but no further detail of excavation provided.	n/a	250 BP (ANU 3359) 480 BP (ANU 3360) n/a
		Paton (1983, p. 84)	-	Refers to 1962 excavation by Pretty in small overhang above the McBean Pound fish trap. A large trench (3 x 1.5 m) was excavated to a depth of 1 m. No dates or section drawings are available. The deposit included large amounts of mammal, fish, crustacean, reptile and freshwater mussel.	n/a	n/a
7	s3 Fisher	Tindale (1930–1952, p. 18)	1932	Describes a shelter measuring ~20 x 6 ft with 2 ft of debris comprising freshwater mussel and heat retainer (burnt limestone).	n/a	n/a
8	Punyleroo	Parkin (1938); see also Pretty (1977b), Tindale (1939a); Bellchambers (1931); Roberts et al. (2022); Roberts et al. (2023)	1937	Includes cross-section and plan of cave. Parkin (1938) refers to Fenner conducting an excavation and exposing a 9" thick ash/shell unit and quartz flakes.	Ad hoc possibly using shovels based on photo image in Parkin (1938, p. 9).	n/a
9	Ngaut Ngaut	Sheard (1927a)	1926	Shelter measuring 70x16 ft with 3 ft of deposit (ashes, freshwater mussel, quandong kernels, Murray cod bones, small animal bones, burnt rock, millstone and flakes).	Small ad hoc test pit at southern edge of the shelter.	n/a
		Tindale (1922–1930, pp. 353–438)	1929	Field notes relating to excavations at Ngaut Ngaut (and Tartanga). A diverse assemblage is described including a variety of shellfish (not just freshwater mussel; see table p.423). Notes include various section and other drawings.	Formal excavation in three trenches.	n/a

(Continued)

Table 1. (Continued).

Map ID	Site Name	Reference(s)	Year	Description	Excavation detail	¹⁴ C
	Hale and Tindale (1930); see also Broecker et al. (1956)		1930	Summary description of 1929 excavations. Excavated to c. 6 m depth and included a variety of materials including freshwater mussel, numerous faunal remains (bone, gastroliths, otoliths, eggshell etc.), some flora (e.g. quandong kernels), hearth stones, ochre, bone points and more.	Early formal excavation.	2980±90 BP (3351–2870 cal BP) (Gak-cal BP) (1021)
						3460±100 (3967–3415 cal BP) (Gak-cal BP) (1022)
						4250±180 BP (5303–4259 cal BP)
						Lamont lab
						4290±140 BP (5284–4430 cal BP)
						Lamont lab
						(L-271G)
						4360±110 BP (5291–4581 cal BP) (Gak-cal BP) (1023)
						5180±100 BP (6180–5655 cal BP) (Gak-cal BP) (1024)
						n/a
	Tindale (1930–1952, p. 171)		1935	Description of sand banks built up over shelter since the 1929 excavations.	n/a	n/a
	See also Bland et al. (2012); Hutchinson (2012); Roberts et al. (2015a); Roberts et al. (2015b); (Roberts et al. 2014a; Roberts et al. 2014b; Roberts et al. 2012); Smith (1982); Wilson et al. (2022) etc. for additional materials		1980s onwards	Reanalyses, syntheses, interpretive materials and rock art research.	n/a	n/a

(Continued)



Table 1. (Continued).

Map ID	Site Name	Reference(s)	Year	Description	Excavation detail	¹⁴ C
10	Wongulla Series	Sheard (1927b, pp. 137–138); see also summary in Pretty (1977b) and Bellchambers (1931)	1927	Describes three shelters with the largest measuring 30 x 12 ft and containing beds of ash and debris to 3 ft, layered with hammerstones, quartz and quartzite artefacts, bones of Murray cod and freshwater mussel. A second shelter contained ashes and debris and the third shelter contained engravings. SAM collection A13499 includes ancestral remains, spear and part of a string bag (collected by NBT 1927).	n/a	n/a
11	Scrubby Flat	Sheard (1927b, p. 140)	1927	Describes quandong, bones of Murray cod and animal, large amounts of freshwater mussel and a hammerstone on the floor of small shelter measuring 12 x 6 ft. Possibly also detached rock art fragment (SAM A56339).	n/a	n/a
12a	Tungawa Rockshelter No. 2	Sheard (1927b)	1927	A 'continuous bed of ashes and debris' across the entire floor to a depth of ~6 ft (test pit excavated by Tindale). Stratigraphy described as a bedrock base, lower 17" of sterile sand, 30" intermittent layers of burnt sand and charcoal, 25" of continuous ash, upper 4" ash and debris. Granite and slate pieces were identified at depth. Describes another shelter with rock art 3 chains upstream.	Probe/auger	n/a
		Tindale (1930–1952, pp. 30–31)	1932	Recorded landscape profile and description.	n/a	-

(Continued)

Table 1. (Continued).

Map ID	Site Name	Reference(s)	Year	Description	Excavation detail	¹⁴ C
		Mulvaney (1960)	1956–58	Refers to six shelters in total along the Fromm's cliff line located by Mountford in 1952. Initial probing using a soil auger reached a depth of 14 ft at rockshelter shelter 2 and 5 ft in rockshelter 6. Mulvaney (University of Melbourne) visited site in 1952 and excavated in 1956–58. A diverse assemblage of stone, animal bone, shell, wooden artefacts and bone points was recovered. Ancestral remains were exposed, and a child burial was also noted in a nearby rock crevice wrapped in wallaby hide and grass bundle and held together with net bag.	Formal excavation conducted in trench measuring 32 x 7 feet to a maximum depth of 20 feet over 11 units.	3240±80 BP (3632–3213 cal BP) (R 456/2) 4850±100 BP (5848–5314 cal BP) (R 456/1)
12a	Tungawa Rockshelter No. 6	See also Roberts (1998); Roberts et al. (1999); Wilson et al. (2022) Mulvaney et al. (1964)	1990s onwards 1952, 1956–58	Reanalyses and syntheses. Initial section recorded in 1952 then excavation in 1956–58. Diverse assemblage included stone artefacts, bone points, freshwater mussel, Notopala spp., emu egg, mallee fowl egg, crustacea, lizards, fish, large amounts of marsh clubrush in association with a burial, quandong nuts and animal bone (including dingo burial). A child burial was also exposed.	Formal excavation over trench measuring 28 x 10 ft to maximum depth of approximately 14 ft.	2950±91 BP (3340–2799 cal BP) (NPL 28)
12b	Fromm's (s302/323 Hd, Ridley)	Tindale (1930–1952, p. 31)	1932	Floor debris cleared by floods. A few straight-line motifs were noted.	n/a	3450±90 BP (3903–3447 cal BP) (NPL 63)
12c	Fromm's South	Tindale (1930–1952, p. 14)		Shelter at southern end s323—didn't stop, probably "poor shelter" (see Sheard) south of site on s301.	n/a	n/a
13	Caurnamount (s304, Hd Ridley)	Tindale (1930–1952, p. 167)	1932	Large rock shelter with deposit (shell, ash and burnt stone) to 3 ft. Some engravings also noted.	n/a	n/a

(Continued)

Table 1. (Continued).

Map ID	Site Name	Reference(s)	Year	Description	Excavation detail	¹⁴ C
14	Caurnamont (sO, Hd Forster)	Tindale (1930–1952, p. 12, 167)	1932	Small shelter measuring 15 x 7 ft with roof fall over a 3-ft deposit of leaves, sticks (some including gum), seed stems, chewed rush fibre, quandong kernels, ?? bones, pig face, bones of small marsupial, shell (freshwater mussel, <i>Corbicula</i> spp., <i>Palandina</i> spp.).	n/a	n/a
15	Purnong (Hd, Ridley, s317)	Tindale (1930–1952, p. 33)	1932	Originally described as a shallow overhang without a 'great depth' of protected floor, 8 ft above the 1931 flood level and with 10 ft of 'debris'. Fragments of bone and a quartzite implement were noted. Tindale provides a sketch of rock carvings (tally lines and bird track) and planned to return but there is no record of this occurring. However, the site is possibly related to SAM collection A20417, which includes the partially mummified remains of small mammal that had been excavated.	n/a	n/a
16	Upstream of s39 hd	Tindale (1930–1952, p. 5)	1932	Collapsed shelter with several feet of floor deposit (containing shell) exposed by rabbits.	n/a	n/a
17	Younghusband s39 hd Younghusband	Tindale (1930–1952, p. 5)	1932	Small shelter with floor cleared of debris but scattered on talus. SAM collection A20412 contains chippings and a section drawing, though no excavation is described.	n/a	n/a
18	Caloote Landing (A)	Tindale (1930–1952, pp. 3–4)	1932	Small shelter opposite s1414 Hd. Younghusband with smoke blackened roof and 2 ft of debris comprising ash, freshwater mussel, Murray cod bones etc.	n/a	n/a
19	Caloote Landing (B)	Tindale (1930–1952, p. 35)	1932	Describes 8 ft of debris in small overhang.	n/a	n/a

(Continued)



Table 1. (Continued).

Map ID	Site Name	Reference(s)	Year	Description	Excavation detail	¹⁴ C
20	s305/306 Hd Mobilong	Tindale (1930–1952, pp. 35–39)	1932	Description of a shovel trench excavated in shelter with profiles. Natural holes in shelter walls had been 'carefully plugged' with wads of chewed fibre, potentially to trap small (?). Tindale opened several of these and found no material inside. A detailed section drawing depicts a flexed infant burial, with additional annotation showing locations of chewed fibre, mulloway otolith, emu egg and ash layers. Top 6" at back of shelter contained chewed fibre, pieces of twisted rope (?) or cord, eggshells of (?), emu etc. Dense shell occurred between 6" and 18", and below 18" there was a well-defined layer of freshly preserved thin juvenile shell (freshwater mussel). A few quartz 'chippings' were found in the lowest level to ~46".	Shovel trench with detailed section drawing provided.	n/a
21	Kutchel's Bluff, pt s84 and 97 Hd Mobilong on 2 chain road	Tindale (1930–1952, p. 41)	1932	Some vegetable debris in the top layers including charred (?) grass clumps.	Tindale noted that he planned to excavate but there is no documentation of this.	n/a
n/a	Roy's Shelter	Tindale (1930–1952, p. 44)	1930	Small shelter described near 'Roy's place' (no other location provided) and excavated by Mr Roy exposing sequence of lenses of shell, ash, and yabby claws to ~1 m. Section diagram shows boulder under drip line which looks to have retained deposit.	Ad hoc excavation presumably using shovel. Rough section drawing provided.	n/a

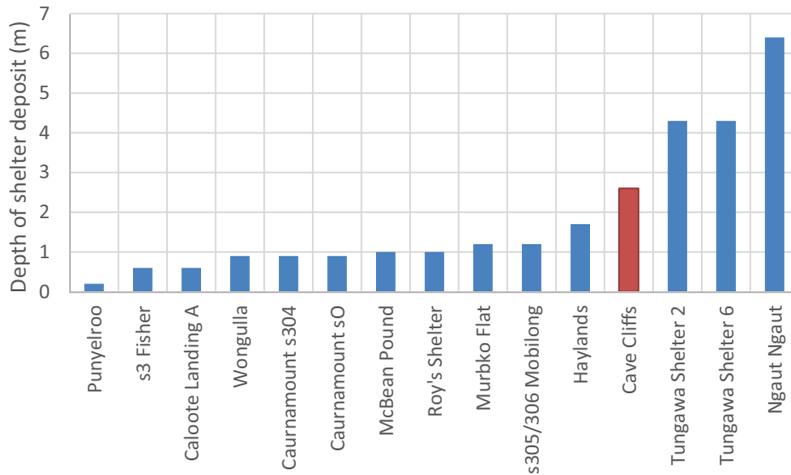


Figure 6. The reported depths of archaeological deposits in rockshelters on the Murray River. Cave Cliffs Rockshelter is highlighted in red.

were initially identified during a series of excursions undertaken by Tindale along the river in 1932 (Tindale, 1930–1952; see also Tindale, 1940–1956, 1961–1965). Tindale conducted several exploratory excavations during these excursions and identified a number of locations that he intended to revisit and formally excavate (e.g. at Kutchel's Bluff, Purnong and Murbko Flat) (see entries in Tindale, 1930–1952). However, other than his direct involvement at Ngaut Ngaut and Tungawa, there is no indication that he re-visited any other shelter for this purpose. Graham Pretty's excavation of the McBean Pound Rockshelter in 1962 appears to be the last by SAM personnel on the river and occurred as part of a larger excavation programme conducted at Roonka (Pretty, 1977a; Walshe, 2009).

Archaeological deposits have been reported in 22 rockshelters along the Murray River in South Australia, based on a review of various archival and documentary sources (Table 1). All of these shelters occur downstream of Cave Cliffs with most located in the lower Murray River Gorge downstream of Morgan. Informal excavations are reported for eight shelters, with formal excavations conducted in a further four at Ngaut Ngaut (Hale & Tindale, 1930), Tungawa Rockshelters Nos 2 and 6 (Mulvaney, 1960; Mulvaney et al., 1964) and McBean Pound (Pretty, 1977a, 1977b, 1988). The McBean Pound excavation remains largely unpublished with only brief mention of it made in Pretty (1977a, p. 289, 320 and 322) and a basic chronology supplied in Pretty (1988:S38). The oldest approximate date reported for the site is 450 BP (ANU 3360) (no error value is provided). Additional radiocarbon dating was undertaken at the Ngaut Ngaut and Tungawa shelters, with the oldest age of 6,180–5,655 cal BP (Gak-1024) reported for the former (Broecker et al., 1956).

The reported content of the shelters varies significantly. In the 15 instances where the depths of deposit are noted, this ranges from ~0.6 to 4.3 m, with the majority (12) under 2.0 m (Figure 6). The Cave Cliffs' deposit is reported to be approximately 2.6 m deep. The Ngaut Ngaut and Tungawa rockshelters represent distinct outliers with maximum depths in all three shelters exceeding 4 m. Ash and freshwater mussel are ubiquitous

components of the reported assemblages with additional materials reported in almost half of the shelters including some combination of ash, shell, animal and fish bone, yabby remains, emu eggshell, vegetable fibre and other flora (notably quandong kernel) and stone artefacts. Ancestral remains were identified in six instances. Ash, shellfish, sheep and other unspecified animal bones were reported at Cave Cliffs (Anon, 1963).

The 1961 Cave Cliffs excavations

As noted above, a single-page newspaper article in the *Murray Pioneer* dated August 1963 remains the only published account of the excavations of Cave Cliffs Rockshelter (Anon, 1963). The article appears to be based on information provided by Norman Tindale and related the site to an Aboriginal “legend” about a “tribe who kept a fire burning in a cave during winter” in order to rekindle firesticks (Anon, 1963). According to Anon (1963), the narrative had been recounted to Tindale by an (unnamed) Aboriginal knowledge holder from the Adelaide “tribe”, and based on this information, Tindale had identified the Overland Corner area as a likely location for the site. This, in itself, is one of many curious aspects in the investigations at Cave Cliffs, given that Boehm (1939) had referenced the same Aboriginal story (with more precise location details) in relation to a rockshelter named Tanamee near Morgan. Tindale (1939b) was certainly aware of Boehm’s work, as he published an article on the “Ngaiawung Tribe” in the same edition as Boehm’s (1939) Morgan paper, but no mention of this is recorded by Anon (1963). Tindale (1961–1965, pp. 811–813) also made no mention of the “perpetual fire” narrative in his original journal entry when he visited Cave Cliffs Rockshelter in August of 1962 and seems to still be looking for it c. 1967 (Tindale, 1965–1971, p. 1333). Indeed, Tindale seems confused about the connection between the narrative and the site, an issue which is perpetuated in later documentation (e.g. Woolmer, 1967, p. 2).

Another narrative may also be relevant to Cave Cliffs Rockshelter, this being the “Cowirra warrior” tradition:

Chatting to an old black [sic], in 1890 about the cave in the Big Bend below Swan Reach, he told me that in the earlier days, long time ago, the Lake Bonney tribe of natives came down the river, and raided the wurlies of the Cowirra blacks, killing some of the males and carrying off the best looking of the girls. One young warrior of the Cowirra tribe, followed up the victors, and when near Overland Corner killed both his bride-to-be and the native, who had carried her off. Taking to the river, with the enemy in close pursuit, he swam across to the cliffs and entered a small cave, or opening in the cliffs (from his description I should say it was Heinicke’s Cliff). Knowing it was useless to return, he scrambled and crawled along, hoping to find another outlet. In three days he reached the open air again, coming out from the wellknown [sic] Punyelroo Cave, only too pleased to find himself well away from his pursuers. White folks had penetrated this cave and crawled through it for hours. In some places it opens out into large rooms, and dead trees are lying in some of the larger caverns. (Dreamer, 1918, p. 6)

It is likely that “Dreamer” is a pseudonym. The use of a *nom de plume* in the 19th and 20th centuries was common, and was often used to conceal gender, social status and/or to allow for other literary conceits (see Foster, 1991; Spennemann & Downing, 1999, p. 148). We have been unable to ascertain the author’s actual name and, therefore, cannot deduce their Aboriginal “informant”, however we have located two other newspaper

articles by Dreamer, both of which also relate to the Murray River (Dreamer, 1919, 1920). It appears from the 1920 article that Dreamer may have known Tommy Walker (Poltpalingada Booboorowie), “a Ngarrindjeri man reputedly born on the shores of Lake Albert” (see Foster, 2005). Poltpalingada Booboorowie, however, was a very well-known figure who was “prominent among the community of fringe-dwellers in Adelaide” in the latter part of the 19th century (Foster, 2005). After his death in 1901, “the coroner Dr W. Ramsay Smith had removed his skeleton before the burial and sent it, along with other ‘anthropological specimens’, to the University of Edinburgh”. Smith’s “grave-robbing” emerged as a scandal a number of years later when Poltpalingada Booboorowie’s grave was exhumed, and no body was found (see Hatswell, 2020). Dreamer’s (1920) article referred to this “grave-robbing” but also to a story said to have come via “séance” (probably a form of literary conceit) from the “late lamented Tommy Walker” which talks of how serpents made the Murray via their wriggings, a story which has correlations to other creation narratives (c.f. Roberts et al., 2023). Similarly, the “Cowirra warrior” narrative has enough salient points of reference, such as places names and correlations to other traditional narratives, to consider it a relevant account (see also below). However, authorship issues, combined with the complexities of poetic licence and the European colonial gaze, makes any further exegesis of such Aboriginal narratives difficult and we note these issues here.

The Cave Cliffs shelter was described by Anon (1963) as:

... 40 feet [12.2 m] wide, 60 feet [18.3 m] in length and 15 feet [4.6 m] high at its mouth. The walls are yellow fossiliferous limestone and since soft, hold masses of carved names, initials and dates, including Johnson 1910, W. A. Carvosso 1933, D. A. McBain 1930, A. L. Spencer February 6, 1927, Les Smith 1926, Bill Sheuard, Cobdogla; J. A. Smith 1925, E. Hall 1934, J. Peterson 1934, C. Her 1911; and more recently N. Spencer, G. E. Admanson 1947, K. Kleeman 1950 and R. O. Fox.

The ceiling was “covered” in swallow nests and fossils of coral, oyster, sea urchin and shell, with the distinctive outline of the rockshelter interpreted as having formed through undercutting of the base of the cliff by the river and the failure of the overlying cliff face along a series of angled joint planes (Anon, 1963). Reference is also made to a “canoe tree” at the rockshelter’s entrance and “an old track” to the east of the shelter that descended a steep creek-line from the rim of the cliff (see Figure 4). The track was interpreted as having been created/used by Aboriginal people before European invasion based on the large number of stone “implements” along it.

The article mentioned two trenches excavated at the site in 1961. The first (labelled here as Trench A) was located at the base of a large rockfall towards the rear of the rockshelter. The pit extended through 69 cm of “silt and other food debris, some recent animal bones and nondescript pieces of flint” associated with minor charcoal and freshwater mussel shell (Anon, 1963). Below this unit, a “profusion of mussel shell, ashes and some bones” continued to large roof-fall blocks at a depth of 183 cm (Anon., 1963). The second excavation (Trench B) was located nearer the entrance of the shelter with sediment removed using pick and shovel to a depth of 163 cm. A post-hole digger was then used to extend the excavation below the base of the pit to a maximum depth of 263 cm. According to Anon (1963), the stratigraphy in Trench B comprised four generalised units (referred here as units SU1 to SU4) described as follows:

- SU1 (0–31 cm). At least five distinct layers of flood-derived sediment (fine sand and limestone gravel).
- SU2 (31–99 cm). Ash, charcoal, freshwater mussels and snails. Several unspecified bones were identified in a cut feature exposed in the wall of the excavation.
- SU3 (99–135 cm). Thick ash, charcoal and shell associated with a larger component of burnt limestone “rocks and pebbles”.
- SU4 (135–263 cm). A stiff grey, black and brown clay with variable amounts of charcoal, freshwater mussel and burnt limestone with coarse rockfall continuing to a firm limestone base. As above, the method of excavation changed to a post-hole digger at 163 cm in this lowermost unit and, as such, the interpretation of a “firm limestone base” had relied on a relatively small diameter hole only.

The excavated sediments were “searched for bones, stone implements and any other items of interest” with these materials relocated to the SAM where they were “washed” and further examined (Anon, 1963). According to Anon (1963), none of the stone pieces could be confidently identified as artefactual, despite “dozens” being examined. The bone was exclusively “animal”,² with no two bones attributable to a common individual. Based on a comparative depth to the shelter deposits excavated on the Lower Murray near Nildottie (e.g. Ngaut Ngaut, Tungawa), it was suggested that the Cave Cliffs deposit could extend to 5,000–6,000 years in age and radiocarbon dating of the abundant charcoal was considered for potential future analysis (Anon, 1963).

Sam Warne’s 1961 Wigley flat excavations

Despite the specific mention in Anon (1963) of the SAM’s involvement in the Cave Cliffs excavations, the museum’s collection databases include no references to “Cave Cliffs” (pers. comm. Michael Slizankiewicz, 2023). Tindale’s journals also provide no summary of any subsequent sorting of “Cave Cliffs” excavated materials. However, materials provenanced to “Sam Warnes” dig’ at Wigley Flat were deposited in the museum by Tindale in 1962 (e.g. Box ARCH Lot 3255). Wigley Flat refers to the area of floodplain on the southern bank of the river directly opposite Cave Cliffs and, as we argue below, we believe these materials relate to the excavation of the Cave Cliffs Rockshelter. Given Tindale’s known penchant for collecting, sorting, categorising and synthesising knowledge in furtherance of his “dogged pursuits” (Burke, 2015; see also Monaghan, 2015), this inconsistency in place-naming is yet another curious aspect in the investigations of this site.

Sam Warne’s Wigley Flat excavation is described briefly in Tindale’s (1961–1965, pp. 807–815) account of an excursion to a series of archaeological sites along the Murray River between Boggy Flat and Overland Corner in August 1962. During this trip, B.H. Loffler, the son of the landowner at Cave Cliffs, took Tindale by boat upstream from the Loffler’s residence opposite Waikerie “past Cave Cliffs to Wigley’s Flat” and to a large cave that contained occupation “debris”. Two trenches had been excavated in the shelter by Sam Warne, a geologist that Tindale had met previously in the far north of SA (pers. comm. Tom Gara, 2021) and who had corresponded with Tindale regarding archaeological sites along the Murray River (Tindale, 1940–1956, pp. 382–385). Warne, who

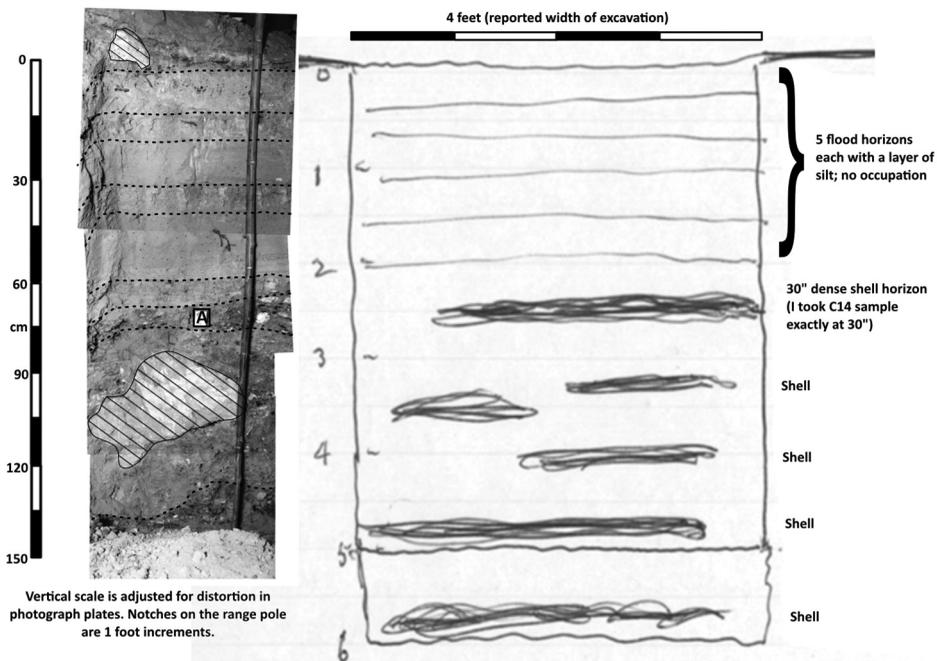


Figure 7. (Left) stitched photographs compiled from a series of black and white slides supplied with the Aboriginal Affairs and Reconciliation documentation for Cave Cliffs Rockshelter. Our annotations show the visible unit boundaries (dashed lines), roof fall blocks (line infill) and a matchbox (labelled A) placed in the section at a depth of 30 inches. The images are assumed to relate to the 1961 excavation at the rear of Cave Cliffs Rockshelter, i.e. Trench A. (right) a section drawing reproduced from Tindale (1961–1965, p. 812) of the initial trench excavated by Sam Warne at “Wigley Flat”. Tindale’s annotations have been replaced for readability. Note the corresponding height of the ^{14}C sample and the matchbox. The photographs and section drawing are shown here at approximately the same scale.

could aptly be described as an amateur archaeological enthusiast, had made several donations of stone artefacts to the SAM since at least 1957 (e.g. SAM A50058, A50073).

The trenches had evidently been left open since an initial excavation by Warne in January 1961 and subsequent work later in that year. Tindale described the first trench as measuring 4×4 feet in plan and extending to a depth of ~ 72 inches (183 cm). A rough section drawing of one of the trench walls (Tindale, 1961–1965, p. 812) depicts a distinct change in the stratigraphy at a depth of ~ 30 inches (76 cm) where an upper unit of silt, deposited over at least five interpreted flood events, gave way to “several horizons of large *Unio* shell [freshwater mussel] and abundant charcoal” which continued to the base of the excavation (Figure 7). An annotation on the diagram indicates the collection of an unspecified ^{14}C sample from a depth of 30-inches. We can find no record of any radiocarbon dating being completed in relation to this site. The second trench had been excavated and “sieved”, but no further description of this trench is recorded by Tindale (1961–1965).

Loffler informed Tindale that Charles P. Mountford, who was also associated with the SAM, had visited the site sometime prior and had planned to return to conduct formal excavations (Tindale, 1961–1965, p. 811). Curiously, it is evident from Tindale’s journal

entry that he was unaware of Mountford's visit, and we have found no record of any follow-up excavation having been undertaken at the site.

The descriptions of Cave Cliffs Rockshelter in Anon (1963) and Tindale's (1961–1965) account of the Wigley Flat excavations share a number of striking similarities which lead us to conclude that the two sites are, in fact, the same. The excavations at Cave Cliffs and Wigley Flat were both undertaken in 1961 with two trenches described for each site. The detail in Tindale's section diagram of the first trench excavated by Sam Warne is essentially replicated in photographs taken in 1961 of an excavated section at Cave Cliffs, notably the specific reference to five layers of flood-derived sediment forming the upper unit and the distinctive change in stratigraphy to a deposit of densely packed shell and combustion features at a depth of ~32 inches (Figure 7). There are also, admittedly, some inconsistencies in the stratigraphic descriptions. The large block of roof-fall seen in the photographs and the descriptions of roof-fall blocks in Anon (1963), for instance, are not replicated in the section diagram (assuming of course that it was the same section being photographed and described).

Another line of circumstantial evidence is that Tindale accompanied B.H. Loffler, the son of the landowner at Cave Cliffs, to the Wigley Flat site. In this case, we conclude that Tindale may have simply referred to "Wigley Flat" as a general location on the river rather than a specific place. Notably, Dowling (1990: Figure 22) also indicated Warne's Cave as being located on the northern bank of the river in the general vicinity of Cave Cliffs Reserve – Dowling was either in possession of additional information or had reached the same conclusion as us.

Five "bags" of excavated material attributed to Sam Warne and the Wigley Flat site were deposited with the SAM, having been "donated" by Warne (ARCH Lot 3255) and "collected" by Tindale (ARCH Lot 3258). As far as can be ascertained, these five bags represent the only physical samples from the excavations, despite Warne's two trenches representing a conservative estimate of 5 m³ of excavated material. The SAM's collection catalogue contains no record of any further work conducted at the site and/or material collected from it.

The excavations at Cave Cliffs occurred a year after the publication of results stemming from Melbourne University's 1956–58 excavations at Tungawa Shelter No. 2 (Mulvaney, 1960), the largest archaeological project to be conducted on the Lower Murray River since the SAM's work at the Tartanga Island open site and Ngaut Ngaut Rockshelter in the late 1920s (Hale & Tindale, 1930). Radiocarbon dating had been introduced to archaeological research in the mid-1950s and had been applied to all three of these locations, representing some of the earliest use of this dating technique in Australia. The dating had demonstrated a deep Holocene occupation timeline at each site (Broecker et al., 1956; Mulvaney, 1960; Ralph & Stuckenrath, 1962; Tindale, 1957), stimulating an understandable degree of public interest (Roberts & Mannum Aboriginal Community Association Inc, 2012). Whether Sam Warne had been inspired by the Tungawa excavations remains speculative, though the coincident timing, and Warne's personal association with Tindale, are conspicuous. It is also worth noting that Tindale (1940–1956, pp. 612–613) had been informed of another excavation also conducted in 1961 downstream of Morgan at Murbko Flat by another amateur enthusiast, R. Teusner (see Table 1). A collection in the SAM attributed to Teusner (ARCH 2595) probably relates to this shelter. Tindale had planned to visit the Murbko Flat site, though we have

found no evidence of this occurring. This kind of informal association between amateur enthusiasts and the SAM, both in terms of excavation and the collection of artefacts, appears to have been a common scenario throughout this period.

Post-excavation descriptions

The Cave Cliffs site was reported on several occasions subsequent to the 1961 excavations. Tindale (1965–1971, p. 1333) recorded the donation of land encompassing the site by the property owner, Mr Loffler, to the Barmera Branch of the National Trust in January 1967 (see also Woolmer, 1986, p. 109). Loffler’s motivation, Tindale (1965–1971, p. 1333) wrote, was to “preserve its natural untouched state as a proper fauna and flora reserve”. Tindale (1965–1971, p. 1333) again referred to the site as the place of “perpetual fire”, stating that “I have been looking for this cave whose existence is on record from the early days of the State of S Australia”.

The site and surrounding area were declared a Historic Reserve under the *SA Aboriginal and Historic Relics Preservation Act 1965* on 30 May 1968 and referenced as “*Cave Cliff Archaeological Site*”. The site card held in the Aboriginal Affairs and Reconciliation Central Archive relates to this original declaration and is attributed to a 1967 report by the Barmera Branch of the National Trust of SA. Notably, the excavations at the site are credited directly to Tindale rather than Sam Warne. The site is described as:

A large cave at the base of a high limestone cliff. The cave is possibly associated with the Aboriginal legend of the perpetual fire. A number of canoe trees and a campsite are also included [in the site]. Test shaft by Tindale showed occupation debris.

The site complex was nominated by the National Trust of SA for inclusion on the former Register of the National Estate and it was formally registered on 21 October 1980. The complex is described in the nomination as being in good condition due to its inaccessibility, and comprised the cave, an adjacent canoe tree and middens along the rim of the cliff. The nomination makes no mention of any further assessment of the site and is assumed to have been made on the basis of the information originally summarised in Anon (1963).

In December 1986, a “condition report” was submitted to the then Department of Aboriginal Affairs by P. Kostoglou. The report noted several causes of damage to the site that included graffiti on the shelter wall, recent camping activities and evidence that sheep were accessing the shelter and rubbing against the walls. By this time, there was no visible evidence of the 1961 excavation with the “entire floor area ... covered with new soil”. It is worth noting that the intervening period had witnessed one of the largest floods (in 1974) to occur along the Murray River since the megaflood of 1956. The 1974 flood was similar in scale to the recent 2022–23 event and, based on the site recording conducted for the current research, would have inundated the shelter to a depth of approximately 2 m (see below). A basic site plan accompanies the 1986 report. The site was registered on the current Aboriginal Affairs and Reconciliation Central Archive on 23 April 1990 (site ID 6929–286) and a second condition report was conducted by departmental officers in March 2005.

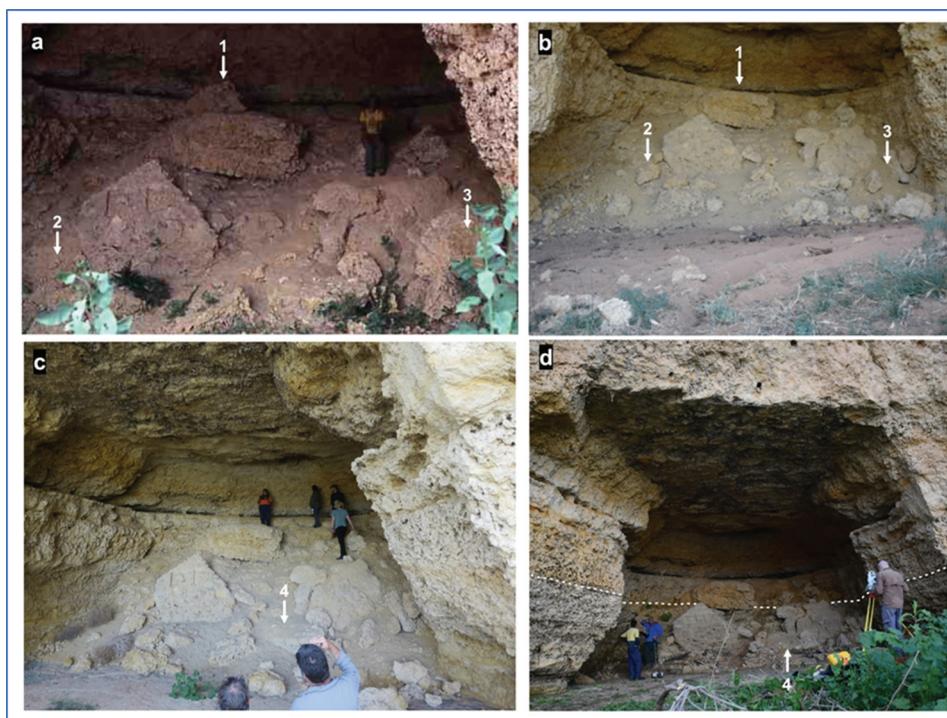


Figure 8. Photographs of Cave Cliffs Rockshelter taken in (a) 1986, (b) 2005, (c) June 2022 and (d) June 2023. Changes in the shelter's architecture are indicated by the numbered arrows and include (1) the slumping of a large roof fall block, (2) exposure and (3) covering of blocks across the lower talus between 1986 and 2005, and (4) the stripping of fine sediment from the talus during the 2022–23 flood (the flood level is indicated by the dashed line in plate d).

The current Aboriginal Affairs and Reconciliation file includes black and white slides that we assume relate to the 1961 excavation, the Register of the National Estate nomination form, the 1963 media article (Anon, 1963), the original 1967 site card and subsequent condition reports compiled in 1986 and 2005. No other investigations or analyses of the site are mentioned in any of these documents. The black and white slides include an image showing three men looking at an open trench, one of whom appears to be Charles Mountford. As such, these images are likely to pre-date Tindale's visit in August 1962. The National Trust of SA have been unable to relocate any documentation of the site, despite their involvement in the nomination to the Register of the National Estate. Sam Warne was a founding member of the Cobdogla Branch of the National Trust (pers. comm. Helen Barney, 2023) and it is reasonable to assume, given his association with the site, that he had instigated the nomination.

Various photographs included in the Aboriginal Affairs and Reconciliation file are shown in Figure 8 together with images taken either side of the 2022–23 flood during the current research. These images suggest only minor changes in the rockshelter's structure over the intervening 40 years, including the movement and (re)exposure of roof-fall

blocks across the rear talus slope and the stripping of fine sediment from the lower section of the talus during the 2022–23 flood.

Methods

The methods applied in this study have sought to compile available information relating to the 1961 excavation and provide a context to this work; relocate the 1961 excavation trenches and develop a better understanding of the rockshelter's condition, extant archaeology, structure and stratigraphy.

South Australian Museum collection

The SAM archaeological collections include two boxes attributed to Sam Warne, Wigley Flat (ARCH Lot 3255 and 3258). These contain various materials (burnt rock, artefacts, shell and animal bones) divided amongst nine brown paper bags, three calico bags, a soft vinyl bag and two loose artefacts. A basic inventory of the material was compiled, noting any detail recorded on the labelling and a general description of the content of each bag. Photographs of the materials were also taken.

Site survey

Spatial detail within the rockshelter was recorded using a Leica TS16 total station positioned via resection with an Emlid RS2+ base and rover RTK GNSS system. During the field survey, a temporary datum was established with a base position averaged for 5 minutes. The survey coordinates were updated after post processing of the base position using the Auspos service. Data points collected within and outside the shelter were processed into a Digital Elevation Model (DEM) using MapInfo Vertical Mapper software with 0.2 m contours derived from this DEM. A drone survey of the area surrounding the shelter was undertaken using a Mavic Air UAV, the results of which were processed into an orthophoto and digital surface model using Agisoft Metashape Professional.

Given the prior references to a “canoe tree” and “graffiti” (Anon, 1963), the rockshelter walls and ceiling were thoroughly inspected and documented following the methods outlined in Roberts et al. (2019). Accessible areas around the rockshelter were also subjected to pedestrian survey. Unfortunately, the cliff-top and the gully with a potential trackway (see above) could not be accessed due to safety concerns and/or because access was not permitted by private landowners. Gaining access to these areas would be highly beneficial in any future work at this location. In particular, the collection of freshwater mussel shell from the cliff-line for the purpose of radiocarbon dating (if any remains extant) should be seen as a priority considering the Pleistocene chronology recently obtained for other cliff-top sites in the upper Riverland (see for example Westell et al., 2020).

Geophysical surveys

Geophysical survey was undertaken for the purpose of relocating the 1961 excavation trenches, to map the bedrock geomorphology and to locate any blocks of roof-fall in evaluating the potential of the site for future investigations. The use of geophysical survey within archaeological rockshelters is becoming increasingly common (Mackay et al., 2023; Maloney et al., 2022, 2022), although some complexities exist with data interpretation (Olenchenko et al., 2020). Geophysics has previously been used for the investigation of a diverse range of archaeological sites along the Murray River (Moffat et al., 2010; Roberts et al., 2017, 2021, *in press*; Ross et al., 2019; Simyrdanis et al., 2018, 2019; Wallis et al., 2008), but no studies specifically relating to rockshelters have been published.

Electrical resistivity tomography (ERT) data were collected in two, approximately perpendicular lines within the rockshelter; the first orientated north to south and the second west-north-west to east-south-east. Data were collected using a ZZ FlashRES-Universal with 0.4 m (line one) or 0.2 (line two) spacing between 59 (line one) or 64 (line two) electrodes. Data were collected using Wenner ($k = 20$) and Dipole-Dipole ($k = 15, l = 5$) arrays at 120 V with an on time of 1.2 second and an off time of 0.2 seconds. The instrument failed after point 876 of 1065 in line two, resulting in incomplete data set for the Dipole-Dipole array. Electrodes were watered to decrease contact resistance, with measured values in the range of 250–2000 Ω . Data were exported using the ZZ RdatacheckU64 software, reformatted using a custom R script and combined with the topography from the total station and then processed using Res2D using the L1-norm (robust) function. Display colours for each array were calculated using the getJenksBreaks function within the BAMMtools package in R. The results were interpreted in Res2D and the location of interpreted features plotted in ArcGIS for comparison with other site features.

Ground penetrating radar (GPR) data were collected with a Malå X3M using a 500 MHz antenna. A total of 31 approximately parallel lines spaced ~ 0.5 m apart were collected orientated \sim northwest. All lines were collected from a straight baseline positioned approximately at the dripline of the shelter and terminated either at the sidewalls of the shelter or at the base of a rubble screen extending from the rear of the shelter into the floor. As such, the GPR lines vary in length. Data collection parameters included collecting to a maximum time of 62 ns using 1024 samples, a 2 cm trace increment and 2 stacks. Data were processed in ReflexW software using the move start time, subtract mean (dewow), bandpass Butterworth, energy decay, background remove, and time cut filters. The velocity of the sediments was estimated as 0.2 m/ns based on hyperbola fitting. The possible locations of former excavations and sediment-rock contacts were picked in ReflexW and the location of these features exported to ArcGIS Pro for interpretation.

Results

South Australian Museum collection

The SAM collection attributed to Wigley Flat is summarised in Table 2 and Figure 9, and is comprised largely of angular, non-artefactual, blackened limestone gravel together with some freshwater mussel shell, several artefacts and three animal bones (two of which are

Table 2. A summary of the South Australian Museum collection materials attributed to the Wigley Flat (Cave Cliffs) shelter.

Bag/Item	Label detail	Content general description
ARCH Lot 3255		
Paper bag	Excavation 2, Bone fragment 53"–57"	Single bone shaft fragment.
Paper bag	53 to 57, Wigley Flat SA S. Warne 1962	Paper label "Excavation 2", 10 fragments of darkened rock, two with potential bulbs.
Paper bag	Wigley Flat RM S Austr, S Warne 1962, Exc 2 46"–53"	Random angular rubble as above.
Paper bag	Wigley flat RM S Austr, S Warne 1962, Excavation 1 63"–69"	4 rocks, including coarse sandstone block and fine sandstone cobble (non-artefacts).
Paper bag	Wigley Flat RM SA Sam Warne 1962, Excavation 39"–46"	~15 pieces of angular rubble (non-artefacts), ashy coating, single fine grain red sandstone pebble, a possible core but more likely naturally shaped angular piece.
Paper bag	Wigley flat, S. Warne, Excav. 1, 55"–63"	Random angular rubble as above, with ashy coating.
Loose object	Wigley Flat S. Warne	Large silcrete cobble grinding topstone with single planated surface, 14 × 14 × 10 cm.
Loose object	Wigley Flat, S. Warne	Broken calcrete nodule.
Paper bag	57"–64"	Paper label "Sam Warne Excava 2, 57–64", 8 pieces rock including single flake, all other natural rock fragments with powdery coating as above.
ARCH Lot 3258		
Calico bag	(Illegible) from Wigley, A 19 Oct 58	3 artefacts including quartz flake, silcrete core, exfoliated basalt fragment.
Calico bag	Wigley Flat	Single calcrete nodule, broken.
Calico bag*	CD3, 290–291, Bogy Flat	Large silcrete core, large claystone adze flake.
Paper bag*	Old Andado	-
Paper bag*	8 35 Hut Site (Illegible)	14 artefacts including silcrete and chalcedony flakes. Material does not appear to be from the Murray River – no labelling to identify likely provenance.
Vinyl bag	No label	Femur and tibia (sheep), whole <i>A. jacksoni</i> and <i>V. ambiguus</i> valves, charcoal fragments and angular gravel.



Figure 9. A summary of the SAM collection materials attributed to Sam Warne, Wigley Flat, including (a) typical example of the random gravel contained in the collection and the paper bags used to store the bulk of the collection, (b) a large silcrete cobble topstone, (c) a sheep femur and tibia, (d) an unidentifiable fragment of bone shaft, (e) *A. jacksoni* and *V. ambiguus* valves and, (f) sandstone cobbles and a possible silcrete core.

sheep). The limited range and extent of the collected material is at odds with Anon's (1963) description of a "profusion of mussel shell, ashes and some bones" in Trench A. The observation that no two bones could be attributable to a common individual also implies that a reasonably sized assemblage of bone had been recovered, however this is not reflected in the collection. The ^{14}C sample collected by Tindale in 1962 was not present in the materials and we have been unable to locate any other reference to it.

Site survey

A contour plan and drone image of the shelter is shown in [Figure 10](#). The recent 2022–23 flood inundated the rockshelter to a level approximately 2 m above the floor, leaving a distinct water line on the walls of the shelter and top-dressing the floor with fine sediment. No archaeological materials were exposed in or under this sediment or on the talus slope extending outside the drip line. There was also no visible evidence of the previous excavations within the shelter, consistent with observations reported in the 1986 Aboriginal Affairs and Reconciliation site condition report.

[Table 3](#) summarises the engraved/inscribed names that were extant and discernible on the walls of the Cave Cliffs shelter and adjoining cliffs during field work undertaken on 15 June 2023. Other weathered/indistinct inscriptions were also present but are not catalogued in the table. No exact matches for the engraved names mentioned in Anon (1963) could be located, although the surname “Peterson” appears in the 1963 account but with a different initial ([Figure 11](#)). Presumably the inscriptions recorded by Anon (1963) have since weathered away (we also note the comment about sheep rubbing on the shelter walls). At least one inscription of “1941” predates the 1963 article, though was not mentioned in it. This date is possibly associated with the “AHEINICKE” engraving ([Figure 12](#)).

The “canoe tree” noted in the prior documentation of the site remains extant (e.g. see Anon, 1963). However, this scarred tree (*E. camaldulensis*), like many in the Riverland region, is now dead (e.g. see Dardengo et al., 2019). The tree is c. 20 m in height and has a circumference of 6.1 m at a point 1 m above the ground surface ([Figure 13](#)). It has one large, semi-symmetrical, east-facing scar on its trunk measuring 320 cm long by 40 cm wide. The scarring is consistent with the removal of bark in the manufacture of a canoe. No other archaeology was observed during the 15 June 2023 survey, although ground surface visibility was significantly reduced (c. 10–20% visibility) under dense vegetation cover outside of the shelter, as evident in the drone image in [Figure 10](#).

Geophysical surveys

The GPR data are extremely difficult to interpret, with little coherent stratigraphy visible in any of the lines, though nevertheless, they complement an interpretation of the site stratigraphy. In the eastern portion of the survey area (lines 24–31), there is a sudden, approximately horizontal, change from low amplitude to high amplitude reflections that we interpret as the bedrock surface. However, the depth (~1 m) of this change differs from what might be expected adjacent to the shelter wall and, as such, this may instead be a reflection from the shelter ceiling. We observed no reflector that might be interpreted as a bedrock surface elsewhere within the GPR survey. A distinct area of high amplitude confused reflectors is present in the central area of the shelter ([Figure 14](#)), and we interpret this as one of the former (1961) excavation trenches.

The ERT data ([Figure 15](#)) can resolve a number of stratigraphic and anthropogenic features within the site. We report the resistivity value obtained from the Wenner arrays here, based on the better signal-to-noise ratio and lower noise contamination of these data (Dahlin & Zhou, 2004). However, we also used the Dipole-dipole results to inform our interpretations. ERT Line One has moderate (9 to 583 $\Omega\cdot\text{m}$) resistivity values across

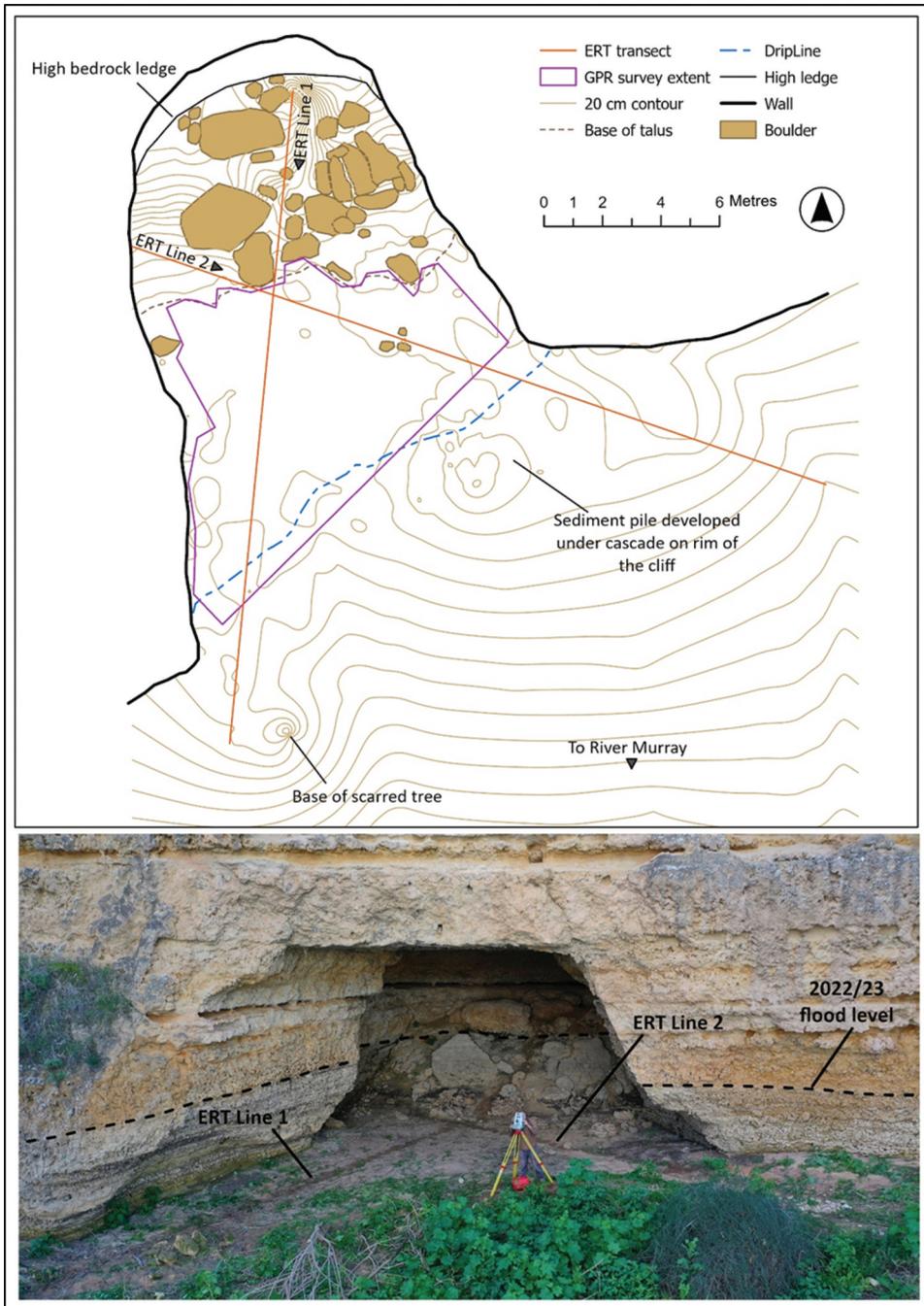


Figure 10. Contour plan and drone image of the Cave Cliffs shelter.

the talus slope from the start of the line to 6.4 m, corresponding to exposed limestone blocks on the surface and in the shallow subsurface. The floor of the shelter has consistently low to moderate resistivity values ($< \sim 100 \Omega \cdot \text{m}$) except for several distinctive



Table 3. A summary of the engraved/inscribed names at Cave Cliffs rockshelter, 15 June 2023.

Inscription	Reference Material	Notes
Outside shelter entrance (west side)		
AHEINICKE	Thursday 19 December 1940 <i>Murray Pioneer</i> . Lists an A.K. Heinicke from Berri District serving in WWII. Thursday 18 December 1941 <i>Murray Pioneer</i> : Reference to an Alan Heinicke of Wigley's Flat. Thursday 31 March 1949 <i>Murray Pioneer</i> : Reference to an Angus Heinicke. Also note reference to "Heinicke's" in many "Steamer" records.	Possibly associated with "AHEINICKE".
1941?		
Inside shelter (west wall)		
MPETERSON	Friday 2 May 1924 <i>Murray Pioneer</i> : Notes the Peterson family as early settlers of Kingston-on-Murray.	
WAO?		
WIN		
?N		
?I		
KP		
WH		
AHUr6?		
JENTxx		
BEV?		
TUCK		
PETER		
ADA?		
SPO?		Enclosed by border.
1971?		
STEV?		
L7E		
SK		
RRN?		
RJ		
SAAE		
SON		
1900?		
??H?K?		
??ART?		
?N		
Inside shelter (western side of rear talus)		
M.L.		
JA		

(Continued)

Table 3. (Continued).

Inscription	Reference Material	Notes
68		
L		
NI		
R		
TM		
Inside shelter (eastern side of rear talus)		
JMITTON	Thursday 25 November 1915 <i>Murray Pioneer</i> : Lists a J. Mitton of Berri. Possibly Sgt Mitton, brother of E. G. Mitton, see Thursday 2 December 1915 <i>Murray Pioneer</i> .	
K?		
??A		
??DR?		
RMJM		
Inside shelter (ceiling above northern wall)		
Inside shelter (east wall)		
IVAN		



Figure 11. The “mpeterson” engraving, 15 June 2023.



Figure 12. The “AHEINICKE” engraving, 15 June 2023.

higher resistivity areas (up to 1645 Ω .m) in the sections 9.4–10.6 m, 11.2–12.4 m and 12.8–13.6 m from the start of the line. These features are surrounded by a larger area of moderately elevated resistivity (<~600 Ω .m). The end section of the line (beyond 18.4 m from the start) has an elevated resistivity, mostly in the range of ~ 100–400 Ω .m, including several discrete areas which are interpreted as limestone blocks or tree roots.

ERT Line Two has moderate (44 to 221 Ω .m) resistivity values across the toe of the talus slope. The floor of the shelter has consistently low to moderate resistivity values (mostly <~150 Ω .m) except for several distinctive higher resistivity areas (up to 2906 Ω .m) in the sections 10–11.6 m, 12–12.6 m and 13–15 m from the start of the line. Resistivity values are elevated (in the range of ~ 100–500 Ω .m) as the line moves beyond the drip line (at ~13 m) and runs over a small mound, probably reflecting the presence of multiple blocks of limestone in the subsurface.



Figure 13. Cave Cliffs “canoe tree”, 15 June 2023.

Discussion and conclusions

The investigations and reporting of Cave Cliffs Rockshelter reflect, to some extent, upon the early development of archaeological practice in South Australia, and specifically, the interactions that the general public and cultural institutions had with Aboriginal heritage on the Murray River. As highlighted below, a number of inconsistencies in the reporting of this site relate to the traditional Aboriginal narrative/s associated with the rockshelter; the nomenclature assigned to the rockshelter; the nature of the archaeological investigations (and personnel involved); and the outcomes of the archaeological research, including the housing of the collected assemblage/s.

Traditional narratives

As outlined earlier in this article, the first association of Cave Cliffs Rockshelter with the “firestick” or “perpetual fire” traditional Aboriginal narrative does not appear until the newspaper account provided by Anon (1963), which relayed information seemingly provided by Tindale. However, this same narrative is also noted more precisely in relation to a rockshelter (Tanamee) near Morgan (Boehm, 1939, p. 13). Given that it is

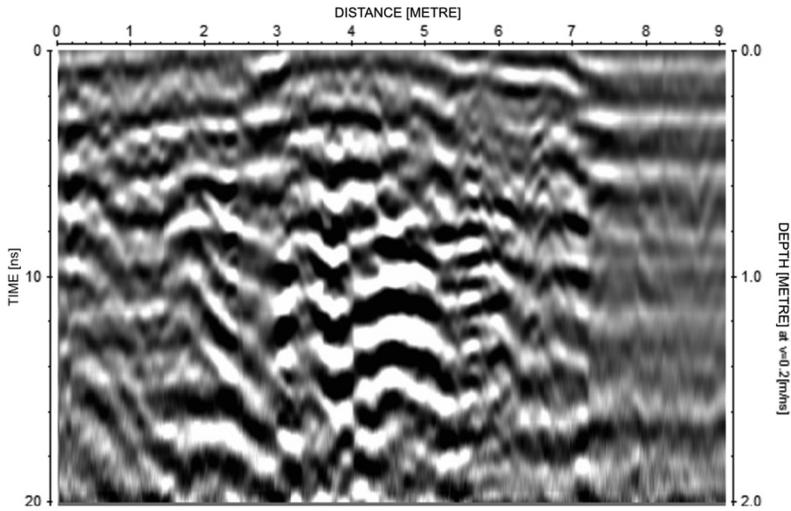


Figure 14. GPR line DAT_0010 from Cave Cliffs Rockshelter. The left of the line is south-east, approximately in the location of the drip line. The right of the line is north-west, terminating on rocks at the rear of the shelter. The area of confused reflectors interpreted to be one of Warne’s excavations is from ~3 m to ~5.5 m along the line.

unlikely that both rockshelters have the same associated narrative, we argue that Tindale erred in making this association with Cave Cliffs. A connection to the “Cowirra warrior” narrative is, however, potentially revealed in an historical inscription that relates the Heinicke family to the shelter (see [Figure 12](#) and [Table 3](#)) and provides a pointer, albeit tentative, to the reference of “Heinicke’s Cliff” in Dreamer’s (1918, p. 6) account of the narrative. We have been unable to locate the name “Heinicke’s Cliff” on any historical or more recent geographic mapping and assume that it was a reference known to Dreamer and other locals. As noted in Roberts et al. (2023), “the formation of caves also feature in other ancestral narratives in the region”, providing additional veracity to the “Cowirra warrior” tradition.

Nomenclature

The confusion in place-naming at Cave Cliffs extends beyond its traditional Aboriginal connections to later archaeological recording. It is officially recorded in the Aboriginal Affairs and Reconciliation register as “Cave Cliff Shelter” and as part of the Register of the National Estate’s “Cave Cliff Historic Reserve”, however, as argued in this paper, this is the same site as that referred to by Tindale (Tindale, 1961–1965, pp. 811–813) as “Sam Warne’s Wigley Flat Excavation” and “Warne’s Cave” (Dowling, 1990:Figure 22). We have followed the official South Australian nomenclature of “Cave Cliffs” for this location.

There are also some inconsistencies between the inscriptions recorded by Anon (1963) and those currently visible on the walls of the shelter, a result that we attribute to weathering of the limestone walls, the incomplete nature of the inventory provided in

Anon (1963) and the potential burial of other inscriptions. It is worth noting that Anon (1963) described “masses” of carved names but listed only 15. A total of 41 inscriptions were noted in our inventory (Table 3).

Archaeological investigations and outcomes

It was the geologist and amateur archaeological enthusiast Sam Warne, who conducted the 1961 excavations. Tindale appears to have made some basic observations on a day visit to the site (by boat) and retrieved some of the assemblage which he deposited in the SAM. It is possible that Sam Warne is the anonymous “Overland correspondent” referred to in the Murray Pioneer article (Anon, 1963). It also appears that Mountford made no attempt to recover any material during his visit(s) to the site. Indeed, we have been unable to trace any other record of Mountford’s engagement with the site other than the passing reference in Tindale’s journal and his image in one of the photographs taken of the excavation.

Considering the descriptions of the site provided by Anon (1963) and Tindale (1961–1965, pp. 807–815), the SAM collection is somewhat underwhelming and leads us to conclude that the collection is either incomplete or represents a small sample that was able to be salvaged by Tindale during his visit. This visit occurred over a year after Warne had excavated and we can only surmise that Warne had dug the trenches with no attempt to systematically recover material. He had also evidently left the trenches open. Unfortunately, Warne was just one of a number of enthusiasts in the 20th century who conducted these types of ad hoc excavations in rockshelters along the Murray River. Ultimately, these investigations are of limited value given the scant details of the excavation methods, contextual information and other stratigraphic data, and the minimal recovery of the material assemblages. In effect, these excavations have disturbed sites with limited meaningful data having been recovered.

New insights and further work

The geophysical data from Cave Cliffs provides important information for validating the excavation history of the site. The resistivity anomaly found in the ERT Line One and the area of confused reflectors in the GPR are located in the same part of the shelter (Figure 15). This suggests that at least one excavation was located on the floor of the shelter inside the drip line in the western half of the site (Figure 16). The depth to the bottom of the resistive feature located from ~9.4–10.6 m along the ERT Line One is approximately 1.5 m (Figure 15) and correlates well to the written description provided by Anon (1963) of Trench A and the stratigraphic drawing and photographs shown in Figure 7. The horizontal extent of ~1.2 m also correlates well to the reported 4 × 4 foot outline of this excavation. Curiously the amplitude of the geophysical response from both the ERT and GPR is greater than might be expected if the site was backfilled with sediment and this might suggest that pieces of bedrock were placed in the excavation trench and that the space between them remains partially filled with air and/or looser material. The four broadly defined stratigraphic units in Trench A cannot be resolved in the geophysical data, suggesting an insufficient contrast between these units despite the differences in the described content.

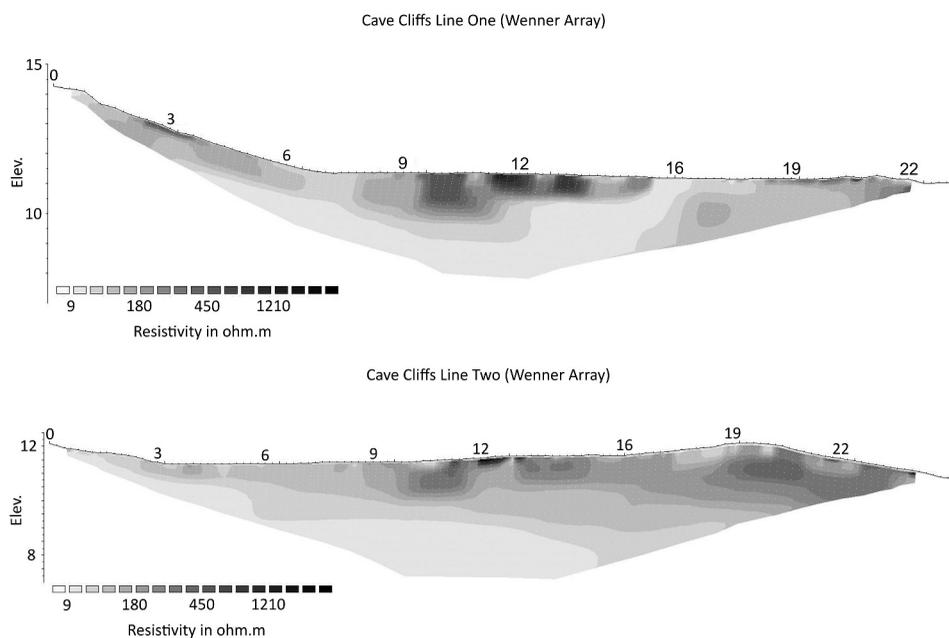


Figure 15. ERT lines one (top) and two (bottom) from Cave Cliffs Rockshelter. The left of ERT line one is north and the right is south, the left of ERT line two is west-north-west and the right east-south-east. The area of elevated resistivity values from ~ 9.4 – 10.8 m on ERT line one is interpreted to be one of Warne’s excavations. The area of elevated resistivity values from ~ 10 – 11.6 m is interpreted to be the second of Warne’s excavations.

An additional feature is suggested by high resistivity values to a maximum depth of ~ 1.5 m in the centre of the site, between ~ 10 m and 11.6 m on ERT Line Two (Figure 15). This might represent a second excavation (see Figure 16), as both the depth and extent correspond with the description of Warne’s second excavation trench. There is, however, no confused GPR response associated with this feature and the GPR suggests that a shallow shelf is present at a depth of approximately 1 m in this location. Given the limited number of hyperbola available within the site for depth modelling, the possibility of reflections from the walls and/or ceiling and the ambiguous nature of the GPR data in general, we are inclined to accept the suggestion that this may be the former Trench B based on the ERT data (Figure 16), but this interpretation is much less certain than for Trench A.

The geophysical data is less useful for informing future excavations as it provides no unambiguous information on the depth to bedrock, other than some limited and uncertain insights from the GPR in the east of the site. Why the bedrock is not obvious at this site, unlike in other limestone caves (e.g. Maloney et al., 2022, 2022), is unclear but is perhaps the result of the low degree of resistivity contrast between the limestone blocks and the shelter floor. This is obvious in the results from the talus slope at the rear of the site in ERT Line One where there is only a subtle difference in resistivity response between these two materials. This suggests that it would be difficult to accurately resolve the bedrock-sediment interface at depth through these methods, though obviously the

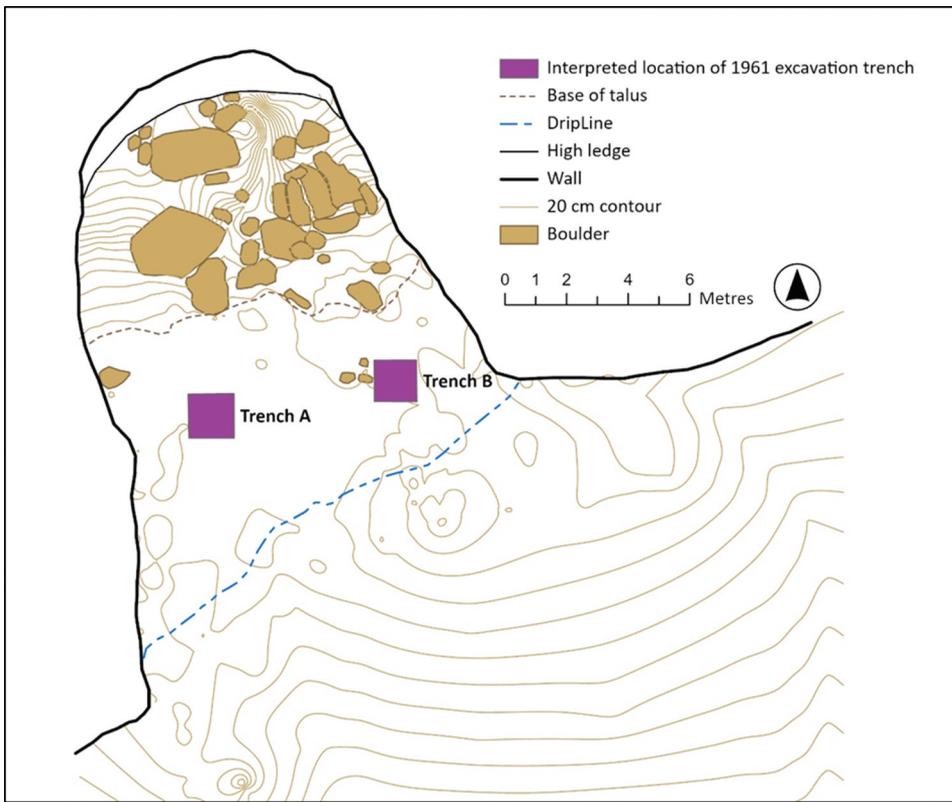


Figure 16. Map of Caves Cliffs Rockshelter showing the indicative interpreted location of Warne's two excavation trenches. The exact edge and shape of these features are poorly defined, as might be expected as they were apparently left open for a period following the excavations.

two excavated depths of trenches to approximately 1.8–2.6 m provide an established minimum.

The close correlation between the depth and width of the resistive feature in ERT Line One to the previous descriptions of Trench A also suggest that the shelter floor has been largely preserved since 1961, a period which has included several major flooding events. Scouring of the floor does not appear to have occurred to any significant degree. The 1986 site condition report noted that the “entire floor” had been covered with fresh sediment. From this, and the current assessment, it appears the floor remains largely accretionary, albeit for the apparent etching of the interior talus slope, as seen in [Figure 8](#). This assessment is supported by the sheer depth of accumulated cultural deposit, reported as extending to between 1.8 and 2.6 m. The geophysical data do not suggest any truncation of the deposit beyond the excavation trenches, further illustrating a high level of preservation and the potential of the site for further archaeological investigations.

From what can be gleaned from the prior documentation and these new insights, we argue that the significance of the site is multi-faceted. It is possible that Cave Cliffs Rockshelter relates to the “Cowirra warrior” narrative – a tradition that spans a geographic space from Lake Bonney to Cowirra – connecting people and places and

encoding lessons about laws and customs (see also Roberts et al., 2017, 2023). Indeed, for RMMAC members, all of their riverscape is “replete with meaning” being both “tied to its creation” and the “lived experiences of Aboriginal people spanning millennia” (Roberts et al., 2023).

Cave Cliffs Rockshelter is also significant as it represents the upstream limit of this archaeological site type and deposit, with a potential to provide a valuable comparison to the assemblages formally excavated in downstream locations at Ngaut Ngaut, Tungawa and McBean Pound. The minimum reported depths of 1.8–2.6 m for cultural deposits exposed in the 1961 trenches further highlights this potential. The materials contained in the SAM collections represent a small fraction of the estimated 5 m³ of sediment excavated from the two trenches. As noted in Table 1, a diverse array of cultural materials was recovered during the methodical excavations in rockshelters at Tungawa and Ngaut Ngaut, including wooden and stone artefacts and faunal remains. It might be expected that an excavation at Cave Cliffs using modern methods would similarly reveal a greater breadth of material beyond that reported and collected, to date. A comparative rockshelter assemblage, from a location several hundred river kilometres upstream of Tungawa and Ngaut Ngaut, and with a refined chronology, would represent an obvious contribution to regional debates about Aboriginal lifeways on the Murray River corridor, technological changes over time, the intensity of site use, population changes and the effects of, and responses to, El Niño-Southern Oscillation (ENSO) activity, among other things (e.g. see Bland et al., 2012; Hale & Tindale, 1930; Hutchinson, 2012; Jones et al., 2017, 2022; Mulvaney, 1960; Mulvaney et al., 1964; Roberts, 1998; Roberts et al., 1999; Smith, 1982; Westell et al., 2020). In the interim, preliminary radiocarbon dating of the freshwater mussel shell contained in the SAM collections might be considered in an initial analysis of the site, with these materials assumed to have been collected from at least 0.5 m below the surface (see Figure 7).

This paper provides a context to the Cave Cliffs site in respect to other rockshelters that have been reported along the River Murray in various media and archival materials and is a clear illustration of the value in “data mining”. Whilst much of these data have limited value in terms of sophisticated analysis, they nevertheless provide a clear pointer to the significance of Cave Cliffs Rockshelter and its potential to improve our understanding about former Aboriginal lifeways on the Murray River. This paper can be read as a primer for future work at this site. The cultural deposit appears to remain intact, albeit except for the two trenches excavated in 1961, and based on our interpretation of the geophysical data and earlier observations, extends to a depth that is suggestive of a deep timeline of occupation (see also Anon, 1963). Ultimately, the lack of care applied in the documentation of the site, the ad hoc nature of the excavations and recovery of the material assemblages, seem inconsistent with the level of respect this site should be rightly afforded.

Notes

1. The authors have undertaken a reconnaissance (by boat) of the river between Overland Corner and Devlins Pound and did not locate any additional extant shelters, although small areas of collapsed cliff were noted which could have formed around former rockshelters.
2. It is assumed that the “animal” bone referred to by Anon (1963) relates specifically to mammal bone.

Acknowledgments

This research has been funded by the Australian Research Council for the project entitled 'Rockshelters and Rock Art in the River Murray Gorge: New Data and Syntheses' _ (LP200200803). This is a collaborative project between Flinders University and River Murray and Mallee Aboriginal Corporation (RMMAC) and was approved by Flinders University's Human Research Ethics Committee (Project Number: 4852). Amy Roberts and Ian Moffat are the recipients of Australian Research Council Future Fellowships (FT230100499 and FT220100184) funded by the Australian Government. We thank RMMAC members who participated in the field work.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

The work was supported by the Australian Research Council [LP200200803]; Australian Research Council [FT220100184]; Australian Research Council [FT230100499].

ORCID

Craig Westell  <http://orcid.org/0000-0003-2405-6861>
 Amy Roberts  <http://orcid.org/0000-0002-9004-292X>
 Ian Moffat  <http://orcid.org/0000-0002-2171-7145>
 Marc Fairhead  <http://orcid.org/0000-0001-8166-7779>

References

- Anon. (1963, August 8). Historic cave in Cave Cliffs near Devlin's Pound. *The Murray Pioneer*.
- Archer Russell, G. E. (1921a, November 12). Among the campsites of the Ral Rals. *The Journal*.
- Archer Russell, G. E. (1921b, November 5). Attune with Nature. *The Journal*.
- Archer Russell, G. E. (1923, January 24). Relic hunting on the Ral Ral. *The Register*.
- Archer Russell, G. E. (1924, June 28). Relics of native work: Specimen hunting on the Murray, flints and stone implements. *The Journal*.
- Bellchambers, J. P. (1931). *A nature-lovers notebook*. Adelaide: Nature Lovers' League.
- Bland, C., Roberts, A. L., Campbell, I., & Mannum Aboriginal Community Association Inc. (2012). New interpretations for the stone artefact assemblage from Ngaut Ngaut (Devon Downs), South Australia. *Journal of the Anthropological Society of South Australia*, 36, 46–65. <https://anthropologicalsocietyasa.com/journal>
- Boehm, E. F. (1939). Notes on the extinct aborigines of the Morgan District, Murray River, South Australia. *South Australian Naturalist*, 20(10), 13.
- Boehm, E. F. (1943). Further notes on Ngaiawang tribe. *South Australian Naturalist*, 22(2), 1.
- Broecker, W. S., Kulp, J. L., & Tucek, C. S. (1956). Lamont natural radiocarbon measurements III. *Science (American Association for the Advancement of Science)*, 124(3213), 154–165. <https://doi.org/10.1126/science.124.3213.154>
- Burke, P. (2015). Cartographic ethnogenesis: Tindale's invention of the Jadira tribe in the Pilbara region of western Australia. *Journal of the Anthropological Society of South Australia*, 39, 102–126.
- Dahlin, T., & Zhou, B.-Y. (2004). A numerical comparison of 2D resistivity imaging with 10 electrode arrays. *Geophysical Prospecting*, 52(5), 379–398. <https://doi.org/10.1111/j.1365-2478.2004.00423.x>

- Dardengo, M., Roberts, A., Morrison, M., & River Murray and Mallee Aboriginal Corporation. (2019). An archaeological investigation of local Aboriginal responses to European colonisation in the South Australian Riverland via an assessment of culturally modified trees. *Journal of the Anthropological Society of South Australia*, 43, 33–70. <https://anthropologicalsocietysa.com/journal>
- Dowling, P. J. (1990). Violent Epidemics: Disease, Conflict and Aboriginal Population Collapse as a Result of European Contact in the Riverland of South Australia. Unpublished MA thesis, Department of Prehistory and Anthropology, Australian National University.
- Dreamer. (1918, February 15). The Punyelroo Cave. *Murray Pioneer and Australian River Record*.
- Dreamer. (1919, June 27). Early navigation on the Murray: “Dreamer” sees visions of the past. *Murray Pioneer and Australian River Record*.
- Dreamer. (1920, July 23). Who dug the Murray? *Murray Pioneer and Australian River Record*.
- Firman, J. B. (1971). *Renmark SI 54-10 geological mapsheet [digital map] 1:250,000*. Geological Survey of South Australia.
- Foster, R. (1991). ‘The spirit of the River Murray a poem by Richard Penney’: Introduction. *Journal of the Anthropological Society of South Australia*, 29(1), 24–53.
- Foster, R. (2005). Poltpalingada Booboorowie (1830–1901). In Christopher Cunneen (Ed.), *Australian Dictionary of Biography, Supplementary Volume 1580-1980* (pp. 324). Melbourne University Press.
- Hale, H. M., & Tindale, N. B. (1930). Notes on some human remains in the lower Murray valley. *Records of the South Australian Museum*, 4(2), 145–218.
- Hatswell, A. (2020). How the death of Tommy Walker exposed a grave-robbing coroner. Retrieved September 4, 2023 from <<https://www.abc.net.au/news/2020-10-20/tommy-walker-graverobbing-adelaide-coroner-indigenous-history/12721850>>
- Hutchinson, S. (2012). *Them bones, them bones: A technological and functional analysis of the bone tools from Ngaut Ngaut (Devon Downs)*. Department of Archaeology, Flinders University.
- Jones, R., Morrison, M., Roberts, A., & River Murray and Mallee Aboriginal Corporation. (2017). An analysis of indigenous earth mounds on the Calperum floodplain, Riverland, South Australia. *Journal of the Anthropological Society of South Australia*, 41, 18–62. <https://anthropologicalsocietysa.com/journal>
- Jones, R., Roberts, A., Westell, C., Moffat, I., Jacobsen, G., Rudd, R., & River Murray and Mallee Aboriginal Corporation. (2022). Aboriginal earth mounds of the Calperum floodplain (Murray Darling Basin, South Australia): New radiocarbon dates, sediment analyses and syntheses, and implications for behavioural change. *The Holocene*, 32(8), 816–834. <https://doi.org/10.1177/09596836221095981>
- Mackay, A., Saktura, R. B. K., O’Driscoll, C. A., Boyd, K. C., Marwick, B., Moffat, I., & Jacobs, Z. (2023). The middle stone age sequence at Klipfonteinrand 1 (KFR1), Western Cape, South Africa. *Journal of Paleolithic Archaeology*, 6(1), 1–38. <https://doi.org/10.1007/s41982-023-00147-x>
- Maloney, T., Dilkes-Hall, I., Setiawan, P., Oktaviana, I. M., Geria, I. M., Effendy, M., Ririmasse, M., Febrymanto, S. E., Priyatno, A., Atmoko, F., Moffat, I., Brumm, A., & Aubert, M. (2022). A late Pleistocene to Holocene archaeological record from East Kalimantan, Borneo. *Quaternary Science Reviews*, 277, 107313. <https://doi.org/10.1016/j.quascirev.2021.107313>
- Maloney, T., Dilkes-Hall, I., Vlok, M., Oktaviana, A., Setiawan, P., Priyatno, A., Ririmasse, M., Geria, I. M., Effendy, M., Istiawan, B., Atmoko, F., Adhityatama, S., Moffat, I., Joannes-Boyau, R., Brumm, A., & Aubert, M. (2022). Surgical amputation of a limb 31,000 years ago in Borneo. *Nature*, 609(7927), 547–551. <https://doi.org/10.1038/s41586-022-05160-8>
- Moffat, I., Wallis, L. A., Hounslow, M., Niland, K., Domett, K., & Trevorrow, G. (2010). Geophysical prospection for late Holocene burials in coastal environments: Possibilities and problems from a pilot study in South Australia. *Geoarchaeology: An International Journal*, 25(5), 645–665. <https://doi.org/10.1002/gea.20321>
- Monaghan, P. (2015). Tindale’s Antakirinja and the search for the ‘real western desert natives’. *Journal of the Anthropological Society of South Australia*, 39, 73–101.

- Mulvaney, D. J. (1960). Archaeological excavations at Fromm's Landing on the lower Murray River, South Australia. *Proceedings of the Royal Society of Victoria*, 72(2), 53–86.
- Mulvaney, D. J., Lawton, G. H., & Twidale, C. R. (1964). Archaeological excavations of rock shelter no. 6 Fromm's Landing, South Australia. *Proceedings of the Royal Society of Victoria*, 77(2), 479–520.
- Olenchenko, V. V., Tsibizov, L. V., Osipova, P. S., Chargynov, T. T., Viola, B. T., Kolobova, K. A., & Krivoschapkin, A. I. (2020). Peculiarities of using 2D electrical resistivity tomography in caves. *Archaeology, Ethnology and Anthropology of Eurasia*, 48(4), 67–74. <https://doi.org/10.17746/1563-0110.2020.48.4.067-074>
- Parkin, L. W. (1938). A limestone cave at Swan Reach. *South Australian Naturalist*, 19(2), 6–9.
- Paton, R. C. (1983). An analysis of Aboriginal subsistence in the lower Murray District, South Australia. Unpublished Honours thesis, Department of Prehistory and Anthropology, Australian National University.
- Pretty, G. L. (1977a). The cultural chronology of the Roonka Flat: A preliminary consideration. In R. V. S. Wright (Ed.), *Stone tools as cultural markers* (pp. 288–331). Australian Institute of Aboriginal Studies.
- Pretty, G. L. (1977b). *Ngaiawang folk province: Preliminary inventory of the cultural landscape*. Anthropology and Archaeology Branch, South Australian Museum.
- Pretty, G. L. (1988). Radiometric chronology and significance of the fossil hominid sequence from Roonka, South Australia. In J. R. Prescott (Ed.), *Early man in the Southern Hemisphere. Supplement to Archaeometry: Australasian studies 1988* (pp. S32–S52). University of Adelaide.
- Ralph, E. K., & Stuckenrath, R. (1962). University of Pennsylvania radiocarbon dates V. *Radiocarbon*, 4, 144–159. <https://doi.org/10.1017/S0033822200036602>
- Roberts, A. (1998). Digging Deeper: A Re-analysis of the Archaeology of Fromm's Landing.
- Roberts, A., & Mannum Aboriginal Community Association Inc. (2012). *Ngaut Ngaut: An interpretive Guide*. IPinCH and MACAI.
- Roberts, A., Barnard-Brown, J., Moffat, I., Burke, H., Westell, C., & River Murray and Mallee Aboriginal Corporation. (2021). Invasion, retaliation, concealment and silences at dead Man's Flat, South Australia: A consideration of the historical, archaeological and geophysical evidence of frontier conflict. *Transactions of the Royal Society of South Australia*, 145(2), 194–217. <https://doi.org/10.1080/03721426.2021.1940751>
- Roberts, A., Burke, H., Morton, C., & River Murray Mallee Aboriginal Corporation. (2019). Connection, trespass, identity and a swastika: Mark-making and entanglements at Pudjinuk rockshelter no. 1, South Australia. *Australian Archaeology*, 85(3), 235–251. <https://doi.org/10.1080/03122417.2019.1738666>
- Roberts, A., Burke, H., Pring, A., Zhao, J., Gibson, C. T., Popelka-Filcoff, R. S., Thredgold, J., Bland, C., & River Murray and Mallee Aboriginal Corporation. (2018). Engravings and rock coatings at Pudjinuk rockshelter no. 2, South Australia. *Journal of Archaeological Science, Reports*, 18, 272–284. <https://doi.org/10.1016/j.jasrep.2017.12.044>
- Roberts, A., Campbell, I., Franklin, N., & Mannum Aboriginal Community Association Inc. (2015). The use of natural features in the rock art of Ngaut Ngaut (Devon Downs), South Australia, and beyond. *Rock Art Research*, 32(2), 233–238. <https://doi.org/10.1080/03122417.2015.11682042>
- Roberts, A., Campbell, I., Pring, A., Bell, G., Watchman, A., Popelka-Filcoff, R. S., Lenehan, C. E., Gibson, C. T., Franklin, N., & Mannum Aboriginal Community Association Inc. (2015). A multidisciplinary investigation of a rock coating at Ngaut Ngaut (Devon Downs), South Australia. *Australian Archaeology*, 80(1), 32–39. <https://doi.org/10.1080/03122417.2015.11682042>
- Roberts, A., Duivenvoorde, W., Morrison, M., Moffat, I., Burke, H., Kowlessar, J., & Naumann, J. (2017). 'They call 'im crowie': An investigation of the Aboriginal significance attributed to a wrecked River Murray barge in South Australia. *International Journal of Nautical Archaeology*, 46(1), 132–148. <https://doi.org/10.1111/1095-9270.12208>
- Roberts, A., Fairhead, M., Westell, C., Moffat, I., Kowlessar, J., & River Murray and Mallee Aboriginal Corporation. (in press). Wurranderra's symbols: An exploration and

- contextualisation of the Thurk (Kingston-on-Murray) petroglyph site on the Murray River, South Australia. *Rock Art Research*.
- Roberts, A., Franklin, N., Campbell, I., & Mannum Aboriginal Community Association Inc. (2014). A few notes on historical vandalism and 'graffiti' at Ngaut Ngaut (Devon Downs), South Australia. *Rock Art Research*, 31(2), 244–246.
- Roberts, A., Franklin, N., & Campbell, I. (2014). Ngaut Ngaut (Devon Downs) petroglyphs reconsidered. *Rock Art Research*, 31(1), 36–46.
- Roberts, A., Pate, D. F., & Hunter, R. (1999). Late Holocene climatic changes recorded in macropod bone collagen stable carbon and nitrogen isotopes at Fromm's Landing, South Australia. *Australian Archaeology*, 49(1), 48–49. <https://doi.org/10.1080/03122417.1999.11681652>
- Roberts, A., Popelka-Filcoff, R. S., Westell, C., & River Murray and Mallee Aboriginal Corporation. (2022). Ochre, Flint and violence: An Aboriginal history of the Ma: Ko region (Overland Corner). *Transactions of the Royal Society of South Australia*, 146(2), 319–340. <https://doi.org/10.1080/03721426.2022.2111055>
- Roberts, A., Westell, C., Fairhead, M., & Lopez, J. M. (2023). 'Braiding knowledge' about the peopling of the River Murray (Rinta) in South Australia: Ancestral narratives, geomorphological interpretations and archaeological evidence. *Journal of Anthropological Archaeology*, 71, 101524. <https://doi.org/10.1016/j.jaa.2023.101524>
- Ross, D., Morrison, M., Simyrdanis, K., Roberts, A., Moffat, I., & River Murray and Mallee Aboriginal Corporation. (2019). A geophysical analysis of Aboriginal earth mounds in the Murray River Valley, South Australia. *Archaeological Prospection*, 26(4), 313–323. <https://doi.org/10.1002/arp.1746>
- Sheard, H. L. (1927a). Aboriginal rock carvings at Devon Downs, River Murray, South Australia. *Transactions of the Royal Society of South Australia*, 51, 18–19.
- Sheard, H. L. (1927b). Aboriginal rockshelters and carvings—three localities on the lower Murray. *Transactions of the Royal Society of South Australia*, 51, 137–140.
- Sheard, H. L. (1928). Aboriginal rock paintings seven miles north of Blanchetown, River Murray, South Australia. *Transactions of the Royal Society of South Australia*, 52, 231–234.
- Simyrdanis, K., Bailey, M., Moffat, I., Roberts, A. L., van Duivenvoorde, W., Savvidis, A., Cantoro, G., Bennett, K., & Kowlessar, J. (2019). Resolving dimensions: ERT imaging and 3D modelling of the Crowie barge, South Australia. In J. McCarthy, J. Benjamin, W. van Duivenvoorde, & T. Winton (Eds.), *3D-Modelling and interpretation for maritime archaeology*, 175–186. Cham: Springer International Publishing. <https://doi.org/10.1007/978-3-030-03635-5>
- Simyrdanis, K., Moffat, I., Papadopoulos, N., Kowlessar, J., & Bailey, M. (2018). 3D mapping of the submerged crowie barge using electrical resistivity tomography. *International Journal of Geophysics*, 2018, 1–11. <https://doi.org/10.1155/2018/6480565>
- Smith, M. A. (1982). Devon Downs reconsidered: Changes in site use at a lower Murray Valley rockshelter. *Archaeology in Oceania*, 17(3), 109–116. <https://doi.org/10.1002/j.1834-4453.1982.tb00052.x>
- Spennemann, D. H. R., & Downing, J. (1999). Unmasking transient colonial authors: The case of Handley Bathurst Sterndale. *Bibliographical Society of Australia and New Zealand Bulletin*, 23(3), 148–163.
- Tindale, N. B. (1922–1930). Diary of researches 1922–1930, volume 2. [Digitised journal]. South Australian Museum.
- Tindale, N. B. (1930–1952). Murray River notes vol. 1. [Digitised journal]. South Australian Museum. AA.
- Tindale, N. B. (1939a). Eagle and crow myths of the Maraura tribe, lower Darling River, New South Wales. *Records of the South Australian Museum*, 6(3), 243–261.
- Tindale, N. B. (1939b). Notes on the Ngaiawung tribe, Murray River, South Australia. *South Australian Naturalist*, 20(1), 10–12.
- Tindale, N. B. (1940–1956). Journal on campsites and stone implements of the Australian Aborigines; and others; notes, etc. [Digitised journal]. South Australian Museum. AA.

- Tindale, N. B. (1957). Culture succession in South eastern Australia from Late Pleistocene to the present. *Records of the South Australian Museum*, 13(1), 1–49.
- Tindale, N. B. (1961–1965). Journal on campsites and stone implements of the Australian Aborigines; and others; notes, etc. vol. IV with index. [Digitised journal]. South Australian Museum.
- Tindale, N. B. (1965–1971). Journal on campsites and stone implements of the Australian Aborigines; and others; notes etc. Vol 5 with index. *Adelaide S. Aust. And Palo Alto, California*. [Digitised journal]. South Australian Museum.
- Tindale, N. B. (1974). *Aboriginal tribes of Australia: Their terrain, environmental controls, distribution, limits, and proper names*. University of California Press.
- Wallis, L. A., Moffat, I., Trevorrow, G., & Massey, T. (2008). Locating places for repatriated burial: A case study from Ngarrindjeri ruwe, South Australia. *Antiquity*, 82(317), 750–760. <https://doi.org/10.1017/S0003598X00097350>
- Walshe, K. (Ed.). (2009). *Roonka: Fugitive traces & climatic mischief*. South Australian Museum.
- Westell, C. (2022). Just Add Water: Transformations in a peopled riverscape in the Riverland region of South Australia. Unpublished PhD thesis, College of Humanities, Arts and Social Sciences, Flinders University,
- Westell, C., Roberts, A., Morrison, M., & Jacobsen, G. (2020). Initial results and observations on a radiocarbon dating program in the Riverland region of South Australia. *Australian Archaeology*, 86(2), 160–175. <https://doi.org/10.1080/03122417.2020.1787928>
- Westell, C., Roberts, A., Morrison, M., Jacobsen, G., & River Murray and Mallee Aboriginal Corporation. (2020). Initial results and observations on a radiocarbon dating program in the Riverland region of South Australia. *Australian Archaeology*, 86(2), 160–175. <https://doi.org/10.1080/03122417.2020.1787928>
- Wilson, C., Roberts, A., Fusco, D., & Ngarrindjeri Aboriginal Corporation. (2022). New data and syntheses for the zooarchaeological record from the lower Murray River Gorge, South Australia: Applying a *ngatji* lens. *Australian Archaeology*, 88(2), 200–214. <https://doi.org/10.1080/03122417.2022.2042639>
- Woolmer, G. (1967, January 26). Barmera Nat. Trust Projects. *Murray Pioneer*.
- Woolmer, G. (1986). *Overland Corner: A history of Overland Corner and its hotel*. Barmera, S. Aust.: Woolmer.