
NADJEDBEBE

Madjedbebe is a sandstone rockshelter located not far from Jabiru, in the Northern Territory, in the traditional lands of the Mirarr people. May Nango (shown opposite) is a custodian of the site, and welcomes you to learn more about Madjedbebe in this brochure.

Madjedbebe is of great cultural significance to the Mirarr as a place where their ancestors camped and where many of their 'Old People' are buried. The site is also well known as being the oldest archaeological site yet discovered in Australia, proving the presence of humans on this continent from 65,000 years ago.

The archaeological deposits at Madjedbebe extend 2.65 m below the modern ground surface. Actually, the sandy sediments at the site go even deeper than this, but it is only at this level and above that we start seeing signs of people. These signs include more than 100,000 artefacts. These objects include flaked stone tools, ground stone axe heads, grinding stone slabs, animal bones, shellfish remains, different coloured ochres with evidence of grinding on their surfaces, charcoal, seeds, other plant remains and human burials.

An aerial photograph of the Madjedbebe site.

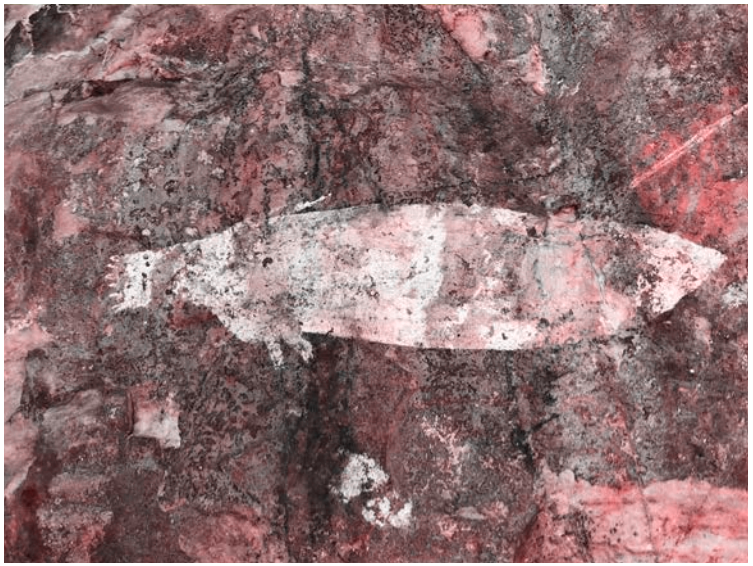
Although it is best known as Australia's oldest site, Madjedbebe also includes more than 1000 bim (pictures) on the walls of the shelter. Mostly dating to the last few thousands years, these reveal insights into the lives of the artists using Madjedbebe, and of the surrounding landscape.

The Madjedbebe motifs are mostly paintings (meaning that they were created using wet paint). However, there are also stencils (where a negative image is created by spraying wet paint around the outside of an object held up against the wall), drawings (created by dragging a piece of dry ochre, clay or charcoal across the wall) and beeswax figures (created by applying small balls of rolled honeycomb to the wall surface).

Many different coloured pigments have been used to create the bim at Madjedbebe. These are typically shades of red, yellow and orange, but also include white clays and black minerals. These are the same pigments and shades that artists use today to create painted artworks that are sold at Marrawuddi.

Objects depicted at Madjedbebe include many human-like figures (archaeologists call these 'anthropomorphs', because we do not know if the artists intended to depict actual people or rather spirit figures in the form of humans), geometric designs, hand stencils, wooden artefacts such as spears and spearthrowers, fibre objects such as baskets and nets, and objects from the 'contact period'. The latter include fire-arms, Balanda (European people) wearing clothing, hats and standing in a distinctive 'hands on hip' manner, smoking pipes, knives and ships.

There are also more than 80 images of djenj (fish) at Madjedbebe. These include binjdjarrang and ngalmakkawarri (catfish), namarnkol (barramundi), burrukulung (freshwater long-tom) and ngaldadmo (saratoga). All of these species can be caught in the billabongs and rivers near the site using a variety of techniques such as spearing, bait and line, trapping, scoop netting or poisoning.

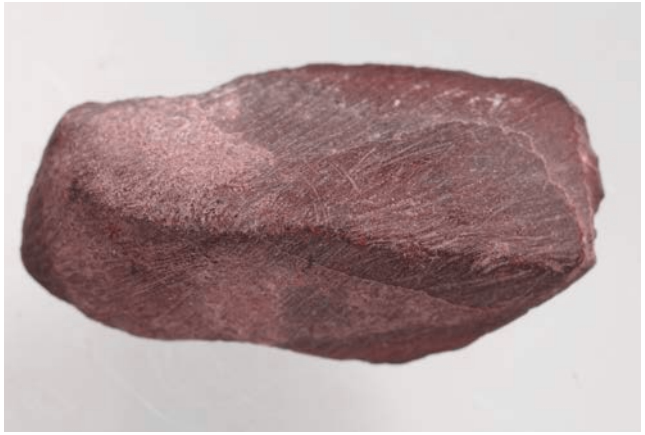


A painting of a binjdjarrang (eel-tailed catfish) at Madjedbebe.

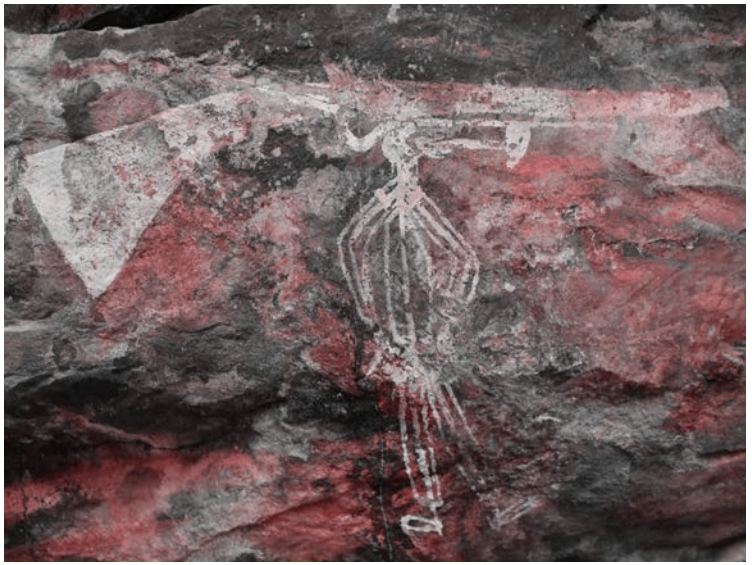
A painting of a sailing vessel at Madjedbebe.

There are no direct ages for any of the rock art motifs at Madjedbebe. Instead, the art has been dated using what archaeologists call 'relative techniques'. These indicate that the majority of the art present today was created in the last 1,500 years, though some motifs may be older than this. It is highly likely, however, that the tradition of painting in the site is far older than this, with older paintings having faded away or been painted over.

Of relevance to questions about the age of the art at Madjedbebe are fragments of ochre recovered from the lowest levels of the site. Many of these ochre fragments have ground facets, where tiny striations have been created when the ochre was rubbed against a grinding stone to create coloured powder. These fragments are a tantalising suggestion that from 65,000 years ago people were engaging in some form of artistic pursuit, whether that was painting motifs on the walls of the shelter, or decorating objects or themselves.

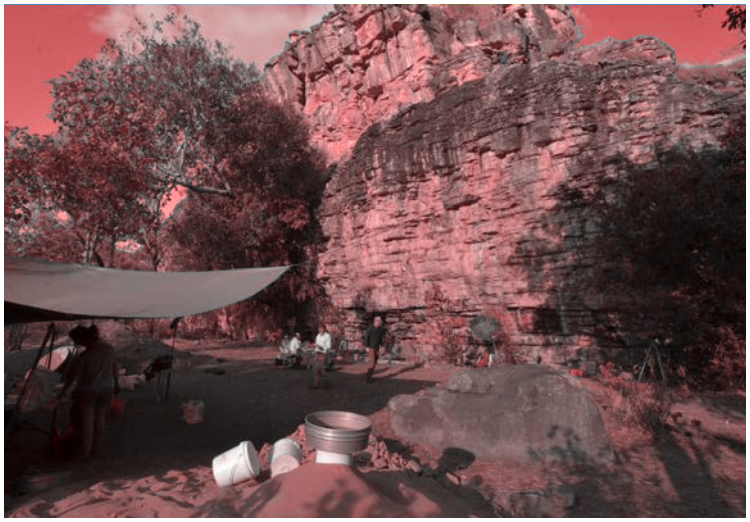


A fragment of ochre. Note the microscopic striations on the different facets. These were created by the fragment being ground to create a powder that would have been mixed with a binder to form a paint.



A painting of a fire-arm and a Balanda with clay pipe at Madjedbebe.

A view of the Madjedbebe site.



These photographs show the archaeological excavation at Madjedbebe in 2012. Starting in 1973, the site has now been excavated three times. Each time archaeologists have been able to use newly developed techniques to study the site sediments and artefacts to reveal fresh information.

Opposite page: Mirarr representatives Simon Mudjandi, Rosie Mudjandi, May Nango and Djaykuk Djandjomerr sitting in the Madjedbebe site.

Many fine and coarse-grained sandstone grinding stones were found in the Madjedbebe deposit, right down to the lowest levels of the site. These are the oldest known examples of seed-grinding stones found in the world outside of Africa.

Archaeologists have studied the microscopic residues preserved on the surfaces of these grinding stones to find out what Bininj were processing with them. They discovered that people were processing a broad range of fruits, soft and hard seeds, water lilies, yams and other plants. Most of these plants were used as foods, but it is likely that some of them were used as medicines to treat ailments such as aches, pains and coughs. Some foods, such as man-kindjek (cheeky yam) and man-marrabbi (sand-palm) needed to be pounded (or processed in other ways) before being eaten to remove toxins or to make them palatable.

A small number of the grinding stones were also used for processing small animals to make them into a protein-rich paste, or for grinding segments of bone to shape them into tools. These includes bone points used to tip spears, bone 'needles' used to help make woven nets and bags, and ornaments that were worn through the nose. Many small fragments of bone sharpened on both ends were then fixed to wooden spear shafts to make multi-pronged fishing spears; Bininj still fish with these sorts of spears throughout Arnhem Land today.

A 30,000 year old grinding stone from Madjedbebe. This object has microscopic evidence for ochre and plant processing preserved on it.

A fragment of bone deliberately ground to sharpened points on both ends.

Other uses of the Madjedbebe grindstones include grinding ochre for making the rock art on the walls of the shelter. This is exactly the same process that artists use today, where fragments of ochre are rubbed against a coarse piece of sandstone to make a powder. The powder is then mixed with a suitable binder to form a paint. The binders usually come from plant sap, animal fat or blood. If only water is used to make the paint, when it dries it will quickly flake away and will not preserve.

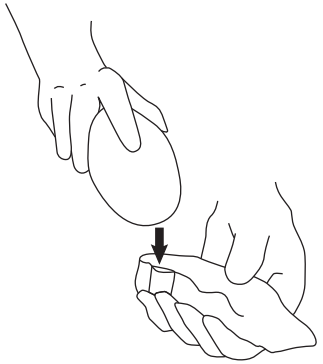
Grinding stones were also used as 'whetstones' for shaping and sharpening stone axes.

A grinding stone from Madjedbebe that is about 50,000 years old.

A 55,000 year old grinding stone from Madjedbebe. It was used for shaping and sharpening stone axes.

At least ten “edge ground” stone axes (barndadken) were found at Madjedbebe, as well as many other small flakes that were knocked off from the edges of other axes.

Edge ground axes are made from hard volcanic rocks such as dolerite and hornfels. They are made by firstly taking a piece of volcanic rock of approximately the right shape and size and using another, harder rock (called a ‘hammerstone’) to knock ‘flakes’ off from around the edges of the volcanic rock until it is closer to the desired final size and shape. This ‘axe blank’ is then ground using water and sand against a piece of sandstone until the edge has been sharpened into the final shape.



Just like Western steel axes, edge ground axes were used for tough tasks such as chopping into trees to access foods such as mankung (sugarbag) and djebuyh or djorrkkun (possums). Sometimes you will see trees around Jabiru and in Kakadu National Park with scars on them which have been created by Bininj accessing these sorts of resources.

Axes were also used for cutting bark and wood used for making objects such as carrying dishes, borndok (spear-throwers) and roofing material.

In Europe, edge ground axe technology only appears around 10,000 years ago when people began clearing vegetation for farming fields. As ground edge axes were found in the lowest (oldest) layer of Madjedbebe, they are 55,000 years older than the oldest similar axes in Europe!

A sample of stone axes from levels of Madjedbebe dated from about 25,000 to 30,000 years ago.

Axe blanks ready for grinding into final shape on a slab of sandstone.

Madjedbebe also contains hundreds of bone artefacts. Bone and other organic artefacts are not often found in sandstone rockshelters because the sediments are usually too acidic. However, at Madjedbebe, the top layers of the site (dating to about the last 8,000 years) are filled with discarded shellfish remains. This has turned the sediments alkaline, which is excellent for the preservation of bone. It is from these upper layers of Madjedbebe that most of the bone artefacts have been recovered.

About half of the Madjedbebe bone artefacts were sufficiently well preserved to allow archaeologists to identify what they had been used for. These included nginj (fishhooks, or fishing-spear tips), fragments of weaving tools, and possible ornamental pieces.

On permanent display at Marrawuddi is a series of bone 'bipoints' (meaning they are pointed on both ends) from the Madjedbebe excavations. Bipoints are typically used to tip the ends of djalakiradj (multi-pronged fishing spears). They are made by smashing an animal bone (most often a kornobolo or kunj — wallaby or kangaroo — leg bone) into smaller pieces and picking out one of about the right shape. You then grind that fragment against a piece of sandstone until it was the desired shaped (in this case, a fine bipoint). Sometimes man-bambula (sandpaper fig) leaves were used to do the grinding instead of sandstone.

One end of many of the bipoints from Madjedbebe preserve microscopic evidence of sinews and/or resin. These indicate that they had once been hafted into a wooden spear. Often the other tip was broken. This told archaeologists that these tools had probably been damaged during use, rather than being broken after being discarded. The large numbers of bone points at Madjedbebe reflects the importance of djenj (fish) in the local diet in the last 6,000 years when the nearby billabong became established due to rising sea levels.

Bone bipoints from the last 6,000 years at Madjedbebe.

Sharpening a fragment of bone into a point by rubbing it against some sandstone.

At Marrawuddi you should also look out for a display containing three tiny, red-coloured beads. These were made from the vertebrae of the Carcharhiniformes family of sharks. These sharks are known locally as ‘wamba’ and they are found in the various Alligator Rivers.

The three beads on display were recovered from a rockshelter in a sandstone outlier on the eastern margin of the Magela floodplain, not far from the Madjedbebe site. They would have originally been suspended on a string likely made of plant fibre and would most likely have formed part of a necklace.

Beaded necklaces were common in Aboriginal societies across Australia, as evidenced by the many ethnographic examples of beads and necklaces in museum collections. In fact, Bininj are still making vertebrae bead necklaces today, an example of which is shown in the display alongside the ancient beads. In Arnhem Land, some types of beaded necklaces were commonly worn as a part of mourning rituals when someone died.

These particular beads are covered in a red ochre slip made from a clay ‘slurry’ and the originally tiny hole in the centre of beads (for the spinal cord to pass through) have been ‘drilled’ out so it is large enough for the bead to be suspended on a string. Though they have not been directly dated, the majority of bim (rock art) in the site where they were found is in a style that dates to the last 1,000 or so years. By association, and given their condition, it is reasonable to assume the beads are of a similar age, that is, mostly likely a few hundred years old.

Modern and ancient shark vertebrae beads on display at Marrawuddi.

If you are interested in learning more about what archaeologists have discovered about the Madjedbebe site, or about any of the objects on display at Marrawuddi, the following online news articles may be of interest:

Clarkson, C., B. Marwick, L. Wallis, R.L.K. Fullagar and Z. Jacobs 2017 Buried tools and pigments tell a new history of humans in Australia for 65,000 years. *The Conversation*. Available online at theconversation.com/buried-tools-and-pigments-tell-a-new-history-of-humans-in-australia-for-65-000-years-81021.

Griffths, B., L Russell and R. Roberts 2017 Friday essay: When did Australia's human history begin? *The Conversation*. Available online at theconversation.com/friday-essay-when-did-australias-human-history-begin-87251.

Florin, A., A. Fairbairn, C. Clarkson, J. Shulmeister, N.R. Patton and P. Roberts 2021 Burnt ancient nutshells reveal the story of climate change at Kakadu — now drier than ever before. *The Conversation*. Available online at theconversation.com/burnt-ancient-nutshells-reveal-the-story-of-climate-change-at-kakadu-now-drier-than-ever-before-1527600.

Florin, A., A. Fairbairn and C. Clarkson 2021 65,000-year-old plant remains show the earliest Australians spent plenty of time cooking. *The Conversation*. Available online at theconversation.com/65-000-year-old-plant-remains-show-the-earliest-australians-spent-plenty-of-time-cooking-131761.

Florin, A., A. Fairbairn and C. Clarkson 2022 65,000 years of food scraps found at Kakadu tell a story of resilience amid changing climate, sea levels and vegetation. *The Conversation*. Available online at theconversation.com/65-000-years-of-food-scraps-found-at-kakadu-tell-a-story-of-resilience-amid-changing-climate-sea-levels-and-vegetation-181240.

Disspain, M. and L. Wallis 2022 School of fish: How we involved Indigenous students in our investigation of a 65,000-year-old site. *The Conversation*. Available online at theconversation.com/school-of-fish-how-we-involved-indigenous-students-in-our-investigation-of-a-65-000-year-old-site-144577.

The following academic articles will also be useful, though they may be a little harder to find:

Clarkson, C., Z. Jacobs, B. Marwick, R. Fullagar, L. Wallis, M. Smith, R. Roberts, E. Hayes, K. Lowe, X. Carah, A. Florin, J. McNeil, D. Cox, L. Arnold, Q. Hua, J. Huntley, H. Brand, T. Manne, A. Fairbairn, J. Shulmeister, L. Lyle, M. Salinas, M. Page, K. Connell, G. Park, K. Norman, T. Murphy and C. Pardoe 2017 Human occupation of northern Australia by 65,000 years ago. *Nature* 547(7663):306–310.

Hayes, E.H., J.H. Field, A.C.F. Coster, R. Fullagar, C. Matheson, S.A. Florin, M. Nango, D. Djandjomerr, B. Marwick, L.A. Wallis, M.A. Smith and C. Clarkson 2021 Holocene grinding stones at Madjedbebe reveal the processing of starchy plant taxa and animal tissue. *Journal of Archaeological Science Reports* 35:102754.

Hayes, E., R. Fullagar, J.H. Field, A.C.F. Coster, C. Matheson, M. Nango, D. Djandjomerr, B. Marwick, L.A. Wallis, M.A. Smith and C. Clarkson 2022 65,000-years of grinding stone use at Madjedbebe, northern Australia. *Scientific Reports* 12(1).

Florin, S.A., A. Fairbairn, M. Nango, D. Djandjomerr, B. Marwick, R. Fullagar, M. Smith, L.A. Wallis and C. Clarkson 2020 The first Australian plant foods at Madjedbebe, 65,000–53,000 years ago. *Nature Communications* 2021(11):924.

Florin, S.A., P. Roberts, B. Marwick, N.R. Patton, J. Shulmeister, C.E. Lovelock, L.A. Barry, Q. Hua, M. Nango, D. Djandjomerr, R. Fullagar, L.A. Wallis, A.S. Fairbairn and C. Clarkson 2021 Pandanus nutshell generates a palaeoprecipitation record for human occupation at Madjedbebe, northern Australia. *Nature Ecology and Evolution* 5(3):295–303.

Hayward, J., I.G. Johnston, S.K. May and P.S.C. Taçon 2018 Memorialization and the stencilled rock art of Mirarr country, Northern Australia. *Cambridge Archaeological Journal* 28(3):1–18.

Johnston, I.G., J. Goldhahn and S.K. May 2017 Dynamic Figures of Jabiluka: Chaloupka's four-phase theory and the question of variability within rock art style. In B. David, P.S.C. Taçon, J. Delannoy and J. Geneste (eds), The Archaeology of Rock Art in Western Arnhem Land, pp.109–127. Terra Australia. Canberra: ANU Press.

Langley, M.C., L.A. Wallis, M. Nango, D. Djandjomerr, C. Nadjamerrek, R. Djandjul and R. Gamarrawu 2023 Fishhooks, fishing spears, and weaving: The bone technology of Madjedbebe, Northern Australia. *International Journal of Osteoarchaeology* 33(2):221–234.

May, S. K., P.S.C. Taçon, D. Wright, M. Marshall, J. Goldhahn and I. Domingo Sanz 2017 The rock art of Madjedbebe (Malakunanja II). In B. David, P.S.C. Taçon, J. Geneste and J. Delannoy (eds), *The Archaeology of Rock Art in Western Arnhem Land*, pp. 87–107. Terra Australis 47. Canberra: ANU Press.

May, S.K., D. Wesley, J. Goldhahn, M. Litster and B. Manera 2017 Symbols of power: The firearm paintings of Madjedbebe (Malakunanja II). *International Journal of Historical Archaeology* 21:690–707.

Wright, D., M.C. Langley, S.K. May, I.G. Johnston and L. Allen 2016 Painted shark vertebrae beads from the Djawumbu-Madjawarrnja complex, western Arnhem Land. *Australian Archaeology* 82(1):43–54.

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