A review of archaeology and rock art in the Dampier Archipelago

A report prepared for the National Trust of Australia (WA)

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Final draft





Forward

As this thoughtful and readable survey makes clear, the Burrup Peninsula and adjacent islands merit consideration as an integrated cultural landscape. Instead, the Western Australian government is sacrificing it to proclaimed industrial necessity that could have been located in a less destructive area. Before being systematically recorded, this ancient art province is divided in piecemeal fashion. Consequently, sites that are not destroyed by development become forlorn islands in an industrial complex.

Twenty-five years ago the Australian Heritage Commission already had noted the region's potential for World Heritage nomination. Today, State and corporate authorities lobby to prevent its listing even as a National Heritage place! This is shameful treatment for an area containing perhaps the densest concentration of engraved motifs in the world. The fact that even today individual motifs are estimated vaguely to number between 500,000 and one million reflects the scandalous government failure to sponsor an exhaustive survey before planned industrial expansion. It is best described as officially sanctioned cultural vandalism, impacting upon both Indigenous values and an irreplaceable heritage for all Australians.

Instead of assigning conservation priorities, since 1980 more than 1800 massive engraved rocks have been wrenched from their context and sited close to a fertilizer plant. The massive gas complex, its expansion approved, sits less than a kilometre from a unique, deeply weathered engraved panel, certainly one of Australia's most significant ancient art survivors. Such motifs, which endured centuries, now face the pollutants from these sources. So do some dozen Tasmanian tiger (thylacine) depictions, presumably greater than 3000 years old.

The government claims that archaeologists and conservationists irrationally oppose development and employment opportunities. This is nonsense, because prior recording of this landscape should ensure alternative (and less costly) sites for development. In 2006 it perseveres with its negative policy—to construct a road and visitor centre on archaeologically unsurveyed territory.

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Acknowledgements

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This report is dedicated to the late Pat Vinnicombe, tireless campaigner for the rock art of the Dampier Archipelago.

Summary

The Dampier Archipelago contains the largest concentration of rock art in the world, estimated at perhaps a million petroglyphs. The art is extraordinary in its range and diversity. Associated with the art is a rich archaeological record, including camp sites, quarries, shell middens and stone features. Many motifs and some stone features are connected to the beliefs and ceremonial practices of Aboriginal people in the Pilbara region today. The entire Archipelago is a continuous cultural landscape providing a detailed record of both sacred and secular life reaching from the present back into the past, perhaps to the first settlement of Australia.

The combination of cultural richness and scientific potential of the Dampier Archipelago has been known since the 1960s. Repeated archaeological investigations of the area over the last forty years have reinforced the view that the cultural landscape of the Dampier Archipelago is highly significant by international standards and demands comprehensive study. Nevertheless, the same period has seen the planning and establishment of major industrial and infrastructure developments in the area with little regard for its heritage values. There is still no comprehensive management plan based on sound archaeological research and consultation with local Aboriginal people. Heritage consultants investigate and make recommendations on specific projects in a vacuum without a comprehensive understanding of the values of the area as a whole. As a result, the outstanding heritage values of the area continue to be compromised by short-term industrial imperatives. Sites are physically destroyed by construction, eroded or polluted by industrial emissions, damaged deliberately or accidentally by visitors as population grows and road access develops. Some sites survive, but in a radically transformed and unsympathetic landscape.

The Dampier Archipelago is highly significant for Aboriginal people in the Pilbara and beyond. As a unique record of human achievement, it also has significance at the national and international scale. However, there is little information about the archaeology and rock art of the Dampier Archipelago that is readily accessible to the public. Most of the information is in unpublished technical reports. This report was commissioned by the National Trust of Australia (WA) and describes heritage values and conservation issues in the Dampier Archipelago. Its main focus is on the archaeological and scientific importance of the area, while acknowledging its continuing significance to Aboriginal people. It aims to describe what is known and what is not known about the cultural heritage of the area, to outline its significance, and to identify some of the key issues with respect to its conservation for future generations.

Figure 1. The Dampier Archipelago

Chapter 1: Introduction

The Dampier Archipelago contains the largest concentration of rock art in the world, estimated at perhaps a million petroglyphs. The art is extraordinary in its range and diversity. Associated with the rock art is a rich archaeological record, including camp sites, quarries, shell middens and stone features. Many art motifs and some stone features are connected to the beliefs and ceremonial practices of Aboriginal people in the Pilbara region today. The entire archipelago is a continuous cultural landscape providing a detailed record of both sacred and secular life reaching from the present back into the distant past, perhaps to the first settlement of Australia some 50,000 years ago.

The cultural richness and scientific potential of the Dampier Archipelago have been known since the 1960s. Repeated archaeological investigations of the area over the last forty years have reinforced the view that the cultural landscape of the Dampier Archipelago is highly significant by international standards and demands comprehensive study. Nevertheless, the same period has seen the planning and establishment of major industrial and infrastructure developments in the area with little regard for its heritage values. There is still no comprehensive management plan based on sound archaeological research and consultation with local Aboriginal people. Heritage consultants investigate and make recommendations on specific projects in a vacuum without a comprehensive understanding of the values of the area as a whole. As a result, the outstanding heritage values of the area continue to be compromised by the short-term imperatives of industrial development. Sites continue to be physically destroyed by construction, affected by industrial emissions, damaged deliberately or accidentally as a result of increased numbers of people using the area. Some sites survive, but in a radically transformed and unsympathetic landscape.

The National Trust of Australia (WA) and the Hon. Robin Chapple MLC nominated the Burrup Peninsula to the National Trust Endangered Places List in 2002. In 2003 the World Monuments Fund added it to its list of Most Endangered Places—the first time an Australian place had been included. In 2004, the National Trust, the Native Title Claimants and Robert Bednarik, President of the International Federation of Rock Art Organisations, nominated the Dampier Archipelago to the National Heritage list, under the new Commonwealth heritage legislation. The National Trust has continued to campaign to secure protection for the rock art of the Dampier Archipelago and commissioned this study with funding assistance from American Express through the World Monuments Fund.

Background and scope

There has been a large amount of archaeological work in the Dampier Archipelago, most of which has been conducted in the context of industrial development. Very little of this work has been published and the results of it are effectively inaccessible. Archaeological investigations in the Dampier Archipelago fall broadly into three categories.

1. Major archaeological investigations, usually involving large scale site recording programs. Some aspects of these have been developed further into research projects at honours or masters level. Generally, however, these studies had to focus on description rather than analysis and synthesis. Most such surveys were severely constrained by the requirements of developers rather than the principles of scientific investigation. Nevertheless, the large scale of these studies allows them to be used to assess the cultural heritage of the area and develop guidelines for future research.
2. Small-scale studies relating to specific development issues. These include a very large number of (usually) short reports relating to site identification surveys and consultation of Aboriginal community members for specific projects in the present industrial areas. To some extent, therefore, these reports build on the major salvage projects.
3. As well as the reports, there is a large amount of primary data available in the site files held at Department of Indigenous Affairs (DIA) and in the Western Australian Museum. This includes photographic documentation, field notes, record sheets, location maps etc, as well as

material from collections or excavations. Some material is believed to be lost or held by other agencies.

A full review of the archaeology of the Dampier Archipelago would require a comprehensive assessment of all this material including the location, assessment and analysis of archived data. This would clearly be a very large and complex task and, in view of the limited resources available, it was essential to identify priorities.

The main priority for this study was to produce an accessible overview and synthesis of the available information about the archaeology of the Dampier Archipelago. This involved assessing the current state of knowledge, and identifying significant gaps in understanding of the cultural heritage values of the area, critical areas for further research and urgent conservation issues, such as the effects of industrial development, rising population and usage, on the area as a whole. This was achieved through a review of the limited amount of archaeological survey and analysis that has been conducted within a scientific framework, as well as evaluating the **major** site recording projects in terms of such factors as survey coverage, sampling strategy, and results. A comprehensive review and assessment of the archived primary data, including the so-called 'grey literature', is more properly part of the ground work required to develop a long-term management plan for the cultural values of the entire Dampier Archipelago. The archived primary data itself is clearly of enormous research potential. Assessment of this material is a project in its own right and should be part of a long term research program.

This study has not involved consultation with Aboriginal people and does not attempt a comprehensive discussion of the significance of the Dampier Archipelago to the Aboriginal communities of the Pilbara region. This report is primarily concerned with the **archaeological** values of the Dampier Archipelago and its importance to the wider community. The significance of the Dampier Archipelago to Aboriginal people is acknowledged.

Therefore, the specific aims of this study were to:

- Review and evaluate existing knowledge about the archaeology of the Dampier Archipelago
- Describe the heritage significance of the Dampier Archipelago in both national and world contexts
- Identify key issues to be addressed in developing a long term management plan for the Dampier Archipelago.

The results of this review are described in two documents—this main report and a general non-technical summary (Bird and Hallam 2006).

Natural environment

The Dampier Archipelago is on the Indian Ocean coast of the Pilbara Region of Western Australia. It is made up of 42 islands and islets of which Dampier Island is the largest. As a result of industrial development, Dampier Island is now an artificial peninsula known as the 'Burrup Peninsula'[1] (Figure 2, Figure 3 and Figure 4).

Figure 2. The north-west of Western Australia, showing places mentioned in the text (base mapping from *The Macquarie Illustrated World Atlas* 1984)

Figure 3. The Dampier Archipelago

Figure 4. The Burrup

The Dampier Archipelago is a unique landscape with rich and diverse terrestrial and marine habitats. Its significant natural values are well recognised and most of the islands are nature reserves or reserved for conservation and recreation (Morris 1990). The Archipelago is the richest area of marine

[1] The use of the term 'Peninsula' gives a misleading impression of the landscape before the construction of the causeway. Following Vinnicombe (2002:3), the name 'Burrup' without the qualifier is used here to refer to Dampier Island in some discussions.

biodiversity in Western Australia and a marine conservation reserve is planned for the area (Department of Environment and Conservation 2005).

Most of the Dampier Archipelago is made up of pre-Cambrian igneous rocks, including granophyre, gabbro, andesite and basalts, and granite. Limestone also occurs in a number of coastal locations and is dominant on Legendre Island at the northern tip of the Archipelago. The distinctive rugged landscape, comprising resistant ridges and ranges dissected by valley systems, results from the ancient weathering and erosion of the pre-Cambrian igneous rocks. This can form a range of landforms including smooth vertical rock faces, creviced and fissured surfaces and massive boulder accumulations (Semeniuk et al. 1982). The rugged landscape with its massive boulder-strewn ridges, plateaus and steep-sided valleys contrasts markedly with the broad low-lying Abydos Plain of the mainland (Figure 5, Figure 6 and Figure 7).

Figure 5. Dampier landscape

Figure 6. Massive boulder slopes

Figure 7. Vertical rock faces

The diverse coastline and sea-bed mean that there is a wide range of marine ecosystems (Semeniuk et al 1982). Consequently the sea provided rich food resources for Aboriginal people. The inter-tidal zone provided molluscs and crustaceans. Fish were caught using nets and tidal fish traps, while turtles and their eggs, and dugongs were also taken (Vinnicombe 1987a).

Soils in the area are generally shallow and plant cover sparse. The dominant vegetation of the area is spinifex grassland. Spinifex was an important resource for Aboriginal people, providing edible seeds, which were ground into flour, string for making nets and baskets, resin for hafting stone artefacts. However, the complex topography has created a range of micro-habitats which support a variety of specialised plant communities. These include a high number of species normally only found much further north in the Kimberley region (Morris 1990:25). Many of these species are edible and provided important food resources for Aboriginal people. They include a number of edible tubers which grow in pockets of trapped soil in rocky terrain (Vinnicombe 1987a:2-3, 42).

The climate is characterised by high summer temperatures and an erratic rainfall affected both by southern winter rainfall pattern and northern tropical cyclones. Water is scarce in the Archipelago and there are no permanent surface sources. The valley systems carry ephemeral creeks during the wet season which seasonally replenish rock pools and soaks (Figure 8). These would have been of critical importance to the people of the area (Vinnicombe 1987a:2).

Figure 8. Seasonal rock pool

At the time Australia was first settled by humans, about 50,000 years ago, sea levels were much lower than today and the Dampier Archipelago would have been a series of rocky ranges and ridges rising out of a flat plain. The sea would have been more than 100km distant. Sea levels rose over a several thousand year period at the end of the last Ice Age and the Dampier Archipelago we see today is a drowned landscape. Sea level stabilised about 6000 years ago, forming rock platforms and boulder beaches with gradual accumulation of sand and silt in more sheltered bays (Semeniuk et al. 1982; Semeniuk and Wurm 1987).

Chapter 2: Aboriginal people of the Dampier Archipelago

Early European observation: explorers

It is with a visit by William Dampier that informative records for the Dampier Archipelago begin at the very end of the seventeenth century. [1] On 21 August 1699 he found himself amongst an 'Archipelago of Islands'; and on 22 August landed on one he named Rosemary Island. His description gives an impression of plentiful marine and other resources – 'Shell-fish, *viz* Limpits, Perriwinkles, and an Abundance of small Oysters growing on the Rocks'; plus green turtle, sharks and watersnakes; sea birds, land birds, and leguminous plants. On Rosemary Island 'the Bushes had been burned, but we found no other sign of inhabitants'; but they saw smoke on a neighbouring island, indicating indigenous use of the offshore islands (Dampier 1703: 114-117).

In 1801, and again in 1803, a French scientific expedition under the command of Captain Nicolas Baudin, reconnoitred the northwest coasts, running west to east, from Northwest Cape to the Dampier Archipelago and on to the Bonaparte Archipelago (Horner 1987: map on p.102-3). On each foray, the *Geographe* cautiously kept well away from the actual coastline, deterred by dangerous shallows and adverse wind-directions On the first occasion (Baudin 23 to 28 July 1801, in Cornell 1974:227-232) Baudin refers to the archipelago where Dampier had anchored as 'the Rosemary islands'. But he did not approach near offshore islands until 27 July, when Baudin (Cornell 1974: 229) sent Citizen Ronsard to land on an island 'separated from the continent by an arm of the sea', which Peron (1809:103) identifies as Depuch Island, about 100km east of the Dampier Archipelago. Ronsard gives a vivid description of 'rocks piled on top of each other' and 'piled in confusion' in the dales; the ferruginous coating on these rocks; fireplaces at the foot of trees; and flaked stone with no geomorphic explanation (Cornell 1974: 232). But he says nothing about the engravings now known on Depuch (Crawford 1964). Four or five columns of smoke from fires well inland showed the mainland behind Depuch was inhabited (Cornell 1974: 231).

In 1803, both the *Geographe* and the *Casuarina*, under Freycinet, skirted these coasts more closely, apparently rounding Delambre Is (Baudin 29 March to 1 April 1803, in Cornell 1974: 519-521). French cartographers gave names to several islands in and near the Dampier Archipelago – Regnard, Malus, Legendre, Delambre, and to the east the Forestier Archipelago and several of its islands, including Depuch Island, named after the expedition's minerologist (Marchant 1998: Appendix 8).

Over the years from 1818 to 1822 Captain Phillip King surveyed the western and northern coasts of Australia, passing or touching the Dampier Archipelago several times, adding to our knowledge of resources and Aboriginal life in the archipelago, particularly in 1818. In February the *Mermaid* anchored in the archipelago, off the western island King named Enderby. On landing, his men reported plentiful shellfish and *beche de mer*; and a useful water source. He tells us that 'The tracks of natives and their fire-places were every where visible, and around the latter the bones of kangaroo and fishes were strewed' but it is not absolutely certain that this refers to Enderby (King 1827: volume 1, 35-37).

Next day, sailing slowly eastward with very little wind, the vessel encountered three Aboriginal men paddling small craft from the inshore islands towards Lewis Island, east of Enderby. King describes each craft as a single log, with a steering device. On the central island of the inshore 'Intercourse' group there were no fewer than forty Aborigines gathered, mainly women and children, lamenting

[1] This was not the notorious voyage which had brought Dampier in January 1688 to islands off what became the Dampierland Peninsula in the Kimberley. On that occasion the indigenes proved friendly and curious, but disappointed his hopes that they 'would work heartily for us.' As Calvert (1894: 6) remarked, 'they were not quite such fools as they looked'! When Dampier tried to persuade them to carry barrels of water to his boat, 'they stood like statues' and 'we were forced to carry our water ourselves'! In retaliation, he described these inhabitants of northern Australia as 'the miserablest people in the world', and this is often the first European opinion quoted. Dampier more usefully records the visits to islands by groups of around 40 people, and the place of shellfish, and of fish, harvested in tidal 'weirs' (fish traps), in the diet of northern Australia (Dampier 1697: 312-315).

loudly when the seamen captured one of the three navigators (King 1827: volume 1, 38-41). An approach was made to the island, and the Aborigines seemed much intrigued by Boongarie, a southern native in King's boat, but the coast was too rocky to land. Fires were seen on the island during the night, and also on the 'mainland' (possibly the south end of Dampier Island) to the south. In the morning the Aborigines called loudly to King's crew; but by afternoon they were gone, leaving only their shelters (King 1827: volume 1, 41-44). The presence of a large nest makes it possible to identify the island as West Mid Intercourse (Vinnicombe 1997a: 8), which has a surviving osprey nest at the east end.

Two more men were encountered on their log craft, and four or five more on another adjacent island. King suspected there were more Aborigines, including women, hiding close by. Again, they were fascinated by Boongarie. Sufficient exchange took place for King to understand that he could find water on another island to the northeast (King 1827: volume 1, 45-47). On this island, probably East Intercourse Island, twenty or thirty Aboriginal men with spears successfully prevented the mariners from going ashore to seek water, their threats not, however, backed by actions. Next day two more log navigators were seen 'crossing over to the main upon their logs', probably from one of the Intercourse Islands to Dampier Island (King 1827: volume 1, 47-49).

On Malus Island, north of Lewis, the surveyors saw turtle tracks; and these no doubt are among the resources bringing Aborigines to the islands at this time. Deep ravines and boulder-strewn hillsides were remarked on Malus and Enderby Islands. Before leaving the archipelago King skirted its northern perimeter, identifying Rosemary Island, Gidley, Legendre, Huay and Delambre, but nowhere remarking on signs of Aboriginal presence. He then swung round to anchor in Nickol Bay; before finally departing for Depuch and the Forestier Archipelago (King 1827: volume 1, 50-56). King did not again penetrate this archipelago on any of his subsequent comings and goings through these northwest seas.

Thus considerable gatherings, social and probably ceremonial, were happening in February on the immediately inshore island group, which King consequently named Intercourse Islands (King 1827: volume 1, 48-49); and where enormous mound middens can be seen today (Bradshaw 1993, in Murphy et al. 1994). There were one or two encounters with a few individuals near the intermediate islands; but none in the outer islands.

While whalers may already have established bases in the archipelago before the 1840s (Bednarik 2002a), the next useful documentation comes from more formal visitors. During its plotting of Australian coasts the survey ship *Beagle*, like the *Mermaid*, travelled to and fro parallel to the Pilbara coast several times. In 1838, Wickham, commanding the *Beagle*, followed Dampier, Baudin and King north-eastward off the Pilbara coast, staying well offshore from the Montebellos to Roebuck Bay. His journey in the reverse direction took him even further from the coast (Hordern 1989: map on p.43). In 1839 the *Beagle* sailed south from the Victoria River to the Swan yet further seaward (ibid.: map on p.159). This was unfortunate, for when the *Beagle*'s next northward journey (ibid.: map on p.215) took it to Depuch Island, sketches and descriptions of the Aboriginal engravings resulted, and we can only regret the lack of similar records for Dampier Island.

The *Beagle* anchored off Depuch Island in June 1840. J. Lort Stokes comments on the geomorphology: 'large columnar blocks of the greenstone of which the island is composed, present, as the sun falls on their iron rusty surface, an appearance as if the sides of the valley were lined with red warriors. … Depuch Island is one great pile of reddish coloured blocks'. Stokes describes several bough huts covered in loose spinifex matting. He thought it would be possible to walk across from the mainland at low tide, speculating that the natives visited 'that they may enjoy the pleasure of delineating the various objects that attract their attention, on the smooth surface of the rocks. This they do by removing the hard red outer coating, and baring to view the natural colour of the greenstone.' This may indicate some experiment by the mariners. Indeed, one of the rocks on Depuch is engraved with the name of the ship and the date–10 June 1840–which had not lost its freshness in 150 years (Stubbs 1974: 78, fig.78; 84)

Stokes may have been mistaken about the mineralogy of the rock; but he gives a very clear account of an engraving technique which depends for visibility on the colour contrast between the dark

ferruginous coating, and the lighter original rock coloration, exposed when that coating is removed (Stokes 1846: volume 2, 169-172). He goes on to speculate on the 'long period of time' implied by the immense numbers of engravings–'the human figures, the animals, the birds, the weapons, the domestic implements, the scenes of savage life'. These are all shown in 'copies made by Captain Wickham of the native drawings on Depuch Island' (ibid: plate opposite p.170). Stokes praises the innate creative impulse, which brings these Aboriginal artists 'to admire and add to the productions of their forefathers'; again obviously deducing diversity in time from diversity in weathering. Stokes concluded, however, that 'there is not in them to be observed the slightest trace of indecency'; so his explorations cannot have been sufficiently extensive or thorough to notice coital themes.

Unfortunately, the return journey southward from Timor in August touched only at Bezout Island, north of Cape Lambert. A boat party saw a group of 27 people, including seven children, on the mainland near the cape. Landing briefly on Delambre Island before sailing west for the Montebello Islands, Stokes remarked only on the steep shoreline and the abundance of turtles and their eggs (Stokes 1846: 205-207; Hordern 1989:227, map on p.215). The *Beagle* thus initiated an unfortunate tradition of recording art on Depuch Island , and failing to notice it on the Dampier Archipelago.

In May 1861, Francis Gregory reached Nickol Bay in the barque *Dolphin*, leading a party of exploration preparatory to European settlement in the Pilbara region (Gregory 1884: 52-98). He established a base camp on the west coast of the bay at the Cove he named from the accidental wounding of Mr Hearson. Like King, Gregory encountered Aboriginal men moving between islands on hand-propelled logs, provided with footrests. He commented on their tall build, and lack of both circumcision and tooth evulsion (Gregory 1884: 56).

The groups Gregory actually saw on the inshore islands were fewer in numbers than King encountered. 'Fourteen natives' (presumably men) initially ordered Gregory's party back from their camp to the ship (ibid: 57). This may imply perhaps as many in the total group as the forty or more, mainly women and children, King encountered in the Intercourse group; but contrasts with perhaps twice as many men who prevented King's search for water on another island of that group. In July Gregory returned from an exploratory trip on the mainland to find 'a dozen natives mending their nets' (sex unspecified, but presumably men) by Hearson Cove (Gregory 1884: 73). Group numbers on the mainland had a similar range—'a large camp', 'eighteen [men]', 'ten or twelve', 'eight or ten'; and Gregory judged them 'not numerous'. While floats would be necessary to reach the islands further offshore, those close to the mainland could be reached by wading. Gregory records a party of seventeen crossing the shoals to Dampier Island (Burrup) at low tide (Gregory 1884: 58).

The European party Gregory left at his Nickol Bay base must have had ample opportunity to observe what the Aboriginal groups were doing; and indeed Mr Walcott amassed a vocabulary (Gregory 1884: 97-8). But neither Walcott nor Gregory mentions art or artistic and/or ritual activity.

Early European observation: settlers

Gregory's foray was the prelude to the beginnings of European settlement of the Pilbara region, under way by the mid-1860s, which would see a harbour and various pastoral properties established on the mainland, initially east of the Dampier archipelago (Battye 1915: 18-26).

The first actual account of the production of art, and its Aboriginal ownership, comes in 1865, soon after European settlement had been established on the mainland, Jefferson Pickman Stow (1981: 64-67) gives us intriguing glimpses of the geomorphology and resources of the archipelago, and of Aboriginal activities there.

Stow and a small group left the ill-fated settlement at Escape Cliffs, near the mouth of the Adelaide River in the Northern Territory, in an open boat, and sailed southward, eventually reaching Champion Bay (Geraldton). En route, on 19 June 1865, they put into Nickol Bay, where there were plenty of turtles; and contacted a group of about 20 men, women and children, apparently on the mainland side of the bay. Next day they landed further into the bay. Here the spinifex had been burnt, and they saw smoke rising from other bushfires in the ranges to the south. Forays over two days revealed traces of rock wallaby, emu and dingo, plus a 'native burying-ground' along a creek line. They had camped on

a sandhill by ‘a camping-ground for the natives. There were many old fireplaces, fish and turtle bones, and breakwinds of bushes’ and two enigmatic contrivances, floats like those described by King and by Gregory, enabling Aborigines to reach the islands.

On the 22nd Stow’s party sailed along the shore of Dampier Island north of the bay (now the Burrup) and landed at a ‘small sandy bight’, possibly Watering Cove, but perhaps as far north as Dolphin Island. Here a group of eight men and boys, plus a more cautious old man who kept his distance, greeted them first with token threats, then, after laying down their unbarbed spears, with more friendly exchange. The group used a dozen or so English words, so they had already had some contact, with Gregory’s party, or with the recent European settlers on the mainland. They had ‘fish ready cooked’ to offer in exchange for knives and tobacco. ‘They showed us water in the rocks’, and, now friendship had been established, they helped to load it.

More intriguingly, the group showed off their art, and demonstrated that they were still keeping their skills current by continuing to produce marine motifs. ‘The native showed us some of their drawings on the rocks. There were sketches of fish, turtles, lizards, and different kinds of birds, including emus. One aboriginal [sic] artist made a sketch of a turtle on the sand. If the performance would not have satisfied a critical eye, it had the merit of being dashed off with a free hand.’ Additionally, Stow describes the typical geomorphological setting of such art, hill slopes comprised of ‘piles of loose rocks’; and a generally treeless landscape, with gum trees only along watercourses. Next day Stow steers westward through what may be Searipple Passage, and anchors between Legendre and Delambre Islands, still seeing abundant turtles.

Although Stow failed to locate Europeans on this coast, in fact Messrs Padbury, Samson, Nairn and others had already unloaded stock early in 1863, at a harbour they named after their vessel, the Tien-Tsin, later to become the port of Cossack. In 1864 John Withnell had landed stock at Cossack, and eventually established a succession of pastoral properties on the Harding, George and Sherlock Rivers. By 1865 stations had been established from the Harding to the De Grey. In 1866 the town of Roebourne was established. The Dampier artists must already have felt ripples from pastoral presence. Pearling also started in the 1860s, as a consequence of Gregory’s report. By the end of the decade pearls and pastures were impinging hugely on Aboriginal life. Thus only Stow’s report comes from the very narrow window of time in which settlers could observe traditional life almost undisturbed. By the 1890s, Calvert (1894:16-17) reports that ‘in the north of the colony, natives largely supply labour on the settlements and in the Pearl Fisheries’.

John Withnell was another European able to make some observations before he and his fellow pastoralists wrought drastic change; his little book on the *Aboriginals of North Western Australia* was not published until 1901. He describes increase rituals, circumcision ceremonies (which he will have observed inland) and ‘corrobories’, with associated body decoration with ochre, clay, feathers, and, for the general Pilbara area, the ‘very many rock carvings ’on ‘every hill with suitably hard stone’, some large, some small. ‘The carvings are mainly representative of men, kangaroos, rats, opossums, emus, turkeys, fishes, spears, shields, native weapons of all kinds, and many men and women in a variety of vulgar attitudes.’ Presumably he had looked more closely than Stokes!

Towards the end of the nineteenth century, we have the accounts Curr garnered from Richardson for the Nickol Bay Tribe (Richardson 1886:296-301), plus one for mainland folk around the De Grey River (Harper 1886:287-293; 294-5). Curr (1886:287) prefaces details of specific tribes by a generalisation that near-coastal groups, from the De Grey to Albany lack both circumcision and “the terrible rite” [of subincision] practised by groups further inland.

Charles Harper had seen the devastating effect of smallpox in 1865, spreading from the north, and reducing Pilbara populations substantially. His account (1886:287-293) of the people around the mouth of the De Grey River relates to an area almost 300km east of the Dampier Archipelago, but describes the basic subsistence pattern of the region—acacia and grass seed ground and baked into damper, plus small mammals, reptiles and birds—and describes key technologies—spears, spinifex fibre nets, wooden scoops and conch shells. It was on these sparse bases that the richer maritime economy and technology of the Archipelago was superimposed, once sea levels had risen to create it. The ritual background to the art includes ceremonial and song celebrating ancestry; and body

decoration with chest, arm and abdominal scarring, ochre paint and white clay, gum pellets, plumes and pearl shell pendants. 'They cut and carve with shells, and also with flints fixed on to the ends of their woomeras.'

For the people along a coastal strip from Nickol Bay to the Yule River we have an account from Richardson, who lived there from 1865 to1876. Here smallpox struck in 1866, reducing numbers from an estimated 300. The use of spinifex fibre extended to baskets as well as nets. Not only seeds, but also tubers are noted as basic to the diet, plus animals, birds, and the maritime component of fish, speared or netted. Cicatrice scarring, but not circumcision, was practised. Most interestingly, 'they draw rude figures on stone'.

Aboriginal cultural associations

Aboriginal people knew the Burrup as *Murujuga*, meaning 'hip bone sticking out' (DAS 1979a). The group inhabiting the Dampier Archipelago and the adjacent mainland are usually called the Yaburara. It is not clear whether this was a distinct group or a part of the Ngarluma people of the adjacent mainland (Gara nda; Veth et al. 1993:30ff). They certainly had close cultural and linguistic ties with the Ngarluma and, to a lesser extent, the Mardudunera to the west.

European pastoral settlement in the region proceeded rapidly as a result of Gregory's reports and the Dampier Archipelago became a base for pearling and whaling, and later commercial fishing (Morris 1990:15). Early relations seem to have been amicable, but, as elsewhere in Aboriginal Australia, the influx of Europeans proved disastrous. Aboriginal people were exploited as indentured labour, and this together with introduced diseases, had a devastating impact on their society. In 1868, a policeman was speared in circumstances that are not clear in the official accounts and may have been related to the abduction of a Yaburara woman. This led to reprisal raids by a force of police and settlers, sworn in as special constables, and resulted in the deaths of men, women and children (Bednarik 2006; Gara 1983, nda; Veth et al. 1993:49ff). We do not know the final death toll in what became known as the Flying Foam Massacre—it was certainly more than the five to ten of the official accounts and estimates range from 30 or 40 dead to more than 100. Whatever the number, the impact on the community was undoubtedly catastrophic. As a result, the Yaburara no longer exist as a distinct group, although some Aboriginal people in the region today identify as Yaburara descendants.

Despite the destruction of Yaburara people, East and West Ngarluma people living now mainly in Roebourne retain cultural associations with the Dampier Archipelago. The neighbouring coastal Mardudunera also have traditional links with the area, as do the Indjibarndi whose country is mainly further inland (Veth et al. 1993:132ff). These communities strongly asserted their traditional interests in the Dampier Archipelago at the 1984 Aboriginal Land Inquiry (Seaman 1984:54) and included the area in Native Title claims first lodged in 1994 (Vinnicombe 2002:10).

Three overlapping Native Title claims in the Pilbara include the Dampier Archipelago. However, the Federal Court determined in 2003 that native title no longer exists over the Dampier Archipelago (Daniel v State of Western Australia [2003] FCA 666). Protracted negotiation between the Native Title claimants and the State Government over industrial development on the Burrup resulted in a mediated agreement—the Burrup and Maitland Industrial Estates Agreement—in January 2003 (CALM 2003). This resulted in transfer of part of the Burrup to the Native Title claimants for joint management with the Department of Conservation and Land Management under a lease-back arrangement. Significant resources were also committed for developing a management plan and for management and development of visitor facilities, and for employment and training opportunities for the Aboriginal community.

There is no doubt that the Dampier Archipelago is part of a living cultural tradition. Aboriginal people believe that petroglyphs in the Dampier Archipelago are the work of the *marga*—ancestral creator beings—in the Dreaming (Palmer 1975). They are a permanent reminder of the Law and retain their spiritual power. Looking after the petroglyphs is an inherited and ongoing responsibility. Pilbara people have songs and mythology for many of the images depicted in petroglyphs and some of the motifs found in the Dampier Archipelago have been identified by Aboriginal people in Roebourne as having specific ceremonial meanings and to be viewed only by initiated males and illustrated in

publications (Vinnicombe 2002:19). Many of the images have cultural meaning over and above straightforward depictions and could have played a role in education and initiation.

Chapter 3: Archaeology of the Dampier Archipelago

Background

The archaeology of the Dampier Archipelago is rich and complex, and includes petroglyphs, various types of stone arrangements, stone quarries, rock shelters, bedrock grinding patches, shell middens and surface scatters, and surface scatters of stone artefacts. Some areas also have ceremonial or mythological significance for Aboriginal people today. There are more than 2500 sites registered with Department of Indigenous Affairs, but thousands more certainly exist. It is important to understand that the notion of 'site' in this context is primarily a pragmatic way of recording the information available. 'Sites' range from single cultural components, such as isolated artefacts or individual petroglyphs, to large site complexes with a range of cultural components. Thus, 'sites' can vary in extent from perhaps a metre square to thousands of square metres. These issues are discussed in more detail in Chapter 6.

Survey project	Survey area (km^2)	Actual area surveyed (km^2)	% coverage of survey area	N of sites	Site density (sites/km^2)
Dampier Archaeological Project (Vinnicombe 1987a:51)	King Bay (11.8)	7.08	59	204	29
	Boongaree (4.2)	1.48	37	109	73
	Tartaruga (5.0)	4.85	97	113	23
	Withnell Bay (5.7)	1.98	33	152	76
	Hearson Cove (5.4)	1.15	23	20	17
	Pistol Range (27.7)	4.20	15	114	27
CALM (Veth et al 1993:93)	Burrup Peninsula	8.8	20	498	57
DRD: Maitland Heavy Industry Estate (Vinnicombe 1997a:59)	North West Intercourse	3.4	Not stated	204	60
	West Mid Intercourse	0.5	100	22	44
	SW Burrup	2.5	Not stated	111	44
	Mainland Industrial site and southern corridor	12.6	33	37	3
DRD: King Bay-Hearson Cove (Vinnicombe 1997b:46-47)	King Bay-Hearson Cove	10.9	100	373	34

Table 1. Survey coverage and estimated site densities for major archaeological surveys associated with industrial development and land management on the Burrup

Density of registered sites is generally very high by Australian standards, although it varies in different parts of the Archipelago. Estimates from various surveys range from about 76 registered sites per square kilometre to 17 registered sites per square kilometre (Table 1). Such estimates, however, do not give a truthful picture of the distribution of cultural features within the landscape. Many registered sites comprise multiple cultural components. The density estimates also do not distinguish between different sizes of site. So a single component site covering a very limited area is treated as equivalent to a major site complex covering a much larger area.

The density of individual archaeological features is a rather more useful measure. In the area surveyed by the Dampier Archaeological Project, average density of archaeological features was about 753 per

km^2, comprising 690 petroglyphs, 34 grinding patches, 15 open sites (including artefact scatters and middens) and 14 stone features (DAS 1984a:48).

Table 2 shows estimates of the density of recorded petroglyphs for areas where this can be calculated with reasonable accuracy. It should be noted that these are all **minimum** figures. Depending on the parameters of the project, including time available and experience of site recorders, it is unlikely that all individual petroglyphs would have been recorded in a given survey area. Many are difficult to see and it would be necessary to repeat the survey in a range of different lighting conditions to ensure 100% identification. In the Dampier Archaeological Project the main recording effort was directed to registered sites that would be impacted by development. Some sites not under direct threat were only noted and individual petroglyphs were not recorded. In the CALM survey also, some very large site complexes, comprising thousands of petroglyphs, were not recorded in detail because of their size.

Survey project	Survey area	Number of petroglyphs recorded/ km^2	Comment
Dampier Archaeological Project (DAS 1984a)	King Bay	552	'Pistol Range' and Hearson Cove 'catchments' are omitted because of the limited areas surveyed and the high proportion of site complexes which were not recorded in detail.
	Withnell Bay	1135	
	Boongaree	731	
	Tartaruga	250	
CALM (Veth et al 1993:102)	Burrup Peninsula	293	This estimate omits six very large site complexes with an estimated 10,000+ petroglyphs each. The true figure is much higher.
DRD: Maitland Heavy Industry Estate (Vinnicombe 1997a:61)	Combined Island survey	582	Includes survey areas North West Intercourse, West Mid Intercourse and SW Burrup

Table 2 Density of recorded petroglyphs for major archaeological surveys in the study area. All densities are minimum estimates only.

There are few parts of the Archipelago where the distribution and relationships of different cultural components have been mapped in detail or analysed (Bolton 1980; Green 1982; Lorblanchet 1992). Thus, the complexity of associations between different aspects of the archaeological record for the area as a whole is poorly understood. Interpreting these features in terms of past human behaviour is therefore difficult except at the most general level. This lack of an interpretive framework and the continuing uncritical use of data from the DIA site register in turn causes problems in making sensible and practical management decisions. The implications of this are discussed in more detail below (Chapter 6).

What is clear is that the entire Archipelago should be considered as an integrated cultural landscape. Although there are local variations in the density of cultural material, the distribution of cultural material is effectively continuous. The clustering of cultural elements and their relationship to one another and to particular landscape features is preserved at a scale that is unusual and to a level of integrity that can provide important insights into the organisation of past human behaviours. The significance of individual archaeological features and localities is greatly enhanced by the way they mirror the web of associations linking people and landscape through time. The original report of the Dampier Archaeological Project stated that:

> For all intents and purposes, the Dampier Archipelago exhibits a density of archaeological material sufficient to warrant its designation as a single site complex. (DAS 1984a:13)

No subsequent archaeological work has modified this conclusion (cf. Jo McDonald Cultural Heritage Management 2005:174; Veth et al 1993:176).

Types and distribution of archaeological features

There is an extraordinary diversity of archaeological features in the Dampier Archipelago. The distribution of these archaeological features in the landscape seems to be largely determined by availability of water and food resources. Cultural material is commonly grouped together in complexes (Lorblanchet 1992; Virili 1977). Two basic patterns of habitation have been recognised for large complexes of cultural material (Vinnicombe 1987a:51-52). In the first, evidence of specialised activities, such as food preparation or stone tool making, radiates out from habitation campsites located close to water sources. Petroglyphs are found on boulders immediately associated with the campsite and further away. In valley areas, site distribution is linear in form, with activities extending along the valley floor and onto any level areas among the boulders forming the steep valley slopes. Standing stones occur on ridgelines and vantage points. These site complexes are undoubtedly camping areas to which people would have returned regularly over a long time span and where they would have performed a wide range of largely domestic activities. They are located in sheltered valleys, along the coast near productive shell beds or fishing areas, or close to sources of fine-grained stone suitable for artefact manufacture.

Particular cultural components also occur in isolation. These probably mark more transient or more specialised activity. Small scatters of stone tools and shells, for example, may be the remains of individual meals or mark travel routes. Isolated artefacts may have been lost while travelling or discarded at the site of a particular activity. Some locations are likely to have been where ceremonial activities took place. These types of archaeological evidence are widely dispersed and may occur anywhere.

More than 2000 localities are registered as 'sites' by Department of Indigenous Affairs (DIA) in the Dampier Archipelago (Table 3). Many of these include multiple components. Maps showing the distribution of different archaeological features can be found in Appendix 1. It is important to note that the site register only lists localities that have been reported as sites to DIA. Since a large proportion of the registered sites in the Dampier Archipelago have only been reported as a consequence of industrial development since 1980, the distribution of registered sites is closely related to the industrial estates (Appendix 1, figure 8). The cultural material recorded in the 1993 CALM survey is the most substantial body of data recorded on the Burrup outside the industrial estates. It is a particularly useful dataset because it was collected for management purposes using a statistically valid sampling strategy (Veth et al 1993; Vinnicombe 2002:11; cf Mattner 1989). However, the sites recorded do not appear on the distribution maps because locational information was not supplied to the DIA until 2004 (Jo McDonald Cultural Heritage Management 2005:45) and these data are still not accessible through the DIA heritage information system (as at April 2006).

Cultural feature	
Petroglyphs	1521
Artefact scatters	724
Middens	293
Stone features	319
Grinding patches	170
Quarries	106
Ceremonial	13
Mythological	25
Burials	9
Fish traps	5
Repository/ cache	4
Modified tree	2
Historical	2

Table 3. Types of cultural features in registered sites (Data from DIA: 18 April 2006)

Petroglyphs (Appendix 1, Figure 1)

Engravings are the most common category of archaeological feature in the DIA register for the Dampier Archipelago. These are more properly called by the more general term 'petroglyphs', since, strictly speaking, engraving is not a technique commonly used in the Dampier Archipelago for making rock art (Vinnicombe 2002). However, the term 'engraving' is in common usage in Australian archaeology as a synonym for petroglyph. It is also the term used in the Site Register maintained by DIA for categorising rock art made by marking a rock surface using one or more of several techniques including carving, pecking, pounding, abrading or incising. The term 'carving' is also in popular usage to refer to the rock art of the Archipelago.

Petroglyphs are made by removing the outer weathered surface of the local granophyre to reveal the paler colour of the unweathered interior. This creates a sharp colour contrast. Over time, the colour contrast diminishes to nothing as the exposed surfaces weather in their turn. The range of colour contrasts in the Dampier rock art indicates that petroglyphs were made over a long period of time. Processes of weathering in the Archipelago have not been studied in detail so we do not know how long this period may have been.

Petroglyphs are found in a bewildering variety of locations. They can be isolated motifs, or galleries of hundreds or thousands of motifs, or in association with other archaeological features. They are more common in some areas than in others, but there is no part of the Archipelago where they can be confidently pronounced to be absent. The characteristics of the Dampier rock art are discussed in more detail below. However, it is extraordinarily diverse in technique, style and subject matter and constitutes a corpus of art which is significant at the international scale.

Figure 9. Petroglyphs on massive boulders at Skew Valley

Figure 10. Petroglyphs are common on rock piles and boulder slopes

Surface artefact scatters (Appendix 1, Figure 2)

Stone artefact scatters are also common in the area and constitute the second most common category of archaeological feature. These comprise scatters of flaked and ground stone artefacts, primarily the waste from stone tool manufacture. Features such as hearths may also occur. Local granophyre was commonly used for tool making and outcrops of fine-grained rocks were selectively targeted as quarries. Small quantities of exotic stone, from sources on the mainland, also occur. Some artefact scatters are associated with other cultural components, but also occur by themselves. Artefacts may also occur in isolation. Large occupation sites have complex assemblages and show evidence of a range of activities. Smaller sites are task-specific and reflect localised processing of specific resources or artefact manufacture. Stone artefact sites have received almost no attention from archaeologists. Peter Veth (1982) conducted the only study for an honours thesis in 1982. For a sample of ten sites, he showed differences between quarry sites, task specific sites and habitation camp sites in terms of the nature and use of raw materials.

Figure 11. Surface artefact scatter

Shell middens (Appendix 1, Figure 5)

Shell middens are also common in the Dampier Archipelago. These are accumulations of shells which represent the remains of meals. Other food remains, such as fish, crustaceans and land animals, may also be present, as well as features, such as hearths, and stone and bone artefacts. Middens may occur simply as deflated surface scatters of shells or as *in situ* lenses of varying thickness and extent. Small discrete scatters of shells or accumulations of shell refuse among rocks most likely represent 'meal-time camps'. These are often near the shoreline or near mangroves or mudflats. These sites indicate places where shell fish were eaten on the spot close to where they were collected. More substantial accumulations of shell remains, commonly associated with other cultural material such as bone refuse and artefacts, tend to be located near close to soaks or rock pool (Vinnicombe 1987a:23-24).

A number of substantial 'mound middens' have also been recorded, most notably on West Intercourse Island (Bradshaw 1993 in Murphy et al. 1994, Bradshaw 1994; Vinnicombe 1997a). These occur both

in the Dampier Archipelago and at the mouths of the major rivers on the mainland. Those that have been excavated seem to date to the last 4000 years (Bradshaw 1994; Clune 2002). Mound middens are commonly found in parts of the tropical north of Australia, but are rare further south.

Figure 12. Shell midden

Figure 13. Large mound midden on West Intercourse Island

Stone features (Appendix 1, Figure 4)

A variety of stone features has been recorded in the Dampier Archipelago. These features fall into three broad categories: standing stones, 'pits' and 'walls' (heaped linear arrangements of stones).

The origin of many of these features is controversial. It is often difficult to distinguish artificial structures from natural weathering features on the scree slopes. This problem was recognised by the original Dampier Archaeological project teams, but never satisfactorily resolved (Chappell 1982; DAS 1984a:49; Vinnicombe 1987a:32-34).

There are many examples in Australia of Aboriginal people building stone structures either for ceremonial purposes or for domestic purposes such as hut bases, fish traps, or hunting hides. Stone features are known from elsewhere in the Pilbara region and in the Kimberley and Western Desert regions. These are often associated with ceremonial activities, most commonly increase, or *thalu*, ceremonies (Daniel 1990; Palmer 1977a, 1977b). Other sites are the metamorphosed bodies of ancestral beings or are marker stones, indicating the presence of significant sites. The diversity and density of stone features recorded on the Burrup is much greater than anywhere else in the region.

Standing stones are elongated natural stones that have been intentionally placed in an upright position in crevices in the bedrock or gaps between boulders (Gara ndb; Vinnicombe 1987a:32-33; cf. Daniel 1990:26). They are sometimes wedged in place by other stones. They can occur by themselves or in more complex arrangements of standing stones. There are examples of arrangements with hundreds of stones. They are commonly on ridge crests or other prominent places. Occasionally petroglyphs occur on the stones themselves (cf. Daniel 1990:24, 25). Some of these stones are known to be *thalu* sites and are known to contemporary Aboriginal people. Standing stones are the least controversial of the stone features of the Dampier Archipelago, although it is possible for the natural weathering of columnar-jointed blocks to be mistaken for standing stones (ACHM 2003:62).

Stone pits are depressions which appear to have been formed by removal of boulders which are piled along the edge of the pit. They range in size from one to two metres to ten metres in diameter. Larger ones often contain soil or vegetation. Some pits have been interpreted as hunting hides, but many do not seem to be strategically positioned for hunting purposes.

Stone walls are probably the most controversial of the features in the Dampier area. There are three walls in an inlet at King Bay and these are likely to be the remains of tidal fish traps (Gara ndb; Vinnicombe 1987a:34). Some circular features have been interpreted as hut circles or as hunting hides (Gara ndb). The most problematic features are the so-called 'terraces'. These are linear features of heaped stones, often extending for considerable distances, that occur at the base of boulder slopes or following contours in mid-slope, creating a terraced effect. These 'walls' often act as soil traps. The Dampier Archaeological Project (Vinnicombe 1987a:34) suggested that these structures might have been deliberately constructed to promote the growth of tuberous plants. Those that occur in the Dampier Archipelago in landforms which trap soil include *Ipomoea costata*, the bush sweet potato (Bindon 1996: 161); *Vigna lanceolata*, the pencil yam (Bindon 1996: 262; Crawford 1982: 53); *Portulaca pilosa* (Crawford 1982: 58; Pate and Dixon 1982: 48, fig.3.3); several species of *Boerhavia*, the tarvine (Bindon 1996: 55; Crawford 1982: 47-8); and *Operculum brownii*, the bush potato (Crawford 1982: 70; Isaacs 1987: 226), all widely used as carbohydrate food resources by Aborigines across the 'top end' and/ or into the more arid centre. However, field observations at the time were inconclusive and the features have not been adequately investigated.

A complex stone arrangement comprising ten stone circles, a cairn, a linear stone feature and 79 small conical mounds of stone and coral arranged in a crescent shape was recorded at Phillip Point by the Dampier Archaeological Project (DAS 1984a:15-16; Gara ndb; Vinnicombe 1987a:38). Test pits were

excavated into two of the stone circles and subsurface hearths within them yielded dates of 410±110 BP and modern.

Lorblanchet (1992:44-45) recorded a number of circular stone features on the plateau at Gum Tree Valley. He excavated one of them and found midden deposits containing cultural material similar to the Skew Valley midden. A shell sample gave a date of 2730±110 BP and shell from a nearby feature gave a date of 2680±150 BP. He interpreted these features as huts or shelters. Lorblanchet (1992:45) suggested that the Gum Tree Valley features represented specialised activities and that the absence of grinding material and the relatively small amount of midden material might indicate that the site was used by men only, perhaps for ceremonial activities.

One of a pair of hunting hides near Phillip Point was also excavated. Here loose stones removed from the floor of one of the hides were removed to expose a deposit about 15cm deep of shell, animal bones and stone artefacts. A date of 4280±100 BP was obtained from this deposit (DAS 1984a:18). The stone arrangement and hunting hides near Phillip Point, excavated by the Dampier Archaeological Project, were both destroyed by the construction of Woodside's LNG plant. A stone 'terrace' feature was also excavated in the 'Pistol Range catchment'. No artefacts or datable material were found (Vinnicombe 1987a:42).

The concentration and diversity of the stone features that have been recorded in the Dampier Archipelago is remarkable (Gara ndb; Jo McDonald Cultural Heritage Management 2005:64ff). The main problem with stone features is distinguishing artificial structures from natural geological phenomena and this problem is particularly acute in the distinctive scree landscape of the Dampier area. The stony rises in western Victoria present similar problems (Clarke 1991, 1994; cf. Coutts et al. 1978). In both areas, the first archaeological surveys tended to take an approach which accepted a range of features as artificial structures in the absence of a straightforward natural explanation for them. A better understanding about natural weathering processes has led to the realisation that some of the stone features in Victoria are likely to be natural. It is likely that some of the Dampier stone features are also natural. ACHM (2003), in a recent review of weathering processes in the landscape, have detailed a number of natural processes that can produce patterned arrangements of rocks that mimic artificial structures, and therefore they have reassessed some features as natural. They also suggest some criteria that might be used to identify structures that are definitely artificial.

The stone features in the Dampier Archipelago remain enigmatic. Systematic investigation—preferably using both archaeological and geomorphological expertise—is urgently required to resolve their status, establish criteria for distinguishing cultural from natural features and understand their roles in Aboriginal use of the Archipelago. It should be noted that stone features may be culturally significant to Aboriginal people regardless of whether they are artificial features or not.

Figure 14. Standing stone

Grinding patches (Appendix 1, Figure 3)

Evidence of grinding activity on flat bedrock surfaces in the form of circular or oval abraded patches is common in the Dampier Archipelago. In most cases these are evidence for grinding seeds into flour. These features are commonly found in association with other occupation evidence. Turner's (1981:42ff) study of grinding patches in the Withnell Bay area suggested that they were particularly common close to spinifex grasslands, indicating that grinding spinifex seeds into flour was the most likely purpose of them. The presence of silica gloss is also indicative of grass seed processing. Some patches in her study had evidence for rejuvenation in the form of incised lines or pecking, while 'desert varnish' had also formed on some of them. Grinding was sometimes done over earlier petroglyphs and sometimes petroglyphs were placed on top of old grinding patches. All these factors suggest long term usage of particular localities.

Quarries (Appendix 1, Figure 3)

Quarries are localities where stone raw materials have been obtained for manufacture into tools. Seams, boulders and outcrops of fine-grained local granophyre all show evidence of quarrying in many areas. They are often associated with workshop sites where stone was further worked into

products selected for use. Stone artefacts have been found carefully wedged between rocks, apparently cached for future use (Vinnicombe 1987a:21).

Figure 15. Quarry, showing flaked block of fine-grained granophyre and waste flakes

Other site types (Appendix 1, Figure 7)

In addition, there are a range of less common site types. Rock shelters are rare in the Dampier Archipelago. A small number of burials have been recorded, all in sand bodies. Burials are likely to occur in any sand body as soils in the Archipelago are generally thin and suitable burial places are scarce. A burial was excavated during the excavation of Georges Valley midden during the Dampier Archaeological Project (Vinnicombe 1987a:38). The remains could not be left *in situ* and were reinterred close by without further study.

A number of ceremonial and/or mythological sites have been recorded (Jo McDonald Cultural Heritage Management 2005:71-74). Many of these are stone features, such as stone arrangements or standing stones. Some are *thalu*, or increase sites. Aboriginal people in the Pilbara believe that the petroglyphs themselves were created during the Dreaming (Palmer 1975, 1977a). Some specific motifs have mythological or ceremonial associations. For example, radiating lines from the head of anthropomorphic figures are linked with ceremonial headdresses and should only be viewed by initiated males. Other restricted motifs include designs representing sacred objects (Vinnicombe 2002:19).

Figure 16. Rock shelter

Excavated sites

More than twenty archaeological excavations have been conducted in the Dampier Archipelago, and subsurface deposits have been sampled by auger at four sites. The Dampier Archaeological Project excavated fifteen sites and auger-sampled four in the early 1980s. Bradshaw excavated six sites in the early 1990s, one of which (Magic Midden—P2772) had been previously auger sampled by the DAP team. Skew Valley was sampled by Robert Bevacqua of DAS (Bevacqua 1974a) and later excavated by French archaeologist Michel Lorblanchet in 1976. Lorblanchet also excavated features at Gum Tree Valley (Lorblanchet 1983, 1992; Lorblanchet and Jones 1979).

Unfortunately the only excavation to have been even partially published is Skew Valley (Lorblanchet and Jones 1980). Apart from Skew Valley, the only detailed analysis of excavated material was Jacqueline Harris' study of Georges Valley Midden (P1885) as a BA (Honours) project (Harris 1988). The only published information available about the remaining excavations is in the form of brief summaries and notes, and lists of radiocarbon determinations (Bradshaw 1994, 1995; DAS 1984a; Vinnicombe 1987a).

Establishing a chronological framework

Developing a chronological framework is critical for establishing a context within which to interpret the archaeological record. For the Dampier Archipelago, this is complicated by the scarcity of datable sites. The pressure of development on archaeological investigation has tended to mean that archaeologists have focussed on the range and distribution of cultural heritage in particular areas rather than looking at change through time. To investigate questions of antiquity of occupation and how people have interacted with changing environments through time is difficult on the Dampier Archipelago because rockshelters in which sequences of occupation layers can develop are rare and most evidence of occupation is simply in the form of open scatters of stone artefacts and shells.

However, the hunter-gatherers who used the resources of the Dampier Archipelago undoubtedly included neighbouring areas within their territory and had wide-ranging social connections with other groups. Therefore, archaeological sites elsewhere in north-western Australia also provide important clues which allow us to interpret the archaeology of the Dampier Archipelago within its regional context.

Rock art is extremely difficult to date as it is unusual to find it in association with datable occupation deposits. Methods of dating that rely on measuring degrees of weathering or growth of micro organisms remain controversial or experimental. It is however possible to propose relative chronological sequences based on differential weathering, style changes and superimposition of images. The subjects depicted in rock art can also offer dating clues. Examples include the depiction of animals that are now extinct, marine subjects that must post-date the rise in sea level at the end of the last Ice Age, and motifs showing post-contact subjects.

Radiocarbon dating is the main method used by Australian archaeologists to determine the age of archaeological features (Mulvaney and Kamminga 1999:47-51). Some care needs to be taken in interpreting radiocarbon dates and the method can only be used on organic material. But radiocarbon dating is fundamental to establishing the chronological framework within which to interpret archaeological evidence. Most of the radiocarbon dates from the Dampier area come from shell middens. Shellfish tend to be exploited on the spot and are rarely carried far from where they were collected; consequently, these sites commonly date to the last few thousand years. This was the most recent period of occupation of the Archipelago as the sea levels rose at the end of the last Ice Age to their present position and drowned the continental shelf. Many of these sites represent single or short-term episodes of occupation rather than long sequences of occupation of the sort often found in rock shelters.

Regional archaeological context

The last two million years has been a period of climatic change, characterised by alternating cycles of global cooling and warming. During colder episodes, known as glacials or ice ages, extensive ice caps formed at the poles and over the continental land masses of the northern hemisphere and this in turn caused lowered sea levels, 100 metres and more below present. At times of low sea level, Australia formed a ‘super-continent’ with New Guinea, but was never connected to south-east Asia. Human colonisation of Australia therefore must have involved crossing the sea. Archaeological evidence suggests that Australia was originally settled by about 50,000 years ago, during the last major glacial cycle, when sea levels were about 30 metres below present. Somewhere along the north-western coast is a likely area for the first landfalls (Mulvaney and Kamminga 1999).

Climatic conditions in Australia about 50,000 years ago were generally cooler and precipitation less than today, although in many areas, reduction in evaporation rates meant that many inland lakes that are dry today were full. The best known example of this is the Willandra Lakes system in western New South Wales where run-off from the Great Australian Divide sustained extensive lake systems 50,000 years ago (Bowler et al. 2003). From about 35,000 to 30,000 years ago conditions began to deteriorate and Australia’s climate became cooler and drier. The period 25,000 to 12,000 years ago was particularly dry and characterised by massive expansion of the desert core, drying up of lakes and reduction in water flows, and dune-building episodes indicating windy conditions. Sea levels were about 130m below those of today at the height of this period, at what is known as the Last Glacial Maximum (LGM). Global temperatures and sea levels began rising about 15,000 years ago, although conditions remained very dry until about 12,000 years ago. The sea stabilised at about present levels some 6000 years ago.

There is ample archaeological evidence that central Australia was colonised by about 30,000 years ago. Like desert dwellers in central Australia in the recent past, the population would probably have comprised small highly mobile groups and ranged widely between reliable water sources. The least habitable areas were probably abandoned during the LGM and not recolonised until after conditions began to improve about 12,000 years ago. However, human occupation seems to have continued throughout in ‘refuges’—usually desert ranges with reliable water sources and relatively diverse environments (Mulvaney and Kamminga 1999; Smith 1989; Veth 1989).

In north-west Australia, there is evidence for human occupation before 30,000 years ago from the Kimberley to Shark Bay. Sites on the Cape Range peninsula date back more than 30,000 years (Morse 1999; Pryzwolnik 2005), while there is evidence for occupation of what are now the Monte Bello

Islands from about 27,000 years ago (Veth 1993, 1999). There are several inland Pilbara sites dated to more than 20,000 years ago (Marwick 2002; Veitch et al. 2005; Veth 1995).

Dating rock art

Dating rock art is difficult (Morwood 2002:118). It is rare to find art associated with organic material that can be directly dated by the radiocarbon method. The only examples in the Dampier Archipelago are the petroglyphs found in association with shell midden deposits at Skew Valley. The oldest of these is dated to older than about 3800 years ago. This date does not indicate when the petroglyph was made, only when it was incorporated in the deposit. The petroglyph must be older than this but how much older cannot be determined. A radiocarbon determination of 18,510±260 BP (Ly-3609) from trumpet shell (*Syrinx aruanus*) fragments from between rocks is not directly associated with engravings, although its presence is suggestive (Lorblanchet 1992).

Attempts have been made to use microerosion studies (Bednarik 2002) or analysis of the surface deposits that accumulates over petroglyphs for dating (e.g. Dorn 1996; Nobbs and Dorn 1993; Watchman 1992), but these methods generally remain experimental and controversial. They have not, in any case, been successfully applied to the Dampier Archipelago petroglyphs, although some attempts to do so have been made (Clarke 1978; Dragovich 1989).

The presence of particular subjects or techniques can also sometimes allow age ranges to be determined. The depiction of European objects, for example, allows a post-contact date to be assigned, but these are almost unknown in the Dampier Archipelago (K. Mulvaney, pers. comm.). A depiction of a sailing ship on Dolphin Island with numbers and letters is the only post-contact subject so far identified in the area and may not have been executed by Aboriginal people (Vinnicombe 2002:22). Also in this category are depictions of extinct fauna, which can be assumed to relate to a time period when the animal was extant in the region. About twelve depictions thought to be of thylacines, or Tasmanian tigers, have now been recorded in the Dampier Archipelago (Figure 17) (Mulvaney, in press). Thylacines are believed to have been extinct for some 3000 years on the Australian mainland (Mulvaney and Kamminga 1999:260). Images of so-called ‘fat-tailed macropods’, also known from elsewhere in the Pilbara, have recently been recorded. These may also depict a locally extinct species (Brown 1983:187; Mulvaney, in press). By contrast, the large numbers of marine motifs seem likely to relate to the recent period of higher sea levels.

Figure 17. Striped animal thought to be a thylacine. (Photo J.W. Rhoads)

Gunn (2003:19-20) has recently described a distinctive form of pecking produced by a chisel-like implement. He terms this ‘gouging’ and suggests that a metal implement may have been used. He notes that all the gouged motifs are unpatinated, which would be consistent with a post-contact date.

Relative dating methods involve analysis of differential weathering, superimposition, style and spatial patterning. There is some evidence for refurbishing of individual motifs. Superimpositions seem to be rare in the Dampier Archipelago. (Figure 18, Figure 19 and Figure 20). Green (1982:121) noted only eleven instances of superimposition in his King Bay study, including grinding patches on petroglyphs. Differential weathering has proved difficult to use as a dating technique. Vinnicombe (2002:22) has commented that colour contrasts are as much a matter of the thickness of the rock crust and different techniques for marking rock as they are chronological markers. Local variation in erosion (for example, in the littoral zone) also complicates the issue. Lorblanchet’s analysis (1983, 1992) was the first to have any real success in sorting out correlations between style, motifs, techniques and patination states. He has suggested a four stage chronological sequence for Skew Valley and Gum Tree Valley. Older more deeply patinated motifs dated to the Pleistocene, before 10,000 years ago, and preceded sea level rise, while more recent motifs were associated with the shell midden deposits and dated to after the sea reached its present level (Table 11).

Figure 18. Recent unpatinated arc motif superimposed over deeply patinated ‘archaic face’

Figure 19. Recent anthropomorphic figure superimposed over patinated fish

Figure 20. Track motif superimposed over patinated complex geometric design

Ken Mulvaney has recently built on Lorblanchet's work and proposed a broad sequence for the Dampier rock art based on his observations of stylistic variation associated with different degrees of weathering (Mulvaney, in prep.). He identifies a series of distinctive ways of depicting humans and animals based on whether they are stylised or naturalistic, the presence of particular features, and technique of production. He proposes a sequence for these, based broadly on degrees of weathering, which extends back beyond the post-glacial sea level rise to the height of the last glaciation. Although the sequence is a relative one, there are some chronological markers that that anchor it to particular time periods. These include the depiction of extinct species and the appearance of marine subjects. The representation of subjects which have meanings in terms of contemporary belief systems and ceremonies in the Pilbara can also provide an indication of date.

Suggested approximate date (years BP)	Phase	Examples of motifs
25,000-15,000	1	Archaic faces Elaborate geometric designs Human figures – elongated with disarticulated heads Simple birds and simple human figures
18,000-12,000	2	Large outline fauna (mostly emu and macropod)in prominent locations Deeply pecked tracks Simple geometrics Wider range of birds and animals Thylacines and fat-tailed macropods (now extinct on mainland)
12,000-8000	3	Simplified human figures in groups and dynamic poses Stylised birds
9000-5000 Sea levels close to present level	4	Marine fauna, including large outline marine fish and dugong Turtles important; pecked circles associated (?eggs) Aquatic birds Group scenes and dynamic representations Human figures in lines and with objects (often restricted subjects)
<4000 BP	5	Stylised birds Unpatinated very shallow petroglyphs Sting ray liver, whale and dugong tails Stylised human figures Human figures with large hands and feet Human figures with features associated with contemporary Aboriginal ceremonial activity in the Pilbara

Table 4. Mulvaney's proposed relative chronological sequence (Mulvaney, in prep., summarised from http://burrup.org.au/forum2)

Radiocarbon dates from shell middens

There are 49 radiocarbon determinations available for the Dampier Archipelago (Appendix 2). Lorblanchet obtained a comprehensive series of radiocarbon determinations from his excavations at Skew Valley and also obtained determinations from features in Gum Tree Valley (Lorblanchet 1992; Lorblanchet and Jones 1979). The Dampier Archaeological Project excavated or auger sampled 18 sites and obtained dates from eight of these (Vinnicombe 1987a:36). Four dates were also obtained from surface samples (Vinnicombe 1987a: 63-64). Elizabeth Bradshaw (1994, 1995) excavated a number of sites in the Dampier Archipelago and adjacent mainland and obtained radiocarbon determinations from four sites in the Archipelago. All these dates are on marine shell from open midden deposits or rockshelters except for two charcoal dates from the Dampier Archaeological Project.

Unfortunately, the only dates for which there is good published contextual information are from Lorblanchet's excavations at Skew Valley (Lorblanchet 1992; Lorblanchet and Jones 1979). Skew Valley midden at the southern end of Dampier Island is 21m long, 8m wide and 1m high and abuts the east slope of the valley, which is covered with engravings. Eleven square metres were excavated. Lorblanchet's excavations at the Skew Valley midden site established a preliminary chronological framework for the Dampier Archipelago. He noted two layers within the midden; the lower layer was predominantly *Terebralia palustris*, while in the upper layer *Anadara granosa* predominated. A series of six radiocarbon determinations suggested that the upper layer dated between 4500 and 2300BP, while four determinations dated the lower layer to 6900-6500 BP. Surface finds of a flake and tool made of bottle glass suggest the site was also visited in recent times.

The general sequence of exploitation of mangrove species of shellfish from about the time sea level reached its present level with replacement by mudflat species from about 4000 years ago observed at Skew Valley is repeated at several sites in the region (Lorblanchet and Jones 1979; cf. Bradshaw 1994, 1995; DAS 1984a:49; Jo McDonald Cultural Heritage Management 2005:56; Vinnicombe 1987a:53, 1987b:72). A similar sequence has been observed elsewhere in tropical Australia and there is debate over whether the explanations lie in external environmental causes or internal socioeconomic changes (cf. Clune 2002; O'Connor 1999; Veitch 1999).

Skew Valley also provides the main information about technological change. Lorblanchet and Jones (1979) showed that there were systematic differences between the older and younger assemblages, dated to 6900-4000 and 4000-2500BP respectively. The older material was generally larger and had a more limited range of tool types. Most of the artefacts were of local granophyre with some use of quartz. The more recent material was characterised by a greater diversity of raw materials. Backed pieces and adzes appeared about 4000 years ago and there was more use of exotic materials, although these were still at very low levels. There were no backed pieces in the surface of the site, but tula adzes and slugs typical of recent Pilbara assemblages were found as well as tools made of bottle glass, suggesting use of the site as late as the contact period. Bottle glass artefacts have been found elsewhere in the Archipelago (Bevacqua 1974b; Palmer 1975:154). The only other analysed assemblage is from Georges Valley midden (Harris 1988). The assemblage was small—there were only 404 stone artefacts—and generally uniform. There was a marked increase in the quantity of artefacts in the most recent levels, possibly indicating a change in the nature of site use. Most artefacts were waste flakes of local granophyre.

Figure 21. Radiocarbon determinations from shell midden sites in the Dampier Archipelago (all dates uncalibrated)

The distribution through time of radiocarbon dates from shell middens shows an interesting pattern. Unlike many Australian coastal regions, there is no marked increase in the number of sites occupied through time (e.g. Bird and Frankel 1991; Hall 1999:173; Pryzwolnik 2005). Instead, there are noticeable peaks in the distribution of dates. The first corresponds to the middens dominated by mangrove resources, which date between 9000 and 6000 years ago. There is then a possible time lag of a thousand years until the establishment of more recent middens dominated by mudflat, rocky shore or mangrove species, or a combination of these. A third possible peak spans the period from about 3000 to 1000 years ago. More research is needed to confirm this intriguing pattern, which may indicate significant shifts in the nature of Aboriginal use of the Archipelago.

A model of changing adaptations in the Dampier Archipelago

The evidence from the radiocarbon dated sites and tentative relative dating of rock art can be integrated with information about the natural environment to suggest a model of changes in human adaptations over time.

Over most of the last 40,000 years the coast would have been up to 130km away and the Dampier Archipelago would have been the 'Dampier Ranges', an area of rocky ridges rising out of a broad plain comparable to today's central desert ranges (Figure 22). There is ample evidence that the general region was occupied by 30,000 years ago and there is no reason to assume that the 'Dampier Ranges'

were not also occupied at this time. The trumpet shell (*Syrinx aruanus*) found wedged between rocks at Gum Tree Valley and dated to 18,500 years ago (Lorblanchet 1992) is difficult to interpret, but confirms that the ranges were occupied at this early date by people who were connected with the coast. The ranges may even have acted as a refuge area throughout the most arid period of the last glacial period (cf. Smith 1989; Veth 1989). Like dwellers in central Australia in the recent past, the population would probably have comprised small highly mobile groups and ranged widely between relatively reliable water sources. The most ancient art probably dates to this period or perhaps even earlier. The famous 'archaic faces' (Figure 23), which are believed to be among the oldest art in Australia, are found both in the Dampier Archipelago and far inland at sites such as Cleland Hills and Durba Hills (Dix 1977; McDonald 2005). The stylistic homogeneity of these motifs may be evidence of cultural connections over very long distances. It has been suggested (e.g. Franklin 2004; McDonald 2005; Smith 1992) that long-distance connections of this sort are indicators of the open social networks that would have characterised the initial colonising population of the Australian continent, about 50,000 years ago or more.

Sea levels were at their lowest about 20,000 years ago. After that sea levels began to rise, bringing the coastline nearer and nearer to the 'Dampier Ranges'. By 10,000 years ago the sea would have been perhaps 25km away, and, by about 9000 years ago, the outer islands would have been close to the coast. Midden deposits at Wadjuru Rockpool on Rosemary Island date back to about 9000 years ago and provide the first evidence of the exploitation of mangrove resources (Bradshaw 1995). The oldest marine motifs probably date to this period.

As sea levels continued to rise, the environment would have changed rapidly, providing new economic opportunities. By 8000 years ago, large embayments had formed between the major ridges and a narrow channel separated Rosemary Island from the mainland. By 7000 years ago, the Archipelago had formed although Dolphin and Dampier Islands still formed a peninsula. Around 6000 years ago, sea levels begin to stabilise and the Archipelago takes on its present form. During this period, mangroves were more widespread than today. Several dated shell middens indicate the importance of mangrove resources. There is widespread evidence in northern Australia for more extensive past distribution of mangroves and subsequent contraction of this ecosystem (Morse 1999; O'Connor 1999; Veth 1999; Woodroffe et al. 1988).

Sometime after 6000 years ago there is evidence for significant economic change in the way of life of the inhabitants of the Dampier Archipelago. Shell middens dominated by mangrove species drop out of the record. From about 4000 years ago, a range of species occur in shell middens including rocky shore, mudflat and sandy beach shellfish. The particular suite of species that is found seems to be linked to the local environment. Some of these sites are reoccupations of the earlier mangrove middens (e.g. Skew Valley, Anadara Shelter, Magic Midden) while in other cases new locations associated with the new coastline are occupied (e.g. Georges Valley). The formation of the very large mound middens, most notably on West Intercourse Island, may well date to this period. As noted above, the distribution of radiocarbon determinations suggests another possible shift in regional patterns of occupation at about 3000 years ago.

The reasons for these regional changes are not yet known. One possibility is that the final rise in sea level caused a collapse in the mangrove ecosystem. Other possibilities include climatic change, the effects of human activities on the natural environment—for example, predation on shellfish populations, or burning—and significant change in the regional socioeconomic system (cf. Clune 2002; O'Connor 1999; Veitch 1999).

Other excavated material from shell middens indicates exploitation of a range of resources. The remains of land animals such as euro, wallaby, flying fox and quoll have been found, as well as bird remains, and a range of marine fauna including dugong, turtles, fish and crabs. Unfortunately, these sites have not been studied in detail.

There is little information available about technological change. Surface artefact scatters are extremely difficult to date and there are few distinctive artefact types in Australia that provide time markers. In the Dampier Archipelago, it is clear that the ready availability of suitable stone for tool making meant that most stone use was expedient and this is reflected in the dominance of local granophyre and the

rarity of formal tools in surface scatters. Veth's (1982) analysis of surface assemblages confirms that formal tools are rare and that the characteristics of assemblages seem to be related to site function and the abundant supply of raw material.

Figure 22. Changing adaptations in the 'Dampier Ranges'

Figure 23. Examples of 'archaic faces'

Figure 24. Changing adaptations in the Dampier Archipelago over the last 10,000 years.

Chapter 4. Rock art of the Dampier Archipelago

Background

It should be noted that the term 'art' tends to have a restricted meaning for most Australians today, who associate it primarily with aesthetic values and regard it as the province of specialists ('artists'). For people in the past, art would not have been separated from daily life in this way. Symbolic expression seems to be common to all human societies, past and present. The marking or modification of objects or surfaces and the use of symbolic systems were certainly part of the cultural repertoire of the first occupants of Australia. Rock art refers specifically to the marking of natural rock outcrops (Morwood 2002: ix-xi).

Aesthetic values are only one way of understanding art. Ethnographic evidence shows that art can be produced in a wide variety of social contexts for a range of social purposes. In Aboriginal Australia, symbolic systems commonly serve important functions in terms of the maintenance and reinforcement of group identity and connections to country. Art may also function at a number of different levels of meaning, particularly within complex belief systems.

Aboriginal rock art has great potential as a record of various aspects of past human societies, although studies of rock art in Australia have tended to lag behind other aspects of archaeology (Clegg 2002; Morwood 2002; Mulvaney and Kamminga 1999:357). One problem is that some aspects of meaning in rock art are inaccessible without access to the artists. This includes the identification of subjects. A particular image for example may recognisably depict a particular species of animal, but this is rather different from interpreting what that image represents. An image of a kangaroo, for example, may indicate that kangaroos are found in the vicinity, be connected to increase ceremonies for ensuring kangaroos are common, represent a mythical being, or actually be a mythical being. It may even be all of these, or none of them. Nevertheless, the fact that rock art is evidence for symbolic *systems* means that aspects of these are accessible through systematic study.

The rock art of the Dampier Archipelago is, by any standard, extraordinary and may well be the largest and most diverse gallery of petroglyphs in the world. Its significance has been known internationally since the 1970s.

What is clear from all the studies of rock art in the Dampier Archipelago is that it is extraordinarily diverse in content, style and technique, and that the density of petroglyphs is extraordinarily high. Diversity and density are not uniform across the entire region and there are local differences between different parts of the Archipelago. However, in the absence of detailed survey of specific localities, it is not possible to predict the distribution and density of petroglyphs. Where there are suitable rock surfaces the probability of finding petroglyphs is extremely high (cf. Jo McDonald Cultural Heritage Management 2005:174).

The islands as a whole have had limited study but nevertheless seem to differ from the Burrup. Similarly, the northern, central and southern portions of the Burrup differ somewhat from one another. At a local level, variation can be seen even at the level of individual valleys. Generally this diversity is poorly understood, although the limited analysis that has been done indicates that it is clearly patterned (Green 1982; Lorblanchet 1992; Turner 1981).

Some diversity can undoubtedly be attributed to change through time as there is clearly a long time depth for making petroglyphs. Associations between patination and particular motif types and techniques have also been noted (Lorblanchet 1992; Mulvaney, in prep). Archaic faces, for example, are always patinated and seem to be ancient. Human figures with exaggerated hands and feet are normally fresh and unpatinated and seem to have been produced relatively recently.

Diversity may also be explicable in terms of the natural environment. There is a slight trend for marine subjects, for example, to be more common on the islands than on the Burrup (Jo McDonald Cultural Heritage Management 2005: 94). Similarly, the petroglyphs of King Bay have a strong marine focus (Green 1982).

Studies of Dampier Rock Art

There are two main descriptive summaries of Dampier rock art (Jo McDonald Cultural Heritage Management 2005; Vinnicombe 2002). Both these surveys are limited in scope and primarily descriptive. Inevitably, both are handicapped by the problem of the lack of adequate survey and the *ad hoc* nature of the records. However, between them, they do provide a general overview of the current state of knowledge about Dampier rock art. They also provide a general picture of the diversity of Dampier rock art in terms of subject matter, style and technique. They do not address in any detail the important issues of variation in time and space.

Vinnicombe's (2002) summary drew on the data from the major surveys associated with industrial development (but not Lorblanchet's work at Skew Valley and Gum Tree Valley), as well as her own expertise and field experience in the area, to provide general descriptive information about the rock art of the Burrup. McDonald's study was a desktop study. She took an approach that drew on primary data held in the DIA site register. She identified a sample of sites for which drawings or photographs of the rock art could be inspected in the DIA archives. This database is problematic because of its reliance on the DIA register with all its sampling biases (see discussion below, Chapter 6). She examined all records from the islands and attempted to achieve a reasonable representation of different parts of the Burrup itself. The final sample of 8378 individual motifs was from 432 registered sites—about 27% of the total recorded (Jo McDonald Cultural Heritage Management 2005:88-90). McDonald presents summary data on her sample, and compares northern, central and southern parts of the Burrup and the remaining islands. She also conducted a more detailed analysis of the anthropomorphic figures from thirteen sites in order to characterise diversity within the Dampier Archipelago and make comparisons with the art of the Pilbara region as a whole (ibid.: 104-105). The sampling strategy used in this study is far from adequate. However, the use of primary photographic records by a single observer (Jo McDonald) does reduce bias introduced by variation between observers. This, together with the large sample size and the more detailed classification of motifs than Vinnicombe used, does mean that this study provides the best general summary of the current state of knowledge about the rock art of the Dampier Archipelago.

There have been three detailed more analytical studies focussing on the art of particular areas (Green 1982; Lorblanchet 1983, 1992; Turner 1981). Unfortunately only one has been partially published, so the information is not easily accessible. These studies show the complexity of the rock art of the region and indicate the type of intensive analyses that need to be undertaken if this complexity is to be understood. In addition, the 'Climbing Men' panel has been analysed in terms of a controversial neuropsychological model that links rock art to visual phenomena resulting from altered states of consciousness (Sales 1992).

Descriptive studies

Techniques and forms

Most studies suggest that pecking is generally the main technique used to make the petroglyphs followed by a combination of pecking and abrading, then scoring, abrading and pounding, although there seems to be regional variability (Vinnicombe 2002:16) (Table 5). McDonald (2005:101) notes that, although pecking is the dominant technique in all areas, a combination of pecking and abrasion is particularly common in the northern Burrup while the southern Burrup sites have an unusually high proportion of scored motifs. Battering or pounding is an uncommon technique and the recorded examples may be the result of pounding rocks as part of increase ceremonies at *thalu* sites (Jo McDonald Cultural Heritage Management 2005:98). Alternatively, this technique may simply be under recorded. These motifs are easily missed because they are shallow and have little colour contrast (Vinnicombe 2002:16).

Lorblanchet (1992:44) distinguishes between two principal techniques: deep pecking, including both linear and intaglio forms, and superficial pecking. He also notes grooving, abrasion and incising, but these techniques are much less common. Lorblanchet shows that these techniques are also associated with degrees of patination. Deeply pecked motifs are the most heavily patinated.

Jo McDonald Cultural Heritage Management (2005:103) distinguishes four different motif forms: outline, infill, a combination of outline and infill and intaglio, where the motif is formed by completely pecking out the interior of the shape (Table 6). Infill is the most common form, with intaglio forms relatively uncommon. The Islands seem distinctive in the more even distribution of the three main forms. However, this may simply reflect different levels of sampling in the different areas, with the Islands providing the smallest and least likely to be representative sample (Figure 25, Figure 26 and Figure 27.

Motif size

Most motifs are small—less than 30cm in size—and very few are larger than 60cm (Vinnicombe 2002:17) (Table 7). McDonald (2005:103) suggests that there is some variation within the region. The highest proportion of smaller figures occurs in the southern Burrup, while the islands have the largest proportion of large figures. Again, however, this may simply reflect the lack of systematic survey on the islands. There is a greater chance of identifying smaller figures in the course of more intensive systematic surveys.

Figure 25. Large infilled macropod

Figure 26. Large outline macropod

Figure 27. Recent scored motif—probably a human figure

Figure 28. Examples of track motifs

Figure 29. The 'Climbing men' panel

Subjects

Identification of rock art subjects can be problematic (Clegg 2002:104-106). Classifying motifs can be complicated by a number of factors, including cultural bias, recorder expertise, and inconsistency between recorders. There is no standard recording scheme for the Dampier Archipelago and it is therefore difficult to compare the results of different surveys and even to be confident that recording has been internally consistent within individual surveys. It should be noted too that the records have been made from the perspective of a Western scientific paradigm. The categories recognised need not therefore correspond to an Indigenous classification. The related question of meaning is also problematic and there are certainly meanings that are inaccessible to non-Indigenous observers.

Most discussions of Dampier rock art distinguish between geometric and naturalistic motifs. Naturalistic designs are further divided into categories such as human (or anthropomorphic) and animal (zoomorphic) and may be further subdivided. These classifications have restricted analytical value. This is because such broad descriptive categories simply allow petroglyphs to be characterised in very general terms. The most detailed classifications are used by McDonald (Jo McDonald Cultural Heritage Management 2005:91) and Lorblanchet (1992:49). McDonald distinguishes 46 general classes (including 'unidentified'); some of these are further subdivided in the more detailed analysis of anthropomorphic figures. Lorblanchet uses 47 types in his analysis (including 'other motif). However, these classifications differ considerably.

It is difficult to compare different analyses because no consistent general typology for the motifs has been developed from a rigorous stylistic and spatial analysis. Different studies use different general groupings. Even the two most detailed classifications to date (Jo McDonald Cultural Heritage Management 2005; Lorblanchet 1992) differ significantly and cannot be easily compared. It is clear that there is some variability in the subjects depicted in the art in different areas and in different samples (Table 8, Table 9, Table 10,Figure 30). Nevertheless, some generalisations are possible.

- Naturalistic motifs outnumber geometric ones, but the proportion varies in different samples. The smallest proportion of geometrics is in McDonald's island sample, although this could be a result of the less systematic recording in that component.
- There are generally higher proportions of marine motifs than land animals (Vinnicombe 2002). There are particularly high proportions of marine subjects recorded on the islands, especially

turtles, which are also common in the northern Burrup (Jo McDonald Cultural Heritage Management 2005:94).

- Land animals and birds are more commonly represented by tracks (Vinnicombe 2002:20-21). There seem to be two main groups of animal and bird tracks. Many macropod and emu tracks are deeply pecked or intaglio in form and heavily patinated. There are also tracks which are lightly pecked and unpatinated. These appear to be more recent. Human tracks are mostly outlined and also appear to be more recent. Both human and animal footprints sometimes occur in 'trails'.
- Animal representations, including tracks, generally outnumber human figures.

However, these generalisations tend to obscure the stylistic variability evident in the Dampier petroglyphs. This variability is evident, for example, in McDonald's analysis of anthropomorphic figures (Jo McDonald Cultural Heritage Management 2005:104ff), and also described by Green (1982) and, in more general terms, by Vinnicombe (2002). McDonald (Jo McDonald Cultural Heritage Management 2005:107), for example, identifies eleven distinct classes of anthropomorphs, each of which can be further subdivided into a number of types (a total of 217 types). However, even a cursory view of the art indicates a bewildering variety of styles. The distinctive 'archaic faces', for example, all have the common characteristic features of large, owl-like eyes. However, in execution, they are actually enormously variable in technique, form and style (Figure 23).

Another factor that renders these summaries of limited value is the long time depth over which petroglyphs were produced. As noted above, it is clear from the few analyses that attempt to investigate change through time that some types of motifs seem to have been produced over a long time period while others have a more restricted chronological distribution (Lorblanchet 1992; Mulvaney, in prep.).

As well as individual motifs, there are also composite panels with groups of figures arranged in scenes. The best-known of these is the 'Climbing Men' panel, which has been widely illustrated. Other panels in a comparable style have been recorded. Compositions showing economic activities such as hunting or fishing are also known. In some cases, panels have clearly been added to over a long time period. Human and animal footprints sometimes occur in 'trails' which can be followed over long distances and sometimes lead to large images placed in prominent locations. These may well represent the routes of ancestral beings (Vinnicombe 2002:19).

Figure 30. Summary of proportions of subjects represented in Dampier rock art (data from Jo McDonald Cultural Heritage Management 2005)

Variability and style

The Dampier rock art is widely recognised as diverse in terms of style (Green 1982; Vinnicombe 2002). A number of distinct styles have been noted. Some representations of animals and birds for example can be assigned to particular species, while others show the subject in a highly stylised manner. There are several different styles of human figures, including various types of stick figures and outlined figures. One distinctive style shows the head as a detached blob (Figure 31). Another style shows human figures with exaggerated hands and feet. The so-called 'archaic faces' are also distinctive. These are human-like faces with large owl-like eyes. At least 30 of these have been recorded in the Archipelago. Their analogues have long been recognised in the Durba Hills, on the Canning Stock Route, and as far east as the Cleland Hills in Central Australia (Dix 1977; McDonald 2005; Vinnicombe 2002:19).

McDonald (Jo McDonald Cultural Heritage Management 2005) has recently attempted to describe variability within the category of anthropomorphic figures on the basis of a sample of 726 motifs. She identifies eleven different general classes of human figures, distinguished on the basis of both technique and form. These can be subdivided further giving a remarkable total of 217 types. Stick figures (defined as having body, legs and arms the same width), at 36%, were the commonest general class of anthropomorphs in her sample. These could be further subdivided into 32 types.

Some stylistic variations are likely to reflect the long time period over which the petroglyphs were produced. Detailed analysis of the relationship between motifs, techniques of production and weathering can show this (Lorblanchet 1992; Mulvaney, in prep.). For example, human figures with exaggerated hands and feet seem always to be relatively fresh in appearance. This therefore seems to be a relatively recent style. By contrast, the 'archaic faces' with their large owl-like eyes, and complex geometric maze-like designs, are normally weathered and have little or no colour contrast. Both these types of motifs are thought to be among the oldest art in the Archipelago (Figure 23 and Figure 32). Marine motifs are usually relatively fresh in appearance in keeping with their association with the more recent period during and after the formation of the Dampier Archipelago (Figure 33)

Figure 31. Anthropomorphic figure with detached blob for head

Figure 32. Examples of geometric designs

Figure 33. Examples of recent marine motifs

Other stylistic differences may reflect regional variation and suggest that the Dampier Archipelago may have been an important meeting place for groups from different parts of the Pilbara. The Pilbara is itself a very important rock art province with several distinct regional styles. These are all represented in the Dampier Archipelago, which in turn has its own distinctive elements.

Regional context

The Pilbara is one of the most important and distinctive rock art provinces in Australia (Mulvaney and Kamminga 1999:394-398). Pilbara rock art is dominated by petroglyphs and a number of different regional provinces have been defined (Wright 1968, 1977). It is clear that there is a longstanding tradition of making petroglyphs in the region, which probably goes back well into the Pleistocene (before 10,000 years ago) (Bednarik 2002b). Links between rock art and mythology have been recorded in at least three areas—Depuch Island, Port Hedland and the Fortescue River—as well as for the Dampier Archipelago (Palmer 1975, 1977a; Tindale 1987).

In comparison with the broader region, the Dampier Archipelago includes many elements from distinct regional provinces while also showing a range of unique features (Jo McDonald Cultural Heritage Management 2005:140ff). Dampier rock art seems to exhibit more diversity than any individual art province elsewhere in the Pilbara. It also includes a number of distinctive elements, most notably the diverse marine motifs in the more recent art assemblage and the variety and number of 'archaic faces' in the older art assemblage.

	Northern (N=2124)	Central (N=3706)	Southern (N=1937)	Islands (N=619)	Total (N=8386)
Pecked	55	81	65	80	71
Pecked + abraded	39	13	13	18	20
Abraded	5	4	8	2	5
Scored	1	2	13	<1	4
Pounded/ battered	<1	<1	1	0	<1

Table 5. Proportions of different techniques across the Dampier Archipelago (after Jo McDonald Cultural Heritage Management 2005: Table 18 and 21)

	Northern (N=2091)	Central (N=3687)	Southern (N=1939)	Islands (N=619)	Total (N=8386)
Outline	26	30	30	29	29
Outline + infill	30	22	24	36	26
Intaglio	4	2	3	3	3
Infill	40	46	43	32	42

Table 6. Proportions of different motif forms across the Dampier Archipelago (after Jo McDonald Cultural Heritage Management 2005: Table19 and 22)

	Northern (N=2124)	Central (N=3706)	Southern (N=1937)	Islands (N=619)	Total (N=8386)
0-30 cm	73	73	85	71	76
31-60 cm	21	22	12	21	19
>60 cm	6	5	2	8	5

Table 7. Proportions of motifs in different size classes across the Dampier Archipelago (after Jo McDonald Cultural Heritage Management 2005: Table 20 and Table 23)

	Tartaruga-Withnell Bay (N=2103)	King Bay (N=1420)	CALM survey (N=2581)
Unidentifiable	9	19	19
Geometric	37	33	21
Human	30	23	24
Animal	25	26	35

Table 8. Proportions of motif types recorded for Tartaruga-Withnell Bay, King Bay and the CALM survey (data from Vinnicombe 1987b, Veth et al. 1993) NB the percentages for the DAP surveys reported in Vinnicombe 1987a and quoted in Vinnicombe 2002 were incorrect. The correct figures are listed in Vinnicombe 1987b

	King-Bay-Hearson Cove (N=698)	Maitland (N=3713)
Geometric	49	45
Human	15	16
Animal	32	30
Other	5	9

Table 9. Proportions of motif types recorded for King Bay-Hearson Cove and the Maitland surveys (data from Vinnicombe 1997a, 1997b)

	Northern (N=1795)	Central (N=3067)	Southern (N=1631)	Islands (N=377)	Total (N=7031)
Geometric	29	29	26	12	32
Human	20	21	26	14	26
Archaic faces	<1	<1	<1	1	<1
Human/ animal	1	1	1	1	1
Material culture	4	3	3	4	4
Marine animals	13	8	7	17	11
Birds	2	1	1	1	3
Land animals	9	7	5	6	8
Tracks	10	12	12	6	13
Other	1	1	3	11	1

Table 10. Proportions of grouped categories of identifiable motifs in 432 sites for the whole study area and each zone (after Jo McDonald Cultural Heritage Management 2005: Tables 15 and 17).

Analytical studies

The discussion so far has summarised what is known about Dampier rock art in general. This information is a broad scale descriptive level and gives little sense of the diversity and richness of the rock art and the complexity of the associations between rock art, other cultural remains and the natural environment. The few detailed studies indicate the complexity of the rock art and its archaeological and environmental context at a micro scale and suggest a range of further investigations.

Skew Valley and Gum Tree Valley

The most detailed rock art analysis to date remains that of Michel Lorblanchet in the Skew Valley area. In 1975, 1976 and 1984 he conducted field work at Skew Valley and Gum Tree Valley, including large scale excavations at the Skew Valley shell midden and detailed recording of the art of Skew Valley and Gum Tree Valley (Lorblanchet 1977, 1983, 1992; Lorblanchet and Jones 1979). Virili (1977) had originally drawn attention to the major site complexes of Skew Valley and Gum Tree Valley during the construction of a new haulage road for Dampier Salt. This road disturbed the large shell midden at Skew Valley which was briefly excavated by DAS staff (Bevacqua 1974a) and later excavated more fully by Lorblanchet (Lorblanchet and Jones 1979).

Lorblanchet estimated that there were about 20,000 petroglyphs in Skew Valley and up to 18,000 in Gum Tree Valley. He analysed a sample area in Skew Valley and five sample areas in Gum Tree Valley aimed at comparing areas with a high density of engravings and closely associated with shell middens with isolated groups of engravings. A total of 2462 motifs was recorded in detail. Recording involved both photography and tracing of motifs. Petroglyphs were mapped on topographic maps and all associated archaeological features were recorded. As well as recording three states of patina in the field, Lorblanchet also devised a method of measuring contrast between motifs and the rock surface. For analysis, motifs were classified into 47 types.

Lorblanchet then investigated the spatial distribution of different categories of petroglyphs in relation to other archaeological features, motif types, and patination. The greatest diversity of petroglyphs was in the areas associated with shell middens (SKV, GTVS, GTVE), while the other areas showed a narrower range of motifs.

Both GTVS and SKV have a wide variety of states of patination. Both these areas are closely associated with middens and a range of other cultural material. By contrast GTVK, GTVW and GTVT are more homogenous, with larger numbers of deeply patinated motifs and fewer fresh ones. These sample areas are all on top of the plateau, commanding a view of the valley and are not associated with a wide range of cultural material.

Some subjects are found in all states of patination, while others are more closely associated with a particular state of patina. This implies that subjects found in all states of patination were produced over a long time period, while the remainder, which tended to be associated with specific states of patination, were produced over relatively short time periods. At both GTVT and GTVE motifs show evidence of clustering according to states of patina. Lorblanchet suggests a shifting focus of rock marking activity through time with the most recent petroglyphs, which are fresher in appearance, spatially associated with the midden. Older petroglyphs are more widely distributed, with a particular focus on top of the plateau.

The two most common techniques were deep pecking and superficial pecking. Deeply pecked motifs tend to be more patinated while the superficial motifs generally appear fresher.

On the basis of his analysis Lorblanchet suggested a four stage chronological sequence for Skew Valley and Gum Tree Valley (Table 11). He proposed that the older more deeply patinated and deeply pecked motifs dated to the Pleistocene, and preceded sea level rise, while more recent motifs were associated with the shell midden deposits and dated to after the sea reached its present level.

Period	Suggested date	Primary focus area	Principal motifs
1A	>18,000 to 10,000 BP	GTVT	'ghost-like' human figures, kangaroos, rounded peck marks and circles
1B	10,000 to 7000 BP	GTVW, GTVK, GTVE	large grooved outline human and animal figures, including kangaroos, turtles and turtle eggs, some fish, 'dumb bells'
2A	7000 to 4000 BP	SKV, GTVS, GTVE	re-engraved figures, fish and bilobed motifs, birds, boomerangs, arcs
2B	4000 to 2000 BP	SKV, GTVS, GTVE	Fresher petroglyphs, superficial pecking, various kinds of human figures including those with exaggerated hands and feet

Table 11. Chronology of Gum Tree Valley and Skew Valley petroglyphs (after Lorblanchet 1992:56)

Lorblanchet also suggested that spatial patterning in the associations between petroglyphs and other archaeological features indicated functional differences in the use of different parts of the complex. He identified, for example, the long-term campsite occupied by groups of people including women and children and represented by the midden and its associated diverse cultural material, including grinding material, as 'decorated dwellings'. He contrasted this with the limited range of archaeological features on the plateau and the absence of grinding material and suggested that the plateau sites might represent sites where men's ceremonial activities were conducted. He also proposed an associated division between freely accessible public motifs and those with restricted access.

Aspects of Lorblanchet's work have been criticised (Bednarik 2006:36; Jo McDonald Cultural Heritage Management 2005:25). However, it remains the most comprehensive and detailed published analysis of archaeological material in the Dampier Archipelago. It attempts the difficult task of establishing a chronological framework, which is still used. His proposed chronology of rock art has been built on by Mulvaney (in prep.) and aspects of it extrapolated to the entire Archipelago. Lorblanchet's study clearly indicates the range of research questions that need to be addressed to develop an understanding of the complex archaeology of the Archipelago. The complete publication of Lorblanchet's study will be invaluable for future research.

Withnell Bay

Jan Turner (1981) conducted a spatial analysis of the art recorded by the Dampier Archaeological Project team members in the southern part of Withnell Bay (Tartaruga and part of the Withnell Bay catchments) for a BA (Hons) thesis. Rather than using the arbitrary field definitions of registered sites, she analysed the spatial distribution of individual rock surfaces to distinguish eleven clusters of petroglyphs. The number of motifs in each cluster ranged from 15 to 433. She then investigated spatial patterning through the relationships between petroglyphs and other cultural components with the natural environment, as well as exploring variability in subjects within and between clusters.

Turner identified a number of trends.

- Birds and land animals tend to be inversely related to marine motifs. Clusters associated with the littoral zone tend to have high proportions of marine subjects and low proportions of land animals.
- Two (Mangrove Creek and No Name Creek) of the three clusters located near mangal areas have fewer marine motifs. Inland Mangrove Creek is the exception and Turner suggests that it is visibility of the ocean rather than proximity to the shore which may be significant.
- Clusters with high proportions of geometric motifs are not associated with large habitation sites or large numbers of grinding patches. This may indicate that geometric motifs had a mainly non-secular function.

- Most of the grinding patches were located at two clusters (Mangrove Creek and Dusty Roads). Many of the grinding patches at these two localities had silica gloss and signs of re-roughening—indicating that they were in use over a relatively long time period. These two clusters were also located near spinifex steppe.
- Birds are more commonly represented by tracks while terrestrial animals are represented equally by tracks and naturalistic engravings.

Cluster code	N	Geometric	Human	Marine animal	Bird	Land animal	Unidentified
DR	401	30.7	37.2	3.9	13.5	15.2	9.2
IMC	31	48.4	25.8	19.4		3.2	3.2
MC	433	50.1	25.2	6.2	3.2	5.8	9.5
WB	29	27.6	27.6	17.2	3.5	17.2	6.9
SDB	88	36.7	27.3	26.1	2.3	2.3	5.7
TT	282	36.2	30.9	15.2	6.4	4.3	7.1
FB	24	41.7	16.7	16.7	4.2	4.2	16.7
EB	22	36.7	22.7	18.2	4.5		9.1
NNB	120	35.8	27.5	15.0	9.2	3.3	9.2
NNC	15	13.3	40	6.7	6.7	26.7	6.7
TG	162	29.2	49.1	0.6	2.5	11.2	7.5
Total	2053	36.9	30.1	9.2	6.7	8.6	8.5

Table 12. Withnell Bay: proportions of different motif categories in rock art 'clusters' (Turner 1981: Table 6)

Turner's study, like Lorblanchet's, indicates the complex relationship between different elements of the archaeological record. Although the details of the analysis differ, both studies establish the long time span of occupation and differentiate between different localities in terms of likely secular and sacred activities. Both studies suggest a possible association between geometric designs and sacred activities.

King Bay

Nicholas Green (1982) analysed petroglyphs in King Bay for an MA thesis. He analysed 1456 motifs from 55 registered sites in the King Bay area. The number of petroglyphs in each registered site ranged from 1 to 381. Green's analysis focused on relationships between petroglyphs and the natural environment and on defining the range of variability of subjects and styles. Some of the patterning he observed most probably relates to the availability of suitable rocks for marking. He noted some tendency for motifs to be higher up in the landscape (at the top of outcrops or slopes) and a slight preference for horizontal surfaces. Although the whole area is effectively a coastal environment, he noted patterning in the distribution of particular subjects in relation to the environment. For example, he showed that marine motifs, such as fish, turtles and marine birds, tended to occur close to the littoral zone. Macropods and macropod tracks, by contrast, tended to occur away from the immediately coastal fringe. Some geometric or non-naturalistic motifs also showed spatial patterning. Circles, for example, were rare in the littoral zone, but common inland and commonly occurred in clusters (Green 1982:148). Some animal subjects were represented in considerable detail, to the extent that they could be identified to order or even species (Green 1982:138ff). Green also describes the range of human figures represented in the art, distinguishing between two broad types—stick figures and infilled figures.

Green investigated occurrence of so-called 'desert varnish' and colour contrast of petroglyphs with the rock surface. He was not able to identify any clear patterns for the King Bay area, although he did note that most of the art showed high colour contrast and appeared relatively fresh. From the close association between petroglyphs and other site types and the general prominence of marine motifs he inferred that the art of King Bay was likely to be broadly contemporaneous and associated with the period since sea level stabilised at about 6500BP (Green 1982:159). Importantly, however, Green also

notes that the art of King Bay differs from that of other parts of the Burrup (1982:159), although he does not discuss these differences in detail.

Chapter 5: Industrial development and heritage

Initial investigations

After Captain Wickham's1840 sketches of the Depuch engravings, and Stow's 1865 observations of Aboriginal artists at work on Dampier Island sands, detailed recording of Western Australia's northwestern shores remained in abeyance for almost a century. Meanwhile, interest in Australian Aboriginal rock art in general grew slowly, but the field was long regarded by many archaeologists as not worthy of serious attention. For the Pilbara region, twentieth century descriptions of the rock art begin with Herbert Basedow's account and sketches of the engravings on limestone ridges around Port Hedland (Basedow 1925: 299-303). Davidson's desk-top forays in the 1930s recognised engravings in Western Australia only at Depuch Island and Port Hedland (Davidson 1936: 60-66). His Pilbara fieldwork in 1938 and 1939 added more engraving localities on the mainland, but no more sites offshore (Davidson 1952: map 1, 77, 111-112). Tindale (1987) discussed the significance of petroglyphs at Port Hedland with local Aboriginal people in 1953. McCarthy also investigated both localities and his observations at Port Hedland strongly influenced the sequence he developed for Australian rock art (McCarthy 1961, 1962). The art of Woodstock station on the Upper Yule River was also systematically investigated at this time (Mountford 1965, Worms 1954).

The development of iron ore in the Pilbara in the early 1960s initiated the conflict in values between industry and heritage that continues today. Heritage values were not at that time considered in development planning. Depuch Island had been considered as the site of a possible port as early as 1908. In 1962, the WA Museum—knowing that that there were important art sites on the island and alarmed by this possibility—conducted a survey of flora, fauna and archaeology (Ride and Neumann 1964). The report described the Depuch Island rock art as showing a 'wider range of motifs and greater variety in technique' than elsewhere, although with the caveat that relatively little was then known about the rock art of the Pilbara region or indeed much of Western Australia (Crawford, in Ride and Neumann 1964:56). The Board of the Western Australian Museum advised that the cultural and scientific significance of the rock art was comparable to 'such world-renowned prehistoric art galleries as the caves of Lascaux in the Dordogne, and Altamira in northern Spain'. No comparable survey was ever undertaken for any part of the Dampier Archipelago, and indeed the Depuch Island report's publication coincided with the announcement that port facilities for the Pilbara iron ore industry would be developed at Port Hedland and King Bay (Lewis 1964).

In the early 1960's, Bruce Wright, inspired by Crawford's recording of Kimberley rock art and the work on Depuch Island, began a recording program in the Pilbara from 1963 to 1964. He photographed thousands of motifs in the catchments of the Yule, Sherlock and Fortescue Rivers. In 1966, he recorded sites in the Ophthalmia Range and at King Bay in the Dampier Archipelago. His monograph was published by the Australian Institute for Aboriginal Studies in 1968 and provides a regional context within which to assess the rock art of the Dampier Archipelago (Wright 1968, 1972, 1973, 1977).

Early site recorders

In the mid 1960s the township of Dampier was established, with the development of facilities at Parker Point and East Intercourse Island, and later on Mistaken and Mid Intercourse Island. A causeway was built across the tidal mudflats, connecting Dampier Island with the mainland and forming what is now known as the Burrup Peninsula. A salt production industry was also established. No one knows the full extent of damage to Aboriginal cultural heritage in the course of these constructions, though it was certainly catastrophic and included major rock art complexes (Bednarik 2002a:30, 2006:26).

The first reports of rock art in the Dampier Archipelago came from Robert Bednarik and F.L. (Enzo) Virili, who were both based in Dampier and working in industry. From 1968 to 1970, Bednarik worked as Project Manager to an engineering company. He recorded sites throughout the Pilbara, but became fascinated by the Dampier petroglyphs and carried out extensive reconnaissances on foot of

the whole of Dampier Island, identifying some 570 sites. He provided reports to the Museum on stone alignments, and on the numerous, extensive, impressive and diverse petroglyphs, as well as the massive destruction of sites (Bednarik 2002c:29-30, 2006:23-32).

Independently of Bednarik, Virili, who was engineer to Dampier Salt from 1970 to 1976, also became fascinated by the rock art, and, in collaboration with local volunteers and the museum, photographed and recorded sites in the Dampier Archipelago. He described several large site complexes, including Skew Valley, Gum Tree Valley and Kangaroo Valley, at an Australian Institute of Aboriginal Studies rock art conference in 1974, reporting that 'Several years of surveying, analysing and recording are still required' (Virili 1977). Some of these complexes have hundreds of petroglyphs and are rich in other cultural features. Gum Tree Valley and Kangaroo Valley, for example, formed a complex of cultural material more than 1km long, including a wide range of petroglyphs, in varying styles and techniques, and all stages of weathering, as well as camp sites with large shell middens and artefacts, stone arrangements and grinding patches.

Both Bednarik (1977:51) and Virili (1974, cited in Vinnicombe 2002:7) drew attention to the impact of industrial development in the Northwest on Aboriginal sites in the region and particularly on important rock art complexes at Dampier.

Department of Aboriginal Sites, Western Australian Museum

It was in 1970, coinciding with this crucial time of rapidly impinging construction, and exciting archaeological discoveries, that a new 'Department of Aboriginal Sites' (DAS) was created within the Museum of Western Australia, with Warwick Dix as the first Registrar of Aboriginal Sites. The *Aboriginal Heritage Act* of 1972 charged this department with the responsibility for protecting places ('sites') of Aboriginal sacred and secular activity, both extant and ancient, throughout the entire state. However, at a time of massive industrial expansion, this was an enormous task and DAS was seriously under resourced. By 1974, however, more than 100 separate localities had been registered as sites in the Dampier Archipelago, 'although less than half the area has been fully explored on foot' (Dix 1977:280).

Dix published the first colour photographs of Aboriginal engravings in the Pilbara, including some from the valleys at the west end of 'Pistol Range'[1] on Burrup (Dix 1975: 4, 5). In an important paper he illustrated nine face-like figures from the Dampier Archipelago, including the striking 'archaic face' at the 'climbing men' locality, and compared them with other examples in the Durba Hills on the Canning Stock route, and the Cleland Hills (Dix 1977).

Members of staff recorded further sites throughout the 1970s (e.g. Bindon 1978, field notebooks by Dix and Randolph cited in Vinnicombe 2002), including several on Gidley Island (Bevacqua 1974b), and also encouraged Virili in his recording efforts. Aboriginal beliefs about the petroglyphs of Dampier Archipelago and other areas in the Pilbara were also recorded at this period by DAS anthropologist Kingsley Palmer (1975, 1977a). Virili's report of the partial destruction of the shell midden at Skew Valley led to excavations by DAS staff member Robert Bevacqua (1974a). Subsequently, French archaeologist and rock art specialist Michel Lorblanchet conducted further extensive excavations and rock art recording at the Skew Valley midden and made additional detailed records of the Gum Tree Valley site complex (Lorblanchet 1977, 1983, 1992; Lorblanchet and Jones 1979). Lorblanchet regarded Kakadu and Burrup as the most impressive clusters of art he had ever seen, despite his close acquaintance with the art of the Pyrenees and the Dordogne, including Lascaux. He realised that his work on a tiny area had provided merely an appetiser to the feast of knowledge

[1] The 'Pistol Range' is the name applied to the prominent massif at the southern end of the Burrup by the Dampier Archaeological Project field team, as a convenient identifier for one of its survey 'catchments'. The name comes from the nearby Karratha Pistol Club's shooting facilities. It has become widely used by archaeologists and others to refer to the massif (and its extremely significant archaeological complexes), which has no officially gazetted name. For convenience, this usage will be followed here. However, an Aboriginal name has been recorded for the massif (Robinson 1996) and it would be appropriate to consider replacing the informal name with an officially gazetted name in the future.

offered by the archipelago, and advocated the establishment of a research centre to house continual scholarly investigation (Lorblanchet 1984).

Regional planning involving the establishment of port facilities and associated infrastructure at Dampier and Karratha and the consideration of future port facilities and infrastructure development in the 1960s and 1970s comprehensively failed to take into account the existence of the heritage values in the Dampier Archipelago. These issues were already being emphasised in a document prepared by the Registrar for the 1974 Pilbara Study, but not eventually included. This stressed the need to consider Aboriginal sites before, not after, planning the location of industry (DAS 1974, cited in Vinnicombe 2002). While only Burrup locations were being considered for industrial expansion, there lay to the south, on the mainland, large areas of geomorphologically, biologically and archaeologically uninteresting spinifex, available without crowding, without high construction costs, and without threat to significant, unique, species of organism or categories of art.

Then in 1978, the Dampier Archipelago became the focus of development of the North-West Shelf natural gas field. There was no planning process that sought to minimize the impact of the development on Aboriginal heritage. Instead, Woodside Petroleum selected two preferred locations for the development of onshore gas treatment plant and associated facilities—Searipple Passage and Withnell Bay/King Bay—and conducted environmental assessments. There was no comprehensive heritage assessment before choosing the two sites and no consultation with Aboriginal people. Instead, DAS was subsequently involved in survey work to choose between them as part of Woodside's environmental assessment. Following a preliminary helicopter and ground reconnaissance, Bruce Wright (who had succeeded Warwick Dix as Registrar of Aboriginal Sites in 1976) recommended Withnell Bay/King Bay (DAS 1979a; Vinnicombe 2002). The density of Aboriginal cultural material was known to be extremely high in the Searipple Passage area, and industrial development at the northern end of the Burrup would have meant an access corridor, with attendant damage to Aboriginal heritage values along the entire length of the Burrup. In 1979, DAS staff conducted several surveys of the area scheduled for development area as part of the environmental impact assessment (DAS 1979-1980). All indicate the richness of the area's cultural heritage values and DAS stressed the need for comprehensive survey of the Archipelago. In December 1979, Wright consulted with colleagues in DAS and other departments of the Museum, and in the University of Western Australia. Ian Crawford particularly stressed the need to study the immediately threatened areas in the context of site patterning throughout the Peninsula; investigating archaeologically not only the content and location of rock art, but also of occupation sites (including midden and/or artefactual material); and considering subsistence resource location, and ethnographic data on their usage (DAS 1979d). Wright later wrote:

> As so little archaeological research had been undertaken in the Dampier Archipelago area the Museum was not in a position to know whether any place which could be disturbed by the development contained unique or relatively common features. (1981, section 4)

In its evaluation, the Environmental Protection Authority recommended that Woodside employ an archaeologist during the construction phase. A consultancy agreement was then negotiated between Woodside and the Museum to survey, record, and salvage rock art and other archaeological material affected by the development. Wright's proposal (1980a) stressed the need for a full record and salvage program of the development areas where sites would be destroyed to address the immediate priority, but also advocated comprehensive survey of the Burrup and the whole Dampier Archipelago. He noted that, without this sort of information:

> … it is not possible for those people responsible for giving permission on behalf of the community for the destruction of some sites as a result of industrial expansion (the Aboriginal Cultural Material Committee), to make an informed evaluation of the significance of any site. (Wright 1980a, Part 1, section 1)

It is clear that the Department of Aboriginal Sites was already broaching many of the issues currently once again under discussion. Successive governments have repeatedly ignored the recommendations of their own specialist agencies. Vinnicombe points out that in 1980 planners still were deaf to the need to consider heritage significance in the area. As Woodside's plans proceeded, the Department of Resource Development commissioned a report on port and land use planning on the Burrup. The

report (Clough/SLAM 1980) concluded that industrial requirements and conservation were not in serious conflict on the Burrup (Vinnicombe 2002:8).

Bruce Wright responded with a report emphasising the scientific importance of the Dampier Archipelago and a proposal for investigation and preservation (Wright 1980b). This built on the original proposal for the LNG project and advocated comprehensive site survey work, protection of sites including legislative and physical protection, involvement of Aboriginal people and a research program, all based at a local research and education facility. Wright clearly identifies the Dampier Archipelago as a 'rich archaeological resource which has the potential to yield substantial scientific insights into the prehistory of man in Australia', and formulates a proposal to carry out the necessary field investigation and background research to provide a sound basis for the consideration of Aboriginal heritage in regional planning. None of this occurred and State Cabinet adopted the Clough/SLAM report as a guide for the development of the Burrup in 1981 (Vinnicombe 2002:9).

Wright modified and refined his original research proposal several times. His recommendations were far-reaching and percipient. He pointed out that there had been only 'a series of small area and linear site-location exercises', without 'even an initial inspection' of most of the Archipelago. While more than 500 sites had been entered in the Sites Register, in 'very few cases does this amount to a complete recording of the site, or an appropriate scientific analysis of the contents'. Wright recognised the need for a 'comprehensive site reconnaissance programme' over the entire Archipelago, to provide a sufficient comparative basis for the assessment of particular threatened localities. Proposals for locating facilities should not be finalised before such a programme had been carried through. Wright saw that there would be a continuing need for more technical and detailed studies. He envisaged Dampier as likely to yield 'crucial information' on the 'antiquity of man in the Pilbara' and in Australia, and to elucidate questions about the initial peopling of Australia, as part of a global diaspora. Management also should be a continuing operation, implying a management plan. This would include site protection—legislative and physical, including 'protection from wind-borne industrial products', access control and ranger supervision—and could be combined with display and presentation to inform and inspire interest among a wider public, including tourists (Wright 1980b). All this would require a local field centre to be established, for the lengthy process of completing reconnaissance recording, first on the Burrup and Dolphin Island, and then in the rest of the Archipelago; as a base for continuing research; and for the very necessary processes of management and education. Aboriginal people should be involved at all stages. He recommended measures for rock art recording, protection and salvage; test-trenching of shell deposits about to be destroyed; and ethnographic investigation. He also recommended that the most complete possible protection should be extended to a cluster of outstanding sites, which included the 'climbing men' and 'archaic face' complex of engravings. Particular protection should also be given to the valleys in the massif east of the access corridor (the 'Pistol Range'), because they contained various unique motifs, which would be easily accessible to the public once the access road went through (Wright 1980a, 1980b, 1980c, 1981, 1982).

Major surveys: 1980s and 1990s

The Dampier Archaeological Project

The Dampier Archaeological Project (DAP) began in April 1980 with a three person project team, under the direction of Dr Jim Rhoads, to record and salvage archaeological material to be impacted by the development of Woodside's LNG plant and associated infrastructure. However, the project was complicated by amendments to the developer's plans, meaning that new areas had to be surveyed, and the finding that areas scheduled for salvage turned out to be extraordinarily rich in cultural remains. DAS staff examined some of the new areas, but the scale of the problem was such that a second field team, led by Dr Patricia Vinnicombe started work in October 1980. By the end of 1980, the immediate development requirements had been met. The original field team returned to Perth to archive the salvaged material and prepare reports. A third team, under Ken Mulvaney, remained in the field until August 1981, at Woodside's request, to conduct further survey salvage operations. In all 14 resident team members were involved over 16 months and surveyed about 15% of the Burrup land mass.

The main emphasis of the DAP was full documentation of archaeological features in areas that would be directly impacted by Woodside's development. Sample collections and test excavations were conducted at open sites according to protocols designed to provide a representative sample of archaeological features (DAS 1984a:12). If it was not possible to preserve rock art *in situ*, the aim was to remove petroglyphs if possible, and to document them fully if it was not. Methods of documentation included tracing and casting of rock art, as well as photographic documentation and written description.

The DAP defined procedures for field survey and site documentation of the extraordinarily diverse and dense archaeological remains, including minimum standards for recording and salvage operations of both art and open sites, and for site reconnaissance (DAS 1984a:9-10). These have influenced much of the subsequent archaeological work in development areas. The main focus of the DAP was the recording and, where possible, salvage of sites to be impacted by the Woodside development. To organise the recording program, the team divided the area into units of survey and analysis, based broadly on drainage systems and referred to as 'catchment areas' (Figure 34). The 'catchments' were in turn sub-divided into geomorphic zones.

Figure 34. The Dampier Archaeological Project 'catchments' and areas actually surveyed

All archaeological features were recorded to a very high standard. Woodside provided electronic surveying equipment (EDM) and professional surveyors. The positions and extent of most sites were marked in the field on air photographs and accurately plotted on detailed 1:2000 base maps. In parts of the 'Pistol Range catchment' these were not available and 1:5000 maps were used instead. The actual area of sites was mapped, where appropriate. Photogrammetry was also used to record some features, many of which could not be salvaged. Low level air photography was employed to record some extensive archaeological features. As well as comprehensive photographic records, drawings and descriptions, tracings and silicone and latex casts were made of a number of rock art panels (DAS 1984a:12; Vinnicombe 1987a:15-18).

The quantity and diversity of the regional archaeological record and the absence of a framework for assessing significance presented a range of practical problems. The most prominent of these were how to define sites for recording and registration purposes and how to make decisions about salvage.

The approach to defining the boundaries of registered sites for the purpose of assigning numbers in the site register was essentially pragmatic. The original report (DAS 1984a:13) makes clear that the registered sites referred to 'geographical clusterings of archaeological features' and were not in any way interpretive. Generally, 'evidence of human activity that was separated by 25m or more was designated a separate site and was given a different register number' (Vinnicombe 1987a:21). Many of the field procedures developed by the DAP, particularly their definition of a registered 'site', have been widely followed by more recent projects. This has had the advantage that it has been possible to compare different studies over time. However, the lack of follow up analyses has meant that it has not generally been possible to move from the basic data to interpretation in terms of past human activities in the study area. The most serious long-term implication of this in terms of heritage management in the Dampier Archipelago is that the label 'site' encompasses a bewildering constellation of permutations and combinations of distinct archaeological features and cultural components, all of which are weighted equally. A 'site' may be spread over hundreds of square metres (or even kilometres) and the DAP showed that it is common in the Burrup for archaeological features to cluster into extensive 'site complexes'. The register system treats these as equivalent to 'sites' which comprise a single archaeological feature, such as a grinding patch, or a decorated boulder at a single point in the landscape.

The other problem encountered in the field, and also described in the DAP report, was the procedure for making decisions about the salvage, preservation *in situ* or destruction of archaeological material, including rock art. The conditions under which the project was conducted meant that most decisions about whether to seek modifications to development plans to preserve features *in situ*, or salvage individual petroglyphs, or make surface collections or conduct excavations had to be made on the spot. Indeed the normal section 18 procedures were modified by the Aboriginal Cultural Material Committee to facilitate these field decisions. However, the absence of any interpretive framework or

research context made it effectively impossible to assess archaeological features on the basis of their heritage significance. It was therefore decided that decisions about salvage of rock art would be based on purely non-archaeological criteria. These were the likelihood of disturbance during development and whether removal of the petroglyph was practicable under the circumstances (DAS 1984a:12). In other words, as much rock art as possible would be salvaged in development areas without any attempt to rate its significance. More than twenty years later, there is still no archaeological or research framework for assessing the significance of archaeological features.

The DAP documented 720 registered sites in total, ranging from individual isolated artefacts or single petroglyphs, to extensive site complexes with a range of cultural components and hundreds or thousands of individual petroglyphs (Vinnicombe 1987a, b). Of these registered sites, only 315 were preserved in situ and 349 were completely destroyed. A total of 9244 engraved boulders was recorded, of which 1619 were removed to a 'temporary' compound. A large number of surface collections were made using a range of sampling strategies, with a consistent aim of salvaging a 25% sample (DAS 1984a:12). Fifteen sites were excavated in advance of destruction, and subsurface deposits at a further three sites were sampled by auger.

The sheer quantity and richness of the archaeological material in the project area would normally have led to a reconsideration of the overall plan for industrial development, just as the WA Museum survey had earlier for Depuch Island. The DAP was not a research project and thus the strategy for collecting data was, of necessity, biased. It was limited in scope because it was aimed specifically at recording and salvage of archaeological material in areas to be directly impacted by development. Nevertheless, the scale and quality of data recording, the size of the area examined and the intensity of the survey meant that the immediate results and analysis of the archived material should have served as a baseline for future archaeological work in the Dampier Archipelago and, specifically, should have guided the development of a comprehensive heritage management plan for the Burrup. In fact, the data collected on distribution of archaeological features in the most completely surveyed areas (Tartaruga and part of Withnell Bay 'catchments') was used in a study of alternative sampling strategies (Mattner 1989). This study later guided the choice of sampling strategy employed by the CALM survey (Veth et al. 1993). However, although the original intention was to produce a full analytical report of the DAP, this never eventuated. A preliminary report and accompanying map folio (DAS 1984a, b) described the results at a general and descriptive level.

The storage compound for salvaged rock art was intended to be a temporary measure and the boulders were to be relocated after consultation with Aboriginal people (Wright 1981). Various proposals were made, including developing a visitor centre where the salvaged boulders could be displayed. This never occurred and a quarter of a century later the compound remains in place. The salvaged boulders are poorly curated and new boulders continue to be stored there (ACHM 2002).

Most of the finds and records were simply archived and very little was ever analysed. Of the 15 test excavations, only one (P1885—Georges Valley Midden) was ever written up, by Jacqueline Harris, an honours student at UWA (Harris 1988). Peter Veth (1982) analysed several surface collections of stone artefacts, also for an honours thesis. Analyses of petroglyph sites at King Bay and Withnell Bay were conducted by Nicholas Green (1982) for a master's thesis and Jan Turner (1981) for an honours thesis. Students at WAIT (Dixon 1982, Keene 1981, Shipley 1981) and Nedlands College of Advanced Education (Bolton 1980) did student projects on aspects of rock art recording, including photogrammetry. Some papers were written by team members on particular aspects of the project, including a review of historical sources (Gara, Mulvaney), but only Gara's (1983) work on the Flying Foam Massacre was ever published. Finally, Pat Vinnicombe drew together the available analyses into a descriptive report published in 1987 (Vinnicombe 1987a, b).

CALM National Estate Grant Project

In the early 1990s, the Department of Conservation and Land Management (CALM) conducted a survey to address the problem that there was still no systematic study available of the heritage values of the Burrup (Veth et al. 1993, Veth et al. 1994). The survey was funded by the National Estate Grants Program and aimed to assess the 'cultural significance of Aboriginal sites' on the Burrup

Peninsula north of King Bay and Hearsons Cove and nominate significant sites and areas to the Register of the National Estate. The study was conducted in the context of the clearly inadequate basis for land use planning with respect to heritage values in the Pilbara 21 Strategy. The report clearly articulates the world significance of the Burrup and stresses the importance of responsible management through the responsible land use planning agency, the Burrup Peninsula Board of Management (Veth et al. 1993:21-24).

The CALM survey was designed to provide a representative sample of sites to redress the balance of previous surveys. These either did not define sampling strategy or, like the DAP, were constrained by the requirements of developers. As a result of a study by Mattner (1989), who conducted a series of simulated sampling strategies on areas surveyed by the DAP, the CALM survey used a series of systematic 100m wide east-west transects spaced 500m apart (Figure 35) (Veth et al 1993). This strategy gave a 20% sample, which exceeds the 10% threshold that Mattner's (1989:78) study identified as sufficient to provide a representative sample of site types.

The CALM survey recorded 498 'sites' in 87.83km of transect and a total area of 8.78km^2—about 7% of the total Burrup land mass. The results differ to some degree from the DAP survey, in terms of the percentage representation of different types of cultural features and the distribution of archaeological features in relation to landforms. This is not surprising because the design of the survey strategy meant that the areas surveyed were more representative of the region (not constrained by development requirements) and the results provide a more balanced picture of the region as a whole. Unfortunately the records of these sites are not currently available through the DIA Site Register (18 April 2006) and the maps in the report and publication are not at a useful scale.

The CALM survey recommended specific areas should be added to the register of the National Estate (Figure 36). The well-known 'Climbing Men' site and the north end of the Burrup had been declared Protected Areas under the WA *Aboriginal Heritage Act* (1972-1980) in 1984, and, with the site complexes at Skew Valley-Gum Tree Valley, were also listed on the Register of the National Estate. Watering Cove and the 'Pistol Range' had also been nominated for the National Estate, but not listed. The CALM survey recommended that:

- the northern protected area be extended south to Conzinc Bay,
- the Watering Cove National Estate nomination be revised and extended to include Cowrie Cove, and
- two site complexes (I2 and I5) at the south end of Withnell Bay be nominated to the Register of the National Estate.

The survey did not include the 'Pistol Range' area, so no recommendations were made with regard to the nominated sites there. It seems that no progress was ever made with these recommendations (Jo McDonald Cultural Heritage Management 2005:162; Vinnicombe 2002:9).

The CALM report also drew together historical and ethnographic information and described contemporary Aboriginal associations with the Burrup in some detail. This went some way towards remedying the lack of Aboriginal consultation, which was an important weakness of the DAP project. Although the DAP did an extensive review of historical material, only a brief summary appeared in the final report.

Figure 35. Areas covered by the major surveys on the Burrup Peninsula

Figure 36. Areas on the Burrup Peninsula identified as highly significant

King Bay-Hearson Cove and Maitland Estate 1997

Since the DAP and CALM surveys, development has continued, but management of cultural heritage has received little attention in land use planning. A large number of archaeological and ethnographic surveys have been undertaken for a range of industrial projects, many of them in areas already surveyed by the DAP for Woodside's original LNG development. The two largest of these were commissioned by the Department of Resource Development and LandCorp, in 1996, in the King Bay-Hearson Cove area and the proposed Maitland Heavy Industry Estate and conducted by the West

Pilbara Land Council (Vinnicombe 1997a, 1997b) (Figure 35). These followed preliminary assessments of the Maitland Estate (Lantzke et al. 1994; Murphy et al. 1994).

Full information on the King Bay-Hearson Cove and Maitland surveys is not available through the DIA register. There were also a number of mapping problems with the King Bay-Hearson Cove survey. The survey area overlapped significantly with parts of the Dampier Archaeological Project, as well as some more recent surveys (Figure 35). Digitised versions of maps from the DAP map folio (DAS 1984b) were provided to the field team to facilitate identification of previously recorded sites and to minimize duplicate recording. However, the team experienced great difficulty in using these maps in the field and it was later discovered that maps had not been correctly digitised. The locations of previously registered sites were not plotted correctly and were up to 150 metres in error. The survey itself was conducted under very difficult conditions in what appears to have been an unrealistic timeframe. There were misunderstandings about the actual extent of the survey area. Parts of the 'Pistol Range' were originally supposed to be included, but the Land Council did not realise this. The time that had been allowed for the fieldwork was barely adequate for the remainder of the survey, and to include the 'Pistol Range' component was clearly not possible. The boundaries were consequently redefined to be more realistic and to exclude the 'Pistol Range' component (Vinnicombe 1997b:39, 44). Instead, the report includes a general description of the extremely significant complexes in the valleys of the 'Pistol Range', drawn largely verbatim from the report of the DAP (DAS 1984a; Vinnicombe 1987a) with some important supplementary material from a survey of a proposed methanol plant site for BHP Petroleum Pty Ltd and an associated proposal for a visitor centre and walk trails in the area (Robinson et al. 1996; Robinson 1996). The report states:

> The Land Council hopes that this outline of some of the known but as yet unstudied values of the Pistol Range will be sufficient to alert future planners to the exceptional significance of this area. It is also hoped that from this point in time onwards, resources will be directed to the future recording and management of the area as a cultural treasury for the Australian nation. (Vinnicombe 1997b:39)

The Maitland Survey included the first significant investigation on West Intercourse Island, where Bradshaw recorded highly significant site complexes, including 'mound middens' in 1993 (Bradshaw 1993, in Murphy et al. 1994). Although the Maitland Estate itself is on the mainland and has relatively low densities of cultural material compared to the Dampier Archipelago, the proposed port facilities and access corridors include parts of West Intercourse Island and West Mid Intercourse Island—both previously undeveloped—and an area at the south-west tip of the Burrup has been set aside for future development. The south-west Burrup survey area abuts the well-documented and significant complexes at Skew Valley and Gum Tree Valley, as well as other intersecting valley systems such as Happy Valley and Hunters Valley (Vinnicombe 1997a). All the island survey areas proved to have rich assemblages of cultural features and densities of registered sites at the upper end of the range recorded in other Burrup surveys (Vinnicombe 1997a:59).

Other surveys

There have been numerous small-scale archaeological and ethnographic surveys associated with continuing development on the Burrup. These have not been comprehensively reviewed here. Many cover areas already surveyed by the large-scale surveys. Some have produced new information, but it is very difficult to evaluate it because of factors such as limited survey scope, inadequate background information, and duplicate recording of previously recorded sites, which in many cases seems to have led to multiple registrations of the same locality within the Site Register. Site documentation in many of these reports is of poor quality, particularly with regard to ambiguous or insufficiently detailed descriptions and inadequate photographs (Jo McDonald Cultural Heritage Management 2005:42).

Regional planning since 1990

As noted above, from the 1960s onwards, regional planning had been characterised by a failure to acknowledge the presence of significant cultural heritage values and the need to consider these values in the planning process. The Burrup Peninsula Management Advisory Board released a draft plan of

management in 1994 and finalised it in 1996 (O'Brien Planning Consultants 1994; Burrup Peninsula Management Advisory Board 1996). The plan acknowledged the heritage values of the Burrup and the need to balance competing land uses, and essentially partitioned it into an Industrial Area and a Conservation, Heritage and Recreation Area. This ratified what was already a *de facto* division established by previous decisions about siting industrial development. The Industrial Area and the Conservation, Heritage and Recreation Area were divided into a number of policy areas. Within the Industrial Area, the plan acknowledged that there were heritage and conservation values that needed to be considered. Included in the objectives were the preservation of environmental values and significant Aboriginal sites and minimising the impact of development on the values of the adjacent conservation reserve. Within the Conservation, Heritage and Recreation Area, management objectives included research to increase knowledge of both the natural environment and Aboriginal heritage of the area. The Board envisaged that the certainty provided by its allocation of vacant Crown land would enable orderly development on the Burrup within a statutory planning scheme in order to meet the strategic economic needs of the State, while preserving the outstanding natural resources and cultural heritage and meeting public recreational and educational needs. It was recommended that an Implementation Group to finalise the plan. However, no such group was ever established and the Burrup Peninsula Land Use Plan and Management Strategy was never implemented.

The lodgement of Native Title claims that included the Dampier Archipelago by Aboriginal communities in the West Pilbara in 1994 introduced an element of uncertainty that allowed the continuation of the *status quo*. The Federal Court determined in 2003 that native title no longer exists over the Dampier Archipelago. Meanwhile, the Western Australian state government had entered into negotiation with the Native Title claimants. These negotiations resulted in a mediated agreement in January 2003 (the Burrup and Maitland Industrial Estates Agreement—BIMEA). This resulted in transfer of part of the Burrup to the Native Title claimants for joint management with the Department of Conservation and Land Management under a lease-back arrangement. Significant resources were also committed for developing a management plan and for management and development of visitor facilities, and for employment and training opportunities for the Aboriginal community (CALM 2003).

The division of the Burrup into industrial and non-industrial land (conservation reserve) under the BIMEA agreement—like the earlier Burrup Peninsula Land Use Plan and Management Strategy—ratified the *status quo* and essentially repeats the same distribution of industrial and non-industrial land. The provisions of the agreement included the development of a management plan for the Conservation Reserve, site identification surveys in some parts of the industrial land, and a study into the effects of industrial emissions on rock art. The State government initiated an investigation into the effects of emissions in 2002. The Draft Management Plan was released during the writing of this report in July 2006 and submissions close on 11 September 2006 (Department of Environment and Conservation 2006).

The management plan developed as part of the BIMEA agreement departs from the Burrup Peninsula Land Use Plan and Management Strategy (Burrup Peninsula Management Advisory Board 1996) in some important ways. One key difference is that the management plan is for the Burrup Peninsula Conservation Reserve only. There is still no plan of management for heritage values on the industrial land. Another important difference is that the policy statements for the Northern Burrup include clear statements that 'permanent overnight accommodation facilities are considered unacceptable' and that 'camping facilities are considered undesirable, but may be acceptable if restricted to short stays in specified areas' (Burrup Peninsula Management Advisory Board 1996:9). In contrast, the new plan (Department of Environment and Conservation 2006) envisages provision for overnight accommodation through basic camping facilities and the provision of 'high-quality safari tent accommodation' (p.55) with several possible proposed locations within the present North Burrup Protected Area (Map 3). The plan also proposes the development of a visitor centre and associated day visitor facilities at Conzinc Bay (p.54 and Map3). Thus, the plan proposes significant development within the Conservation Reserve that is likely to compromise the surviving heritage values. This is directly contradictory to the advice provided in CALM's own survey of the area (Veth et al. 1993) that the Burrup North Protected Area and National Estate nomination be extended to include Conzinc Bay.

Commonwealth DEH desktop study 2005

The most recent review of the heritage of the Dampier Archipelago was a desktop study conducted in early 2005 by Jo McDonald Cultural Heritage Management Pty Ltd (2005). The Commonwealth Department of Environment and Heritage (DEH) commissioned this review to assist them in assessing nominations for the Dampier Archipelago to the National Heritage List and the World Heritage List.

The desktop study reviewed both published and unpublished major studies of the area. McDonald also conducted a descriptive analysis of rock art using primary records from selected sites. This was intended to provide an overview of variability across the whole archipelago. The advantage of this exercise was that the motifs analysed were brought into a single frame of reference and biases and inconsistencies introduced by multiple recorders were eliminated. Sample size was also large (8386 motifs from 432 sites) and an attempt was made to achieve reasonable geographic coverage. However, it is necessary to be cautious in accepting that the sample of either sites or motifs was truly representative. Unfortunately, an analysis like this is necessarily restricted by the *ad hoc* nature of site recording to date, driven as it has been by the development imperative. The state of the records is also a problem, with much material unavailable or missing. Nevertheless, the DEH desktop study does provide a useful review of archaeological investigation in the Dampier Archipelago and the history of mismanagement of the cultural heritage values, while the analysis of petroglyphs highlights the richness and diversity of the area's rock art. The report's conclusion that the 'entire Archipelago contains archaeological evidence, particularly rock art, which is of arguably extremely high scientific significance' is unambiguous (Jo McDonald Cultural Heritage 2005:175).

Archaeological Research in the Dampier Archipelago

Almost all archaeological investigation in the Dampier Archipelago has been driven by the requirements of development. Very little in the way of academic research has been conducted and even less has been published. A small number of academic papers (Gara 1983; Vinnicombe 1987b) and student projects emerged from the DAP (Bolton 1980; Dixon 1982; Green 1982; Keene. 1981; Harris 1988; Mattner 1989; Turner 1981; Veth 1982), but the bulk of the substantial archive remains unresearched.

A brief paper on the CALM survey has been published (Veth et al. 1994). A program of excavation and site recording initiated for a PhD by Elizabeth Bradshaw in the early 1990s remains incomplete and largely unpublished (Bradshaw 1994, 1995). Kim Sales (1992) has published an analysis of the 'Climbing Men' registered site in terms of a controversial neuropsychological model of rock art production. Bednarik's substantial investigations of rock art remain largely unpublished (Bednarik 2002a, 2006).

The only academic researcher to have published significant amounts of research is Michel Lorblanchet (1977, 1983, 1992; Lorblanchet and Jones 1979; see discussion in Chapters 3 and 4). He has published accounts of his excavations at Skew Valley and on aspects of his study of the rock art of Skew Valley and Gum Tree Valley and the adjacent plateau. More detailed analyses of the Skew Valley assemblage and comprehensive documentation of his rock art studies, however, are still only available in unpublished reports and archived material. Nevertheless, Lorblanchet's work is of great significance and has provided key components in building an interpretive framework for the area. It sets a benchmark for future research in the Dampier Archipelago.

Recent general reviews, focusing particularly on Dampier rock art, have been published in the journal *Rock Art Research* (Bednarik 2002a, Vinnicombe 2002).

Table 13. The Dampier Archipelago: the last 300 years

1699	William Dampier anchors off one of the islands and records signs of burning and smoke in the distance
1801, 1803	French scientific expedition under Nicolas Baudin visits Depuch Island
1818	Phillip Parker King visits the Dampier Archipelago during a survey of the NW coast of Australia
1840s	American whalers active in the Dampier Archipelago
1861	Explorer Francis Gregory establishes a base at Hearson Cove to explore inland as far as the Ashburton and De Gray Rivers
1863	Port established at Tien Tsin (later Cossack). Walter Padbury and John Wellard establish first pastoral runs in the region
1864	John and Emma Withnell establish a station at Mt Welcome
1865	J.P Stow explores Dampier Archipelago—meets Indigenous artists
1866	Smallpox epidemic. Overland stock route established from Geraldton to Roebourne. Townsite of Roebourne gazetted
1867	Pearling industry begins, with Aboriginal and Malay divers
1868	Reprisal raids, known as the Flying Foam massacre, kill large numbers of Yaburara people
1870	Another smallpox epidemic. Whaling station established on Malus Island.
1870s on	Dampier Archipelago becomes a major pearling centre and commercial fishery
1872	Malus Island whaling station closes. Townsite of Cossack gazetted.
1873	Copper discovered near Roebourne
1875	John Forrest completes survey of Nickol Bay district
1886	Aboriginal Protection Board established
1888	Gold discovered in the Pilbara
1900	Pearling fleet moves to Broome
1908	Proposal to build a railway from Marble Bar to the coast to service the West Pilbara Goldfields and Depuch Island suggested as the site for a port
1961	Development of iron ore in the Pilbara leads to new proposals for a deep water port at Depuch Island, about 100km to the east of the Dampier Archipelago
1962	Western Australian Museum expedition to Depuch Island. Australian Academy of Science recommends the entire Dampier Archipelago be listed as an A class reserve.
1963	Hamersley Iron and Dampier Salt begin operations on Dampier Island. Causeway constructed connecting Dampier Island to the mainland to form the Burrup Pensinsula
1966	Dampier townsite established. First iron ore shipment from Dampier.
1968	Karratha established
1968-70	Robert Bednarik, project manager for an engineering firm based in Dampier. Records archaeological sites throughout the Pilbara, especially rock art on Dampier Island
1970-6	Enzo Virili, Project Engineer for Dampier Salt. Documents major rock art complexes, and reports damage to the Skew Valley midden
1972	Department of Aboriginal Sites established at the Western Australian Museum, with Warwick Dix as the first Registrar of Aboriginal Sites
1972	Aboriginal Heritage Act (WA) passed. Hamersley Iron constructs port facilities at Parker Point and East Intercourse Island. Discovery of natural gas on the North-West Shelf.
1975-6	Michel Lorblanchet excavates Skew Valley midden and makes detailed records of petroglyphs at Skew Valley and Gum Tree Valley complexes
1974	Commonwealth and State governments initiate the Pilbara Study, for planning resource development. Registrar Warwick Dix writes a report on Aboriginal heritage that is not included in the Pilbara Study.
1978	Woodside Petroleum begins environmental assessment for the development of onshore gas treatment plant and facilities on the Burrup. Two alternative preferred sites—King Bay/Withnell Bay and Searipple Passage—identified. DAS conducts preliminary field reconnaissance of the two alternative sites and recommends the southern option, because of the quantity of Aboriginal sites at the northern end of the Burrup and the associated destruction along the entire length of the Burrup if the northern site were chosen. DAS reports on archaeological surveys of areas scheduled for development stress the richness of the cultural heritage and the need for proper management.
1979	Dampier Island officially renamed Burrup Peninsula
1980	Woodside Petroleum contracts the Western Australian Museum to undertake site salvage. Department of Industrial Development commissions a report on land and port planning on the

	Burrup (Clough/SLAM 1980). The report concludes that there was no serious conflict between industrial development and conservation. Bruce Wright, Registrar of Aboriginal Sites, responds with detailed proposal for recording, salvage, scientific investigation and preservation of sites in the Dampier Archipelago.
1980-1	Dampier Archaeological Project documents 720 registered sites, including nearly 10,000 petroglyphs.
1980	Cabinet adopts Clough/SLAM report as a guide for industrial development of the Burrup
1981	Wright updates his proposal for the investigation of the Burrup. DAS begins a National Estate site recording program and initiates consultation with Aboriginal communities in Onslow and Roebourne. The project was interrupted by urgent site recording work associated with the Harding River development and never resumed.
1984	Two areas on the Burrup declared Protected areas under the Aboriginal Heritage Act—the 'Climbing Men' site and an area at the north end of the Burrup. These areas, and the site complexes at Skew Valley and Gum Tree Valley, were also listed on the Register of the National Estate. Watering Cove and the Pistol Range also proposed as protected areas and nominated to the National Estate register. Lorblanchet conducts further rock art recording at Gum Tree Valley with funding from the Australian Institute of Aboriginal Studies
1987	CALM involves Roebourne Aboriginal community in inspection of sites on the Islands. Aboriginal community perform a ceremony for the Aboriginal Cultural Material Committee at Hearson Cove
1990	Dampier Salt applies to increase salt field capacity to 4 million tonnes per annum. CALM completes a management plan for the Dampier Archipelago Nature Reserves, subsequently approved by the Minister for the Environment.
1991	Pilbara Region Economic Development Overview (Pilbara 21) study makes no mention of Aboriginal Heritage
1991-3	CALM conducts a survey of the heritage values of the Burrup Peninsula with funding from the National Estate Grants program. This identifies 498 sites.
1992	State Development Department commissions a discussion paper on land use strategy for the Burrup.
1994	Following the Native Title Act of 1993, representatives of Ngarluma and Yindjibarndi people lodge a native title claim over an area of the West Pilbara including the Burrup. Preliminary studies of Maitland Industrial Estate begin. O'Brien Planning Consultants prepare a draft land use plan and management strategy for the Burrup Peninsula Management Advisory Board. This plan cannot be assessed by the EPA for legal reasons.
1996	Burrup Land Use Plan and Management Strategy released.
1995-2002	Heritage surveys conducted in association with various developments including BHP Methanol Plant, Pilbara Energy Pipeline, Plenty River Ammonia Plant, Withnell East Industrial Estate, Dampier Nitrogen, Burrup Fertilisers, Methanex, and infrastructure corridors.
1997	Department of Resources Development and Landcorp commission heritage surveys of the proposed Maitland Heavy Industry Estate, and island areas affected by the proposals. They also commission a survey of the King Bay-Hearson Cove industrial area.
2001	Woodside begins work on gas plant extension.
2002	National Trust (WA) places Dampier Archipelago on its Endangered Places List. WA State government establishes Burrup Rock Art Monitoring committee to address concerns about the impact of industrial emissions on the petroglyphs.
2003	National Trust (WA) holds a public forum to promote community consultation and awareness. World Monuments Fund places Dampier Archipelago on its List of Most Endangered Places. Burrup and Maitland Industrial Estates agreement struck between the WA state government and Native Title claimants. This includes provision for 60% of the Burrup to be conservation reserve, joint management by local indigenous communities and CALM, funding and development of management plan for the non-industrial area and substantial financial compensation for the Native Title claimants. National Native Title recognises claims of Ngarluma and Yindjibarndi but finds that native title no longer exists over the Burrup.
2004	New Commonwealth heritage legislation comes into effect. National Trust (WA) and others request emergency listing to the National Heritage List
2005	Commonwealth Department of Environment and Heritage commissions a report on the significance of the rock art. The minister defers his decision on National Heritage listing.
2006	National Trust (WA) secures World Monuments Fund support and holds a series of forums to raise community awareness. CALM releases a management plan for the non-industrial lands under the BIMEA agreement

Chapter 6: Cultural heritage values in the Dampier Archipelago

The outstanding heritage values of the Dampier Archipelago, particularly the rock art, were increasingly recognised from the late 1960s. Aboriginal sites were first afforded legislative protection in Western Australia in 1972 (the *Aboriginal Heritage Act* 1972-1980), a response to the original resources boom in the Pilbara and the massive threat this posed to Aboriginal heritage.

The Department of Aboriginal Sites, established in 1970 at the Western Australian Museum, began to document sites in the early 1970s. The importance of the Pilbara as a rock art province was already recognised in academia (McCarthy, in Wright 1968), and in 1974 both Virili and Dix presented papers at a conference at the Australian Institute of Aboriginal Studies in Canberra alluding to the outstanding rock art of the Dampier Archipelago. The published versions of the papers appeared in 1977 and in the same year Robert Bednarik also published a paper which drew attention to the destruction of important rock art sites in the Dampier area. A section of Virili's paper as delivered, but not included in the published version, commented on the need for planning to 'prevent the destruction, even in the name of progress, of a unique Australian heritage that must be preserved for future generations' (quoted in Vinnicombe 2002:7).

By the time Woodside began planning to develop onshore facilities for the exploitation of gas on the North-west Shelf in 1978, the presence of significant rock art in the Dampier Archipelago was known. Nevertheless, two possible sites were chosen and the WA Museum was consulted about which should be used. The choice of Withnell and King Bays rather than Searipple Passage was based on a brief field reconnaissance and the existing records of significant site complexes at the northern end of Dampier Island. There was no consultation with Aboriginal people at the planning stage. The WA Museum was then engaged to conduct a salvage program—the Dampier Archaeological Project—beginning in 1980, to mitigate the impact of the development. In the original proposal for the project, Bruce Wright, the Registrar of Aboriginal Sites, recommended comprehensive survey of the remainder of the Burrup and the Archipelago as a whole, as well as specific proposals for the urgent problem of salvage of archaeological material in the LNG area. He made it quite clear that the survey of the remainder of the Burrup and the Dampier Archipelago was a matter of urgency because of the detrimental impacts on Aboriginal heritage observed over the previous five years and because of the expected impacts of increased access as a result of the Woodside LNG development. The proposal acknowledged that this was beyond the scope of any one developer's responsibility. Nevertheless, in the absence of comprehensive information on 'the area as an integrated whole' it would be impossible for the Aboriginal Cultural Material Committee 'to make an informed evaluation of the significance of any site' (Wright 1980a; cf. DAS 1979d). In the event, the sections dealing with the LNG salvage proposal formed the basis of the Western Australian Museum's final contract with Woodside.

The results of the Dampier Archaeological Project (DAS 1984a, b; Vinnicombe 1987a) made it clear that:

- the Dampier Archipelago was extraordinarily rich in archaeological heritage,
- documentation of the resource, and development of a comprehensive management plan and a framework within which significance could be assessed was a matter of urgency,
- allowing further industrial development in the absence of such a plan would result in irrevocable damage to the heritage values of the area, and
- the extraordinary density of cultural material in the Dampier Archipelago showed that the basic units of management should be site complexes or entire landscapes.

Instead, this saga of land use planning on the Burrup without adequate and informed consideration of the documented heritage significance of the area has continued to the present (see Chapter 5; cf. Bednarik 2002, 2006; Jo McDonald Cultural Heritage Management 2005; Vinnicombe 2002). The major surveys (Veth et al 1993; Vinnicombe 1997a, b) have reiterated the conclusions of the Dampier Archaeological Project, stressing the extraordinary significance of the area's Aboriginal cultural heritage and highlighting the need for comprehensive and systematic documentation, so that planning and management decisions could be made on an **informed** basis. Instead, the original uninformed

decision to locate Woodside's onshore gas processing facilities on the Burrup, followed by the requirement that DAS assess the relative significance of two specific locations on the basis of inadequate knowledge, has continued to constrain planning and apparently ensured that the requirements of developers are given priority over good cultural heritage management practices.

The Museum's policy during the Dampier Archaeological Project was to attempt to salvage rock art according to purely practical criteria, rather than attempting to assess its significance. This was explicitly based on the recognition of the inadequate knowledge base on which to base an assessment of 'the importance of any engraving or art site to the region's prehistory' (DAS 1984a:12; cf. Vinnicombe 1987a:17). The knowledge base on which assessments of significance should be made is still inadequate. As the most recent assessment of the heritage values of the Dampier Archipelago points out, the ongoing failure to meet this most basic requirement of effective cultural heritage management continues to result in demonstrably poor outcomes for all stakeholders (Jo McDonald Cultural Heritage Management 2005:167-171; cf. Vinnicombe 2002:24).

The processes and practices that lead to effective management of heritage places are well-developed in Australia. Heritage management is a well-developed profession and exists as an academic discipline in its own right (Pearson and Sullivan 1995). The principles and processes set out in the *Burra Charter* are recognised as the standard for Australian best practice in heritage management and are founded on international standards and practice (cf. Cleere 1984; McGimsey and Davis 1977; Schiffer and Gumerman 1977).

Current best practice in the management of heritage places involves four fundamental steps (Pearson and Sullivan 1995:8-9):

1. Location, identification and documentation of the resource
2. Assessment of the value or significance of the place to the community or sections of the community
3. Planning and decision making to produce a management policy that aims to conserve cultural significance. This involves weighing the values of the place against a range of other opportunities and constraints
4. Implementation of decisions covering the future use and management of the place.

The management of the heritage values of the Dampier Archipelago falls far short of these standards. Indeed, arguably the history of planning and management on the Burrup can be viewed as a case study of how not to manage cultural heritage. After decades of industrial development, the lack of a plan of management demonstrates a comprehensive failure to meet the most basic standards of best practice in cultural heritage management on the Burrup. This leads to the inescapable conclusion that the approach to cultural heritage on the Burrup has not involved balancing competing values, but has been purely an exercise in facilitating development.

Some critical issues regarding the documentation and assessment of heritage values will be highlighted in the following discussion.

Documentation of the resource

Documentation is a key step in an effective planning framework for heritage management and is an essential prerequisite for making decisions that will impact on heritage values (Pearson and Sullivan 1995). As Cleere (1984:126) argues:

> The basis for any rational policy for the selection of cultural resources for preservation and management must be identification of the extent and nature of those resources through survey and inventory. Only when this data base has been securely established does it become realistic to formulate strategies for the future.

The primary resource for documentation of the cultural heritage of the Dampier Archipelago is the Site Register maintained by DIA. Two key issues will be considered here in evaluating this resource as a planning tool.

- Nature of the information, particularly with regard to accuracy and quality

- The concept of ‘site’.

As well as the Site Register, there is a large amount of archived but largely unanalysed data, much of it generated by the Dampier Archaeological Project. Most resources for archaeological investigation have been allocated to site recording and, in some cases, to site salvage. Consequently, although there is a large quantity of archived data, there has been little emphasis on analysis. The large scale surveys (DAP, CALM, DRD) have produced reports which are primarily descriptive. The limited analyses that have been conducted clearly indicate the need for detailed investigation of the nature and variability of the archaeological record.

Data quality in the Site Register

Maintaining a Register of Aboriginal Sites is required under the *Aboriginal Heritage Act* (1972-8). Originally, maintaining the Site Register was the responsibility of the Department of Aboriginal Sites in the Western Australian Museum. The Department of Aboriginal Sites was removed from the Museum in the mid 1980s and has been placed in various administrative contexts since then. The Department of Indigenous Affairs is currently the government agency with current responsibility for maintaining the Register, through its Heritage and Culture Branch.

Originally, the Register comprised individual site files, containing recording forms, written descriptions, maps and photographs. These site files are still the primary repositories of recorded information, but since the 1980s, the Register has been gradually computerised. This means summary information about sites and site location is now available electronically through the Aboriginal Heritage Information System (Department of Indigenous Affairs nd: Section 3.3).

The quality of the data held in the Register is affected by a number of factors which are discussed in the Aboriginal Heritage Procedures Manual (Department of Indigenous Affairs nd: Section 3.4). The DIA has limited control over the quality of data lodged with it. Unlike some other states, there is no clear obligation to lodge site information. The resources available have never allowed data submitted by outside consultants, researchers or members of the public to be routinely field checked. The distribution of registered sites is strongly influenced by the distribution of archaeological investigation, most commonly as a result of development. This is clearly evident in the Dampier Archipelago, where the highest densities of registered sites clearly coincide with the distribution of the industrial areas (see Appendix 1).

The accuracy of locational information in the Site Register is a particular issue. A number of problems have resulted from differences in the availability of accurate topographic maps. In many parts of the state, accurate topographic maps at a suitable scale for site mapping have not been available. The increasing use of GPS has improved this situation for recently mapped sites in those areas where local conditions allow, but many older records are inaccurate. The conversion from imperial to metric grid references has also introduced many inaccuracies.

Another issue is changing policy with regard to the mapped information available to the public. Before 1999, information about the precise location of sites was not publicly available. Site location was were shown as a random location within a 1km grid square in the case of registered sites classified as ‘Open’ and within a 10km square in the case of ‘Closed’ sites as a protective measure. This policy has since been re-evaluated and sites are now mapped in a variety of ways on the register depending on how their position was originally recorded. These are described in some detail in the Aboriginal Heritage Procedures Manual (Department of Indigenous Affairs nd: Section 3.4). The quality of mapping available is variable. It ranges from polygons which actually reflect the size, shape and extent of the area of a registered site, to circles of fixed radii up to 2km, or 1km boxes within which the site occurs.

On the Burrup, the computerisation of the site register has led to a number of specific mapping problems. The Dampier Archaeological Project was able to map sites to an unusually high standard. Sites were plotted on 1:2000 topographic base maps (except in some parts of the ‘Pistol Range catchment’ where only 1:5000 mapping was available) by professional surveyors supplied by Woodside using electronic equipment (DAS 1984a:9-12; Vinnicombe 1987a: 15). A map folio (DAS

1984b) containing these maps, which show the actual recorded extent of registered sites, accompanied the 1984 report. The conversion of these records to digital form seems to have introduced inaccuracies, which has in turn created problems for subsequent surveys and led to the duplicate recording of cultural features. Attempts to address these issues have had limited success.

The results of the King Bay-Hearson Cove survey present particular problems in this regard because of inaccuracies in the digitised maps supplied to the survey team. Apart from the frustration and difficulty this created in the field, this resulted in duplicate recording of already registered sites (Vinnicombe 1997b:44). In a number of smaller surveys, coverage of the same area by different consultants working with different Aboriginal communities has also resulted in duplicate registrations. The absence of data from the Site Register is also a problem, as illustrated by the fact that the records of the CALM survey (Veth et al. 1993) are not available (see above).

The data collected by the various surveys has been highly variable in quality. Not all archaeologists have had specific expertise in rock art recording. There is no doubt that there have been differences between observers (see for example Vinnicombe 1997a:64). The requirements of developers mean that, with the exception of the CALM survey of the northern Burrup (Veth et al. 1993), statistically valid sampling strategies have not been used. It is therefore difficult to generalise about the region as a whole. Individual surveys of small areas cannot be evaluated with reference to a regional context as there is no comprehensive research program and there is no inventory of heritage resources for the whole area. There is no standard for recording apart from the minimal requirements of assessment by the ACMC and the pragmatic field-based definition of a 'site' devised by the DAP.

These problems mean that the Site Register is currently difficult to use as a planning tool, particularly if the digital records are relied on without checking them against the primary record which is individual site files. The process of cross-checking and verifying site records, with or without ground truthing, is difficult and complex. The complexities involved are illustrated by the myriad of reports produced as part of the Section 18 process for the development of the North-South and East-West Infrastructure corridors (e.g. ACHM 2002, 2003; Green 2003; Green and Marwick 2002; O'Connor 2003; Parker 2003).

The concept of 'site'

The *Aboriginal Heritage Act* 1972-1980 defines a site in Section 5 as:

a. place of importance and significance where persons of Aboriginal descent have, or appear to have, left any object, natural or artificial, used for, or made or adapted for use for, any purpose connected with the traditional cultural life of Aboriginal people, past or present;
b. any sacred, ritual or ceremonial site, which is of importance and special significance to persons of Aboriginal descent;
c. any place which, in the opinion of the Registrar, is or was associated with Aboriginal people and which is of historical, anthropological, archaeological or ethnographic interest and should be preserved because of its importance and significance to the cultural heritage of the State;
d. any place where objects to which the Act applies are traditionally stored, or to which, under the provisions of this Act, such objects have been taken or removed.

The Register of Aboriginal Sites comprises records relating to individual places that might reasonably be interpreted as Aboriginal sites. The Site Register lists the cultural components present at that place under a series of defined categories. Some sites comprise a single component or feature (e.g. artefact scatter, midden, engraving), but many others include multiple components. This presents problems for the analysis and evaluation of sites as there is no straightforward way to classify sites. Sites which have multiple components may be very different, but will appear similar in the Register because they contain the same components. For example, a single petroglyph associated with a small surface scatter of shells and stone artefacts is very different in character from a large complex with hundreds of petroglyphs, associated with a dense accumulations of shells and stone artefacts, but both are categorised in the same way in the Register because they comprise the a same components. This is a particular problem on the Burrup where locations with multiple components are very common. The

Register also does not distinguish features that happen to be associated in space, but may belong to very different time periods and thus quite different cultural contexts.

It is important to understand that 'site' in this context is a technical term and is a practical way of recording and describing the information available. Although 'site' carries commonly understood meanings pertaining to function of a place ('e.g. 'campsite', 'sacred site', 'meal-time camp'), identifying these functions is not necessarily straightforward. Information about the meaning and significance of ethnographic sites can be sought from informants with knowledge of them. Archaeological sites, however, must be interpreted within an analytical framework to understand the cultural system of which they are the material evidence. Crucial to this analytical framework is their position in time as well as space.

This problem was recognised by the Dampier Archaeological Project team, who were faced with organising a vast body of complex archaeological information and meeting the administrative requirements of the Site Registration system. Although the density of archaeological material on the Burrup was such as to 'warrant its designation as a single site complex' (DAS 1984a:13), this was not a practical way to meet the requirements of the Site Registration system. The report thus stresses that the grouping of material for the purposes of site registration is purely geographical and pragmatic rather than analytical. Indeed, the studies of rock art by Lorblanchet (1983; 1992), Green (1982) and Turner (1981) did not use the registered sites for the purposes of analysis, but quite properly explored the distribution and characteristics of individual petroglyphs or rock surfaces. Hence, analysis is critical to establishing the significance of archaeological sites at any but the most general and preliminary level.

The question of significance assessment is particularly important in the Western Australian site registration system because, although the definition of the types of places that constitute sites under the Act is comprehensive, the assessment of the significance of those places is built into the definitions under Section 5. The current procedure is for places reported as Aboriginal sites to be placed on the Interim Register until they can be assessed by the ACMC. Once they are assessed, sites can be placed on the Permanent Register if they meet significance criteria, or archived as 'Stored data' if there is insufficient information to assess them, or they are determined not to be places to which the Act applies. These sites can be reassessed if more information becomes available. The role of the ACMC in assessing whether sites are places to which the Act applies is extremely difficult in the absence of a sound framework within which significance can be assessed.

The problem is particularly complex in the Dampier Archipelago because of the sheer quantity and richness of the archaeological record. All the major surveys have shown that there is a complex relationship between different types of archaeological features and how they are distributed in the landscape. However, the absence of an interpretive framework means that this relationship is poorly understood.

The results of the recent Parker Point port upgrade survey illustrate some aspects of this complexity in the actual field recording of cultural features (Gunn 2003, Mulvaney 2004). Coverage was 100% over about nine days with a team of six. Gunn identified 281 archaeological features comprising 581 petroglyphs 42 grinding patches, six stone artefact scatters and one pit feature. These were combined as 36 archaeological 'sites' for the purposes of registering the sites with DIA (using the convention originally established by the Dampier Archaeological Project). The area surveyed was about 2.5km^2. Average site density was therefore about 14 sites per square kilometre with petroglyph density of about 232 per square kilometre. However, the cultural remains in the survey area are best described as falling mostly into two large site complexes. The remainder are four isolated boulders which are outliers of these two complexes (Gunn 2003:19). Subsequent survey of the same area associated with the relocation of some of these petroglyphs recorded further archaeological features (Mulvaney 2004).

Estimating site numbers

The pragmatic problems of site recording in the Dampier Archipelago have implications for estimates of site numbers and debates about the extent of the impact of development on ethnographic and archaeological features on the Burrup. The complexity and richness of the heritage of the Dampier Archipelago is not well described by the Site Register system. The Site Register is therefore of limited value for predictive purposes. It is difficult and time consuming to search the records to answer questions about the nature of sites and their status. As a result, it is very difficult to extract reliable data from the electronic records. In any case the data is of only limited utility for either research or planning purposes, because of the assumptions that need to be made in its interpretation, including the most basic question of what is the definition of a 'site'. For example, in the data supplied in answer to a parliamentary question about the destruction of rock art sites on the Burrup, the DIA suggested the estimated number of sites on the Burrup was 9000. Of these, it estimated that 3690 sites were rock art sites on the basis that 'in well-recorded areas' rock art sites comprise 41% of the total sites. This basis for calculating the estimate, however, derives from the results of the CALM survey (Veth et al 1993). Other surveys have consistently found that registered sites which have a rock art component form a rather higher proportion of the registered sites—an average of 76%, for example, in the Dampier Archaeological Project surveys (Vinnicombe 1987a:44). There is no particular reason for choosing one estimate over the other—both are based on 'well-recorded areas'. The estimates tell us nothing about the nature and characteristics of rock art sites. They conflate registered sites comprising a single petroglyph with registered sites with hundreds or thousands of petroglyphs, and conflate registered sites which comprise only petroglyphs (i.e. 'rock art sites') with extensive site complexes where petroglyphs occur in association with other cultural features. The data is over-generalised and based on assumptions that can be easily challenged.

The main point here is not whether the data is correct or incorrect; it is that the estimates are not based on sound evidence and do not provide useful information for making decisions about heritage management. The distribution of cultural features is one alternative basis for estimating the quantity of cultural features. This avoids many of the problems identified with the 'site' concept, particularly the conflation of categories in the Site Register system. For example, the density of recorded petroglyphs varies in different surveys from 250 to 1135 per square kilometre (see Chapter 3). These are undoubtedly underestimates because of the practical difficulties involved in recording 100% of the petroglyphs in a given area (cf. Gunn 2003; Mulvaney 2004). However, these figures indicate the likely range of densities likely to occur across the entire landscape and take into account the variation that occurs because of how the distribution of petroglyphs can be related to local topography and geology.

There is no doubt that the quantity of archaeological features on the Burrup and in the Dampier Archipelago is generally extremely high. Numerous archaeological surveys since the 1970s have shown this to be the case and it is possible to predict with confidence that comparable numbers occur throughout the region. These features are of significance to Aboriginal people. In addition, there are a range of features of ethnographic significance. These places have generally received less attention and it is inherently much more difficult to estimate numbers without specific consultation with informed Aboriginal people.

Managing cultural heritage

There has been an important shift in understanding and managing cultural heritage away from a 'sites and monuments approach' and towards an appreciation of context and relationships. This is exemplified in the recognition of cultural landscapes by the UNESCO World Heritage Committee since 1992 and the development of criteria for considering dynamic relationships between people and their environment in significance assessment (Head 2000:91). This has been of particular importance in the recognition of the complex physical and spiritual relationships between indigenous people and places, and encouraging a broader appreciation of context and relationships.

In Western Australia, protection is afforded to all places that conform to the criteria set out in the *Aboriginal Heritage Act* (1972-1980) regardless of whether they are registered sites or not.

Development proponents may apply under section 18 of the Act to destroy or disturb a registered site. The Aboriginal Cultural Material Committee assesses applications and provides advice to the minister who may then grant or decline consent.

In practice, this regulatory framework is purely a sites-based approach and tends to mean that consideration of Aboriginal heritage values is unlikely to be incorporated into the planning stage of any project. The Site Register in its present form, and with the level of resources available for its administration, offers little scope for use as a planning tool in any case. The approach to heritage on the Burrup has been—and continues to be—predominantly reactive. Rather than incorporating the assessment of cultural heritage values into an overall planning process, the focus tends to be on seeking approvals to disturb Aboriginal places under section 18 of the *Aboriginal Heritage Act* (1972-1980). The identification and recording of such Aboriginal places commonly occurs only in response to specific development proposals. Each recording project contributes new data, but the lack of a framework within which to assess significance means that the new data does not contribute to understanding. Furthermore, there is no way of assigning priorities. As Vinnicombe points out (2002:24) this means that the amount of resources involved in avoiding cultural material bears no relationship to its significance.

Effectively, there has been no advance on the policy of salvage formulated for the Dampier Archaeological Project in 1980. Salvaging individual petroglyphs has become an easy solution to the dilemmas raised, despite the fact that this option irreparably damages their significance by removing them from their context and destroying the relationships between cultural features and with the natural environment. Furthermore, the condition of the petroglyphs originally salvaged by the Dampier Archaeological Project—in what was supposed to be a temporary measure—and the ongoing failure to curate them demonstrate that the only priority is the 'quick fix' (ACHM 2002).

This failure to address the key issues has produced a poor outcome for all stakeholders. From the perspective of community stakeholders, including Aboriginal people, archaeologists, and the general community—national and international—numerous petroglyphs and other archaeological features have been destroyed and a significant portion of the extraordinary heritage of the Dampier Archipelago has been irretrievably compromised without any clear understanding of what has been lost. Equally, it produces a poor outcome for development interests in the lack of certainty and the potential for conflict. It is undoubtedly expensive, in that the expenditure of resources by both developers and government is poorly directed and inefficient. It ultimately fails in protecting heritage.

The Dampier Archaeological Project first drew attention to the need to consider the Dampier Archipelago as a cultural landscape. At the very least, its conclusions ought to have led to the development of a comprehensive management plan for the whole Archipelago, which could have provided a sound and informed basis for balancing the responsibility to conserve the extraordinary heritage values of the region with the interests of industrial development. The results of the CALM survey also stressed the importance of considering areas, or associations of sites, or site complexes rather than individual sites, in addressing management issues in the Dampier Archipelago, and suggested that:

> many of these issues pertinent to the Burrup Peninsula can only be assessed by looking at aggregations of contiguous sites which adequately reflect the range and diversity of human behaviour that would have constituted people's daily and seasonal rounds of land use (Veth et al. 1993:176).

Assessing significance

A basic prerequisite for effective and meaningful cultural heritage management is an understanding of the values of the place. In the case of the Dampier Archipelago, this would require, basic documentation and research in order to characterise the physical record and assess the range of archaeological, ethnographic, historic, aesthetic, scientific and social values.

Because there has never been an inventory of the cultural heritage of the Dampier Archipelago and because the amount of academic research has been very limited, there is no framework of

understanding within which particular locations or individual cultural elements can be assessed. The original Dampier Archaeological Project report recognised this problem and its impact on the salvage program the teams were required to undertake (DAS 1984a:12). Management decisions were predicated on practicalities and contingent on the immediate circumstances. This effectively means that the management of cultural heritage is driven by the requirements of development.

As a result of these problems, sound information about the archaeological heritage of the Dampier Archipelago is simply not publicly available. Very little material has been published. Most of what has been published is limited to broad-brush description, and tends to focus on the rock art. Nevertheless, development decisions continue to be made in the face of totally inadequate understanding of the most basic facts about the nature and distribution of the archaeological remains.

There is a general consensus that the Dampier Archipelago is a place of outstanding heritage significance because of the extraordinary diversity and density of its archaeological remains and particularly because of the richness of its rock art. The place is significant to contemporary Aboriginal groups in the Pilbara region, particularly the recognised Native Title claimants, for its cultural and spiritual associations. It is clear that the Dampier Archipelago has been occupied for a long time period. Evidence of occupation can be unequivocally demonstrated archaeologically over the last 9000 years. There are strong grounds for inferring that evidence for occupation goes back much further than this to the earliest colonisation of Australia's arid core some 30,000 years ago.

Specific localities on the Burrup have been declared Protected Places under the Aboriginal Heritage Act (1972-1980) (Government Gazette 1984:3503, 3507) (see Figure 36). Burrup Peninsula-North (AHA/43) covers about 1200 hectares and includes extensive art, occupation and quarry sites at the northern end of the Burrup. The 'Climbing Men' complex is also a protected area (AHA/56). Both localities have also been listed on the Register of the National Estate (NER/10096 and NER 10097). An extensive area of the southwest portion of the original Dampier Island, comprising about 1500 hectares, is also listed on the Register of the National Estate (NER 10087). This includes the important rock art and occupation complexes of Skew Valley and Gum Tree Valley. The CALM survey (Veth et al. 1993:20 and Figure 1.2) also noted that both Watering Cove and the Pistol Range had been nominated for the Register of the National Estate, but references are not given in the report.

The area that has become known as the 'Pistol Range' has been recognised as highly significant since the early 1980s. The 'Pistol Range catchment' received only a limited amount of survey during the Dampier Archaeological Project because Woodside's proposed industrial development in the catchment was sited in well-defined and restricted areas. Moreover, it was possible for the field team to recommend modification of the areas to be disturbed during construction to preserve material *in situ* (DAS 1984a:44). The final report identifies the Pistol Range Catchment as one of 'the most significant areas of the Burrup Peninsula' (DAS 1984a:48). The significance of the Pistol Range was strongly reiterated by Vinnicombe in the report of the King Bay-Hearson Cove survey for DRD (Vinnicombe 1997b:31-39). The report also identified the King Bay South area as a highly significant concentration of sites (ibid: 60-61). Heritage surveys in the area proposed for a methanol plant, in one of Woodside's former lay-down areas, also highlighted the importance of this part of the Burrup from an Aboriginal perspective as well as an archaeological one (Robinson 1996; Robinson et al. 1996).

The CALM survey (Veth et al. 1993) was undertaken in the proposed conservation area to the north of King Bay and Hearsons Cove and east of the industrial area with assistance from the National Estate Grants Program The aim was to identify areas of outstanding archaeological and cultural value, to provide management guidelines for the protection of the cultural heritage values and to nominate significant sites, groups of sites or areas to the Register of the National Estate. The report identified a number of significant sites and site complexes and recommended the following nominations to the Register of the National Estate:

- The Burrup Peninsula-north area—already listed and already a protected area—should be extended southwards to include the large site complexes at Conzinc Bay.
- The Watering Cove nomination be altered and extended along the coast to include Cowrie Cove.
- Two site complexes in the Withnell Bay south area (I2 and I5) should be nominated.

These recommendations do not seem to have proceeded.

The heritage values of the Dampier Archipelago are comparable to other Australian places identified as of World Heritage Significance, such as Kakadu, the Willandra Lakes and the Tasmanian Wilderness in terms of richness, complexity and diversity of the archaeological record, and the likely antiquity of occupation. The range and diversity of rock art represents a level of artistic achievement comparable to Kakadu, and, like Kakadu, the area has strong cultural and spiritual significance for Aboriginal people.

The heritage values of the Dampier Archipelago are also comparable to the Aboriginal places already placed on the National Heritage List. The Budj Bim National Heritage landscape, comprising the Tyrendarra lava flow and the associated remains of Aboriginal channels, weirs, ponds and traps for harvesting eels and other fish, was the first place inscribed on the Australian National Heritage list. This is one of the few parallels in Australia for modification of the landscape that may be represented by the enigmatic stone structures in the Dampier Archipelago.

Table 14 summarises the heritage values of the Dampier Archipelago according to the criteria for entry on the National Heritage List. There is no doubt that the Dampier Archipelago would also meet the criteria for World Heritage listing as a cultural landscape (cf. Jo McDonald Cultural Heritage Management 2005: Appendix 8).

Archaeological research potential

Some thirty years ago, Dix's work was already making it clear that the beginnings of Burrup art were truly ancient. It belonged to a time when mobile groups were establishing and / or maintaining ritual and mythic traditions and linkages between uplands dotting the arid heart of the continent, rather than the later coastal and island context created by rising post-glacial seas. That is, by no means the most heavily weathered components of Dampier art were at least as old as the Last Glacial Maximum, when it was essential to maintain long-distance linkages as an insurance against aridity; and were likely to have been established yet earlier, when the ratio of precipitation to evaporation was more favourable, and colonising movement easier (Smith 1992; McDonald 2005).

The incredible diversity of Dampier Archipelago rock art compared to the mainland Pilbara, suggests that the area may well have been used by different groups as well as over a long time span. It has been suggested that the unique and resource-rich environment of the Dampier Archipelago—and, earlier, the 'Dampier Range'—would have been attractive to Aboriginal people throughout the occupation of the Australian continent, and that the area may have been an aggregation locale where groups from different areas may well have congregated, perhaps on a seasonal basis.

A number of archaeological research questions have been identified as a result of previous surveys (cf. Jo McDonald Cultural Heritage Management 2005:153-154; Vinnicombe 1987a:53-54). These questions not only address specifically local and regional questions about the nature and distribution of archaeological sites in time and space, and their interpretation in terms of changing and dynamic interactions between people and landscape, but also have the potential to contribute to broader questions about Australian history, such as processes of colonisation, responses to climatic change and the role of symbolic systems in Aboriginal societies. The extent to which the landscape has been transformed through human action, through both stone arrangements and the marking of rocks (petroglyphs), is an issue which is of great research interest. There are few parallels in Australia for the scale of landscape modification that has been suggested for the Dampier Archipelago.

The place has outstanding heritage value to the nation because of its:	
Importance in the course, or pattern, of Australia's natural or cultural history	Demonstrates long-term Aboriginal occupation of an arid landscape over as much as 30,000 years and adaptation to environmental transformation into an emerging coastal landscape over the last 9000 years
Possession of uncommon, rare or endangered aspects of Australia's natural or cultural history	High density and variety of petroglyphs, the density and complexity of the archaeological record, the density of stone arrangements are all uncommon at the national level. Rare motifs such as depictions of extinct species and 'archaic faces'. The presence of industry on the Burrup and future industrial expansion present both direct and indirect threats to the heritage values of the place.
Potential to yield information that will contribute to an understanding of Australia's natural or cultural history	Research into the archaeology of the Dampier Archipelago has the potential to contribute to a range of scientific research questions; including the nature of early human adaptations to arid environments, how human populations have responded to climatic change and rising sea levels, the sociocultural relationship between inhabitants of the Dampier Archipelago and the broader Pilbara region, establishing a chronological framework for the production of rock art, investigating the changing context of rock art and how it relates to the broader region, the extent to which the environment has been transformed over time through both marking and rearrangement of the rocky landscape
Importance in demonstrating the principal characteristics of: (ii) a class of Australia's natural or cultural environments	The Dampier Archipelago is effectively a continuous cultural landscape, with an extraordinary density and diversity of cultural components over a long time span.
Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group	The extraordinary aesthetic values of the rock art are recognised nationally and internationally, both by specialists and the general community. Aboriginal custodians see much of the art as a production or embodiment of Ancestral Creative Beings and attribute ceremonial or mythological meanings to particular motifs.
Importance in demonstrating a high degree of creative or technical achievement at a particular period	The rock art shows an extraordinary diversity of style, subject matter and technique which spans a time period of about 30,000 years and demonstrates both continuity and change through time.
Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons	The strong cultural and spiritual associations of Aboriginal people in the Western Pilbara, particularly the three Native Title claimant groups, with the Dampier Archipelago have been documented and widely recognised.
Importance as part of Indigenous tradition	Long-term continuities in artistic expression testify to the time-depth of Indigenous traditional connections to the Dampier Archipelago. Standing stones and mythological sites testify to Aboriginal traditional associations.

Table 14. A summary of the national heritage values of the Dampier Archipelago. Criteria from <http://www.deh.gov.au/heritage/national/criteria.html>

Chapter 7. Summary and conclusions

There is a general consensus that the Dampier Archipelago is a place of outstanding heritage significance because of the extraordinary range and density of its archaeological remains and particularly because of the richness of its rock art. The place is significant to contemporary Aboriginal groups in the Pilbara region, particularly the recognised Native Title claimants, for its cultural and spiritual associations. It is clear that the Dampier Archipelago has been occupied for a long time period. Evidence of occupation can be unequivocally demonstrated archaeologically over the last 9000 years. There are strong grounds for inferring that evidence for occupation goes back much further than this to the earliest colonisation of arid and semi-arid central Australia at least 30,000 years ago.

The results of the Dampier Archaeological Project in the early 1980s made it clear that:

- the whole Dampier Archipelago was extraordinarily rich in archaeological heritage,
- documentation of the resource, and development of a comprehensive management plan and a framework within which significance could be assessed was a matter of urgency,
- allowing further industrial development in the absence of such a plan would result in irrevocable damage to the heritage values of the area, and
- the extraordinary density of cultural material in the Dampier Archipelago showed that the basic units of management should be site complexes or entire landscapes.

The CALM representative survey in 1993 did not modify these results and further reinforced the conclusion that what was required was the assessment and management of site complexes.

Professional archaeologists and other scientists involved in the conservation of cultural heritage increasingly recognise the importance of managing sites in the context of their relationships with other sites and their landscape. A basic prerequisite for effective and meaningful cultural heritage management is a thorough understanding of the values of the place, based on sound information. In Australia, the standards for this are set by the *Burra Charter*. In the case of the Dampier Archipelago, this knowledge base still does not exist, despite more than twenty-five years of site recording.

The management of Aboriginal heritage in the Dampier Archipelago is locked into crisis mode, responding to individual applications to destroy sites under the *Aboriginal Heritage Act* (1972-1980). There is no way to make meaningful assessments of significance and, consequently sensible decisions about cultural features affected by development proposals, because no one really knows what is there. It is impossible to answer the most basic questions—about the distribution of different types of features, whether particular cultural features are common or rare, how cultural features are related to one another and to their environmental context, and what the differences and similarities are between different parts of the Archipelago, between different islands and even between different valley systems. It is not possible to identify which motifs are old and which are relatively recent, except at the most general level, nor how long the time span was during which they were produced. The little that is known is recorded in the Site Register held by DIA. This database in its present form is an unsatisfactory tool for planning.

Conclusions

Significance

- The rock art of the Dampier Archipelago is extraordinary in its diversity and density and is probably the largest concentration of petroglyphs in the world. The range of different states of weathering indicates that the petroglyphs were produced over a long time period and the degree of weathering of certain stylistic elements suggests a likely antiquity of tens of thousands of years for at least some of the motifs. This is comparable in age to the Palaeolithic art of Western Europe.

- The petroglyphs are intimately associated with a rich and complex archaeological record with a range of elements including evidence of occupation, bedrock grinding patches, quarries and stone arrangements.
- The Dampier Archipelago has outstanding potential for archaeological research. The archaeological material provides evidence of complex adaptations to a distinctive and unique coastal environment on the margins of the present arid zone over the last 9000 years. The long time span of occupation has the potential to document human adaptations when the 'Dampier Ranges' was part of the Ice Age mainland and then trace adaptation to rising sea levels and long-term climatic changes, in the context of understanding the colonisation of the Australian continent. The complex associations between different cultural elements have the potential to yield insights into the relationships between sacred and secular aspects of life over a long time span.
- The study of the stone structures of the Dampier Archipelago is urgently required to distinguish natural from cultural features and to understand the functions of those structures that are artificial. The transformation of the landscape represented by petroglyphs and by stone arrangements and by other stone features is on a scale that is rare both in Australia and in the context of hunter-gatherer archaeology worldwide.
- The limited analytical research into the distribution in time and space of petroglyphs in particular areas and their relationship to the distribution of other classes of archaeological evidence indicates the research potential of the Dampier Archipelago.
- While this study has focused on the scientific values of the Dampier Archipelago, it is clear that the area is highly significant to Aboriginal people.

Land use planning

- Industrial development has seriously impacted the cultural heritage values of the Dampier Archipelago since the 1960s resulting in the physical destruction of hundreds of cultural features, and thousands of individual petroglyphs.
- The process of decision-making with respect to the destruction of cultural heritage is not based on a sound and comprehensive knowledge of the values and significance. Rather, it is primarily based on the requirements of developers.
- The original decisions to site infrastructure and industrial facilities in the Dampier area did not consider cultural heritage values. The results of these decisions have continued to shape all subsequent land-use planning on the Burrup even though the outstanding heritage significance of the area has been evident since the early 1970s. The most recent agreement perpetuates the arbitrary division between conservation reserve and developed land, based on the original unsound decisions. The entire Dampier Archipelago is of outstanding heritage significance and should be managed as a single unit.
- Past practices of record keeping, site recording standards and survey methodology have failed to develop a reliable and comprehensive data base on which land use planning decisions can be based. Although a large amount of data has been collected relevant to assessing heritage values in the Dampier Archipelago, very little of this has been analysed. The analysis of this substantial amount of archived data vital to provide an informed basis for assessing significance and making management decisions.
- The density of cultural features in the Dampier Archipelago and the high level of integrity of cultural landscapes over the whole area mean that the appropriate scale of management and planning should be associations of cultural features or cultural landscapes rather than individual registered sites. The present system of approval to disturb individual registered sites under Section 18 of the *Aboriginal Heritage Act* (1972-1980) is disastrous for heritage conservation.
- The development of a comprehensive heritage management plan for the whole of the Dampier Archipelago is a serious omission in the history of land management and is, of necessity, a matter of urgency.

- Over the long term, industrial development is incompatible with the cultural heritage values of the Dampier Archipelago.

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Appendix 1. Distributions of different site types and development areas

Figure 1. Petroglyphs

Data from the DIA Register of Aboriginal Sites provided 18/04/2006

Location of sites are indicative only and may not necessarily represent the centre of sites, especially for sites with an access code “closed” or “vulnerable”.

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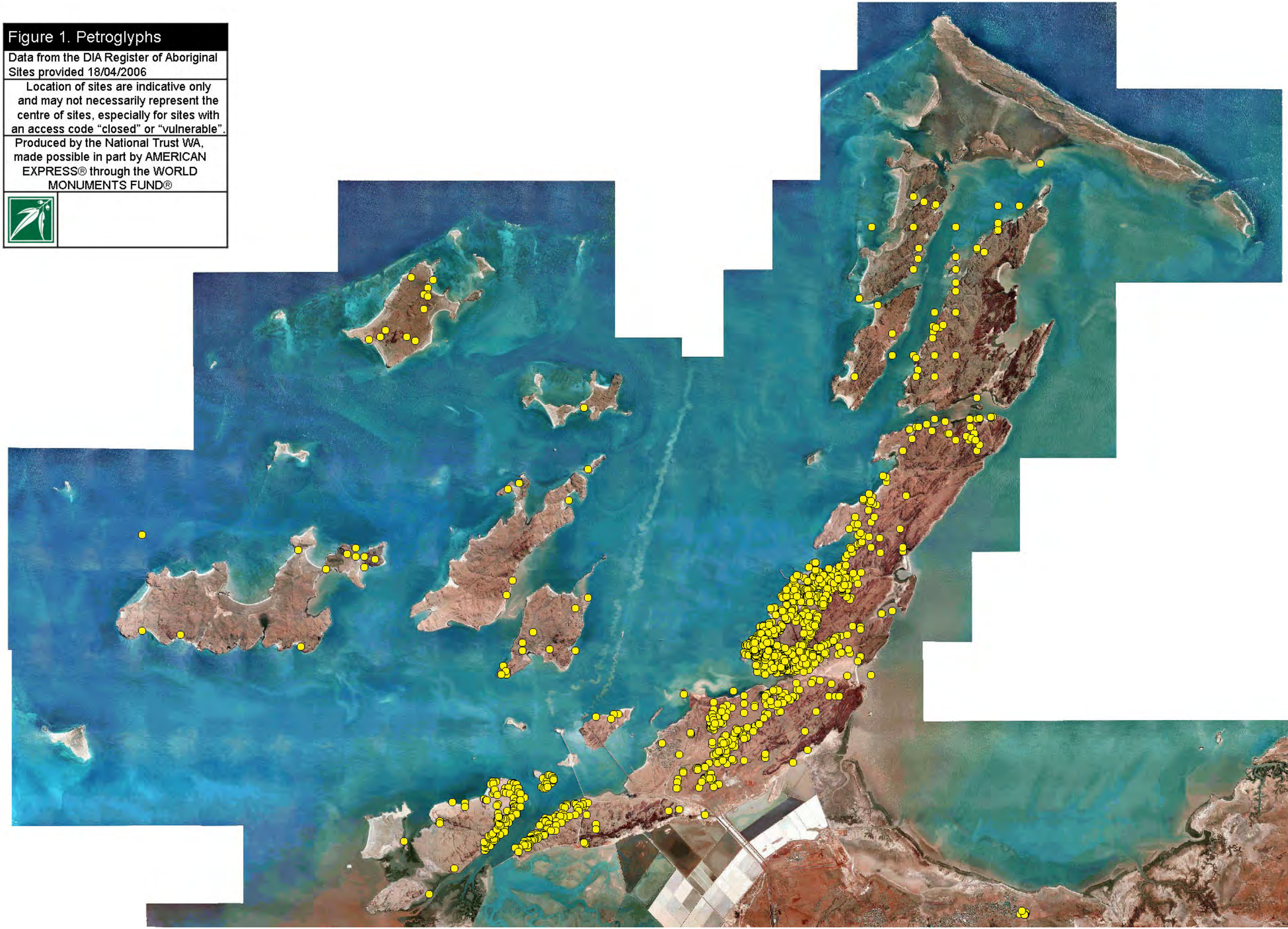

Figure 2. Artefact Scatters

Data from the DIA Register of Aboriginal Sites provided 18/04/2006

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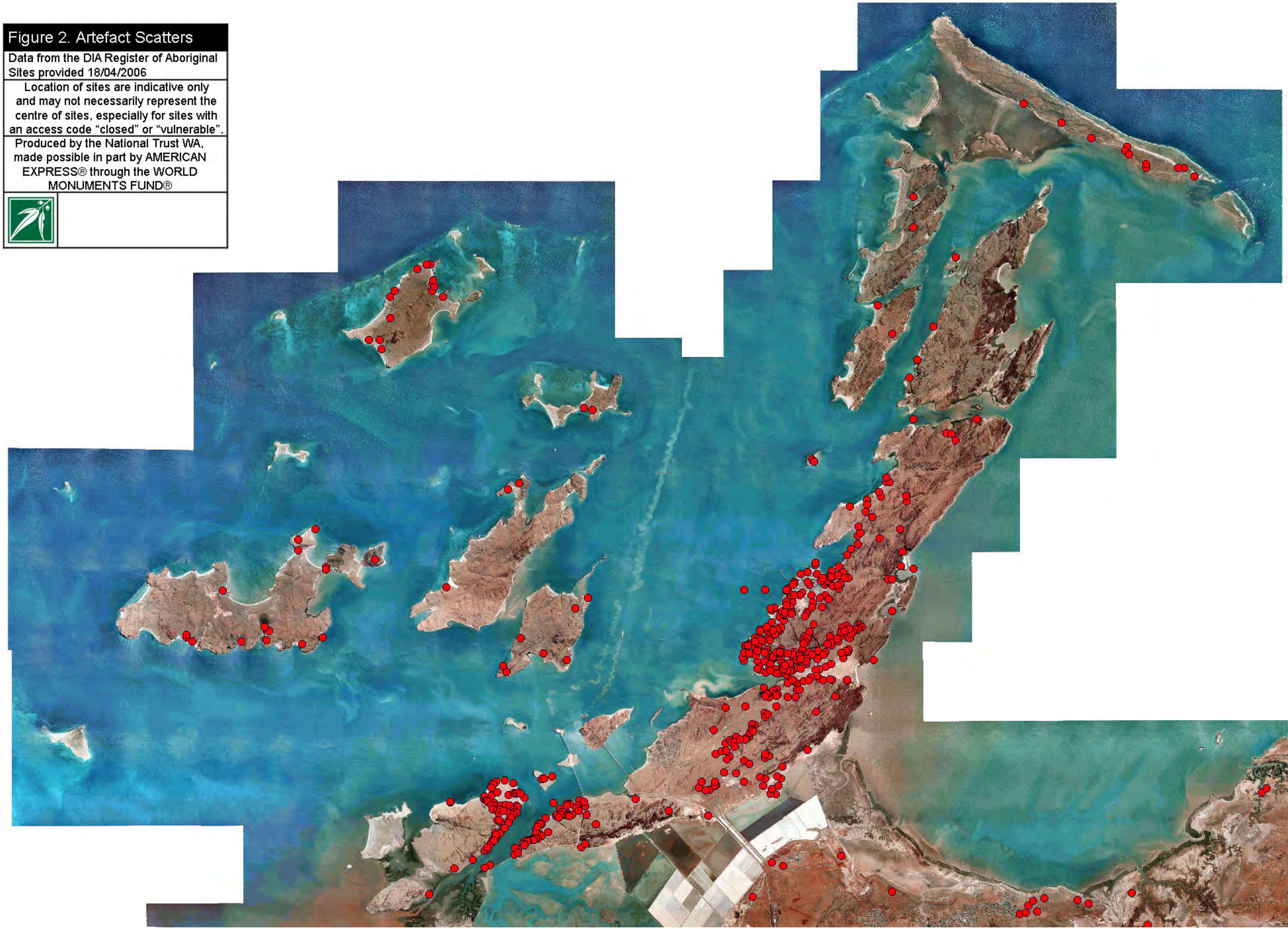

Figure 3. Grinding Patches

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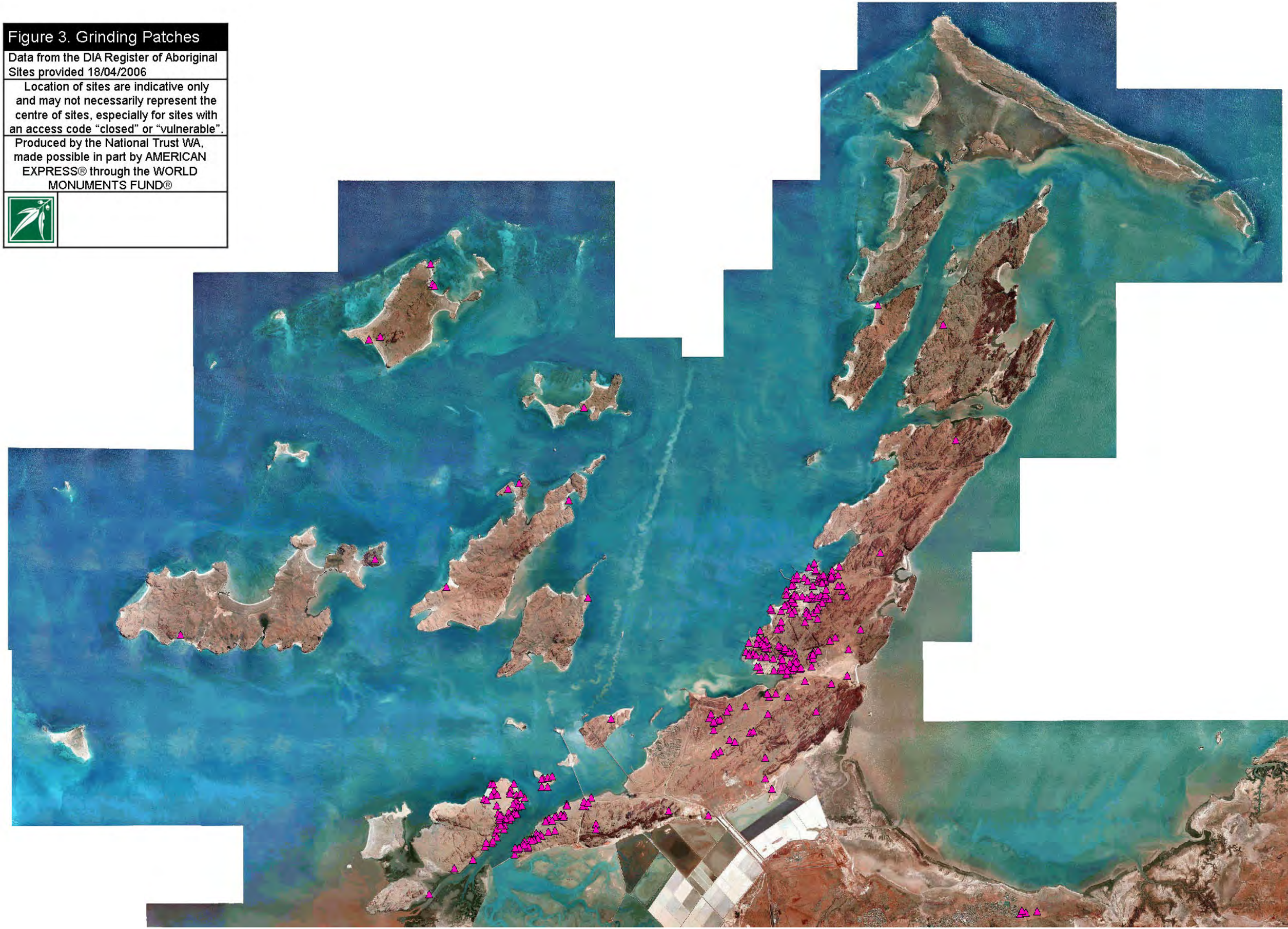

Figure 4. Stone Features

Data from the DIA Register of Aboriginal Sites provided 18/04/2006

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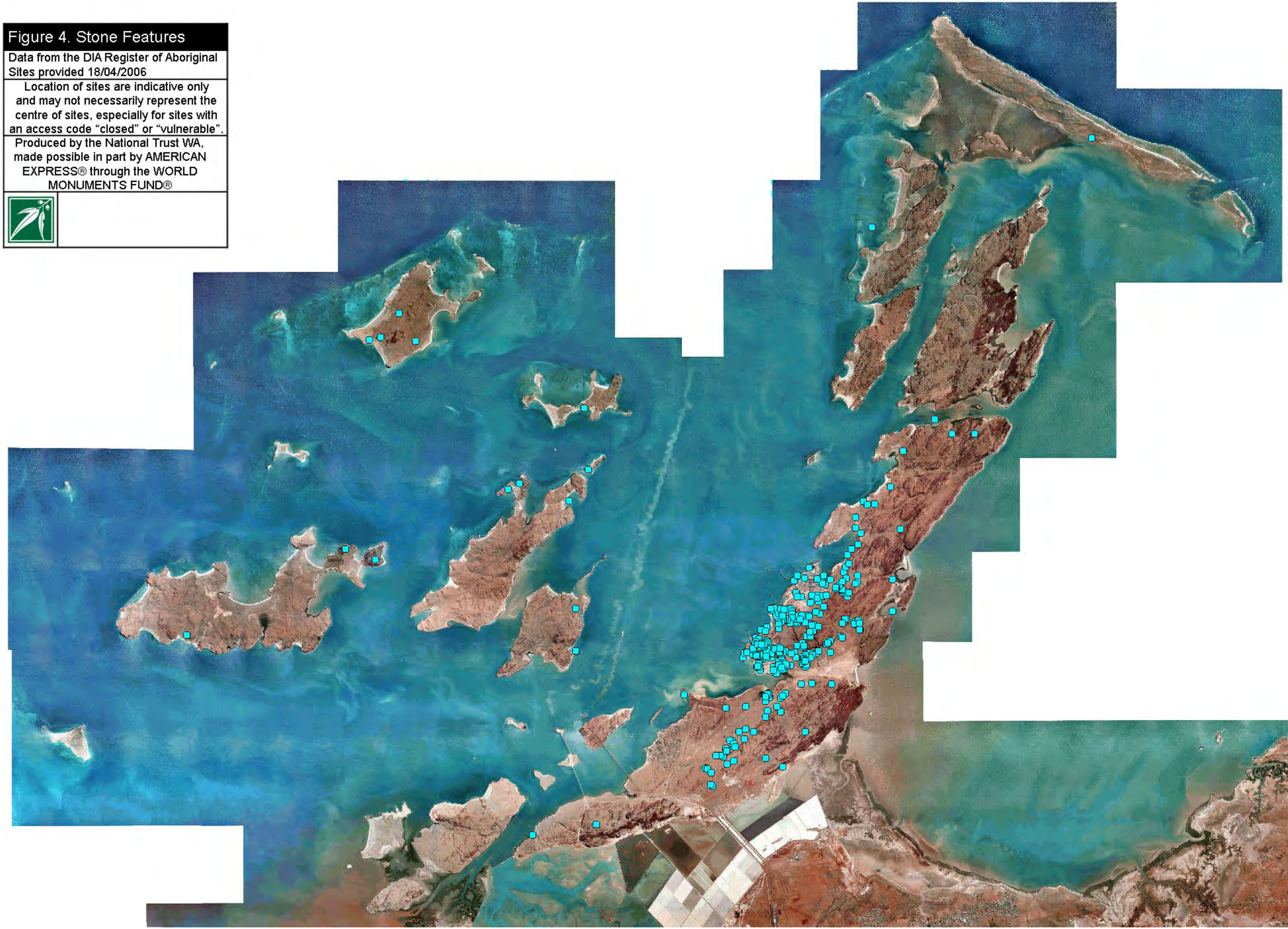

Figure 5. Middens

Data from the DIA Register of Aboriginal Sites provided 18/04/2006

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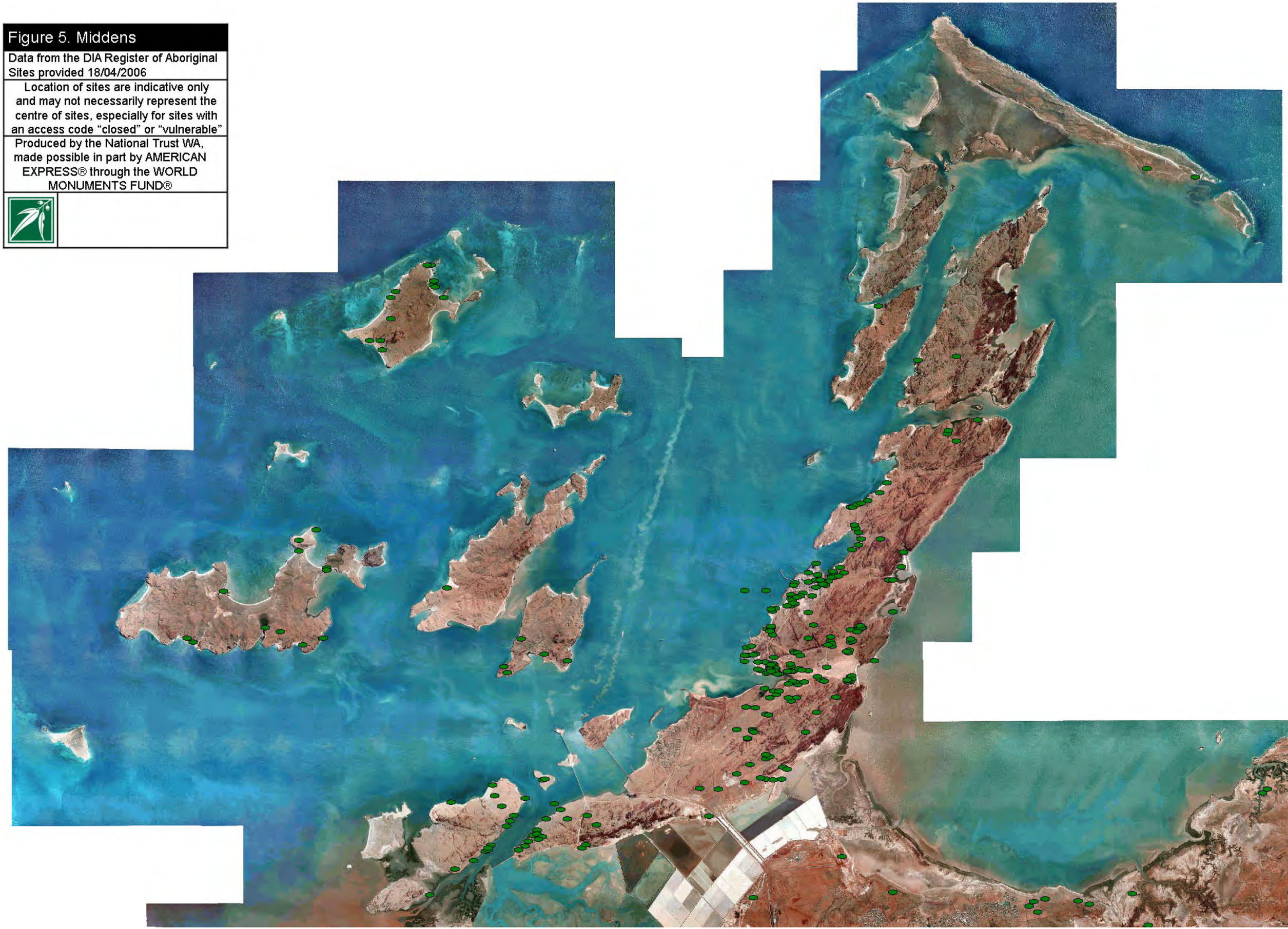

Figure 6. Quarries

Data from the DIA Register of Aboriginal Sites provided 18/04/2006

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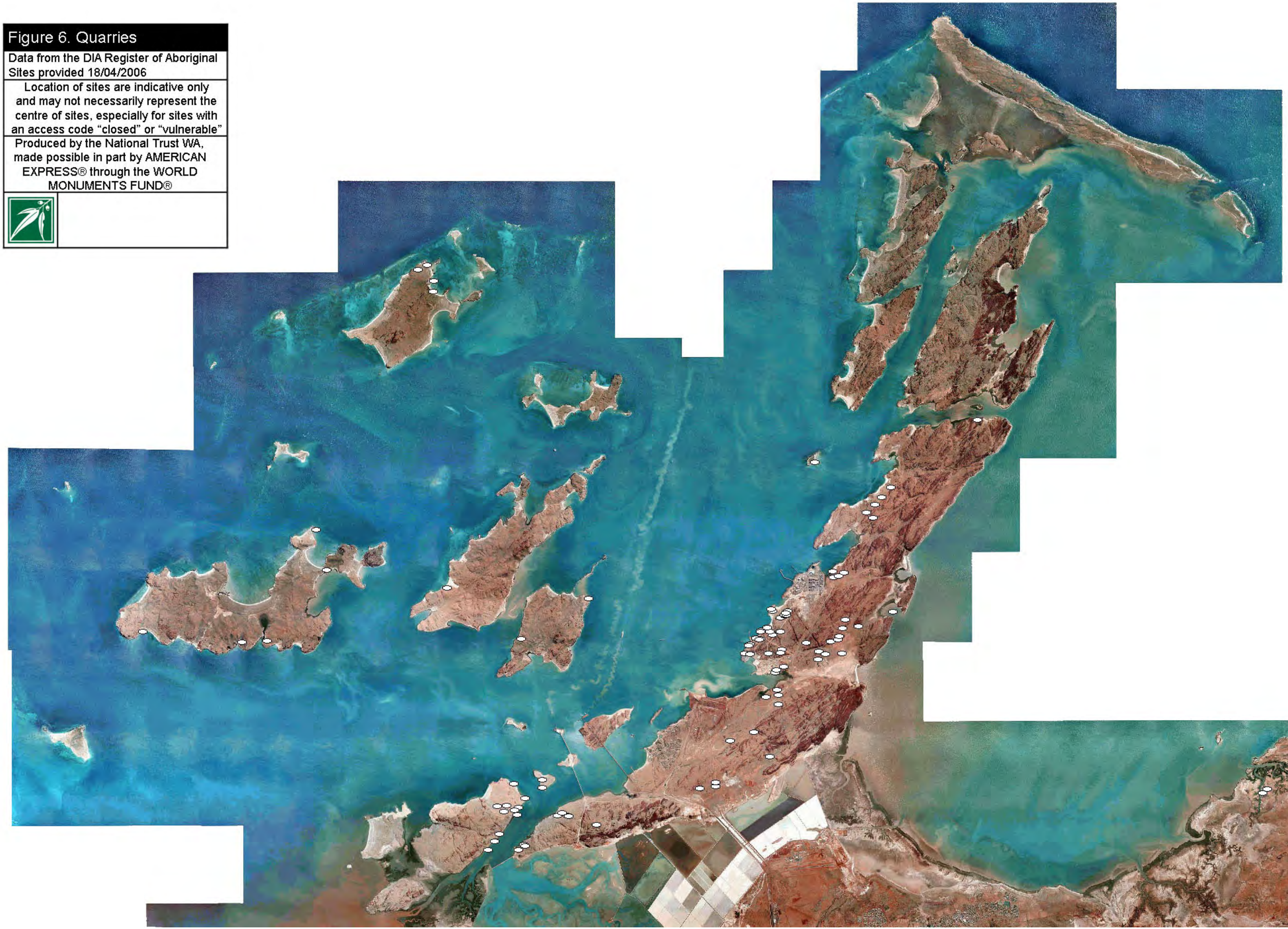

Figure 7. Other Site Types

Data from the DIA Register of Aboriginal Sites provided 18/04/2006

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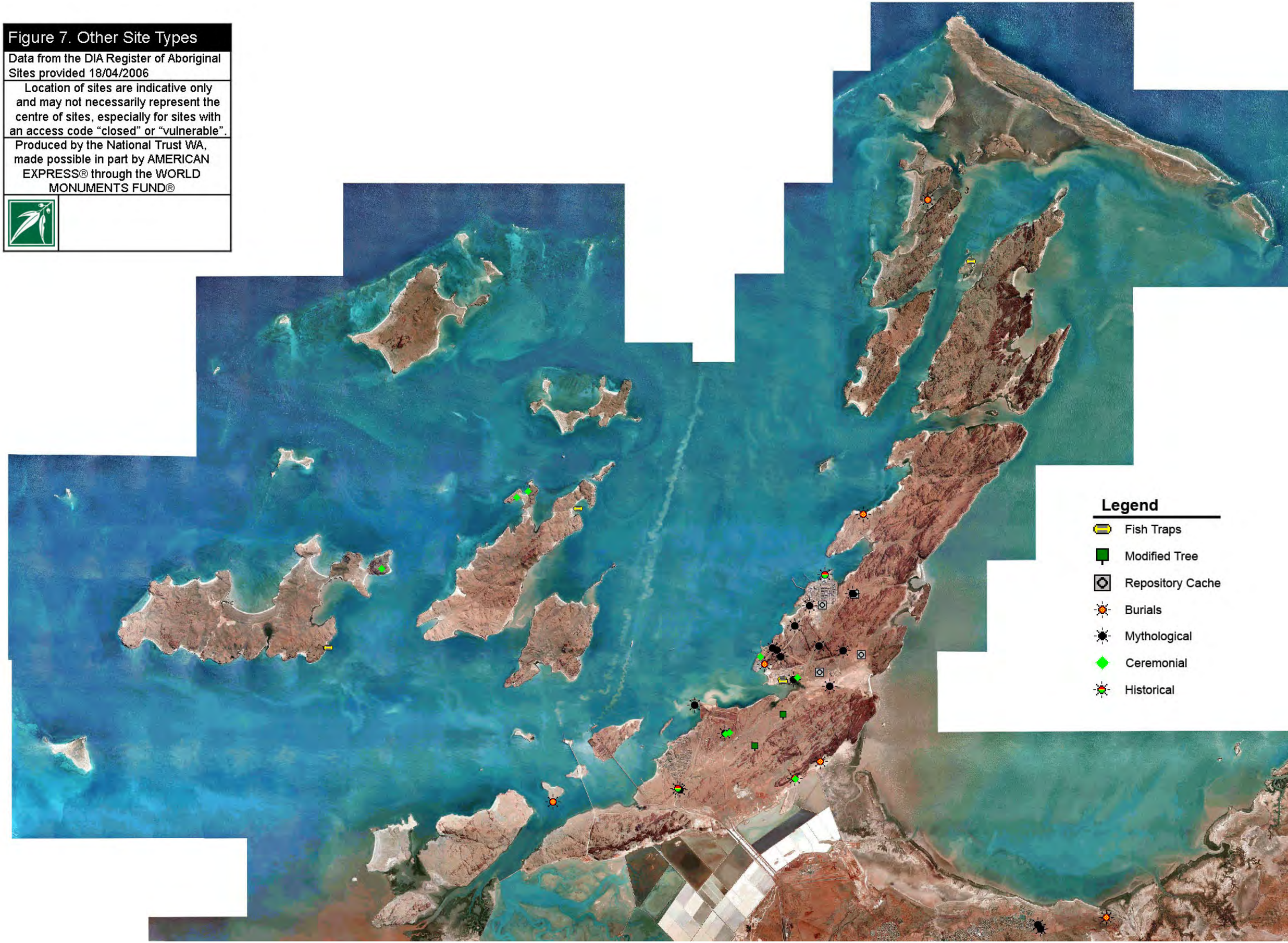

Figure 8. Disturbed areas

Data from the the Shire of Roebourne Town Plans

Areas are indicative only and may not necessarily represent the entire area disturbed

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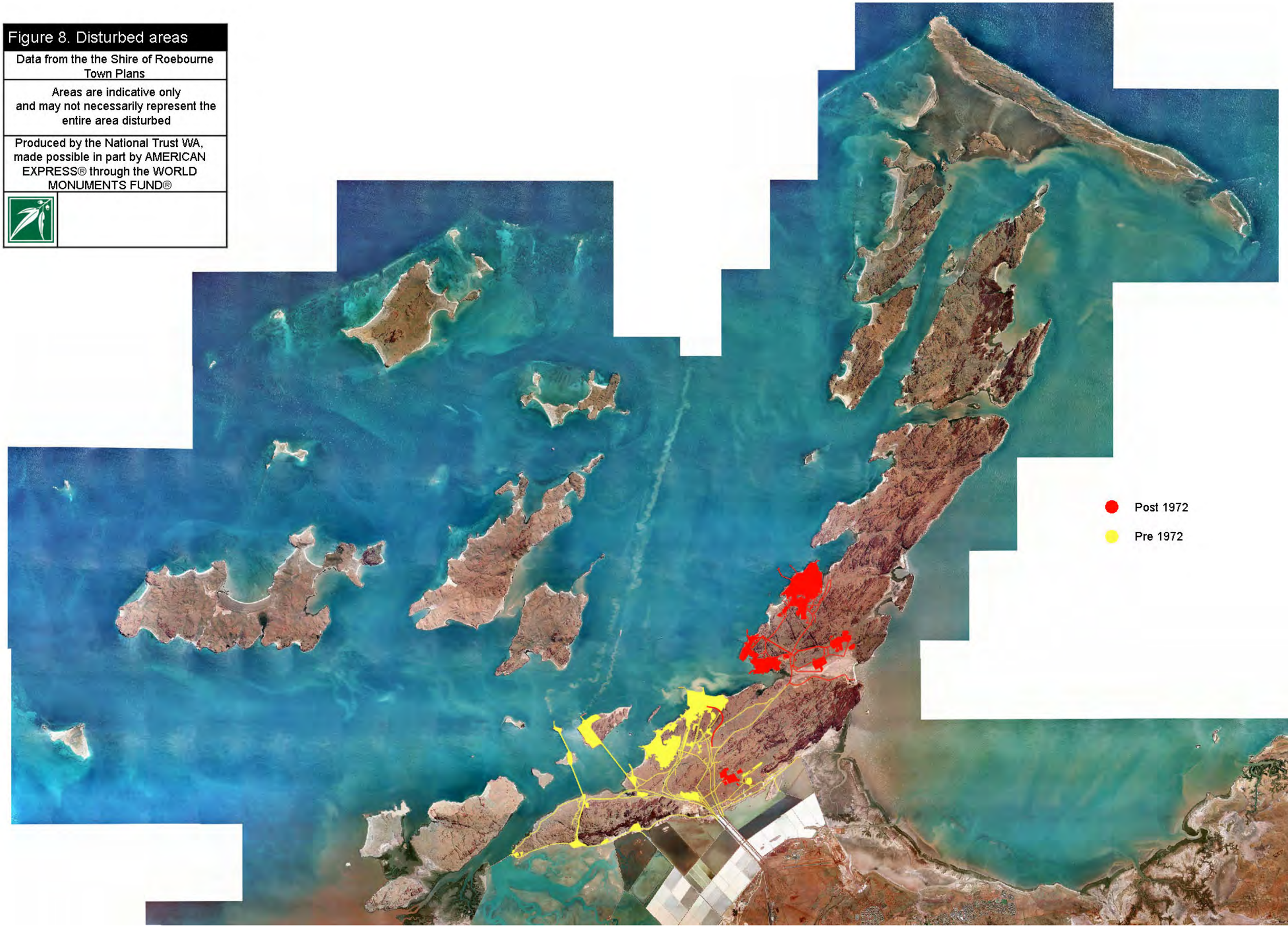


Appendix 2. List of radiocarbon dates from the Dampier Archipelago

					Calibrated date range			
Site	Description	Context	Lab no.	Date (BP)	68% probability		95% probability	
P1846	Open	P1/sp 1	SUA 1858	2290±80	2360	2150	2700	2050
P2585	Open	P1 Surface	SUA 1865	2140±100	2310	1990	2350	1900
		P1/sp 2	SUA 1866	2270±100	2430	2120	2700	1950
		P1/sp 4	SUA 1867	2220±100	2350	2120	2500	1900
P2599	Open	Surface shell	SUA 1859	1020±90	1060	790	1150	730
P1885	Open	0N0E/ sp2	SUA 1869	1360±130	1410	1090	1550	950
		0N0E/ sp32	SUA 1870	3870±110	4430	4090	4600	3900
		0N0E/ sp6	SUA 1871	4190±110	4850	4570	5050	4400
		Basal costein (below lowest cultural material)	SUA 1872	5620±110	6540	6290	6670	6200
P2314	Stone Arrangement	AE 25/F53 hearth	SUA 1874*	410±110	530	310	700	150
		AE 25/F52 hearth	SUA 1873*	98.1±7 (modern)				
P1843	Rock shelter	TP 1/Sp 3 (basal date)	SUA 1868	4760±100	5600	5320	5730	5290
P2299	Hunting hide	TP1/ cult layer (beneath debris within hunting hide)	SUA 1861	4280±100	5040	4620	5300	4500
P2505	Open	TP3/Ly9 hearth	SUA 1857	720±220	910	520	1200	250
P1562	Midden	TPA/sp2	SUA 1855	1460±90	1510	1280	1550	1180
		TPA/ F2	SUA 1856	2180±90	2330	2060	2350	1950
P2772	Midden	Auger sp1	SUA 1862	1510±90	1520	1310	1610	1270
		Auger sp4	SUA 1863	1370±100	1380	1170	1520	1060
		Auger sp5	SUA 1864	6740±130	7700	7470	7950	7400
P1488	Open	Surface shell	SUA 1860	260±90	460	-11	550	-51

Table 1. Radiocarbon date list. Dampier Archaeological Project (Vinnicombe 1987a:63-64). All dates on marine shell with environmental correction according to Gillespie and Polach (1979) unless indicated otherwise (*). Calibrated using OxCal v.3.10 (Bronk Ramsey 1995, 2001).

				Calibrated date range			
Site	Context	Lab no.	Date	68% probability		95% probability	
Skew Valley	Boulder side Sp 5	ANU 1838	2770±80	2650	2370	2710	2320
	Boulder side Sp 7	ANU 1839	3410±80	3380	3180	3470	3050
	F/1/sp3	ANU 1843	3540±80	3540	3340	3630	3240
	Boulder side sp10	ANU 1837	3770±80	3820	3600	3920	3480
	F/1 sp7	ANU 1845	3910±80	4010	3760	4130	3670
	F/1 sp 3	ANU 1834	4150±80	4350	4110	4430	3970
	Shell mound inner no 6	ANU 1502A	4150±80	4350	4110	4430	3970
	Shell mound outer no 6	ANU 1502B	4290±70	4510	4300	4620	4180
	F/II sp 1	ANU 1835A	6600±100	7240	7000	7340	6860
	F/II sp 1	ANU 1835B	6280±90	6860	6630	6960	6500
	FII sp 5	ANU 1836	6960±100	7560	7380	7640	7270
	No 9 80-90cm	ANU 1503	6620±100	7250	7010	7360	6890
Gum Tree Valley	GTVW	Ly 3607	1910±110	1580	1330	1730	1250
	GTVK Hut A	Ly 3610	2730±110	2650	2320	2750	2150
	GTVK Hut B	Ly 3611	2680±150	2610	2200	2750	2000
	GTVK	Ly 3612	3670±140	3760	3410	4000	3250
Gum Tree Valley Top	GTVT	Ly 3608	1510±140	1220	920	1350	750
	GTVT	Ly 3609	18510±260	22000	21150	22250	20750

Table 2. Radiocarbon date list. Skew Valley (P0406) and Gum Tree Valley (P0416 and P7256) (Lorblanchet 1992; Lorblanchet and Jones 1979) All dates on marine shell with environmental correction according to Gillespie and Polach (1979). Calibrated using OxCal v.3.10 (Bronk Ramsey 1995, 2001).

				Calibrated date range			
Site	Depth	Lab no.	Date	68% probability		95% probability	
Wadjuru Rockpool	0.4m *Terebralia*	Wk 3460	6440±180	7150	6730	7350	6500
	0.55m *Terebralia*	Wk-3461	6530±150	7220	6870	7400	6650
	0.8m *Terebralia*	Wk-3462	6840±70	7430	7290	7500	7220
	1.2m Lowest *Terebralia*	Wk-3339	8520±80	9260	9030	9390	8970
Anadara Mound	0 Highest *Anadara*	Wk-3345	2270±50	1950	1810	2010	1730
	0.5m Lowest *Anadara*	Wk-3346	4270±60	4480	4290	4560	4200
	0.4m Highest *Terebralia*	Wk-3347	6290±50	6820	6670	6890	6620
	1.25m Lowest *Terebralia*	Wk-3348	6510±60	7120	6940	7170	6850
Anadara Shelter	0.3m Lowest *Anadara*	Wk-2647	4240±60	4420	4240	4510	4150
	0.7m Lowest *Terebralia*	Wk-2648	6380±70	6950	6760	7050	6660
Not-so-Secret Shelter	0.55m Basal *Terebralia*	Wk-2650	6080±130	6660	6360	6850	6250

Table 3. Other radiocarbon dates. (Bradshaw 1995). All dates on marine shell; no environmental correction. Calibrated using OxCal v.3.10 with standard regional correction for marine reservoir effect (Bronk Ramsey 1995, 2001).

List of Figures

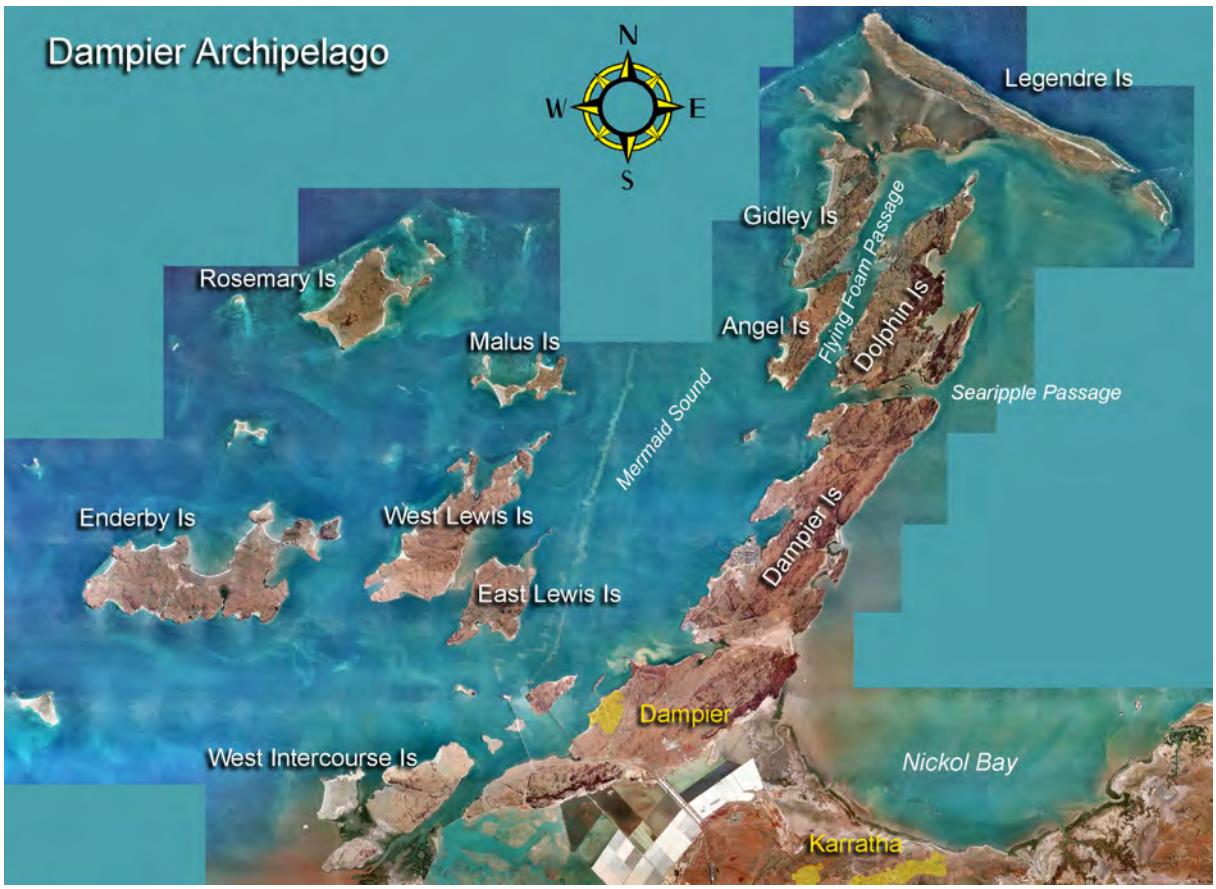


Figure 1. The Dampier Archipelago

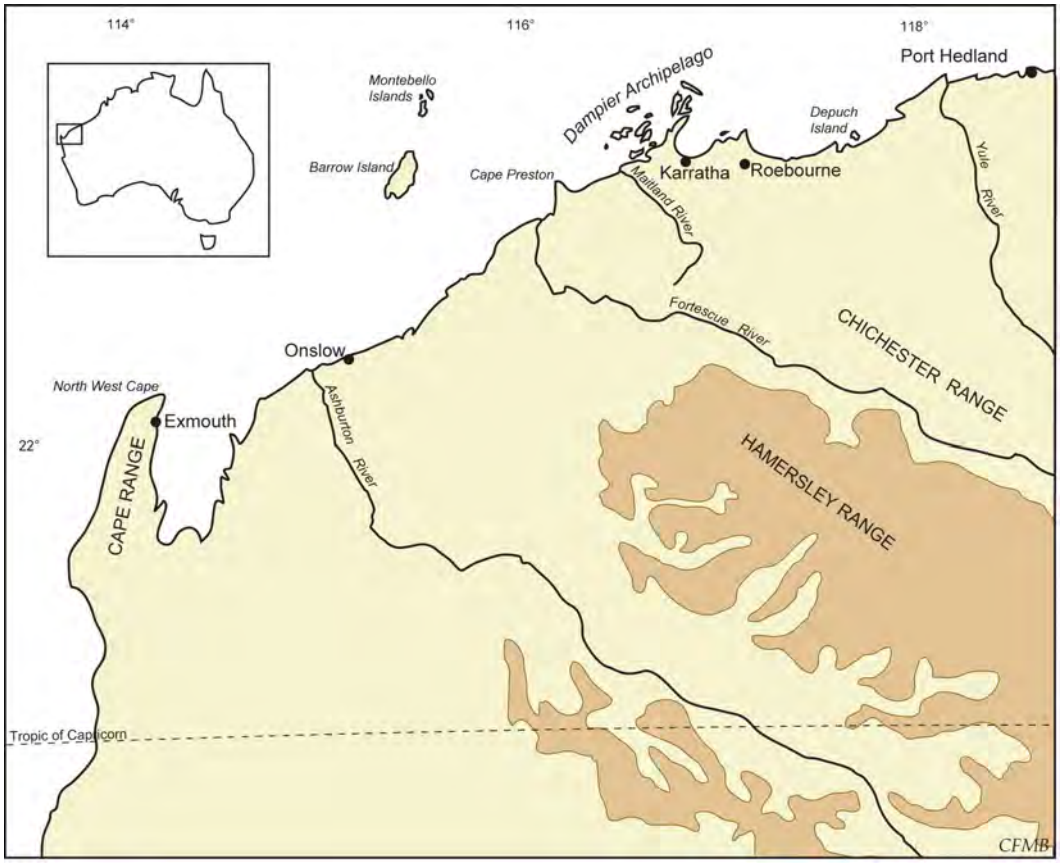


Figure 2.The north-west of Western Australia, showing places mentioned in the text

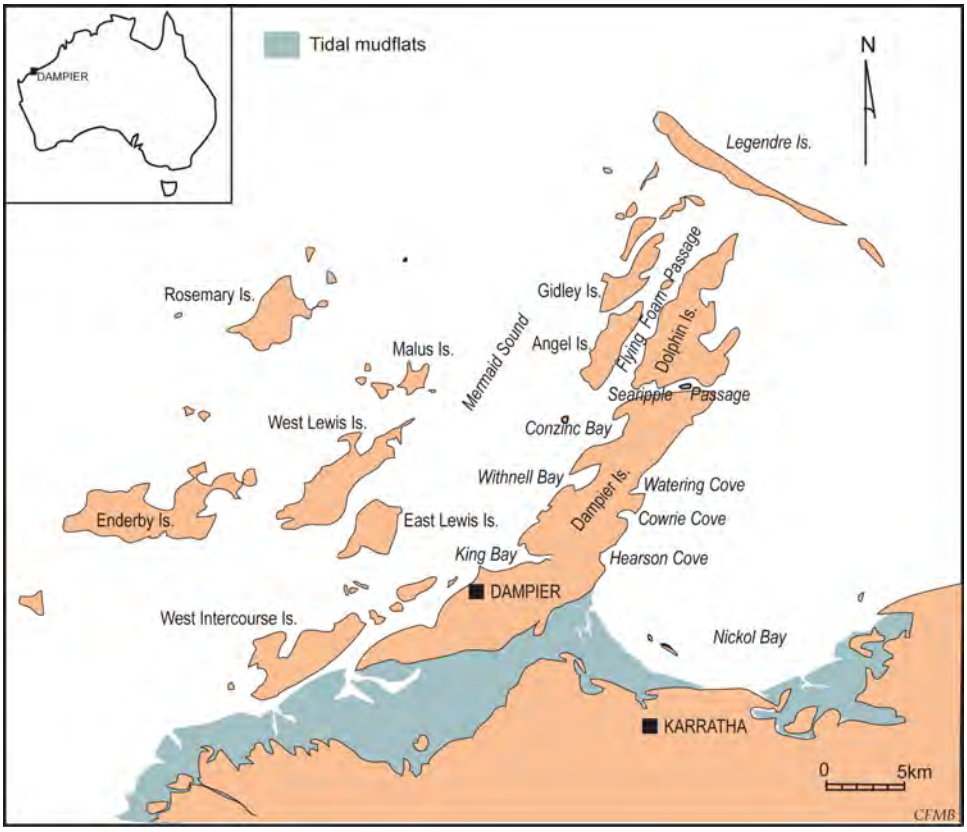


Figure 4. The Dampier Archipelago

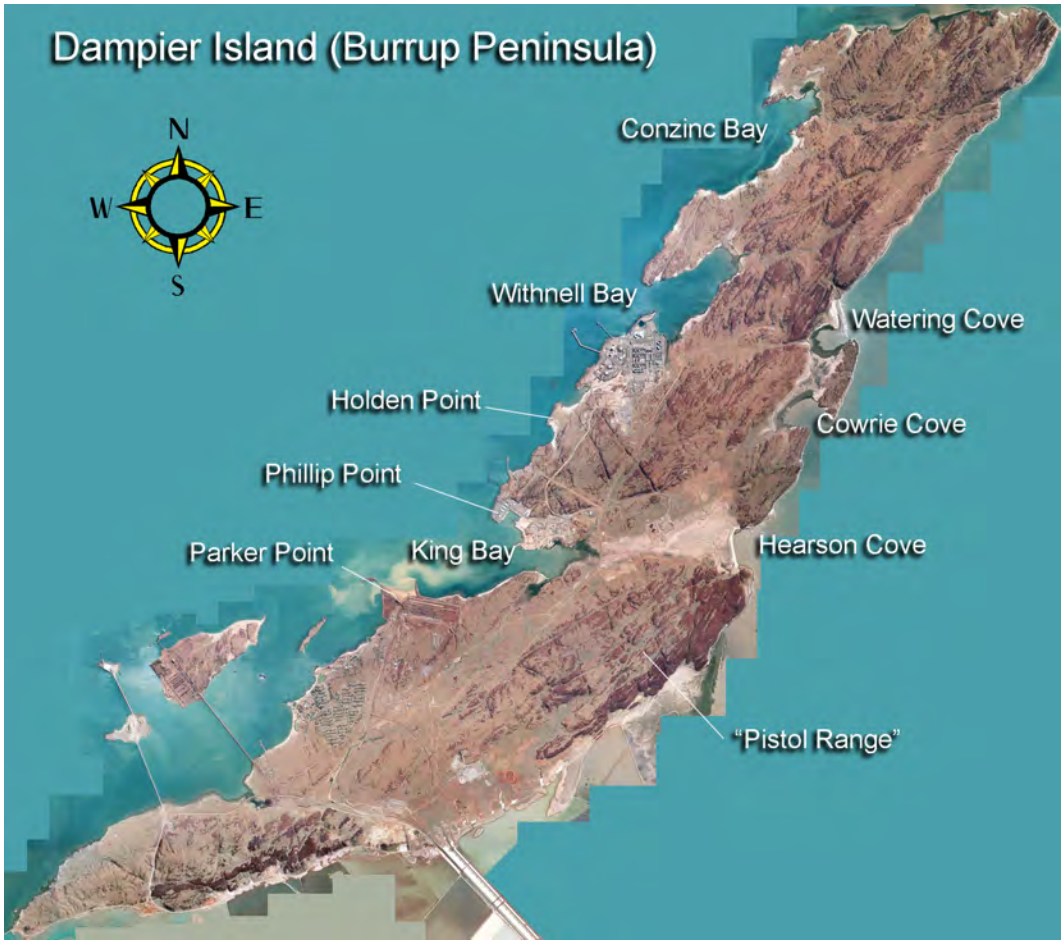


Figure 3. The Burrup

Figure 6. Dampier landscape (Photo: RC)

Figure 5. Massive boulder slopes (Photo: SJH)

Figure 8. Vertical rock faces (Photo: SJH)

Figure 7. Seasonal rock pool (Photo: RC)

Figure 10. Petroglyphs on massive boulders at Skew Valley (Photo: SJH)

Figure 9. Petroglyphs are common on boulder piles and slopes (Photo: RC)

Figure 12. Surface artefact scatter (Photo: JWR)

Figure 11. Shell midden (Photo: JWR)

Figure 13. Large mound midden on West Intercourse Island (Photo: RC)

Figure 14. Standing stone (Photo: RC)

Figure 16. Quarry, showing flaked block of fine-grained granophyre and waste flakes (Photo: RC)

Figure 15. Rock shelter (Photo: RC)

Figure 17. Striped animal, thought to be a thylacine (Tasmanian tiger) (Photo: JWR)

Figure 18. Recent unpatinated arc motif superimposed over deeply patinated ‘archaic face’

Figure 19. Recent anthropomorphic (human) figure superimposed over patinated fish (Photo: JWR)

Figure 21. Deeply pecked track superimposed over complex geometric design (Photo: SJH)

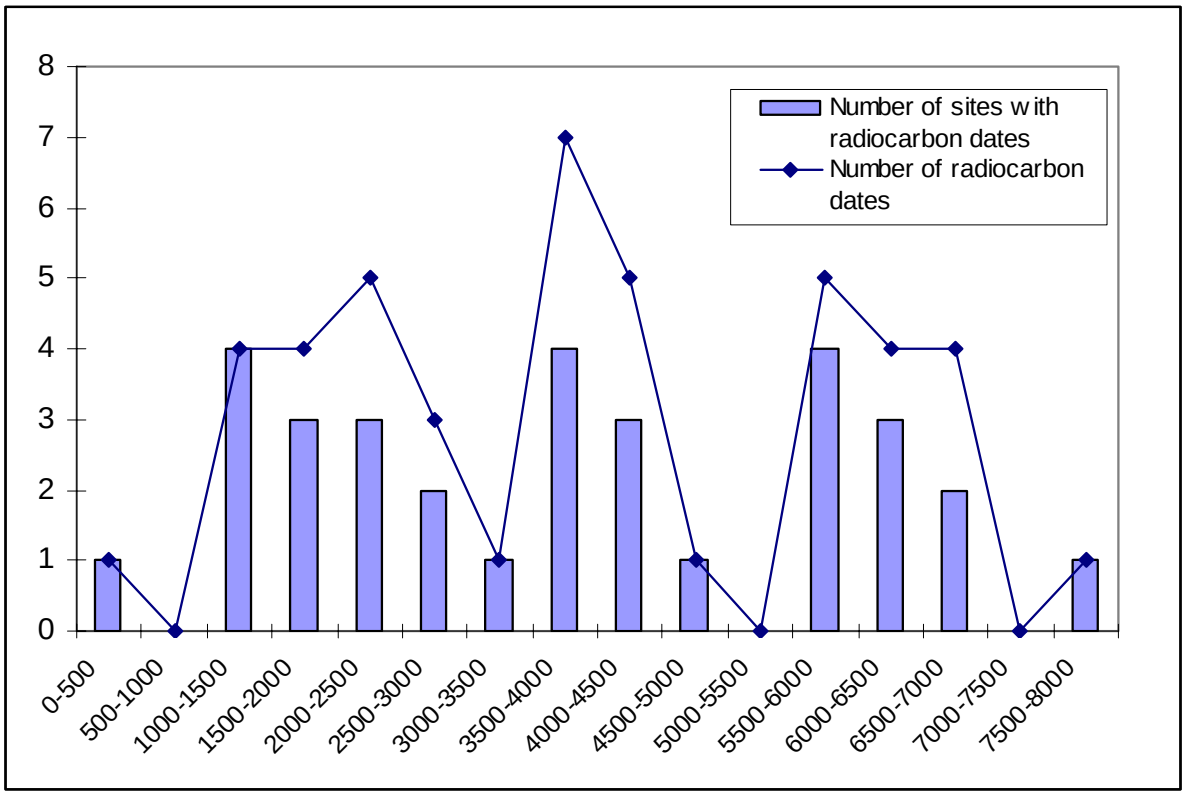
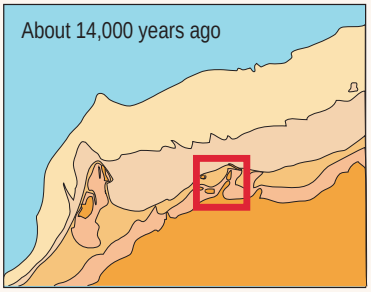
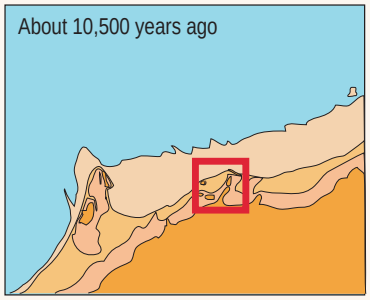


Figure 20. Radiocarbon determinations from shell midden sites in the Dampier Archipelago (all dates uncalibrated)

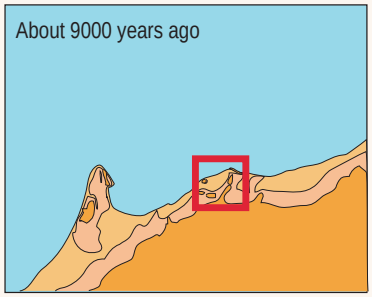
Changing adaptations
Before 7500 years ago



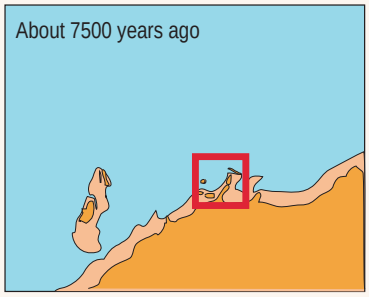
During the last Ice Age, sea levels are up to 130m lower than today. Climate is generally cooler than today and, at the height of the Ice Age, about 20,000 years ago, is very dry as well.
The 'Dampier Ranges' are a series of rocky hills and ridges rising dramatically out of a featureless plain more than 100km from the sea. They would have been an important resource area for small highly mobile groups using both other inland desert ranges and the ancient coastline.The oldest most weathered petroglyphs probably date to before 20,000 years ago.



Sea levels begin to rise quickly from about 14,000 years ago. This is a particularly dry period, but by about 10,500 years ago conditions are beginning to improve. The 'Dampier Ranges' continue to be used by small highly mobile groups with links to both the interior and the coast, which is now within 30km.
Petroglyphs which show a wide range of land animals and birds, including extinct species, probably date to this time and reflect land based hunting activities.



About 9000 years ago the rising sea comes close to the 'Dampier Ranges' and the first firmly dated evidence of humanoccupation can be identified. Marine resources begin to appear in the economy of the inhabitants. Mangroves are an important source of food.
Older petroglyphs which show marine subjects probably date to this time and reflect the growing importance of these resources.



As sea levels continue to rise, large embayments begin to form and the outer islands are cut off from the mainland. Nearby Barrow Island and the Montebello Islands are also cut off and no longer visited. Mangroves are more widespread than today and provide important resources.
Several shell middens have evidence that they were occupied at this time.

Figure 22. Changing adaptations in the 'Dampier Ranges'

Figure 23. Examples of ‘archaic faces’ (Photos: JWR, RC, SJH)

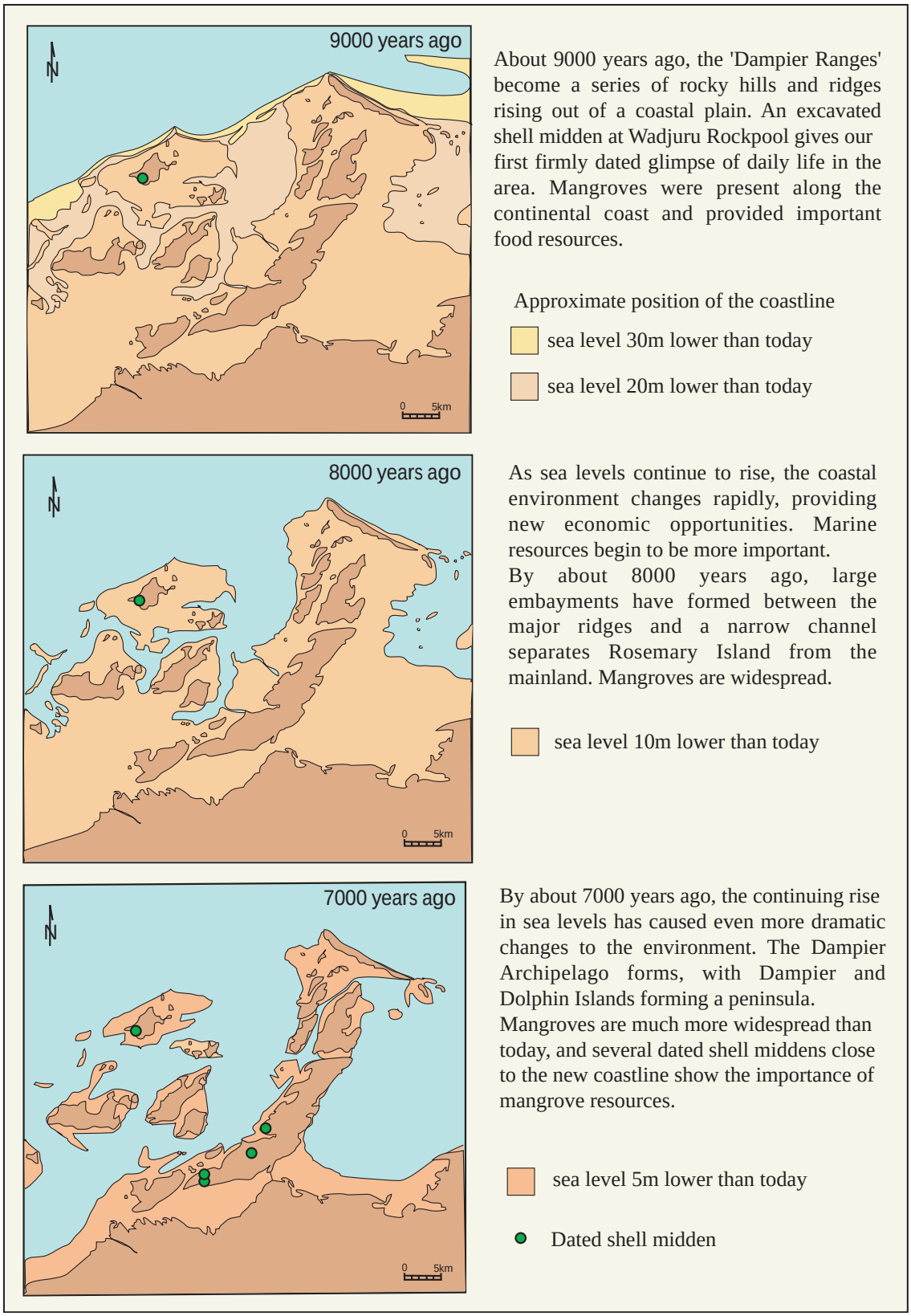
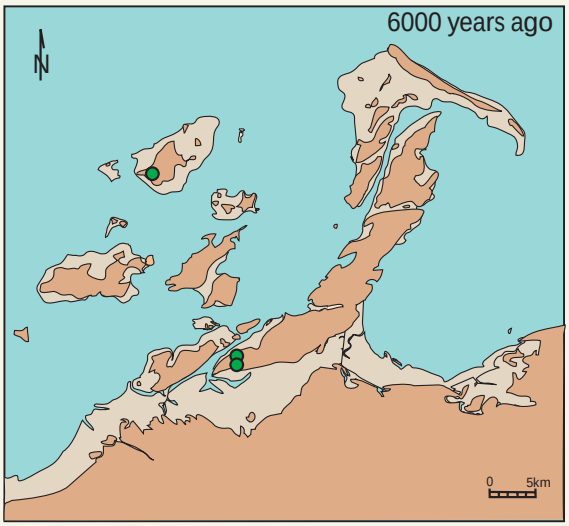
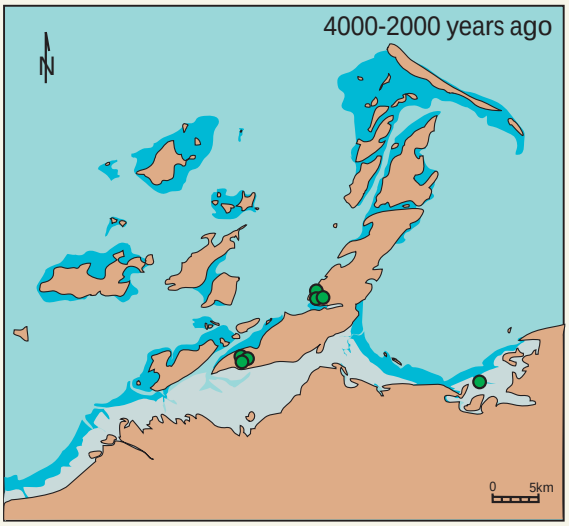


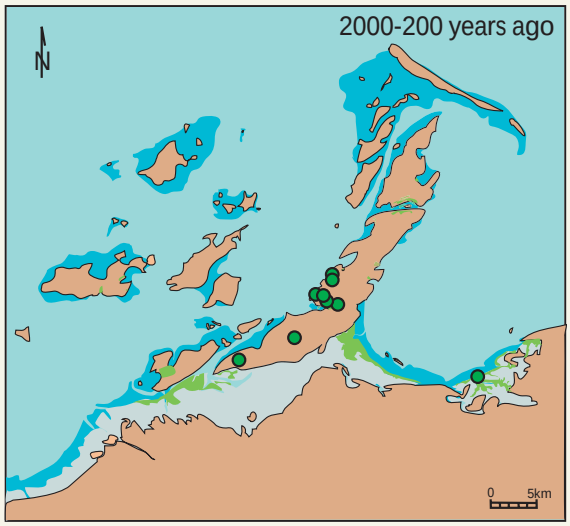
Figure 24. Changing adaptations in the Dampier Archipelago over the last 10,000 years



The coastline begins to stabilise about 6000 years ago as sea level rise levels off. Several dated shell middens show that mangrove resources were important and that this ecosystem was more widely distributed than today. Sometime after 6000 years ago the Dampier Archipelago takes on its present form. Salt flats separate Dampier Island from the mainland.



From about 4000 years ago, there is evidence of significant economic changes in the area. Dated shell middens show that mangrove shellfish species are replaced by a broader range of shellfish species from rocky shores, sandy beaches or mudflats, or a mixture of all three. Some very large midden mounds dominated by mudflat species also appear at this period. The reason for these changes is as yet unknown and different factors may have played a role. One possibility is that the final rise in sea level caused a collapse of the mangrove ecosystem. Other possibilities include climatic change, habitat change caused by human activities, and regional changes in the socioeconomic system.



- Dated shell midden
- Approximate position of coastline: sea level about 2m lower than today
- Present coastline
- Present distribution of mangroves
- Saline flats
- Present intertidal zone

Figure 26. Large infilled macropod (Photo:RC)

Figure 25. Large outline macropod (Photo: JWR)

Figure 27. Recent scored motif—probably a human figure (Photo: JWR)

Figure 28. Examples of track motifs (Photos: JWR and RC)

Figure 29. The 'Climbing men' panel

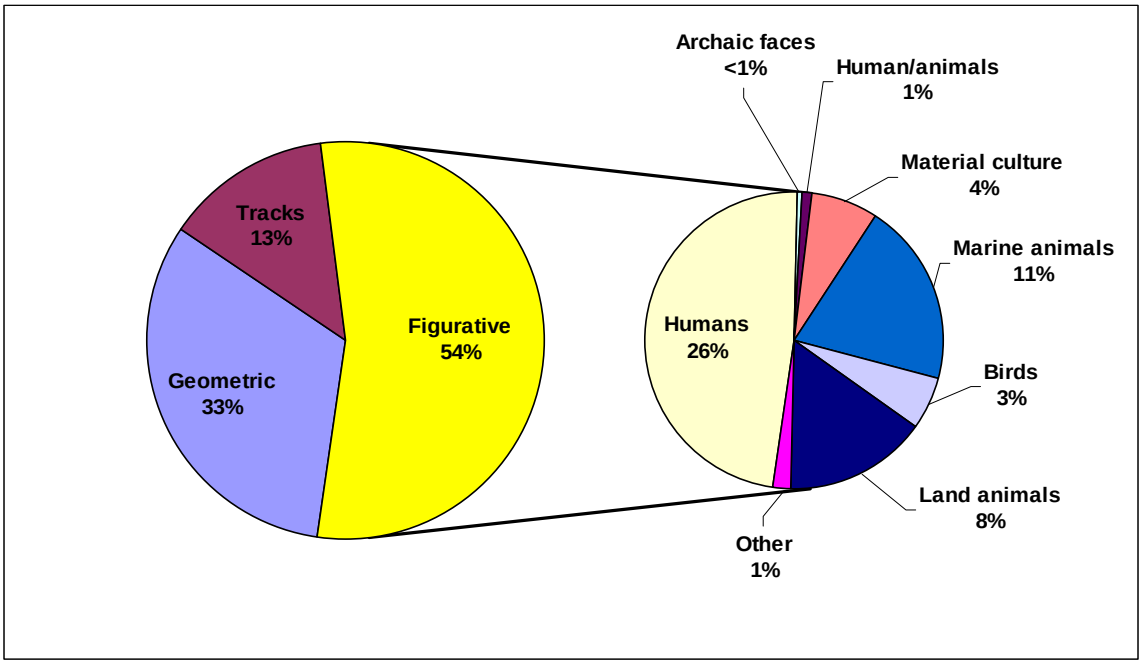


Figure 30. Summary of proportions of subjects represented in Dampier rock art (data from Jo McDonald Cultural Heritage Management 2005)

Figure 31. Anthropomorphic figure with detached blob for head (Photo: JWR)

Figure 32. Examples of geometric designs

Figure 33. Examples of recent marine motifs (Photos: JWR)

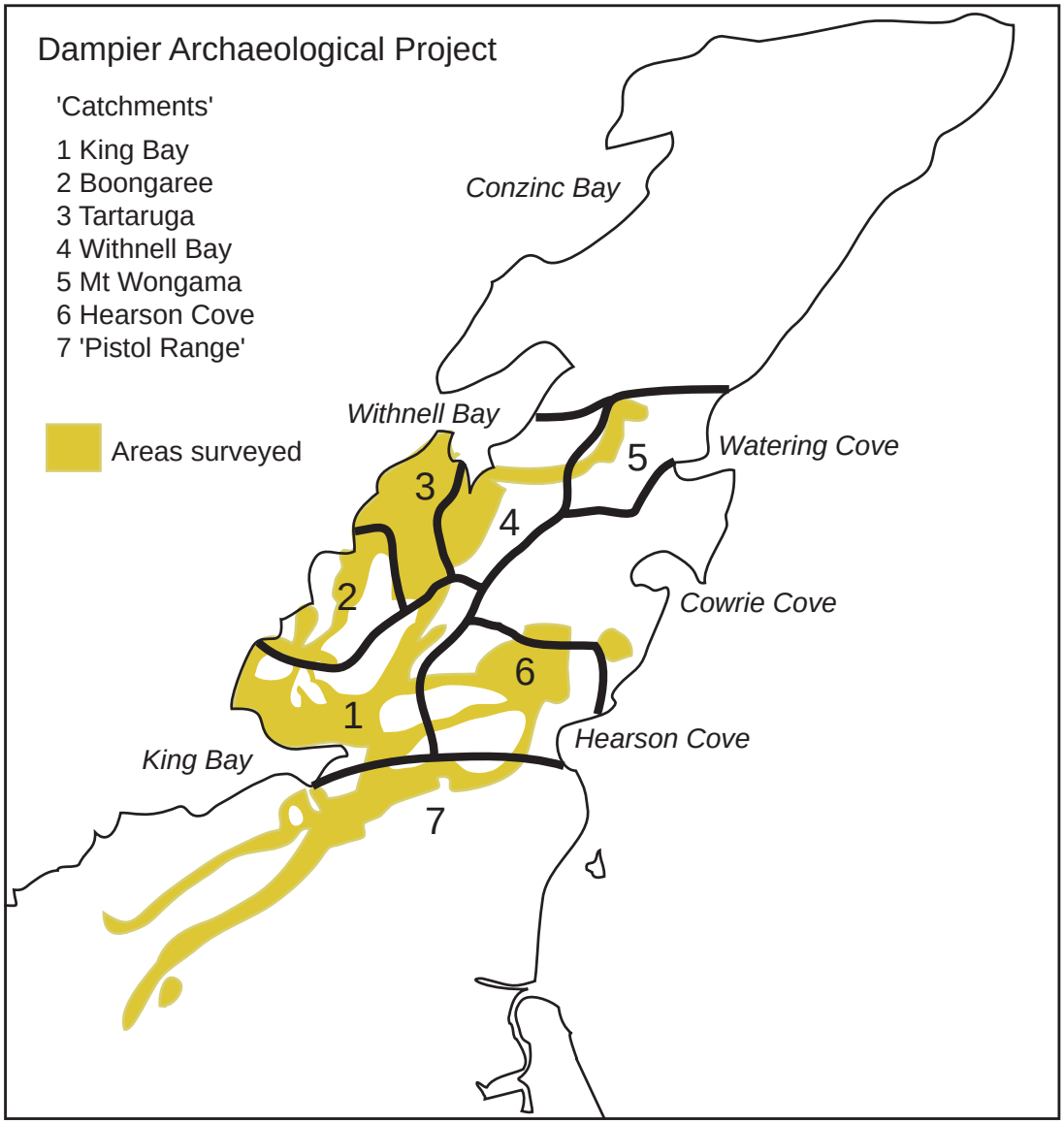


Figure 34. The Dampier Archaeological Project ‘catchments’ and extent of areas actually surveyed

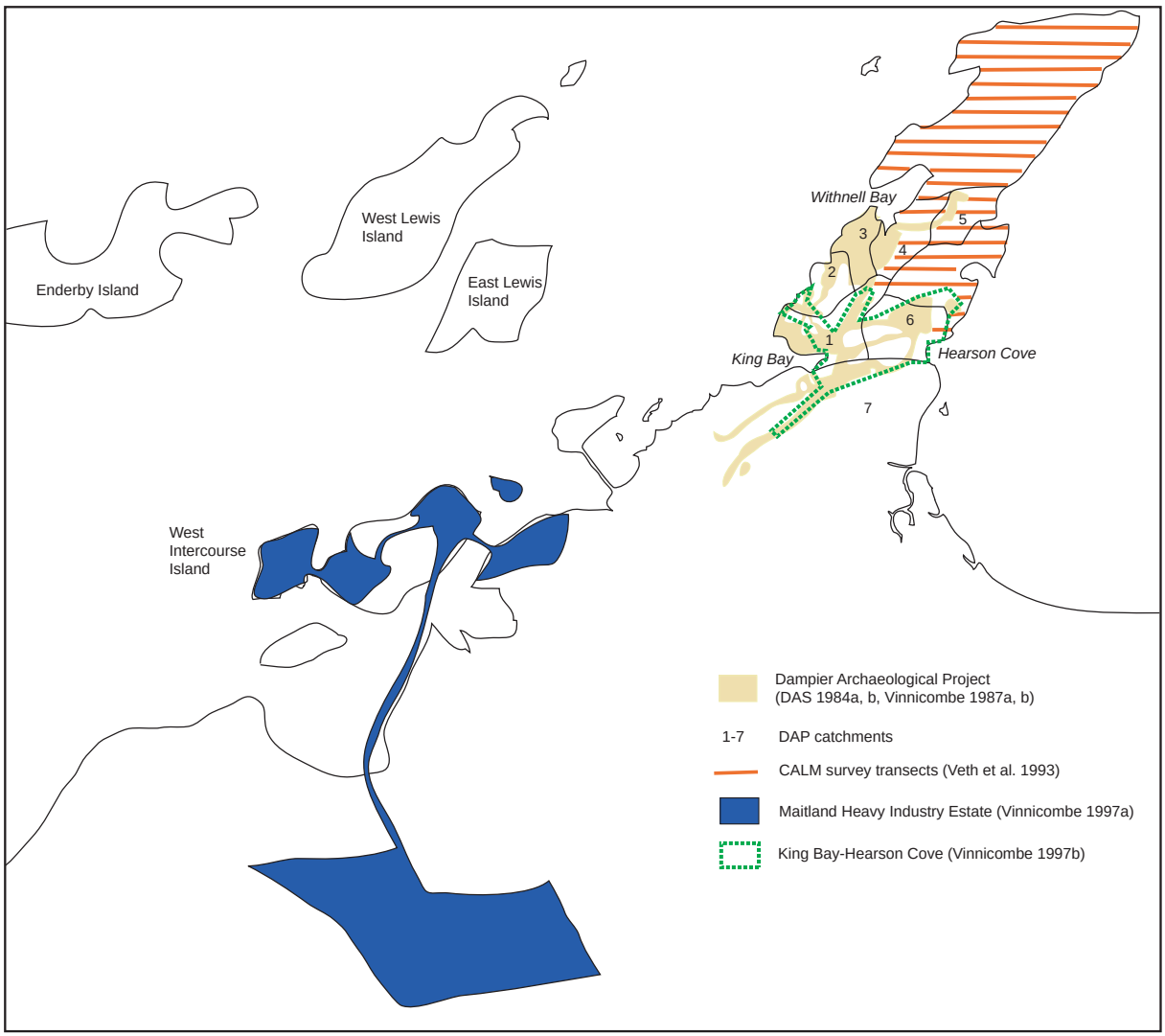


Figure 35. Areas covered by the major surveys in the Dampier Archipelago and adjacent mainland

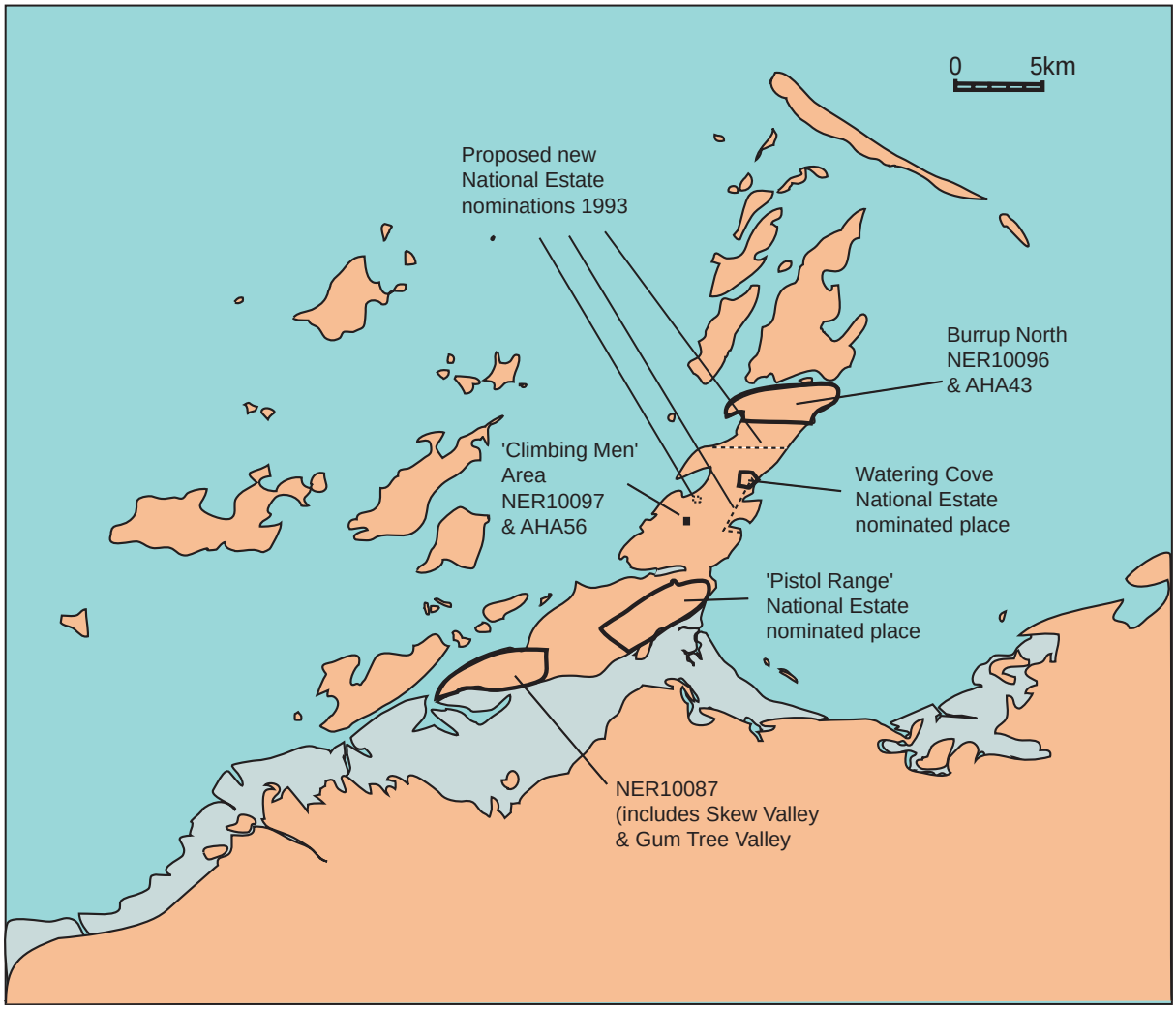


Figure 36. Areas on the Burrup Peninsula identified as highly significant