

**The Rock Art of Kakadu: past, present and future research,
conservation and management**

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3. The Rock Art of Kakadu: past, present and future research, conservation and management

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“I worry about that place ...

Secret place.

That got painting there,

Inside cave.

It got to be looked after because

My father, granddad all look after.

Now me,

I got to do same.

If that painting get rubbed off

There might be big trouble.

That story important.”

Big Bill Neidjie in Neidjie et al. 1985:49

3.1 Introduction

Kakadu National Park (henceforth, Kakadu) is one of the world’s greatest rock art provinces, providing a visual record for stories about people living on country for tens of thousands of years. The rock art draws thousands of tourists each year and has attracted researchers from countries around the world. Rock art was an important reason why Kakadu was put on the World Heritage List. For local Aboriginal people, rock art sites are a significant storehouse of traditional knowledge with the act of producing rock art a powerful tool for educating clan members (especially children) about different aspects of ‘culture’. In this paper we briefly review previous rock art research and look at the future of rock art conservation, management and research in the park. The paper is divided into three sections:

- Rock art studies in Kakadu
- Observations arising from review
- The future of rock art in Kakadu

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3.2 Rock art studies in Kakadu

Over five decades of rock art research and management has occurred in Kakadu. To date, 5362 rock art sites have been recorded in the Kakadu cultural heritage database by park staff (e.g. Sullivan and Haskovec 1986, 1987a), researchers and consultants (e.g. Chaloupka et al 1985; Gunn 1987a; Gunn 1987b). These sites are largely located along the Arnhem Land Plateau, its outliers and on top of the plateau itself. Most rock art sites consist of paintings and stencils, but there are also some beeswax art, prints and a few drawings and engravings. As this is not the place to describe the research, management and conservation of this extraordinary legacy in great detail, a summary is presented in the table below.

Table 1 Overview of rock art work within Kakadu Park with research work in **bold**. This should not be seen as definitive.

Year	Site	Persons Involved	Actions
1845	Central part of Park	L. Leichardt	Made some observations
1962	Southern part of the Park	W. Arndt	Recorded oral histories from three Nargorkin story sites in "Sickness Country".
1968-69	Ubirr	J. Jelinek	Intensive recording during the Czech Expedition to Arnhem Land (Jelinek 1978).
1986-69	23 galleries throughout the Kakadu	J. Jelinek	Focused on the evolution and role of rock art in traditional <i>Bininj</i> society. Jelinek looked at technique and composition, style, regionalism and chronology, subject matter, and social meaning.
1968-69	Deaf Adder Gorge sites	E. Brandl	Systematic analysis of Kakadu rock art. Identification of chronological sequence of 'styles' (e.g. 'Mimi' art precedes 'x-ray' art; Brandl 1988).
1970's	Kakadu-wide	D. Gillespie	The main focus during the 1970's was the causes of rock art deterioration, chemical composition of the pigments & conservation treatment options.
	Ubirr and Nourlangie	D. Gillespie and traditional owners	Sites surveyed and documented and detailed visitor management strategy was created.
1970s	Kakadu-wide	G. Chaloupka	Surveyed more than 263 sites in the park and provided a chronology of the Arnhem Land plateau rock art that incorporates four broad artistic periods: pre-estuarine, estuarine, freshwater and contact .
1970s	Kakadu-wide	D. Lewis	Survey and recording.
1978	Ubirr	D. Gillespie & G. Chaloupka	First silicone driplines installed.
1979-1980	Ubirr and Nourlangie		At a cost of over \$500,000 Nourlangie and Ubirr are developed for tourism.
1979	Various sites	L. Rivett	Detailed photogrammetric recording of a number of rock art sites.
	Various sites	A. Watchman	Undertook geochemical analysis of Kakadu rock art focusing on mineralogy, chemistry, petrology, analysis of the ground and surface water of the rock art sites, and the nature of the salts that impact the rock art in Kakadu.
1980's	Kakadu-wide	G. Chaloupka and R. Gunn	A number of cultural surveys within the Park (e.g. Chaloupka et al 1985, Chaloupka and Kapirigi 1981, Gunn 1987a, 1987b).
1980's	Kakadu-wide	ANPWS as well as P. Taçon, D. Lewis and R. Gunn	Systematic recording of rock art sites, Focused on: <ul style="list-style-type: none"> ~ Location and physical description; ~ Recorded with photography and in written form; ~ Damage and causes; ~ Recommendations for management and conservation; ~ Ethnographic information; and ~ Site assigned a significance rating Lewis (1988), divides art into four phases: Boomerang, Hooked Stick/Boomerang, Broad Spear-thrower and Long Spear-thrower.

<i>Year</i>	<i>Site</i>	<i>Persons Involved</i>	<i>Actions</i>
1980s	Balawurru, Deaf Adder Creek, Amarrkanga, Canon Hill and the Northern corridor	G. Chaloupka and traditional owners N. Kapiirigi, B. Nayidji and G. Namingum	Located and mapped sacred sites, dreaming paths and associated religious information in the Bunidj, Mirrar Erre and Badmardi clans' estate and continuous estates with particular reference to Deaf Adder Creek valley. Also completed for the Northern Outliers. Located and mapped 356 sites.
1981	Deaf Adder and Nourlangie sites including Nawalabila, Blue Paintings, Anbangbang	R. Jones and ANU team	Excavated below rock art panels.
1983	Kakadu-wide	D. Gillespie and ANPWS	1,200 sites are now recorded, although entire Park has not been surveyed. The sites are generally found along the edge of the escarpment and on the outliers of the area. At this time the preservation of the sites is thought to be good.
1983	Ubirr, Cannon Hill, Mt. Gilruth, Mt. Brockman, and Deaf Adder Creek	A. Watchman	Investigation into the geology and weathering of rock formations in the Park. Finds that quartzite in the north is more weathered than that in the south.
1984	Ubirr (boardwalk and western side of the warrior frieze), Anbangbang (main gallery), Nourlangie, and Blue Paintings	L. Rivett	Photogrammetry undertaken at sites to monitor the deterioration of the paintings, rock surfaces, loss of colour, change of pigment, changes in salt deposits and water rush.
	Mt Brockman	H. Sullivan	Photo documentation of sites.
	Namarrgon-Lightning Dreaming	H. Sullivan	34 sites documented along with traditional knowledge.
		A. Watchman	Investigation into salts.
1985-1989	Kakadu-wide	P. Taçon	Australia's first rock art PhD from both an ethnographic and archaeological perspective: From Rainbow Snakes to 'X-ray' fish: the nature of the recent rock painting tradition of Western Arnhem Land (1989). Determined a strong correlation between the forms and sub-styles of recent rock paintings, linguistics and mythology associated with Ancestral Beings, the landscape and past events (numerous publications, e.g. Taçon 1993). 1170 sites visited; 312 recorded.
1985	Nourlangie	H. Sullivan and I. Haskovec	Detailed photographic survey.
	Ubirr, Nourlangie, Blue Paintings and Nanguluwurr	H. Sullivan and I. Haskovec	Large amounts of infrastructure undertaken at sites, including: signage, painting of installations and the placement of rangers at the sites throughout the year to guide tours and patrol the sites.
1985 onward	Kakadu-wide	I. Haskovec	Major conservation works undertaken during this time. Focus was to minimize the damage that was caused between the paint and the surface of the rock by expansion and contraction and installation of driplines.
1986	Yuwendgayay (Referred to as the Leichardt Gallery by G Chaloupka) Deaf Adder Gorge	H. Sullivan & I. Haskovec	Believed to be one of the most important sites in the Park dating to at least 5,180 ± 180 KA (Kaminga & Allen 1973: 82) ~ named Balu-uru site 4 by Brandl in 1973; ~ 1974 Chaloupka wrote report naming the site Yuwendgayay; ~ Ethnographic recording by Taçon in 1985 & 1986; ~ 1986 exfoliated in wild fire in October; ~ Field work undertaken. During this time the site was surveyed, weather conditions documented and recorded and photo survey was completed – water soaks and other causes of deterioration were mapped; and ~ Monitored water, solar radiation, humidity, cryptogammic growth, insect damage, vegetation damage, physical damage.
		J. Clarke and N. North	Hired by ANPWS as rock art conservation consultants.

Year	Site	Persons Involved	Actions
1987-1988	Various sites	J. Clarke, N. North and I. Haskovec	Studies into the accumulation of salts on rock art and the chemistry of the rock. Range of synthetic consolidants and surface treatments trialled. Findings are: the discovery of Sveite a mineral found only in Kakadu and Venezuela. Gypsum the most common agent which causes alterations in the rock art and atmospheric sulphur compounds. Found that the salt forms in the air rather than from groundwater. Investigations showed that salts were found both on the surface of the paintings and within the paint layers.
	Various locations		In collaboration with the chemistry centre of Western Australia, a monitoring program assessing the levels of reactive atmospheric sulphur dioxide and hydrogen sulphide in the Park.
1987	Koongarra Saddle (Mt Brockman)	J. Clark, N. North and I. Haskovec	Trial site for sealants.
	Namarrgon- Lightning Dreaming	J. Clark, N. North and I. Haskovec	Trial using the ceiling section, which had been sampled previously. 10 treatments were applied of 30 x 30 cm PVB treatments.
	Nourlangie (large rock shelter to the west of the main art site)	J. Clark, N. North and I. Haskovec	Turtles and large white fish located at the top of the shelter and a section of deteriorated paintings (on vertical surface- at southern end of the shelter) treated.
	Nanguluwurr	J. Clark, N. North and I. Haskovec	Trialled on small painted rock at front of the gallery. Contains paintings of multi-coloured fish. Treated with 3 treatments on the surface facing west (receives direct sunlight) and on a north facing surface which doesn't receive any sunlight.
	Some Deaf Adder sites	J. Clark	Treated with silicone, although never monitored due to access restrictions.
	White Cockatoo Dreaming	J. Clark, N. North and I. Haskovec	Turtle painting treated.
1989	Nourlangie- Anbangbang	I. Dangas (chief conservator), J. Clark, and I. Haskovec	Restoration of paintings at Anbangbang main gallery.
1990-1995	Kakadu-wide	P. Taçon and C. Chippindale	Survey and recording of rock art sites older than 4000 years, especially Dynamic Figures, Yam Figures and Simple Figures. First detailed full recordings of large panels. Refined and reconciled Chaloupka's and Lewis's chronologies. Information obtained from hundreds of sites. Numerous publications.
1990's	Lightning Man Art site	I. Haskovec	Cleaning and consolidation of deteriorating paint layers.
	Inclined Gallery, Nourlangie Rock	I. Haskovec	Large white wallaby painted, and hand stencil were removed based on the wishes of the traditional owners.
1992	Southern part of the Park	R. G. (Ben) Gunn	Interpretation of Gimbat art styles and stone and bone arrangements in terms of the Bula cult. Also interpretations of Mikinj art site.
1992	Yuwendgayay	A. Thorn	Conservation and intervention at the site. Removed accretions, dust, salt, insect structures, re-attaching flaking paint, removing dislocated pigment from water washed areas, and consolidated the pigments.
1992 - 1994		E. Nelson, G. Chaloupka, P. Taçon & C. Chippindale	Extensive study to provide a register, description and radiocarbon chronology for beeswax art (e.g. see Nelson et al. 2000).
1993	Yuwendgayay, and three other major art sites	A. Thorn	Condition survey of rock art sites including: Moisture survey; microscopic investigation; insulation.

Year	Site	Persons Involved	Actions
	Yuwengayay and Ubirr	A. Thorn	<p>Conservation undertaken to:</p> <ul style="list-style-type: none"> ~ determine solubility parameters of the salt contained within the pigments; ~ develop and test methods of salt removal; ~ lab test conservation techniques including (hydrophobic consolidants); ~ document site condition in preparation of conservation treatment; ~ carry out removal of dust, salts and insect structures; ~ reattach flaking paint; ~ remove dislocated pigment from water washed areas; ~ consolidate pigment as necessary; ~ grout fissures open to water wash; ~ prepare conservation plan for the site; and ~ obtain information on the humidity and temp of the site. <p>At Ubirr focus of humidity and rock surface temperature as well as immediate micro environment.</p>
	Jawyon Country		Dry season site visit and conservation work undertaken.
	Anbangbang	Artist K. Smilit- National Center for the Arts in New Deli	Anbangbang replica project: copied panel, survey and photographic data was collected in 1994. In 1995 it was constructed in studio - displayed in the South Australian Museum.
1997-1999	Nanguluwurr	D. Lambert	Training program: included pigment monitoring photographs and colour monitoring measurements. Drip lines used and assessed air abrasive technique taught for the removal of dust over the pigments. Also removed dust using soft paint brushes.
2004	Ubirr		Names engraved at site dry brushed off and then wet brushed. Believe the graffiti was caused by a school group. In the report there was an interest in identifying the school and then the culprits and turning them over to law enforcement.
2005	Bardedjilidji		Removal of stick figure that was engraved into the rock by the use of dry and then wet brushing.
	Red Lily		Graffiti near Red Lily in Manilakarr estate. Sand blasted the paint because it was nowhere near the rock art.
2008	Blue Painting Site		Fence erected to stop feral animals from walking past the barrier. Based on the amount of human footprints, it is thought that there is little visitor impact to the site.
	Mt Brockman	D. Linder, T. Mahney and team	Removal of names scratched into the rocks by dry and then wet brushing.
	Nawalabila - Deaf Adder	D. Linder, T. Mahney and J. Price (Scientific Pest Management)	Visited to treat termites.
	Nawalabila - Echidna	as above	Treated gallery.
	Nourlangie and Blue Painting Site	as above	Driplines installed. Sites show water damage (exfoliation), damage from lichen and water wash.
	Ubirr	as above	Check interpretation, drip lines checked and replaced, wasp nest removal and spider webs cleaned off of art.
2009	Kakadu Headquarters	IPPHA, ANU and Griffith U. (S. K. May, P. Taçon and M. Johnson (Marshall))	Conservation and management training course primarily for Bininj rangers.
2011	Bindjarran	D. Shine, D. Wright and M. Marshall	Archaeological excavations and rock art analysis (in collaboration with the Nayinggul family).
2010 - 2015	Kakadu – various locations	M. Marshall	PhD rock art conservation and management research.

<i>Year</i>	<i>Site</i>	<i>Persons Involved</i>	<i>Actions</i>
2014	Kakadu Headquarters and various places on country	Numerous Indigenous and non-Indigenous participants from across Australia, southern Africa and elsewhere	9 day workshop on rock art conservation and management resulting in the publication: Agnew, N., Deacon, J., Hall, N., Little, T., Sullivan, S. and Taçon, P.S.C. 2015. Rock art: a cultural treasure at risk. Getty Conservation Institute, Los Angeles.
2015	Mt Brockman	I. Johnston, J. Hayward, P. Taçon, G.O'Loughlin and others.	Survey and documentation of rock art sites for the Mirarr community.

3.3 Observations arising from review

3.3.1 Research

While various detailed reviews and analyses of Kakadu rock art research can be found elsewhere we restrict ourselves to two observations:

1. While much surveying and research has taken place on rock art in the area now known as Kakadu (primarily by Brandl, Chaloupka, Chippindale, Gunn, Haskovec, Jelinek, Lewis, Sullivan and Taçon), very little of this research has fed through to management practices. The majority of researchers were not working for the Park (Sullivan & Haskovec are the exceptions) and, while most returned copies of reports, theses, some images and some site coordinates to Parks staff, most research maintained more of an importance in academic rock art research circles than for management purposes. When researchers were given research permits from the Park, most were not required to return specific site information to bolster the park's archive. This is despite the fact that the best way to conserve site information is to fully record it.
2. There has been a major drop in independent research since the mid-1990s (see Table 1) and park based staff research since 1996. Since 1995, there has been no review or evaluation by Parks Australia (previously ANCA) of rock art conservation techniques or standards in the park (although Marshall is currently reviewing three sites within Kakadu as part of her doctoral research). No rock art specialists have been employed to record/manage rock art since 1996, with a sharp drop in visits by park staff to rock art sites following a decision by traditional owners and ANCA to focus on recording oral histories and sustaining traditional cultural knowledge. Reasons for the drop in independent research include the perceived difficulty of obtaining permits through multiple government and non-government organisations.

3.3.2 Conservation

Site protection and management has been an ongoing concern for Bininj and Balanda. Park staff have a long history of protecting and managing rock art in Kakadu with activities varying from vegetation removal and general site maintenance, detailed scientific analysis of pigments to installation of silicon driplines and removal of graffiti (see Table 1 and May et al. 2012). Again, we make a few observations relating to major issues that are impacting rock art sites in Kakadu.

1. There are obvious environmental considerations such as damage from water, vegetation, insects and birds, animals (native and feral), fire, biological growth and mineralisation (such as salts) and erosion. There are also human impacts, including dust possibly from cars and building/mining work and damage of open and restricted sites by tourists (e.g. graffiti, touching art etc.). It is

important that rangers are trained in rock art monitoring and conservation and empowered to raise/address issues should these arise.

2. A major element contributing to all of these problems has been the lack of continuity in rock art conservation programs and information management. Other issues include a paralysis stemming from the sheer number of rock art sites that need to be managed, limited budgets provided for cultural as opposed to natural heritage and a push for staff to focus on tourism rather than heritage management and conservation (May et al. 2012). With this in mind it is necessary for a rock art management plan to be developed and maintained by Kakadu staff and cultural heritage (including rock art and archaeology) alongside natural heritage to be identified as a priority when allocating funding.

3.4 A new era of rock art management and research in Kakadu?

We have shown in the sections above that there has been a major reduction in research/site visits within Kakadu since the mid-1990s. Considering the international significance of Kakadu's rock art (a priority in the park's world heritage listing) and its value to Bininj this situation is disappointing. Rock art attracts thousands of tourists to the park every year. Investment in cultural heritage is required to maintain this situation. As one of Kakadu's major assets, we suggest the following:

1. Rock art (and more generally cultural heritage – see Wright et al's paper on archaeology in this volume) conservation and research needs to be a Kakadu National Park priority.
2. A Kakadu rock art management team needs to be developed. This team could involve Indigenous and non-Indigenous rangers and researchers working in Kakadu. A rock art conservation specialist should be asked to train members of the team in basic rock art recording and conservation. We recommend the appointment of a coordinator to lead the team on country with for example KIRP (Kakadu Indigenous Ranger Program, day labour, park staff and/or local Indigenous ranger groups.
3. A primary role for this team would be to monitor, conserve and record sites in Kakadu. This would include sites open to the public (including Ubirr and Nourlangie), and those that have not been visited for many years. We also recommend implementation of regular on-country surveys to locate sites, consider their significance, monitor their condition and record rock art for future generations of Bininj and Balanda. The team could work independently and/ or alongside stone country, fire management teams.
4. Major conservation works should only be undertaken as a last resort and only conducted by reputable professional rock art conservators.
5. The effectiveness of artificial (silicone) driplines should be reviewed.
6. Continue to make use of the Cultural Information Management System (CIMS) that is located in NCP at HQ to assist with the management of rock art information. Support may still be required for the input of past data, and researchers/consultants should assist with the provision of data in the appropriate format for any work at rock art sites in the park. District staff should also be encouraged to use the database for monitoring purposes.
7. Involve Bininj, including young people, in all aspects of rock art management. Site visits provide a good way for traditional owners to pass on

knowledge and skills to future generations. A possible link can be drawn to the community ranger program.

8. Apply for grants from various sources (e.g. ARC, cultural heritage programs, etc.). It may be possible to designate a certain amount from each entrance fee to a Kakadu cultural heritage program and advertise this to the public. Kakadu could seek matching funds from federal government. Other innovative funding strategies should be investigated (e.g. sponsorship, crowd funding, etc.).
9. Develop a rock art methods manual for Kakadu staff that relates to documentation, monitoring, management and maintenance of sites.
10. In light of this review we further suggest that independent research should be encouraged, particularly when this is linked with conservation/management objectives of Bininj people and Kakadu National Park staff. These objectives should be made clear to researchers applying for permits to work in Kakadu.

3.5 Conclusion

Kakadu's remarkably rich cultural heritage including its rock art is fundamental to its international, national and local significance. Rarely is the evidence of the relationship between people and landscape as long, rich and diverse as that found in Kakadu. The combination of the ancient rock art and archaeological sites, together with the ongoing living traditions of Aboriginal people is globally recognised to be of outstanding universal value – something to be valued by all humanity. Thus it is imperative we all work together to better protect and understand it for future generations. As Big Bill said 'It got to be looked after ... That story important'.

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