

Rock art and ritual function: The Northern Running Figures of western Arnhem Land

Tristen Jones & Sally K. May

Abstract: This paper explores the distribution, abundance and diversity of Northern Running Figure (NRF) rock art motifs and their archaeological contexts from two study areas in western Arnhem Land, Jabiluka and Red Lily. Motif design elements in the NRF style such as the inclusion of sex and material culture are indices used to explore social function in NRF art. The relationship between NRF archaeological contexts (i.e., distribution, abundance, diversity and overall rock art site contexts) and the variables of sex and material culture are explored via statistical analysis and suggest that NRF art performed a ritual function in the culture(s) of ancient Arnhem Land peoples.

Introduction

The rock art of western Arnhem Land is often heralded as one of the most important assemblages in the world due to its abundance, long sequences and diversity. Argued to have been painted for over 28,000 years (David et al. 2013), this rock art corpus has the potential for much greater antiquity owing to the presence of modified ochre in some of the earliest dated stratified archaeological deposits (Clarkson et al. 2015). Thus, the rock art of western Arnhem Land offers researchers the opportunity to explore change in rock art depictions over a great time depth. This sequence includes a curious style that has been referred to as Mountford figures, Oenpelli figures and Northern Running Figures (henceforth NRFs) in popular and academic literature since the 1940s. The NRFs so inspired the ethnographer Charles Mountford that he used them to illustrate his popular writings, public lectures and exhibition brochures throughout his career. Later rock art researchers (including Chaloupka 1985, 1993, Chippindale and Taçon 1998, Haskovec 1992; and Lewis 1988) noted that this art style appeared to be one of the earliest regionally bounded rock art styles in the stylistic chronological sequence of western Arnhem Land rock art. However, the significance of the bounded distribution and the potential social function of the NRF art style has been underexplored in rock art research.

In this paper, we test the current hypothesised distribution of the NRF art style, and explore the abundance and diversity of NRF rock art motifs and their archaeological contexts from two study areas, Jabiluka and Red Lily. In particular, we utilise the presence - underpinned by the

selected choices made by NRF artists - to depict motif design elements of sex and material culture as indices to explore the potential social function of NRF art in past Arnhem Land culture/s. Combined, our analysis of NRF art style distribution, abundance and diversity and NRF archaeological site contexts, with the NRF motif variables of sex and material culture, suggest that NRF art performed a ritual function. The hypothesis of NRF art as identifying ritual behaviours and practice is then tested against the Ritual Form Model (RFM) (Ross and Davidson 2006, Whitley 2011). This RFM proposes seven criteria based on the universal structure of ritual in human populations (see Rappaport 1999) that, if present, suggest ritual function in rock art assemblages.

The Northern Running Figures art style

NRF-styled art predominately depicts anthropomorphic figures. Definitions presented in the literature to date describe the anthropomorphic motifs as generally shown in exaggerated movement typified by elongated S-shaped bodies, with legs commonly widespread (see multiple examples in Figure 1). While female motifs do exist, it is frequently noted that males are dominant in this art style and are usually illustrated with a prominent penis, muscular legs, and a headdress, though the size and decorative attributes of these features are variable (Chaloupka 1993:132-137, Haskovec 1992:152, Lewis 1988:36-38). NRF-styled motifs are commonly portrayed in groups and in complex scenes with a variety of material culture items and occasionally include animal motifs such as fish.



Figure 1. Drawing of a scene of NRFs made by Charles Mountford during the 1948 American-Australian Scientific Expedition to Arnhem Land (after Mountford 1958:114, digital tracing by Meg Walker).

Items of material culture depicted with NRF figures include boomerangs, spears, hooked sticks and spear throwers (Chaloupka 1993:132, Haskovec 1992:152, Lewis 1988:36-38). In some cases, armlets and pubic aprons are also depicted. Importantly, Chaloupka (1993:132) stresses the importance of the headdress depictions in this art style stating, 'the headdresses are of a variety of shapes and are adorned with feathers and other objects'. Also noted by Chaloupka is the widespread adoption of multiple pigment colours, commonly employed as a decorative tool in the headdresses. With the subsequent loss of some pigments due to poor preservation this has resulted in rendering some NRF styled motifs 'headless' (Chaloupka 1993:132, Figure 2). Some researchers have argued that it is with the NRF style that we first see the widespread use of multiple pigments as a decorative attribute in this region (Haskovec 1992:150).

The art style now known as NRFs was first identified and recorded by Charles Mountford during the 1948 American Australian Scientific Expedition to Arnhem Land (AASEAL). He described the style as '... figures are in deep red. The large legs and thighs and the positions of the bodies of the running figures bear a strong resemblance to South African Bushman paintings' (Mountford 1956:113). He also observed that they expressed coherence and rhythmic movement and he noted that the 'heads' on motifs were missing (Mountford 1956:113-181). These early observations regarding the conventions of NRF art were greatly expanded by later rock art researchers (Chaloupka 1993, Haskovec 1992, Lewis 1988).

It was George Chaloupka, who coined the name 'Mountford Figures' (to perpetuate the legacy of AASEAL), to describe the NRFs and also offered a more comprehensive description of this style (Chaloupka 1985, Chaloupka 1993:132-137). Chaloupka made attempts to explore the stylistic diversity present in NRFs and the types of material culture depicted. He was also the first researcher to assign a place for the art style in a relative stylistic chronology and pose a theory for its regional distribution (Chaloupka 1985:275).

To date, the only study solely focussed on the NRF style was undertaken by Ivan Haskovec in the early 1990s (Haskovec 1992). Haskovec recorded 76 rock art sites

containing 331 paintings. The sites recorded by Haskovec are all situated on the edge of the sandstone escarpment and on the outliers surrounding the floodplains of the East Alligator River, and conform to the hypothesised distribution of the NRF style in the literature by Chaloupka (Chaloupka 1985:275, Haskovec 1992:149). Haskovec's work suggested the spatial distribution of the NRF style was limited to the west of Gunbalanya, with the south west border located approximately 5 km north of Magela Creek (Figure 3) (Haskovec 1992:149).

Recent radiocarbon age determinations producing minimum ages and bracketed ages for the NRF art style have greatly altered the assumed age for the introduction of this art style (Jones et al. 2017). Jones et al. (2017:80-89) have argued for a minimum age of 9,400 cal. BP for the NRF art style, producing ages that verify that this manner of depiction was still in circulation up to 6,000 cal. BP. Furthermore, they argue that it is highly likely that this art style may be significantly older than 9,400 cal. BP, arguing potentially for a terminal Pleistocene antiquity for the NRF style. This suggests a slightly earlier timeframe than proposed in the largely utilised relative stylistic chronology (Chippindale and Taçon 1998:107) where the NRF art style is assumed to be of early to mid-Holocene antiquity, and is assigned to the Middle or Intermediate Periods. The relationship of the NRF art style to other art styles occurring in the same temporal bloc is now identified as a research question of significant interest, as the radiocarbon age determinations suggest an earlier age for all art occurring in the Middle or Intermediate Periods.

These radiocarbon age determinations have confirmed an observation made by Chaloupka that the anthropomorphic motifs painted in the NRF style may have been painted over a considerable timeframe. Chaloupka (1993:132) states that NRFs '...appear in a number of stylistic variations... – they vary in size, degree of elongation, relative width of body, and internal decoration used'. Haskovec (1992:150) similarly argues that they '...range in elaboration and complexity of decoration... the style has undergone marked changes'. The radiocarbon ages affirm that the NRF art style was painted for a minimum of 3,400 years which would account for the range of stylistic variability.

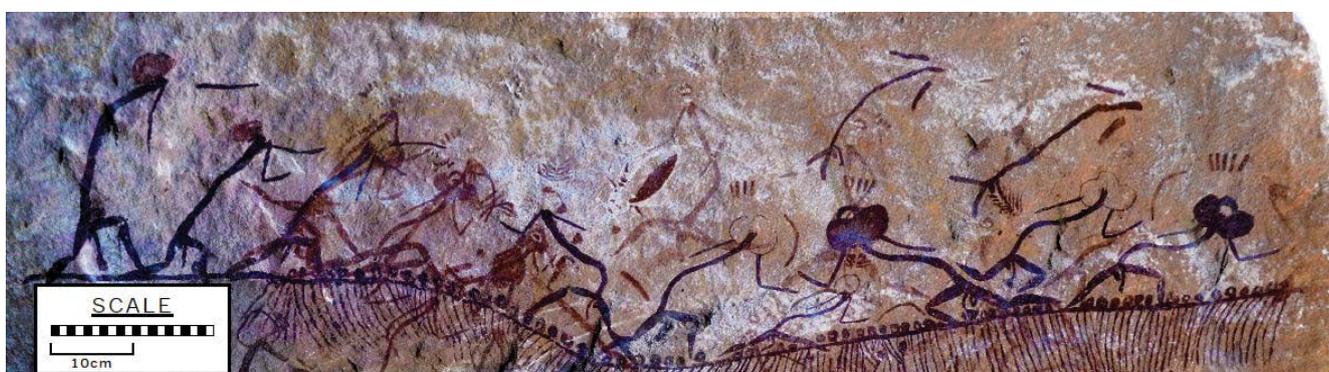


Figure 2. A NRF scene depicting a series of motifs. The NRF motifs display archetypal stylistic attributes including the single delineation S shape body line, headdress (mushroom type), pronounced musculature of the legs and male genitalia. Note also the sequence of repainting of NRFs with newer motifs overlying older NRF styled motifs and the lack of other styles obscuring the NRF art or present on the panel. (Photo: Tristen Jones, enhancement: Meg Walker).

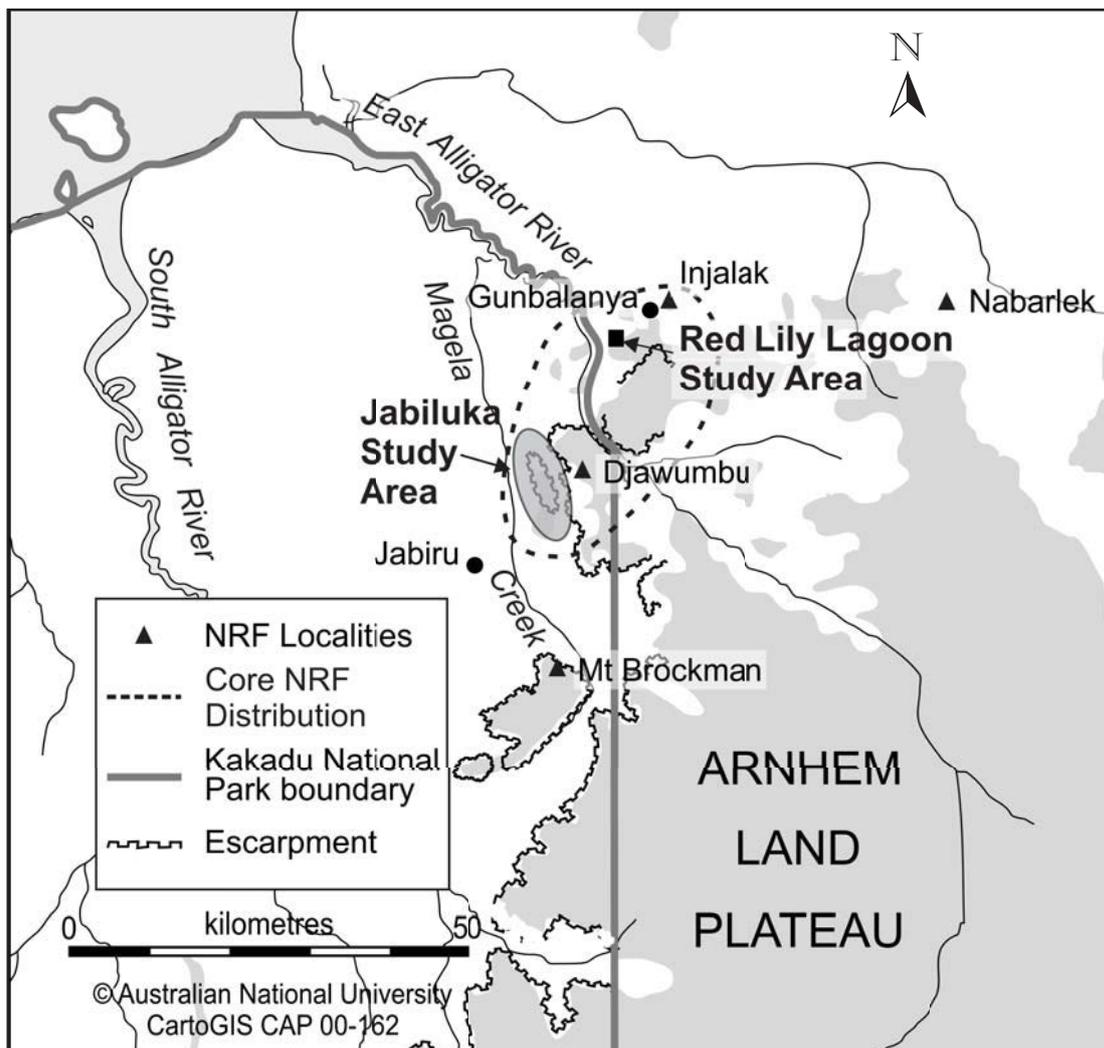


Figure 3. Map of western Arnhem Land highlighting key named locations and sites in text and the area of assumed NRF distribution. (Source: CartoGIS and Daryl Wesley).

This range of variability had perplexed previous researchers and their interpretation of the potential antiquity of the art style. For example, Lewis had previously argued that the NRF art style belonged to the 'Hooked Stick Period' (postulated to have occurred from 9,000 BP until 6,000 BP); however, he conceded that this categorisation of the NRF art style was not definitive as the art style shares similarity to both 'early' and 'late' Mimi art (Lewis 1988:38).

To detail the stylistic diversity of the NRF art style and any temporal changes in the manners of depiction is beyond the scope of this paper. Indeed, the primary focus for future research on the NRF art style should be an exploration of this stylistic diversity, and the NRF art style's relationship to other concurrent modes of artistic representation, particularly the plethora of other anthropomorphic types such as Post Dynamic Figures and Simple Figures with Boomerangs styles, providing a definition of the art style outlining the temporal transitions.

This research adopts a generalised working definition of the NRF style based upon the commonly occurring design elements and that have been collectively identified in the

literature and are present in our assemblages. As such we identify motifs to be of the NRF style if they possess the majority of the following attributes (Figure 1, 2):

- Unbroken sinuous delineation of the body, commonly a single line that represents the head, neck, mid body to groin of the anthropomorphic figure;
- This body line is classically in an S shape with upper torso angled forward thus expressing movement;
- Pronounced musculature of the legs, in particular the calves;
- The dominance of a headdress, very rare for the separate depiction of a head;
- The dominance of male sex with genitalia commonly depicted; and,
- Motif colour is predominately red and/or purple ochres, with the use of other colours (white, yellow and orange) at times utilised for the bi or polychromatic depiction of the headdress.

A macro and micro scaled analysis of Northern Running Figure art distribution

This paper utilises rock art site and motif data generated from two study areas. The first area is located within the bounds of the Mirarr clan estate. Areas of sandstone outcrop within both study areas were chosen for systematic survey with the objective of capturing 100 percent of rock art sites located within these geographic zones. The Jabiluka Leasehold area (Mirarr Country) was systematically surveyed as part of the Mirarr Gunwarddebim project led by one of the authors, Sally K. May from 2011 to 2015. This survey identified and recorded 528 rock art sites across an area of 11.7 km². Some of these sites (including some of the NRF motif data used in this study) also come from just north of the Jabiluka Leasehold border in a region known Ngarradj Bawarddedjobkeng (Kundjeyhmi spelling). However, for ease we refer to them collectively as the Jabiluka sites. The second study area (Red Lily) is located within the bounds of the Manilakarr clan estate. The area was systematically surveyed and recorded from 2011 to 2014 by an Australian National University (ANU) research team led by Tristen Jones. A total of 86 rock art sites were identified and recorded across 3.5 km².

The survey strategy for both research areas was generalised, meaning that all cultural site features were recorded at a place, including rock art, utilising a rapid site recording strategy. This strategy produces baseline data for a rock

art place and estimates ranges of total motifs, motif form, method and content, and the presence and absence of identifiable art styles; however, while in both survey areas the survey methodology and recording methods were the same, in Red Lily the recording teams undertook higher resolution recordings of sites with NRF art, as this art style became the focus of targeted research questions. This may account for the higher Minimum Number of Individuals (MNI) of NRF motifs in the Red Lily (Table 1). The different research aims and recording methodologies between the two projects allows for a complimentary analysis of presence or absence of NRF art (i.e., distribution).

In Jabiluka only 2.2 percent of rock art sites contained NRF styled art (n=12), while at Red Lily 20.9 percent of rock art sites contained NRFs (n=18). Furthermore, the frequency of NRFs in Red Lily was much higher (MNI n=434) than the Jabiluka NRF assemblage (MNI n=109). NRF density is also much higher in the Red Lily assemblage than in Jabiluka. In the Jabiluka study area there is an average of 45.1 rock sites per km², however NRF art is only present in 1.0 rock art sites per km². In comparison, at Red Lily there is an average of 24.5 rock sites per km², with NRF art present in 5.1 rock art sites per km². In summary, while there is a greater number of rock art sites and more densely populated rock art landscape in the Jabiluka study area, there is both a higher frequency and a higher density of NRF styled art in Red Lily.

Table 1. Northern Running Figure Site MNI and complex size for both study areas.

	MNI NRF	Complex Size		MNI NRF	Complex Size
Red Lily 1	4	Small (1-5)	Jabiluka 1	1	Small (1-5)
Red Lily 2	8	Medium (6-20)	Jabiluka 2	41	Large (20-50)
Red Lily 3	4	Small (1-5)	Jabiluka 3	26	Large (20-50)
Red Lily 4	1	Small (1-5)	Jabiluka 4	1	Small (1-5)
Red Lily 5	7	Medium (6-20)	Jabiluka 5	6	Medium (5-20)
Red Lily 8	67	Massive (51+)	Jabiluka 6	6	Medium (5-20)
Red Lily 10	11	Medium (6-20)	Jabiluka 7	1	Small (1-5)
Red Lily 11	11	Medium (6-20)	Jabiluka 9	3	Small (1-5)
Red Lily 12	1	Small (1-5)	Jabiluka 10	2	Small (1-5)
Red Lily 13	29	Large (21-50)	Jabiluka 17	5	Small (1-5)
Red Lily 14	5	Small (1-5)	Jabiluka 11	3	Small (1-5)
Red Lily 15	2	Small (1-5)	Jabiluka 15	2	Small (1-5)
Red Lily 16	30	Large (21-50)			
Red Lily 17	172	Massive (51+)			
Red Lily 18	9	Medium (6-20)			
Red Lily 23	69	Massive (51+)			
Red Lily 24	1	Small (1-5)			
Red Lily 26	10	Medium (6-20)			
TOTAL	434			109	

Additionally, a trend was observed in the data that NRF styled art commonly (57 percent) occurred in major rock art shelters. Major rock art sites are defined as containing in excess of 100 motifs in total. In Red Lily three sites with NRF MNI exceeding 51+ were recorded, in comparison to Jabiluka where there were no recorded rock art sites that contained more than 50 NRF styled motifs.

To explore difference in the distribution, frequency, abundance and diversity of the two NRF motif populations the following variables were recorded from the study areas site and motif data:

- Site information: NRF MNI per site, NRF complex size, site elevation, site geomorphology and total number of paintings in the site; and,
- Motif information: Sex, headdress presence, headdress type, material culture presence/absence, and material culture type.

Following the recording of these variables a number of statistical tests were undertaken for both study areas. In particular, we wanted to explore the *conscious decision of painters in the selection of place* in depicting NRF styled art in this landscape. In order to understand this relationship, we posed the following questions:

- Where do painters choose to depict NRF styled art both in the landscape and in rock art sites?
- Does NRF art increase with the total number of motifs in a site?

In order to test the relative abundance of NRFs to the total number of motifs in a rock art site, the MNI of NRFs were allocated to a corresponding complex size group. A MNI of one to five is grouped as a 'small NRF complex'; a MNI of five to 20 is grouped as a 'medium NRF complex'; a MNI of 20 to 50 is grouped as a 'large NRF complex', and an MNI of 50+ was grouped as a 'massive NRF complex'. NRF complex size was then tested against the total number of motifs in both study areas using a Pearson's chi-squared test (χ test), as the data is non-normally distributed. The χ test for both study areas revealed there is no significant difference between NRF complex size, and the corresponding total number of motifs in each site (Jabiluka $\chi=11.250$, $df=8$, $p=0.188$; Red Lily $\chi=16.543$, $df=18$, $p=0.555$). This suggests that in both the Jabiluka and Red Lily areas the number of NRF motifs were not related to the overall total of motifs painted in each rock art site, and suggests that the number of NRF motifs depicted is related to choice (and not chance).

To understand trends in the location of NRF styled art the number of motifs present in a site was compared to site geomorphology. Site geomorphology was selected as a variable instead of site elevation due to the unreliability and large margin of errors in handheld GPS units. The most dominant site geomorphology type for both study areas is 'outlier top' followed by 'outlier slope' (Figure 4). Outlier top is the geomorphological group with the highest elevation in sandstone escarpment and rock art sites situated in this landscape are often situated in weathered rock stacks on top of the plateau. Outlier slope is the

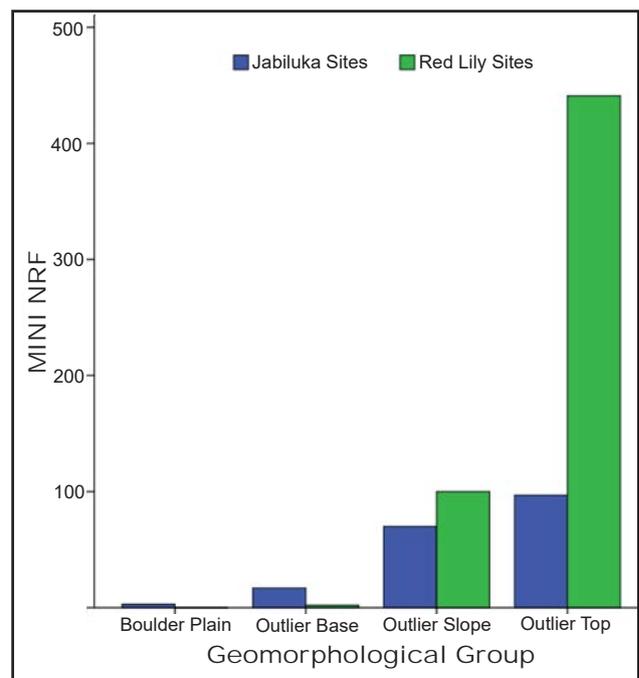


Figure 4. MNI of Northern Running Figure rock art motifs according to rock art site geomorphology type.

geomorphological group encompassing the steeply eroded sides of the sandstone escarpment. This finding mirrors the findings of Wesley et al. (in press) which revealed that Middle Period art styles at Red Lily most commonly occur on hillside or hilltop contexts, and interpret this as potentially a result of changing mobility and occupation patterns in the landscape or a result of taphonomy.

The core distribution of NRF art is from Injalak Hill (Gunbalanya) in the north to the south of the Djawumbu massif in the current Jabiluka Leasehold area. However, some outliers have been recorded such as examples from a site 30 km east of Gunbalanya at Narbalek (Wesley, pers. comm., 20/12/16) and some examples from Dangurrung (Mt Brockman area) that contain some attributes that conform to the NRF manner of depiction but that do not conform to the definition of the style overall. These figures could be considered 'transitional' in NRF form, and may be either very early or very late NRFs, or indeed may be crude imitations of the art style outside of the core distribution zone. Our core zone matches well with Haskovec's (1992:149) argument for the geographical range of the style. This argument is further strengthened by the work of Taçon across western Arnhem Land and Kakadu National Park who states that, apart from the Dangurrung examples, he has not seen examples south of the Djawumbu massif (Taçon pers. comm., 14/12/16). In short, the NRF art style is abundant in the Red Lily area, slowly reducing in numbers as you head north or south.

In both study areas a Pearson's chi-squared test (χ test), revealed there is no significant difference between NRF complex size, and the corresponding total number of motifs in each site. This statistical test suggests that the number of NRF motifs depicted in a site is related to choice and there is a general trend observed in the data that NRF

styled art commonly (57 percent) occurred in major rock art sites. Major rock art sites are defined as containing in excess of 100 motifs in total. Additionally, there seems to be a correlation between the presence of NRF styled art and higher elevation (hillside/hilltop geological contexts). Yet, it is important to note that these findings also suggest a change over time in the placement of rock art generally in these study areas with NRFs not being overpainted and obscured at these higher elevations. The results of the NRF site distribution data and statistical tests support the observation by previous rock art researchers for a limited regional distribution, and that the place and number of NRF motifs depicted is determined by choice.

Exploring the role of material culture and sex in Northern Running Figure art

NRF art is often painted in rock art sites that contain high rock art densities and in some instances NRFs are painted in high frequencies, meaning that the NRF art style was and remains highly visible in these rock art sites. In order to explore then the potential social function of this visible placement, the variables of sex and material culture were selected for further statistical analysis. These variables form the dominant characteristics for NRF manner of depiction excluding the other variables of NRF motif dimensions and the angle of the mid-body line. The variables of sex and material culture may then have the ability to impart both symbolic and practical information that can inform etic observations in rock art.

First, the presence and absence of both sex, headdress and other material culture types were recorded (Table 2). At Red Lily male sex (in the form of a penis) was depicted in 51.1 percent of motifs (n=222), in comparison to female sex (in the form of breasts or a vulva) which was only depicted in 1.8 percent of motifs (n=8). No depiction of sex occurred in 40.9 percent (n=178) of cases, with 'indeterminate' (unable to identify presence or absence of sex) accounting for 6.2 percent of the assemblage (n=26). In the Jabiluka study area the percentage of selected sex representations generally correlated with the Red Lily assemblage (male=45.0 percent, female=1.8 percent, not depicted=15.6 percent, indeterminate=37.6 percent).

The presence and absence of headdress and other material culture was also recorded and analysed. At Red Lily identifiable headdresses were depicted in 28.1 percent

of motifs (n=122), in comparison to 'indeterminate' headdresses which represents 71.9 percent of motifs (n=312). Other material culture types (boomerangs/hooked sticks, spears, spear throwers, body adornments, hand axes) were depicted in only 8.8 percent (n=38) of cases, with no other material culture depicted (88.5 percent, n=384) most of the time, and 'indeterminate' types accounting for 2.8 percent of the assemblage (n=12). In comparison, the study of the Jabiluka area found that identifiable headdresses were depicted in 33.3 percent of motifs (n=36), with 'indeterminate' headdresses representing 66.9 percent of motifs (n=73). Other material culture types were depicted in higher instances than at Red Lily (15.6 percent, n=17), with no other material culture still the dominant selection representing 59.6 percent (n=65) of the assemblage, with 'indeterminate' 24.8 percent of the assemblage (n=27).

Thirteen individual headdress types were identified in the NRF assemblages from both study areas. Headdresses were classified according to shape, with decorative infill elements, colour combinations and decorative additions (such as protruding/radiating lines from the main shaped headdress potentially representing feathers) recorded in the assemblage, but disregarded as determining characteristics in classifying headdress types. Of a total of 543 motifs from both study areas, 158 motifs possessed a headdress. Percentage of headdress types per study area were then calculated (Table 3). In Red Lily the most common headdress type was 'circular' (5.5 percent, n=24), followed by 'mushroom' type (5.1 percent, n=22), and 'crescent' type (3.2 percent, n=14). In the Jabiluka study area the 'crescent' headdress type was by far the most common (13.8 percent, n=15) with the 'circular' type second most prevalent (3.7 percent, n=4) (Figure 5). In order to explore the role of the NRF headdresses further, the following research questions were posed:

- Does headdress diversity increase with NRF complex size?
- Are some headdress types only found, or increasingly found, in particular NRF complex sizes?
- Are there types of headdresses that are only depicted with other particular forms of material culture?

In order to test whether there was a correlation between NRF headdress diversity and NRF complex size a Pearson's chi-squared test (χ test) was employed as the

Table 2: Northern Running Figure motif data for frequency (n) of sex, headdress and other material culture types in both study areas.

	Sex (n) Red Lily	Sex (n) Jabiluka		Red Lily Headdress (n)	Jabiluka Headdress (n)		Red Lily other material culture (n)	Jabiluka other material culture (n)
Male	222	49	Yes	122	36	Yes	38	17
Female	8	2	Indeterminate	312	73	Not depicted	384	65
Not depicted	178	17				Indeterminate	12	27
Indeterminate	26	41						
TOTAL	434	109		434	109		434	109

data is non-normally distributed. The χ test for both study areas revealed there is a significant relationship between the two variables (Jabiluka $\chi=33.885$, $df=20$, $p=0.027$; Red Lily $\chi=69.440$, $df=42$, $p=0.005$), meaning that headdress diversity increases with higher NRF frequencies (NRF complex size). In order to test whether there was a significant difference in headdress diversity between the two assemblages (Red Lily and Jabiluka) a paired sample t-test was undertaken. The test revealed no statistically significant difference between headdress variability between the two study areas ($t=-0.767$, $df=108$, $p=0.445$), meaning that the same types of headdresses are likely to be painted in either study area.

Interestingly, when testing the preference for headdress types in relation to NRF complex size, at Red Lily there was no discernible pattern (Table 4). However, in contrast to Red Lily, in the Jabiluka study area, in all but one instance, the most prevalent headdress type, the 'crescent' type headdress, was found only in 'large' NRF complex sizes (Table 5).

The frequency and percentages of the other material culture types depicted with NRF motifs are described in Table 6. The overall presence for other material types (i.e., boomerangs/hooks sticks, spears, spear throwers, wearable adornments, hand axes) in NRF at both Red Lily and Jabiluka is quite low (8.8 percent and 15.6 percent respectively). At Red Lily the most common other material culture types were single shaft spears ($n=12$, 2.8

percent) and boomerangs/hooks sticks ($n=8$, 1.8 percent) respectively. In contrast at Jabiluka, hand axes ($n=10$, 9.2 percent) were the most common other material culture type followed by single shaft spears ($n=2$, 1.8 percent) and boomerangs/hooks sticks ($n=2$, 1.8 percent). In order to test whether there was a significant difference in the diversity of other material culture types between the two assemblages a paired samples t-test was undertaken. The test revealed no statistically significant difference between other material culture type variability between the Red Lily and Jabiluka assemblages ($t=-5.862$, $df=108$, $p<0.000$), meaning that the same types of other material culture are likely to be painted in either study area.

As the presence of other material culture was low in both assemblages, in order to test the relationship between particular headdress types and other material culture types, a test was undertaken on the frequency and percentages of headdresses absent of other material culture (Table 7). The data reveals that there is no significant difference between the frequency and percentage of the headdress types not depicted with other material culture types in comparison to NRF motifs with headdresses depicted with other material culture types.

Identifying ritual behaviours in rock art

There are many different definitions and understandings of 'ritual' and 'ritual behaviours' (Bell 1992). However, in this paper we define 'ritual' as representing the non-

Table 3. Northern Running Figure headdress type frequency (n) and percentages (%) for both study areas.

Headdress Type	Red Lily (n)	Red Lily (%)	Jabiluka (n)	Jabiluka (%)
Circular	24	5.5	4	3.7
Bell	4	0.9	0	0
Beehive	2	0.5	1	0.9
Mushroom	22	5.1	0	0
Lasso	1	0.2	1	0.9
Crescent	14	3.2	15	13.8
Clover	9	2.1	2	1.8
Bullet	1	0.2	2	1.8
Butterfly	6	1.4	0	0
Half circle	2	0.5	1	0.9
Feathers	8	1.8	0	0
Curved rectangle	5	1.1	1	0.9
Long invert C	1	0.2	1	0.9
Indeterminate*	40	9.2	8	7.3
Not Applicable*	295	67.8	73	67
TOTAL	434	100	109	100

* The category of 'Not Applicable' refers to motifs that possessed an 'Indeterminate' headdress presence, whereas the category of 'Indeterminate' refers to a positive identification of a headdress but due to weathering or overpainting the headdress type cannot be identified.

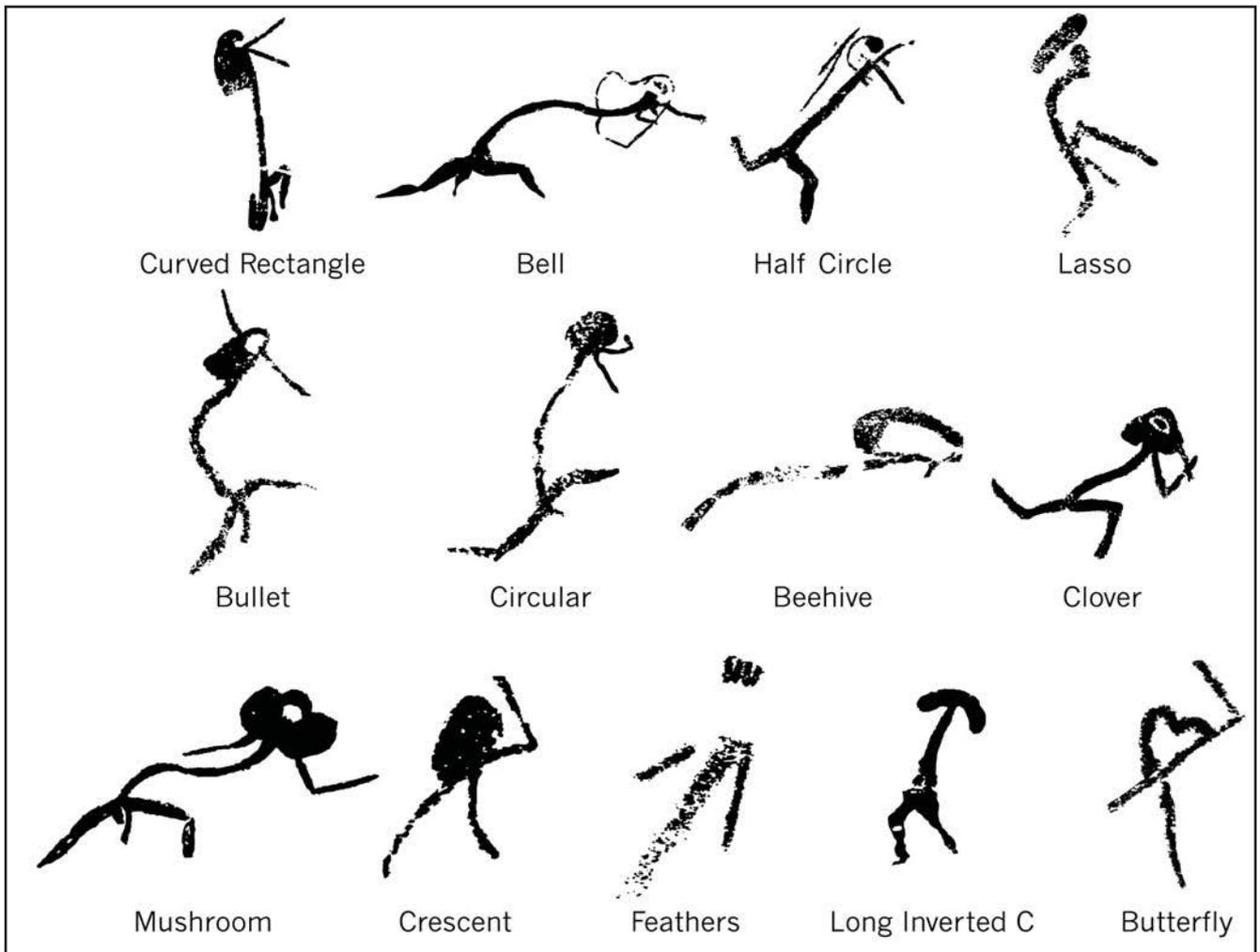


Figure 5. Examples of each of the identified Northern Running Figure headdress types. (Digital tracings: Meg Walker, not to scale).

Table 4. Headdress type frequency (n) and percentages (%) per NRF complex size for Red Lily (for most dominant headdress types).

NRF Complex Size	Red Lily 'Circular' Headdress (n)	Red Lily 'Circular' Headdress (%)	Red Lily 'Crescent' Headdress (n)	Red Lily 'Crescent' Headdress (%)	Red Lily 'Mushroom' Headdress (n)	Red Lily 'Mushroom' Headdress (%)
Small (1-5)	1	4.2	0	0	1	4.5
Medium (6-20)	5	20.8	0	0	2	9.1
Large (21-50)	6	25	2	14.3	0	0
Massive (51+)	12	50	12	85.7	19	86.4
TOTAL	24	100	14	100	22	100

Table 5. Headdress type frequency (n) and percentages (%) per Northern Running Figure complex size for Jabiluka (for most dominant headdress types).

NRF complex size	Jabiluka 'circular' headdress (n)	Jabiluka 'circular' headdress (%)	Jabiluka 'crescent' headdress (n)	Jabiluka 'crescent' headdress (%)
Small (1-5)	3	75	1	6.7
Medium (6-20)	0	0	0	0
Large (21-50)	1	25	14	93.3
TOTAL	0	100	15	100

Table 6. Northern Running Figure frequency (n) and percentages (%) of the other material culture types for both study areas.

Other material culture type	Red Lily (n)	Red Lily (%)	Jabiluka (n)	Jabiluka (%)
Single shaft spear	12	2.8	2	1.8
Single barbed spear	3	0.7	1	0.9
Wearable adornments	2	0.5	1	0.9
Boomerang / Hooked stick	8	1.8	2	1.8
Hand axe *	3	0.7	10	9.2
Indeterminate	248	57.1	1	0.9
Not applicable	158	36.4	92	84.4
TOTAL	434	100	109	100

* In a singular instance at Red Lily a hand axe was depicted in combination with a boomerang, this instance has been counted as an axe. This was the only combination of multiple depictions of other material culture types (excluding headdresses). Note: This table presents presence and absence of other material culture types not the MNI of instances of other material culture types.

secular aspects of past Arnhem Land life, meaning in this case that the symbolism projected in the rock art and the physical act of rock art production and/or rock art viewing communicates belief systems of a higher order or religious/mythological nature. The term ‘ceremony’ on the other hand, is defined in this context as social group activity which may or may not be founded upon religious/mythological belief systems and thus may or may not be considered ritual behaviour.

The presence of material culture such as headdresses and other body adornments, i.e., pubic aprons and tassels, necklaces, hair belts, have been identified as an index of ceremonial or ritual activity that could potentially have been used by artists to also indicate the sex of the subjects (for some western Arnhem Land examples see Johnston this volume, May et al. 2017).

While it is outside the scope of this paper to present an ethnography of headdresses in Aboriginal and Torres Strait Islander culture, it is important to note that material culture such as headdresses were (and in many cases continue to be) used by Aboriginal groups as part of ceremony. For example, Berndt and Berndt (1988:274) note the central place that material culture plays in ritual with bullroarers, ceremonial boards, stones, ceremonial poles and headdresses as key ceremonial items. In western Arnhem Land there are a range of sacred objects used in ritual, and given that many of these ceremonies are still actively practiced, much of this cannot be discussed. It can be stated however, that headdresses were used in some ritual performances in western Arnhem Land with ethnographic records illustrating this clearly¹ and our own contemporary observations at some minor ceremonial performances in Gunbalanya. Headdresses are iconic elements of ritual behaviour in the recent past and, we would argue, the rock art suggests this is a very long-held tradition throughout the Holocene. Indeed, radiocarbon age constraints for the NRF art style supports this assertion (Jones et al. 2017). Thus, such material culture is key to identifying and exploring ritual in rock art studies.

Table 7. Northern Running Figure motif headdress type frequency (n) and percentage (%) absent of other material culture types.

Headdress type	Red Lily (n)	Red Lily (%)	Jabiluka (n)	Jabiluka (%)
Circular	18	4.7	4	4.3
Bell	2	0.5	0	0
Beehive	1	0.3	0	0
Mushroom	20	5.2	0	0
Lasso	1	0.3	0	0
Crescent	14	3.6	12	13
Clover	7	1.8	2	2.2
Bullet	1	0.3	1	1.1
Butterfly	4	1.0	0	0
Half circle	1	0.3	1	1.1
Feathers	6	1.6	0	0
Curved rectangle	2	0.5	1	1.1
Long invert C	0	0	0	0
Indeterminate	37	9.6	6	6.5
Not Applicable	270	70.3	65	70.7
TOTAL	384	100	92	100

In NRF styled art from both study areas the male sex is depicted in 49.9 percent of motifs, with female sex depicted in only 10 cases (1.8 percent) (Table 2). This is a marked change from earlier art styles such as Dynamic Figures where sex is not indicated for most of the figures (see, for example, May et al. 2017). In fact, May et al. (2017) found that more of the Dynamic Figure anthropomorphs in Jabiluka featured breasts than a penis. Similarly in both NRF art and Dynamic Figure art, the human body is predominately depicted with a headdress, with both rock art styles showing great stylistic diversity in headdress types (Johnston this volume, May et al. 2017). While the presence of headdresses in the NRF motifs in the assemblages presented in this paper are low (29 percent) in comparison to the total number of motifs, this is a reflection of the impact of taphonomic factors on the sample size. Generally, headdresses in NRF art are integral components of the motif. This can be argued due to two main factors: (1) there are no recorded depictions of a head, or separated head shape/form, in both assemblages, to the unbroken sinuous delineation which represents the mid body of the NRF motif, and (2) there is only 1 example in the motif assemblage from both study areas where the body of an NRF is not formed by a single line (i.e., has multiple lines indicating body). In some cases the upper end point of the body line of an NRF may be rounded or circular in shape (Figure 6) but there are no examples where a separate head shape is added, or incorporated into the end of the body line in the two study areas investigated here.

In lieu of a clear and defined head form being depicted at the top end of the unbroken sinuous delineation mid body line, a headdress is discernible in 29 percent (n=158) of NRFs. In 71 percent (n=385) due to taphonomic factors a headdress type cannot be clearly determined. This is most likely be a result of weathering due to the use of multiple pigments, which are not as long lasting as red ochres, thus creating figurative gaps in the motifs. This phenomenon has been noted by all other researchers who have studied

NRFs (Chaloupka 1993:132, Haskovec 1992:150, Lewis 1988:37). There are multiple instances of intact uses of multiple pigments particularly in the design elements of the headdresses. Therefore, we have interpreted the 71 percent of 'indeterminate' headdresses as highly likely to have originally included headdresses. This is further supported by the fact that there were no instances of a NRF motif with a head and no headdress being depicted.

A ritual or ceremonial interpretation for the NRF art style is also supported when assessing art according to the criteria set out in the Ritual Form Model (RFM). The RFM identifies seven criteria that if present function as positive indicators of ritual behaviour communicated in rock art. These criteria are shaped by the universal structural form of ritual according to Rappaport (i.e., Rappaport 1999, Ross and Davidson 2006). The seven criteria are: *invariance; repetition; specialised time; specialised space; stylised behaviour or form; performance and participation; and form which holds a canonical message* (Ross and Davidson 2006:312). In most categories, the NRF art style meets these criteria rigorously, particularly the criteria of invariance, repetition; specialised place and time, and stylised behaviour and form.

The definition of a singular art style in some manner confirms the RFMs criteria of invariance, repetition and stylised behaviour and form. More clearly, for a population of motifs to be considered an art style, there must be repeated form, methods, mediums and manners of depiction/design elements (e.g., Francis 2001, Domingo Sanz and Fiore 2014). These variables are determined by the choices of the individual artists producing the art, which in some way is influenced and determined by the social norms of the group to which the artists belong and the symbolic rules determined by the social function of the art and iconography itself.

In the case of NRF art, invariance, repetition and stylised behaviour and form is demonstrated in the dominant variables that classify this art type as an individual style.

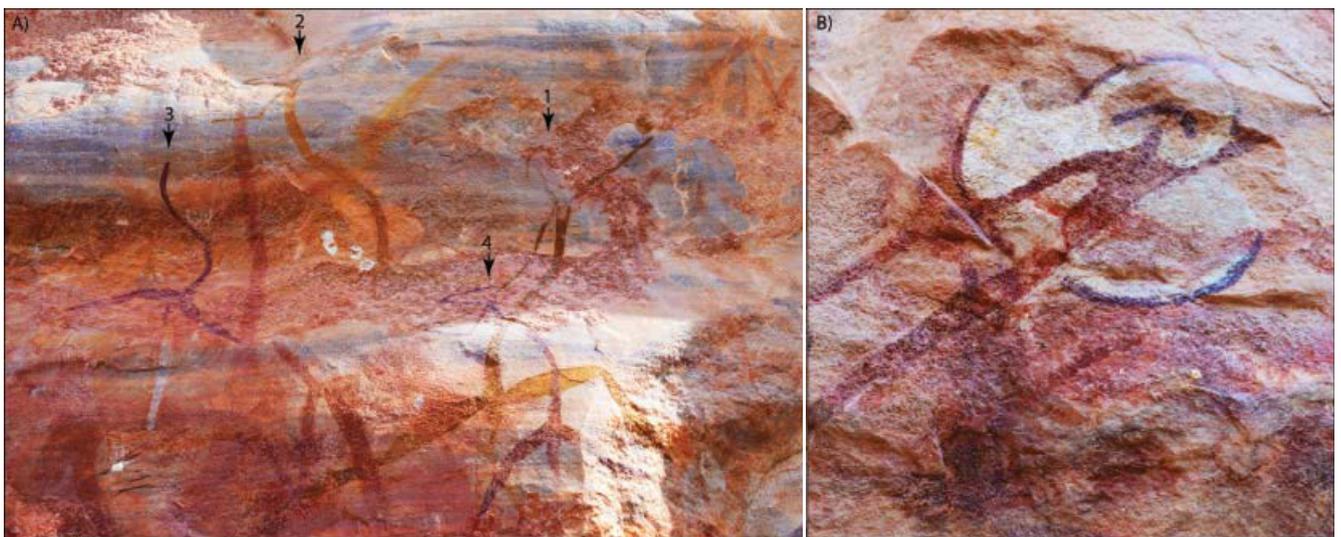


Figure 6. a) A scene of NRF art featuring 4 discernible motifs (1-4), all with headdresses and a single body line. b) An example of an intact bichrome Bell type NRF headdress. There is no scale depicted due to panel location difficulties. (Photos: Tristen Jones, 2015, digital enhancement: Meg Walker).

These variables primarily include:

- The unbroken sinuous delineation of the body of the anthropomorphic motif; commonly a single line that represents the head, neck, mid body to groin of the anthropomorphic figure. This body line is classically in an S shape with upper torso angled forward thus expressing movement;
- The depiction of indicators of male or female sex in the anthropomorphic form, with a dominance of male genitalia depicted; and,
- The presence of material culture namely the consistent depiction of a headdress, in combination with the occasional depiction of other material culture types such as boomerangs/hooked sticks, hand axes, spears and wearable adornments.

Combined with the placement of motifs on the rock surface the invariance and repetition of the stylistic variables produce a stylised form depicting stylised behaviour. NRF styled motifs are commonly depicted in groups (e.g., Figure 1, Figure 2, Table 1). The arrangement of motifs in groups, and the repeated occurrence of the NRF motifs on the same rock surface (panel) generates figurative 'scenes' that can inform interpretations of social structure and behaviours in rock art (May and Domingo Sanz 2010). The common essence of the NRF scene is movement (Figure 2). The impression of movement in NRF art is commented on by all previous rock art researchers who have studied the NRF art style (Chaloupka 1993:132, Haskovec 1992:150, Lewis 1988:36-38). Whether the motifs are running, dancing, falling or floating is irrelevant, but consistent depictions of a recurrent form and behaviour conforms to the criteria of the RFM. Additionally, invariance and repetition is again reinforced by the limited distribution of the art style.

The recent radiocarbon age constraints produced by Jones et. al. (2017) provides a minimum age for the continued production and circulation of the NRF art style and establishes that the NRF art style was in production for at least 3,400 years. This is an exceptionally long time frame for transmission of information between individuals/groups of a set of social and cultural rules which govern the way in which NRFs are depicted. Thus, adhering to the invariance and repetition RFM criteria. Additionally, these results demonstrate NRFs were produced according to a specialised time. Higher resolution timing – such as calendrical or cyclical time constraints for NRF production at this time is unknown. There may be a possibility of deducing higher resolution specialised timing from excavated deposits. Chronometric age determinations for this rock art style have only been recently recorded, and at this time no excavations within the NRF distribution zone have sought to answer questions regarding the links between site occupation, seasonality and ritual behaviour at such high temporal resolution for the early to mid-Holocene.

The limited distribution of NRF art (i.e., the regional boundary) and the placement of NRF art in sites with very high rock art densities (Table 1) conforms to the RFM criteria of specialised place (and strengthens the other criteria of invariance and repetition). The criteria of

specialised place is also supported by the non-significant results of the two χ tests which revealed that there is no significant difference between NRF complex size (MNI), and the corresponding total number of motifs in each rock art site, meaning that the number of painted NRFs depicted in a large rock art site, is not merely a reflection of increased total mass of rock art motifs. Rather the number of NRF motifs depicted, along with the arrangement and placement of the NRF motifs and the way they are depicted are selective choices made by the artist.

The importance of the criteria of specialised place in identifying ritual behaviours is also noted from observational data in the repeated selection of the same rock surfaces for NRF motifs, and the repeated selection of alternative rock surfaces for the painting and repainting of other art styles. This 'clustering' of NRF styled motifs on the same rock surfaces or in separated areas in large occupation sites may highlight the role of art practice in ritual behaviour itself. As does the occurrence of NRF repainting on the same rock surfaces and the choice by artists (whether they are NRF painters or otherwise) not to paint over the NRF friezes (Figure 2). For example, in both study areas the rock art sites with the highest frequency of NRFs (Jabiluka Site 2: n=41, and Red Lily Site 17: n=172) the majority of the motifs are painted on a single or limited number of rock surfaces (Figure 2). Additionally, in these sites there is evidence of repainting over the existing NRF depictions with new painting events solely depicting NRF art. Other localities recorded as having NRF presence and located within the proposed boundary of NRF distribution, such as Injalak Hill, also conform to this observational trend (Figure 1).

These NRF scenes have in the many instances not been painted over by more recent art styles. This again indicates not only individual but also collective choices of painting groups as it is extremely common for late Holocene art styles to overlay earlier art (this phenomenon has been quantified in the Red Lily study area by Wesley et al. 2017). Why then has complex arrangement of NRF motifs on the same rock surfaces not been painted over in many prominent sites and places? And why do they repaint the NRF style over older forms of the same art style on the same rock surfaces? These invariant and repetitive behaviours denoting choice in the selection of place for art styles may signify the practical role that NRF art practice may have played in the performance and participation of ritual. For example, Ross and Davidson (2006:325) in their discussion the RFM category of performance and participation hypothesise that rubbing, repainting, outlining and abrading may in fact serve as the strongest evidence of participation of people in ritual behaviour, and is supported in the ethnographic literature. Indeed, Mountford himself recorded instances in western Arnhem Land where chanting at rock art motifs formed an integral part of increase ritual (Mountford 1956:262).

NRF styled art from both our study areas occurs in 57 percent of cases within major occupation sites with high density rock art assemblages (100+ motifs). This again heavily supports an interpretation that this rock art style is attached to specialised place, and that the content of this

art style is not socially restricted. In fact the occurrence of NRF within a restricted distribution zone with a trend of occurring in sites with high assemblage density may be an example of how a rock art style has a ritual and or ceremonial function in large aggregations (Conkey 1980). In this instance we have not calculated overall rock art assemblage diversity in addition to NRF and rock art motif density, so a strong argument for NRF styled art and the styles' role in aggregation places remains a hypothesis.

The final RFM category - form which holds a canonical message - is the most challenging to identify in ancient rock art assemblages in specific terms. Rappaport (1999:51) defines the canonical as '... represent[ing] the general, enduring or even eternal aspects of universal orders'. The role of the canonical message in ritual then is to communicate a message of the higher order, above the present and with a greater meaning than limited to the individual act. This message is indexed through symbols that are encoded in the invariant aspects of the ritual (Rappaport 1999:58). All rock art motifs have the potential to carry canonical messages as they themselves are symbols whose social function is foremost to communicate with others. In the case of NRF art, the canonical message may lie in the stylised form (body line) and behaviour - the depiction and essence of movement. The canonical message may also be imparted to the viewer via the included material culture, in NRF styled art via the headdress. Colour range and order and size or shape of headdress may encode messages about the individual ritual status or rank of the wearer, or alternatively the identity or rank of the group whose role in the ritual communicates the higher order message. Assessing and comparing headdresses within and between NRF figure groups may allow an assessment of whether individual or group identity is being signalled, and may offer insight into the possible function of the symbol itself. The loss of some pigments from the headdresses made this difficult to discriminate from such a small sample size (for the Jabiluka assemblage), but with further recordings is an aspect of NRF art that may be explored in future research.

Ross and Davidson (2006:326) stress the value of persistence in demonstrating form which holds a canonical message in the RFM. The persistence of the ritual form is demonstrated in NRF art through the selection of place: limited landscape distribution; the repeated presence of NRF in high density rock art sites; and the painting and repainting of NRF art on selected rock surfaces. Persistence in the ritual form is also exhibited in the stylised form and behaviour expressed in the stylistic conventions of NRF art, which is argued by Jones et al. (2017) to continue for at least 3,400 years.

Conclusion

Our analysis of two NRF assemblages from both the Jabiluka and Red Lily study areas has confirmed that the core distribution zone previously hypothesised in the literature seems to be correct. However, our survey has also identified sites with NRF art style that are outliers from the core distribution zone. Additionally, we have identified a range of transitional styled motifs that contain some design

elements that conform to the NRF manner of depiction, but in other cases do not. This study highlights the need for further research to disentangle the relationship between the NRF art style and other anthropomorphic human figures being painted during the same temporal phase, and to map the abundance and diversity of these concurrent anthropomorphic manners of depiction in the landscape. Furthermore, the rock art assemblages from both Jabiluka and Red Lily indicate that the frequency and abundance of NRF art within the distribution zone is much greater than has previously been reported (Haskovec 1992).

A ritual social function in NRF art is signalled in many ways but most poignantly through the marking of *specialised place*. By analysing the distribution, abundance and diversity and the archaeological site contexts of NRF art places, we have revealed that NRF art is commonly located in rock art sites with high motif densities, and that the selection of painting surfaces, the figurative narratives and essence, method and the mode of depiction appears to be a choice made by NRF artists to communicate a ritual message.

Acknowledgments

We would like to thank the Gundjeihmi Aboriginal Corporation, the Mirarr people and Justin O'Brien, Djabulukgu Association Incorporation, Njanjma Rangers, Alfred Nayinggul, family and the Manilakarr clan, Yvonne Margarula, Paul S.C. Taçon, Trent Wilkinson, Daryl Wesley, Iain Johnston, Ines Domingo Sanz, Rose Whitau, Damien Finch, John Hayward, Celena Hayward, Melissa Marshall, Janet Davill, Phil Davill, Norrae Johnston, the Natural Cultural Programs Unit (Kakadu National Park), Gabrielle O'Loughlin, the Northern Land Council, Energy Resources of Australia Ltd (ERA), the Australian National University and Griffith University. This paper forms part of Tristen Jones PhD thesis. The statistics in this paper were processed using SPSSV24. Many thanks to Tim Maloney who greatly assisted in running the statistical tests and in producing the statistical data referred to in the paper. Thanks also to Sue O'Connor and Sally Brockwell who commented and edited earlier versions of this manuscript.

Tristen Jones
School of Culture, History and Language
College of Asia and the Pacific
The Australian National University
Canberra, ACT 0200,
Australia
tristen.jones@anu.edu.au

Sally K. May
Place, Evolution and Rock Art Heritage Unit (PERAHU)
Griffith Centre for Social and Cultural Research
Gold Coast Campus
Griffith University, QLD 4222,
Australia
s.may@griffith.edu.au

Endnotes

1. We have chosen not to reference these publications due to local Aboriginal community concerns regarding the publication of sacred images in them.

References

- Berndt, R. M. and Berndt, C. H. 1988. *The World of the First Australians: Aboriginal Traditional Life: Past and Present*. Aboriginal Studies Press, Canberra.
- Chaloupka, G. 1985. 'Chronological sequence of Arnhem Land Plateau rock art'. In R. Jones (ed.), *Archaeological Research in Kakadu National Park*, pp. 269-280. Australian National Parks and Wildlife Special Publications 13, Canberra.
- Chaloupka, G. 1993. *Journey in Time: The 50,000-year Story of the Australian Aboriginal Rock Art of Arnhem Land*. Reed New Holland, Sydney.
- Chippindale, C. and Taçon, P.S.C. 1998. 'The many ways of dating Arnhem Land rock-art, north Australia'. In C. Chippindale and P. S. C. Taçon (eds), *The Archaeology of Rock-Art*, pp. 90-111. Cambridge University Press, Cambridge.
- Clarkson, C., Smith, M., Marwick, B., Fullagar, R., Wallis, L.A., Faulkner, P., Manne, T., Hayes, E., Roberts, R.G., Jacobs, Z. and Carah, X. 2015. 'The archaeology, chronology and stratigraphy of Madjedbebe (Malakunanja II): A site in northern Australia with early occupation'. *Journal of Human Evolution* 83:46-64.
- Conkey, M.W., Beltrán, A., Clark, G.A., Echeagaray, J.G., Guenther, M.G., Hahn, J., Hayden, B., Paddayya, K., Straus, L.G. and Valoch, K. 1980. 'The identification of prehistoric hunter-gatherer aggregation sites: the case of Altamira [and comments and reply]'. *Current Anthropology* 21(5):609-630.
- David, B., Barker, B., Petchey, F., Delannoy, J.J., Geneste, J.M., Rowe, C., Eccleston, M., Lamb, L. and Whear, R. 2013. 'A 28,000 year old excavated painted rock from Nawarla Gabarnmang, northern Australia'. *Journal of Archaeological Science* 40(5): 2493-2501.
- Domingo Sanz, I. and Fiore, D. 2014. 'Style: Its role in the archaeology of art'. In C. Smith (ed.), *Encyclopedia of Global Archaeology*, pp. 7104-7111. Springer, New York.
- Francis, J.E. 2001. 'Style and classification'. In D.S. Whitley (ed.), *Handbook of Rock Art Research*, pp. 221-244. AltaMira Press, Walnut Creek.
- Haskovec, I.P. 1992. 'NRFs of Kakadu National Park: A study of regional style'. In J. McDonald and I. P. Haskovec (eds), *State of the Art: Regional Rock Art Studies in Australia and Melanesia*, pp 148-158. Australian Rock Art Research Association. No. 6, Melbourne.
- Jones, T., Levchenko, V. A., King, P. L., Troitzsch, U., Wesley, D., Williams, A. A. and Nayingull, A. 2017. 'Radiocarbon age constraints for a Pleistocene–Holocene transition rock art style: The Northern Running Figures of the East Alligator River region, western Arnhem Land, Australia'. *Journal of Archaeological Science: Reports* (11):80-89.
- Lewis, D. 1988. *The Rock Paintings of Arnhem Land, Australia*. B.A.R., Oxford.
- May, S.K., Johnston, I.G., Taçon, P., Domingo Sanz, I. and Goldhahn, J. 2017. 'Early Australian Anthropomorphs: the global significance of Jabiluka's Dynamic Figure rock art'. *Cambridge Archaeological Journal*, published online 14 August 2017.
- May, S. K. and Domingo Sanz, I. 2010. 'Making sense of scenes'. *Rock Art Research* 27(1):35.
- Mountford, C. P. 1956. *Art, Myth and Symbolism, Volume 1. Records of the American Australian Scientific Expedition to Arnhem Land*. Melbourne University Press, Melbourne.
- Rappaport, R.A. 1999. *Ritual and Religion in the Making of Humanity*. Cambridge University Press, Cambridge.
- Ross, J. and Davidson, I. 2006. 'Rock art and ritual: an archaeological analysis of rock art in arid central Australia'. *Journal of Archaeological Method and Theory* 13(4):305-341.
- Wesley, D., Jones, T. and Whittau, R. in press. 'People and fish: Late Holocene rock art at Wulk Lagoon, Arnhem Land'. In B. David, P.S.C. Taçon, J-J Delannoy and J-M Geneste (eds), *The Archaeology of Rock Art in Western Arnhem Land, Northern Australia. Terra Australis* 48. ANU Press, Canberra.
- Whitley, D. 2011. 'Rock art, religion, and ritual'. In T. Insoll (ed.), *Oxford Handbook of the Archaeology of Ritual and Religion*, pp.307-326. Oxford University Press, Oxford.