

## SYNCHRONIC VARIATION: SYDNEY BASIN ENGRAVED ART

### Introduction

This chapter looks at regional stylistic variability in the engraving component. The investigation is restricted to motif depictions, given that technical variation here is minimal. Analysis was aimed at identifying whether broad scale patterns could be interpreted culturally, not just environmentally (McMah 1965). A comparison of these results with those achieved in the shelter art assemblage is made later (Chapter 12).

There was initial concern that focussing on motif would not investigate style *per se*, but mere compositional variety<sup>33</sup>. Given the overall aim was to analyse the engraving and shelter art components at a comparable level (despite their technical differences and the variability that these introduce to motif form), motif taxonomy appeared the most judicious approach to the problem.

Motif has been successfully employed at a regional and localised level, investigating a range of stylistic questions (Clegg 1987, Officer 1984, Franklin 1984, Smith 1989). Sackett (1990) cites various examples of how the combination of motifs and compositional features may indicate high levels of ethnically significant patterning (e.g. Glassie 1975, Longacre 1981) and suggests that ‘themes may well be the [things] that give congruence to isochrestic choices in non-material aspects of cultural life’ (Sackett 1990:41). While this type of classification had not been previously attempted on an archaeological rock art assemblage, the approach used here tested Sackett’s proposition. Correspondence Analysis (CA), which seeks patterning in the combination of variables (motifs) in the data set, was considered an ideal tool for this analysis.

The CA indicated that the region’s engraving assemblage was largely homogeneous (see below). The results were viewed according to the language boundaries in evidence at white contact and to major drainage basins within the study area. These contexts provide an explanatory framework for variation across the region.

The posited style boundary to the south of the region was further investigated. This was initially identified by McMahon (1965). The Rock Art Project determined the likely location for this boundary was the Georges River - and that this boundary existed for both art components (McDonald 1985a, 1990a). This research refines further the extent of the stylistic differences on either side of this boundary. Style clines are also defined and described elsewhere across the region. These are manifested as increasing and/or decreasing amounts of homogeneity in localised areas and varying motif foci.

Engraving sites in different topographic locations were investigated to explore the possibility of different social contexts for information exchange. Vertical engraving sites around the estuarine foreshores (in very public locations) were compared with open engraving sites on the ridgelines (where it is assumed that the audience was more restricted).

The distribution of uncommon motifs is also explored. Rare motifs were thought to have the best potential to demonstrate the influence of local (or even individual) stylistic traits. Rare motifs

<sup>33</sup>A qualitative approach to individual motifs (e.g. body proportions, angle of macropod’s tails, orientation of motif and presence of eyes and other internal features, etc.) may also have revealed stylistic patterning. Given the lack of success of this approach to demonstrating ethnicity on a limited scale (Smith 1983; and see Clegg 1981), and the generalised outcome achieved by such an approach at a regional level (Franklin 1984), this additional type of analysis was not attempted.

are swamped in large-scale analyses, and it was hoped that this type of analysis would provide additional stylistic information. Whales, for instance demonstrate a fairly restricted geographic range. This, however, could be an environmental range as much as a cultural one. Other motifs, such as profile people, culture heroes, certain material objects and Complex-non-figuratives (CXNF's) were considered to be better gauges of cultural choices. The restricted distribution of contact motifs is also discussed.

As well as the regionally based quantitative analyses, several geographically restricted qualitative analyses of motif depiction and preference (Sackett's 'compositional features') were undertaken. Certain attributes on human figures (particularly gender and items of material culture), CXNF's and culture heroes are the focus of this analysis.

### **Defining a regional style: methodology**

The aim of these analyses was to provide a statistical description of each art component (i.e. average assemblage size, motif frequencies etc.) and to determine the amount of variation within the assemblages on the basis of multivariate analysis. The general approach described here was used for both art components.

As with most exercises of quantification, logical steps are required to code the data so it can be read by a computer, analysed and then interpreted. As well as logically ordering the data, it is necessary to justify the selection of variables as meaningful and relevant to the questions being asked. The classification and selection process was discussed fully in the original research (McDonald 1994a: Appendix 1). The procedures followed in quantifying the two art components can be broadly defined as:

- identification of the sample;
- selection of variables;
- collection (counting) of variables for the sample;
- input of counted information into a (computerised) data base;
- selection/clumping of variables for analysis;
- analysis of data base; and,
- interpretation of analysis results.

Having identified the sample (Chapter 5), the selection of variables for analysis proceeded. A motif classification was applied to both art components (these were fundamentally the same with addition of several motifs for the more diverse shelter art component) and a taxonomy accounting for technical variations for the shelter art sites (see McDonald 1994a: Appendix 1). Topographic, grid reference and site association information for both site types was also collected (see McDonald 1994a: Appendices 5 and 6).

### *Motif Variables*

While comparability between the two components was an overriding factor in the selection of motif variables, it was recognised that inherent differences in the two components would necessitate some variation in the motifs identified and counted.

The motif classification was initially devised for the Rock Art Project, specifically for the engraved assemblage (McDonald 1985a). The field recording exercises undertaken in subsequent stages of the Project revealed greater motif variability, particularly in the shelter art component (McDonald 1987, 1990a) which necessitated two additional motif categories (hands and axes) for both components, and the addition of two exclusive categories (hand stencil variations and 'other') for the shelter art sample (see Tables 5.1 and 5.3, Chapter 5).

## Counting

Once the motif and technique classifications had been devised, counting proceeded<sup>34</sup>. The counted data was initially recorded on accounting broadsheets. Each site had one column; variables were recorded by row. As well as counting motif and technique variables, site card information (for those sites not visited by me) provided the topographic and site association variables. AHIMS (then NPWS) site identification was used for each site.

All data were analysed on the mainframe computer at the Australian National University.

## Analyses

Analysis commenced with the motif count information, i.e. the raw data which had been entered into the computer. This involved the analysis of 27 engraved motif variables.

All data were put through a GENSTAT Correspondence Analysis (Version 3.1), designed to investigate variance within large multivariate data populations (the multivariate analyses used were defined and discussed in McDonald 1994a: Appendix 1). This method found that both art components were largely homogeneous populations, which clustered tightly and showed no underlying structure. The pattern of distribution, both for variables and sites, was affected largely by the presence of a few outliers. The analysis was re-run removing the outliers, in an effort to seek the underlying patterns within the greater data set. This was done a few times, until it became clear that the method was imposing structure upon the data - in much the same way as a cluster analysis.

Two further steps were taken in the treatment of the data. This involved clumping the motifs and converting them to binary data. The motif taxonomies for both components were reduced to seven variables (Table 11.1).

**Table 11.1: Engraving Sites. Clumped motif variables used in Correspondence Analysis.**

Variable No.	Motif/Variable description
1	Anthropomorphic
2	Terrestrial
3	Birds
4	Marine
5	Material Objects
6	Tracks
7	Other

Clumped variable 1 includes individual variables 1 - 5; 2 = v 6-8; 3 = v 9,10; 4 = v 11-14; 5 = v 15-8; 6 = v 21-24; 7 = v 25-27 (see Table 5.1). Unidentifiable motifs have been excluded from this level of analysis.

Converting to binary data was a simple process of using presence and absence rather than raw count data: if a variable was present it received a value of 1; if it was absent its value was 0. The CA of the engraving sites was based on a reduced sample of 705 sites (i.e. sites with only unidentified motifs were excluded from the analysis).

## Correspondence Analysis (CA): data, results and interpretation

The aim of a CA was to investigate sources of variance within the data set, to identify groups of similar and dissimilar objects (i.e. sites). The advantage of this technique over

other multivariate tools is that the variables (i.e. motifs) which contribute to these groupings can be identified. It is not so much the presence of individual motifs which creates the variance, but the combination of variables (Baxter 1994, Benzecri 1992, Shennan 1988).

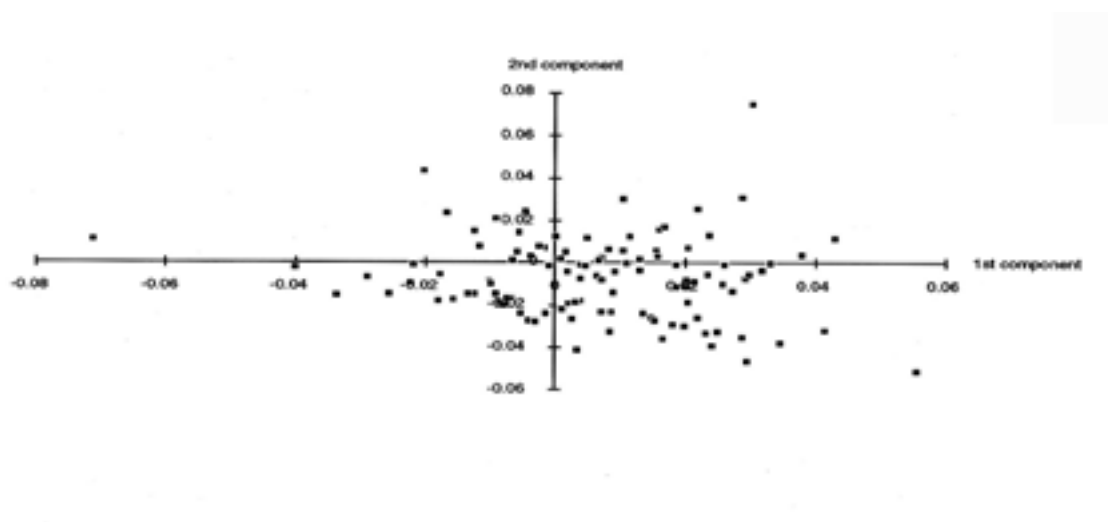
To explore the geographic variability within this assemblage, first a CA was run using grid location as a factor. This revealed no internal groupings or structure, nor any strong positive correlation between geography and motif. This result supported the absence of strong patterning or major divisions within the assemblage.

<sup>34</sup>All sites including those which had been counted previously (McDonald 1985a) were recounted for this research.

The data base for this component is too large for the plot of the site distribution to be meaningfully interpreted (Figure 11.1). The results were thus replotted using subdivisions of the data (Table 11.2: see McDonald 1994a: Appendix 7; Figures A7.1 - A7.7). These sub-plots are based on exactly the same results, but the smaller sample sizes enabled more useful interpretation.

Analysis was undertaken on a variety of scales. The first analysis involved an arbitrary division of the sites into map sheet provenance. The data were subdivided into eight groups which could be interpreted broadly on a geographic basis. The resultant groups were unequal in size, indicating the geographic biases of the sample (Table 11.2). While being arbitrary in terms of archaeological context, this division of the data base gave control over north-south and east-west clines in the data (see Figure 11.2; McDonald 1994a: Appendix 8).

A more detailed subdivision of the region's data was contemplated, but given concerns about the relevance of the documented linguistic boundaries (Chapter 3) and obvious sampling issues (i.e. unequal sample sizes), division of the data into archaeologically meaningful zones was a vexed question. To investigate possible cultural divisions across the region more closely, several localised areas (with good sample sizes) were chosen to investigate linguistic boundaries.



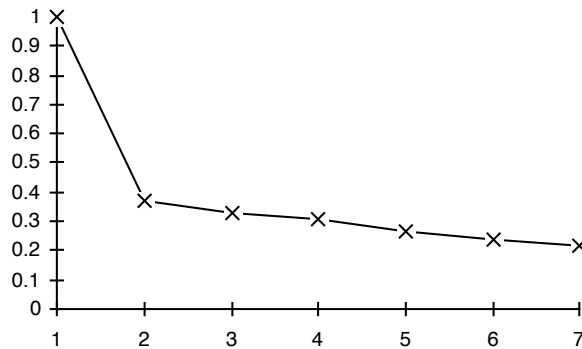
**Figure 11.1: CA Scores: entire Engraving component (705 sites). Each dot represents many sites.**

**Table 11.2: Analytical grouping of engraving sites according to AHIMS numbers. These groups were used in the regional interpretation of the CA results.**

Group	Map numbers	1:250,000/1:100,000 maps	Sample size
Group 1	37 - 6 -'s	Singleton/Cessnock	4 sites
	45 - 1 -'s	Sydney/Wallerawang	
Group 2	45 - 2 -'s	Sydney/St Albans	37 sites
Group 3	45 - 3 -'s	Sydney/Gosford	234 sites
Group 4	45 - 4 -'s	Sydney/Blue Mountains	10 sites
	45 - 5 -'s	Sydney/Windsor	
Group 5	45 - 6 -'s	Sydney/ Sydney	377 sites
Group 6	52 - 2 -'s	Wollongong/Wollongong	19 sites
Group 7	52 - 3 -'s	Wollongong/Port Hacking	35 sites

### Regional Analysis

The first two components account for 64% of the variance in the sample and these components discriminate well. The first component accounts for the greatest amount of variance in the data base (Figure 11.2), and the scree slope plot (Wright 1992) demonstrates that this component describes considerable structure in the data. Less variance is accounted for by the second component, and the slope then tails off.



**Figure 11.2: Engraving CA results: Plot of the latent roots indicating that the variance in the data set is well accounted for by the first two components.**

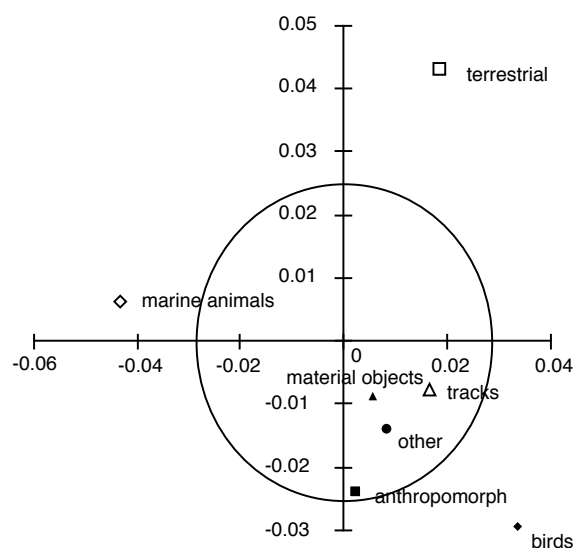
While no major internal groupings were identified, certain sites were identified as outliers (Figure 11.1). The plot of the first two co-ordinates (Figure 11.3) reveals that three of the variables (2, 3 and 4) are good discriminators. In the first co-ordinate, marine animals (3) and birds (4) are negatively correlated, while in the second co-ordinate, birds (3) are negatively correlated with land animals (2). Thus sites which contain large numbers of bird motifs would have very few marine depictions, while sites with a large number of land animals would contain small numbers of bird depictions (and vice versa). Anthropomorphs are relatively weakly positioned on the first co-ordinate, but have a relatively good discriminating effect on the second co-ordinate. Material objects, tracks and 'other' motifs are poor discriminators being situated close to the origin.

The CA results reveal no evidence for strong or distinctive localised variability across the region. Certain stylistic clines can be observed in the region's subdivisions as shown by the bivariate sub-plots (McDonald 1994a: Appendix 7: A7.1-A7.7) in terms of the distribution and/or clustering of sites relative to the origin (i.e.  $X + Y = 0$  on the bivariate plot). Sites close to the origin are poorly discriminated by the axes in question and are stylistically homogenous. Those site distributed away from the origin are well discriminated by their motif assemblage i.e. are stylistically differently. 'Common' sites fall close to the origin; unique and/or more unusual sites are located away from the origin. The identification and distribution of outlier sites in localised areas (according to quadrants on the graph) is the key to investigating thematic variety across the region.

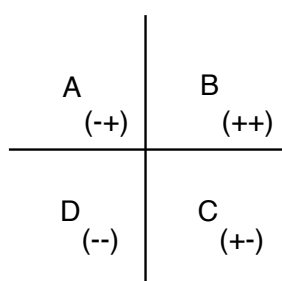
The bivariate plots for each group were analysed. The number of sites within a defined and consistent radius of the origin was noted<sup>35</sup>, allowing for a calculation of the percentage of 'common' and outlier sites in each area. This was necessary for comparability given the disparate sample sizes. As the computer generated plots sometimes generated the two axes at different scales, the radius is sometimes described by an ellipse rather than a circle. The distribution of the outlier sites according to the four quadrants was also investigated (Figure 11.4). Variations in the distribution of sites within the quadrants identified different compositional foci across the region.

The sites in the north-west of the region were found to be relatively heterogeneous. Outlier sites occurred predominantly (86%) on the positive side of the vertical axis, indicating that they are more strongly (and positively) discriminated by the first component. Sites in these groups contained many tracks (bird and macropod) as well as a definite preference for macropods and other

<sup>35</sup>This was drawn on each of the bivariate plots as a heuristic device.



**Figure 11.3: CA results: Engraving Sites. Bivariate Plot of Variable Scores.**



**Figure 11.4: Quadrant labels used in the following discussion of the CA results.**

land animals, birds and anthropomorphs.

The large group of sites (234) in the north-east of the Basin (north of the Hawkesbury River) were more heavily clustered around the origin (45%), while the outliers showed a strong tendency (76%) to be located on the positive side of the vertical axis. There was a preference in these sites for tracks (particularly *mundoes*), material objects (shields) and marine depictions. Anthropomorphic depictions were also very common.

The 377 sites in the centre of the Basin (located between the Hawkesbury River and Botany Bay; the Cumberland Plain and the coast) probably represent the core Sydney Basin engraving assemblage. Most of the sites (54%) in this group were tightly clustered around the origin. The majority of the sites in this group contained marine depictions, material objects, tracks (particularly *mundoes*) and anthropomorphs. Land animals were quite common, as were birds. There are several outlier groups within this sample. One major cluster (53 sites) contains combinations of exclusively marine depictions. In another major cluster (of 25 sites) each contains a single macropod.

South of the Georges River, there was a marked increase in heterogeneity. South of Port Hacking (group 8) the sites are well dispersed away from the origin (only 26.5% homogeneity). These sites contain a predominance of marine depictions and other material objects. Some of these sites included anthropomorphs; others included terrestrial animals and 'other' motifs. The outlier sites in this group indicate a major difference from preceding groups in subject preference. When the percentages of homogeneous sites across the region are compared (Figure 11.5), this patterning is clear.

The most homogeneous assemblages are in the centre of the Sydney Basin (Groups 5 and 3). This homogeneity decreases as you moving north-west and south. Sites to the west of the central core are also fairly homogeneous.

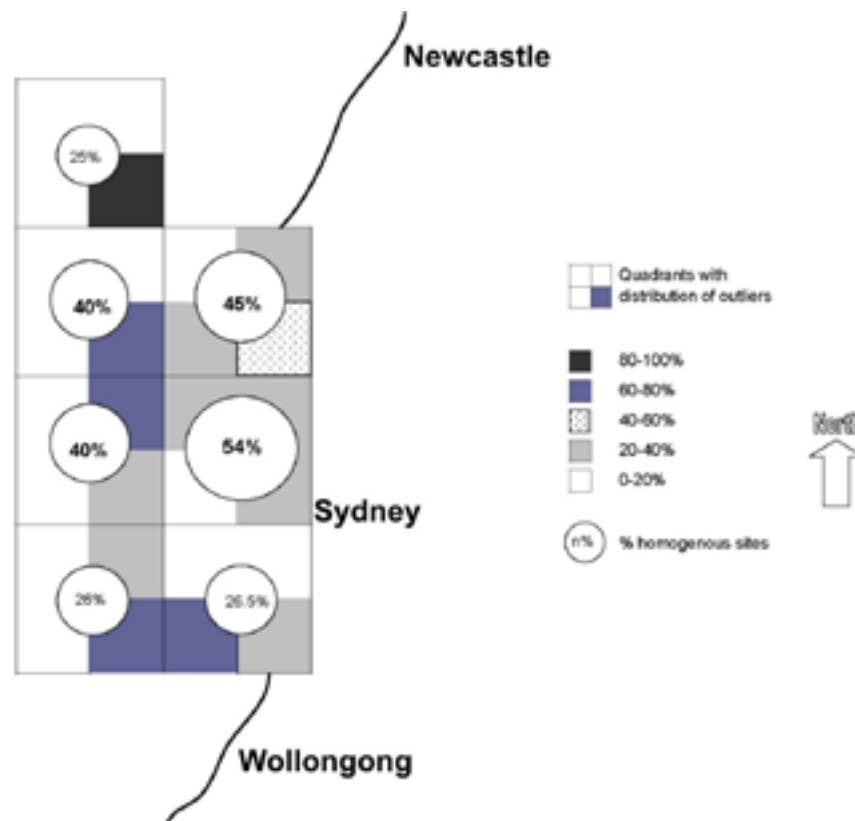
There was also marked variation in the distribution of outlier sites (compositional focus) across the region. The emphasis on certain combinations of motifs varies across the region, and it is the changes in these combinations that characterise the stylistic clines across the region. These are sometimes explicable in terms of economic/geographic factors (e.g. proximity to the sea). Not all variations, however, were so easily explained.

### **Language Areas. Searching for boundaries and between-group distinctiveness**

Five language areas (following Capell 1970) are recognised to have existed within the study area at European contact (chapter 3). These languages were mutually intelligible, although ethnohistoric evidence suggests that the locations of neighbouring 'tribal territories' were recognised and respected by the various groups. Anthropological work elsewhere on the continent suggests that the boundaries between language groups would not have been impenetrable barriers. Such studies



also suggest that such boundaries may have been fluid over time. The territorial distribution of the contact languages may not have extended back more than a few generations.



**Figure 11.5: Percentage of homogeneous engraving sites in each analytical Group.**

Archaeological evidence also casts uncertainty onto the longevity of these boundaries: the cultural change which occurred at around 1,000 years BP (with the introduction of fishhooks and the decrease in the use of rockshelters) may be so significant that the contact language boundaries are meaningless throughout the full extent of the region's art's production (i.e. the last 3-4,000 years).

Capell's (1970) language group boundaries were major rivers and creeklines. I argue (following Tindale 1974, Peterson 1976) that the boundary of any group's range is more likely to be at the periphery of its economically viable area. Boundaries in topographically dissected areas (such as the Sydney Basin – as with the Pilbara) are likely to be along ridgelines. The ethno-historically reported use of ridgelines for access routes around the region supports this argument since it is likely these would have traversed the periphery of any particular group's territory – not bisected the centre.

The model proposed in this thesis suggested that stylistic behaviour which reinforces group distinctiveness should be observable on the basis of drainage basin catchments, with boundaries between groups along ridgelines and not creeklines. The region was thus subdivided by means of drainage basins.

Within the five documented language areas, 25 drainage basins were defined across the region.

As identified earlier, a potential problem with these analyses is the disparate sample sizes (Table 11.3). This distribution of sites represents in part an archaeological 'reality' (Chapter 5), with decreasing site numbers at the periphery of the Sydney Basin. This may in part reflect the geological reality, although this has never been quantified. Much of the bias with this component results from the geographic focus of certain recorders in locations closer to Sydney city (McDonald 1985a). Over 70% of this assemblage was recorded by W.D. Campbell, Fred McCarthy and Ian Sim means that the distribution of this sample largely reflects their areas of interest and recording

**Table 11.3: Language areas, codes and sample sizes.**

Language Group	Code	No. of sites
<i>Darkingung</i>	1	137
<i>Guringai</i>	2	434
Sydney ( <i>Eora</i> )	3	32
<i>Dharug</i>	4	49
<i>Tharawal</i>	5	52

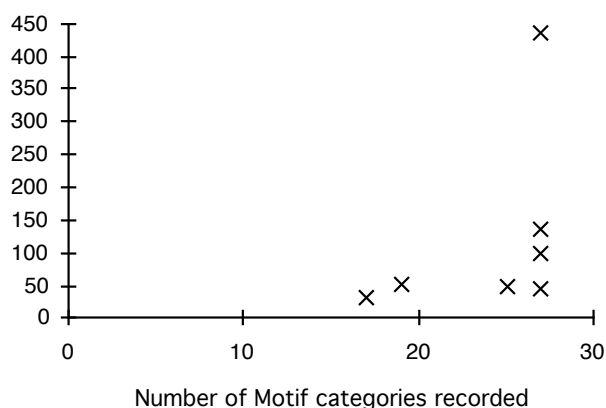
focus [Sim (1966a) represents the only focus in the north-west of the Basin]. More recent recording work (e.g. Tacon *et al.* 2006) indicates that there are still many engraving sites to be found in the west of the region.

Several systematic EIS surveys, in the north and south of the region have revealed a relatively low number and density of engraving sites. Likely explanations for this could be geological or cultural. In the Mill Creek valley (south of the Georges River), the

ridgelines on either side of the drainage basin are characterised by shale laterite, some of which had been extensively mined by the local Municipal Council for road construction (Attenbrow and Negerevich 1981; McDonald 1990b). Systematic survey here (covering c. 45 sq km) revealed only one engraving site.

In the north of the region, the Mangrove Creek valley, both in its upper catchment and its middle reaches around Warre Warren Creek, has been systematically sampled over an area of approximately 200 sq km (Attenbrow 1981, McDonald 1988a). Engraving sites here were relatively few (n=4: 3% of recorded sites) although large numbers of suitable rock surfaces were located and inspected. These results are in stark contrast with those achieved at Maroota south of the Hawkesbury River in the central-west of the Basin, where 12 engraving sites were located in one square kilometre (McDonald 1986a).

A correlation of sample size with language area and motif categories was made (Figure 11.6), to determine whether patterning in these analyses results from sampling inequities (James 1993).



**Figure 11.6: Bivariate plot of sample size and number of motifs recorded per sample area. The five language areas and two randomly generated *Guringai* samples.**

This demonstrated no direct correlation between site size and motif numbers. Further, the *Guringai* sites were subdivided into random 50 and 100 site samples, for the comparison of assemblage composition (and CA results) according to language area. These different steps indicate that the unavoidable sampling inequities in the data base do not appear to produce significant interpretive issues.

#### *Motif Assemblage Differences across the Basin*

Before analysing the CA results, basic assemblage details were investigated for each of the language areas. The division of the sites into language area was based on Capell's (1970) defined boundaries (see Figure 3.1).



### *Darkingung*

This area had 2,127 motifs (1,803 recognisable) from 137 sites. Two of the region's four largest sites (>100 motifs) are found in this area, and average site size is 15.5 motifs/site. The motif focus here is on tracks (bird, human and roo's respectively). The macropod is the next most common motif. Whale motifs are not represented in this assemblage.

Men are the most commonly depicted human figures, followed by non-gendered anthropomorphs. Profile depictions are quite common. Relatively few (six only) culture heroes are found here. Boomerangs are the most commonly depicted material culture items (Figure 11.7).

### *Darug*

This inland area has less of a focus on tracks than its more northerly counterpart. *Mundoes* and bird tracks still figure strongly, but macropods and land animals represent a large component of this assemblage (Figure 11.8). Human figures are again focused on males, and here there is a greater emphasis on profile figures than non-gendered anthropomorphs. Three culture heroes (at two sites) are located in this area. The average site size here is eight motifs/site.

### *Guringai*

This sample is located on the coast and represents the largest sample in the region. The 434 sites in this area produced 4,699 motifs. The average site size is 11 motifs/site. The other two sites with >100 motifs are located in this language area.

To examine the effect of sample size, two random sub-samples were generated (one with 50; the other with 100 sites) to see what effect this may have on the results (Figure 11.9). All three histograms reveal the same focus on *mundoes* and fish, followed by macropods, other land animals and men. While the peaks and troughs of these graphs vary slightly according to sample size, the results are basically the same. Only the sample of 50 resulted in a reduction of motif variables (roo tracks and contact motifs). These were two of the least common motif types in the total sample. While this sample is located on the coast, its motif focus is not entirely explicable in terms of environment (cf. the Sydney group).

### *Sydney (Eora)*

This language group is located on the coast, south of Port Jackson and north of the Georges River. This has the smallest sample size (due partly to the focus of European settlement, but also because the Cumberland Plain comprises a large proportion of this area).

The 32 sites in this area produced 245 motifs (an average of eight motifs/site). The motif focus in this area is on fish (46%), with whales and other marine animals also common (Figure 11.10). The reduced motif classification here possibly is a result of sample size.

### *Tharawal*

This area is also located on the coastal strip, but south of the Georges River. A sample here again was small with 245 motifs recorded at 51 sites. The assemblage sizes here (on average) are the smallest recorded in the Basin (5 motifs/site). There is a focus on marine depictions (30.7%), but the most commonly depicted motifs are men and non-gendered anthropomorphs (20.3% in total). Macropods and land animals are also common, while *mundoes* are the most frequently depicted tracks (Figure 11.11).

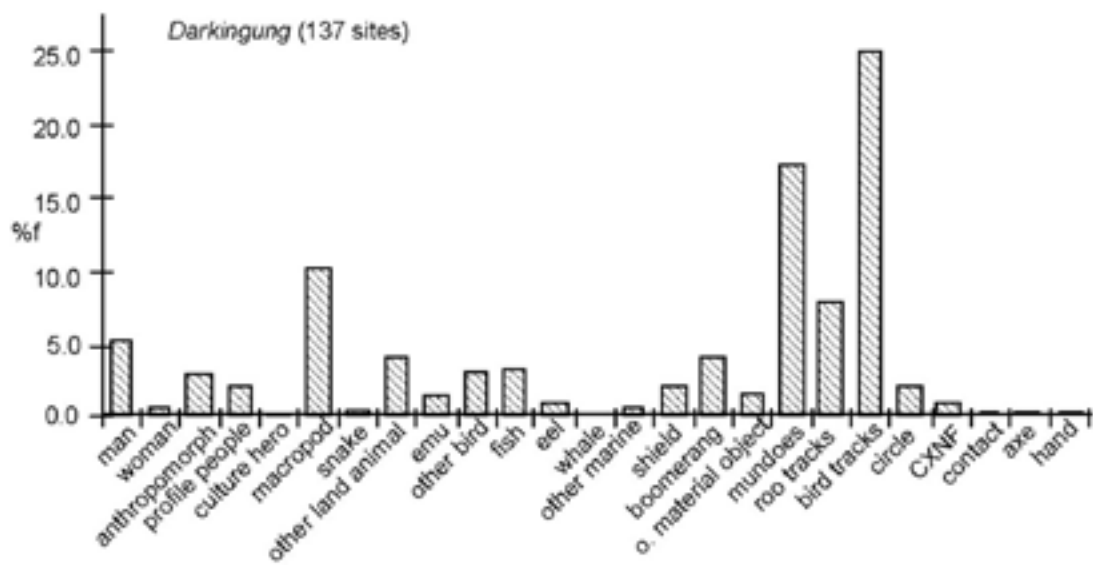


Figure 11.7: Darkingung Language Area. Motif Assemblage.

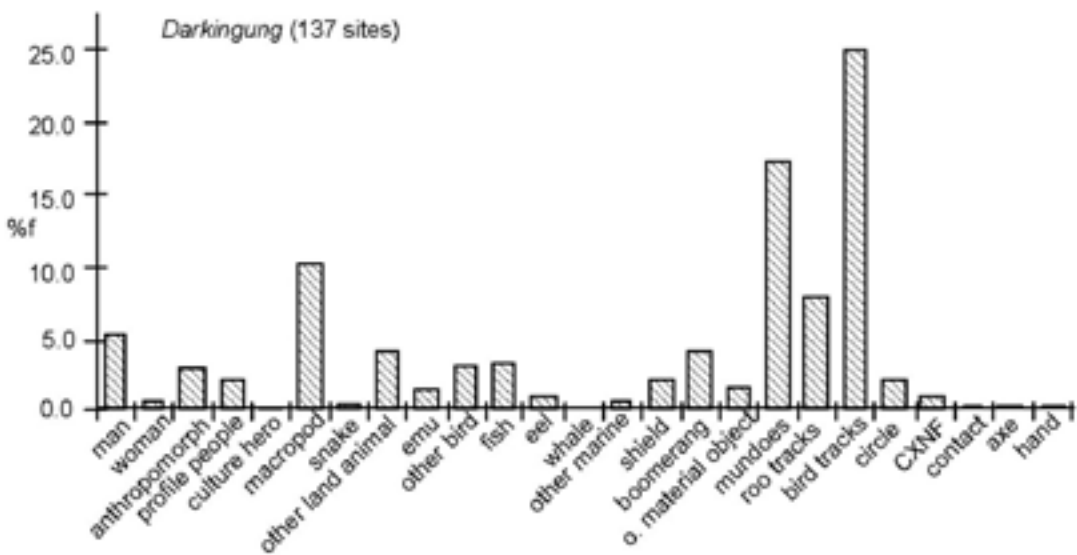


Figure 11.8: Darug Language Area. Motif Assemblage.

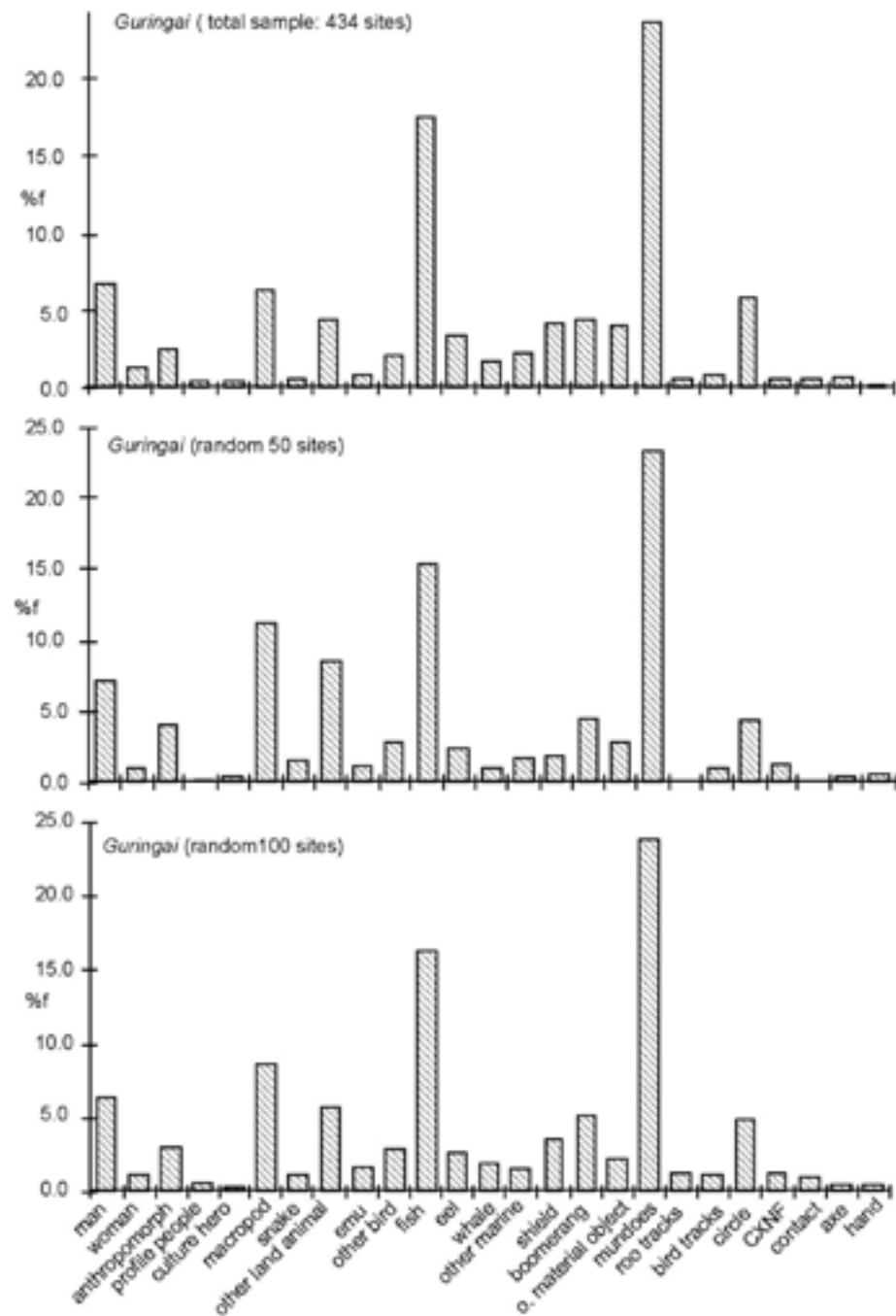
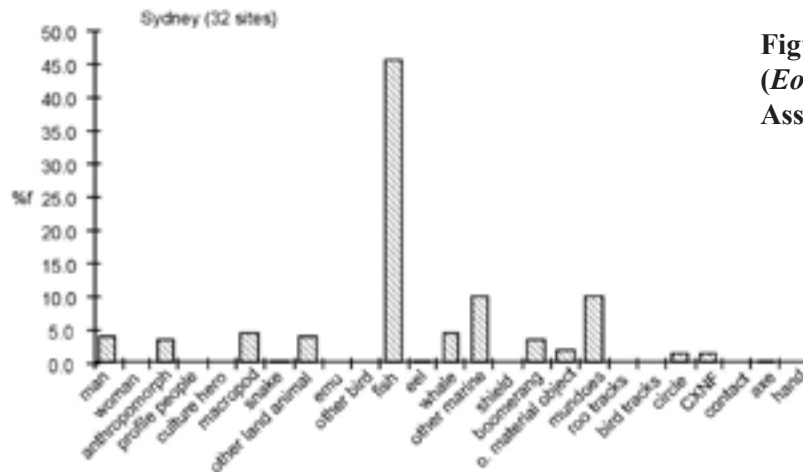
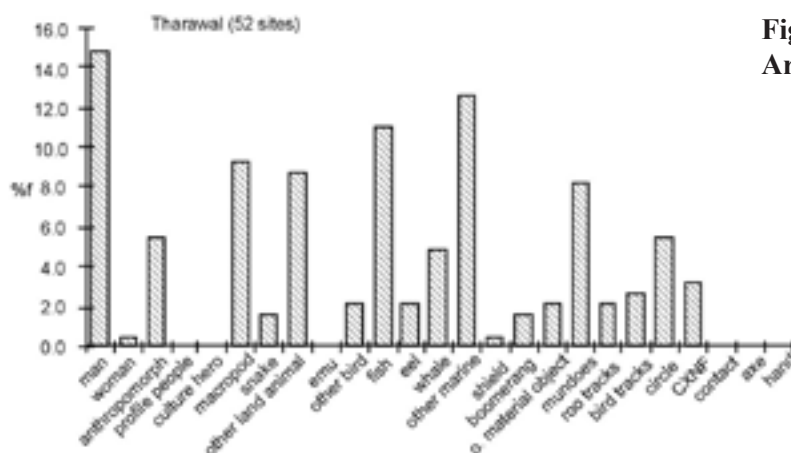


Figure 11.9: Guringai Language Area. Motif assemblage.



**Figure 11.10: Sydney (Eora) Area: Motif Assemblage.**



**Figure 11.11: Tharawal Area: Motif Assemblage.**

### Summary

Site size and motif focus vary across the region. While some of these trends are environmental; i.e. more fish and marine depictions on the coast and higher proportions of land animals inland, there are other foci which cannot be explained so simply. There are varying proportions of animal and human tracks in different parts of the region, and a dominance of human figures in coastal sites south of the Georges River:

The *Darkingung* sites are generally large with several very large sites found along access routes. The density of sites appears lower than in other areas although average assemblage size is higher. The motif focus is on kangaroo, bird and human tracks and macropods.

The average *Darug* site size is roughly half that found in the *Darkingung* language area. Macropods and other land animals dominate this assemblage, but tracks appear less important.

The Guringai area has the largest number of sites and seems to represent the region's core engraving assemblage. Average site size is larger than *Darug* but smaller than *Darkingung*. Dominant motifs are *mundoes* and fish, followed by macropods, other land animals, and men.

Only a few sites have been recorded from the *Eora* area, and these are relatively small. The motif focus here is on fish, *mundoes*, whales and other marine animals.

The *Tharawal* engraving assemblages are the smallest on average. The focus here is on men, other marine depictions, and fish, followed by macropods and other land animals.

## Correspondence Analysis and Language Areas

While trends in the motif assemblages across the Basin are quite clear, the CA results help determine compositional differences and foci in the different areas, and to demonstrate internal variability in the regional assemblage. The language areas were analysed as were drainage basins. This work also tested several of Capell's boundaries along creeklines.

### *Drainage Basins*

A total of 25 drainage basins were defined across the region (Figure 11.12; Table 11.4). These vary considerably in size and very large drainage areas have been defined for areas with low site numbers (e.g. Blue Mountains and Colo). Not all basins have engraving sites; some contain only shelter art sites (chapter 12).

Because of the disparate sample sizes, language boundaries and drainage basin boundaries were investigated in three locations with good sample sizes of both site types. These analyses tested the possibility of language boundaries and explored the degree of intra-language area patterning. The areas tested were:

- 1) Drainage basins 1, 5 and 6 within the *Darkingung* language area, north of the Hawkesbury River (107 sites);
- 2) Drainage basins 10-13 to test east-west patterning across the purported *Guringai/Darug* language boundary, south of the Hawkesbury River (316 sites); and,
- 3) Drainage basins 18 – 21 to test east-west patterning across the purported *Tharawal/Darug* language boundary, south of the Georges River (51 sites).

In the first two of these areas, extensive rock art recording work has been completed (Gunn 1979; McCarthy (see references); McDonald 1986a, 1987, 1988a, 1990a; Sim 1963a, b, 1966a, b; Smith 1983; Vinnicombe 1980) as were the four excavations completed for this research. The third area has been studied in more detail by other researchers (Officer 1984, Sefton 1988, SPG 1974) and although a smaller sample, this was seen as a useful test area south of the Georges River style boundary.

### *CA according to drainage basins*

This analysis viewed sites according to language areas and drainage basins<sup>36</sup> (Figure 11.12). The seven clumped motif classes were again used here (i.e. 'anthropomorphs' include men, women, non-gendered and profile anthropomorphic figures and culture heroes). Detail on thematic focus results from re-inspection of the site recordings.

#### *1) Darkingung language group (drainage basins 1, 5 and 6).*

This group of 107 sites is located north of the Hawkesbury River and includes the major drainage basins of the Macdonald River and Mangrove Creek. The Upper Macdonald and Central Macdonald groups were divided at the Bala Range, a geographic barrier at the centre of the valley. Drainage Basin 4 was excluded here as it contained only one site (although now see Taçon *et al.* 2005, 2006).

<sup>36</sup>All plots are based on the same CA results which are sorted according to location (language area, drainage basin, etc.). The plots have a manually drawn circle or ellipse (depending on the scale of the axes) indicating the arbitrary cut-off for the homogenous 'zone'. This procedure provides a visual aid in the interpretation of the bivariate plots. NB. Each dot symbol may represent one or many sites.

**Table 11.4: Drainage Basins, Language Areas and Sample sizes.**

Drainage Basin	Basin Code	Language Group	No. of sites
Upper Macdonald	1	1	12
Wollombi	2	1	3
Wyong	3	1/2	3
Colo	4	1	1
Central Macdonald	5	1	55
Mangrove Creek	6	1	40
Mooney Mooney	7	1/2	59
Brisbane Water	8	2	88
Kurrajong	9	1/4	-
Cattai	10	1/4	6
Berowra	11	2/4	42/28
Cowan	12	2	113
Pittwater	13	2	27
Middle Harbour	14	2	107
Lane Cove	15	2/4	9/2
Port Jackson	16	3	22
Botany Bay	17	3	1/-
Port Hacking	18	5	35
Woronora	19	5	11
Mill/Williams	20	4/5	-/1
Georges	21	4	1/3
Nepean	22	4	2
Burraborang/Blue Mountains	23	4*	9
Cataract	24	4?/5	-
Avon/Cordeaux	25	4?/5	-

\*May be mixture of Darug and Gandangara Language areas

### ***DARKINGUNG***

#### Outliers

Core: 45%	6.8%	<b>42.4%</b>
	5.1%	<b>45.8%</b>

The 107 sites in this language grouping are relatively homogeneous, with a heavy emphasis in positive quadrants B + C (on tracks, anthropomorphs, terrestrial animals and birds).

### **Upper Macdonald**

#### Outliers

Core: 42%	0%	14%
	0%	<b>86%</b>

This group of 12 sites is relatively homogenous with a strong emphasis on tracks (quadrant C). Many sites here include combinations of tracks, anthropomorphs, other material objects and birds. There are no marine depictions in these sites.



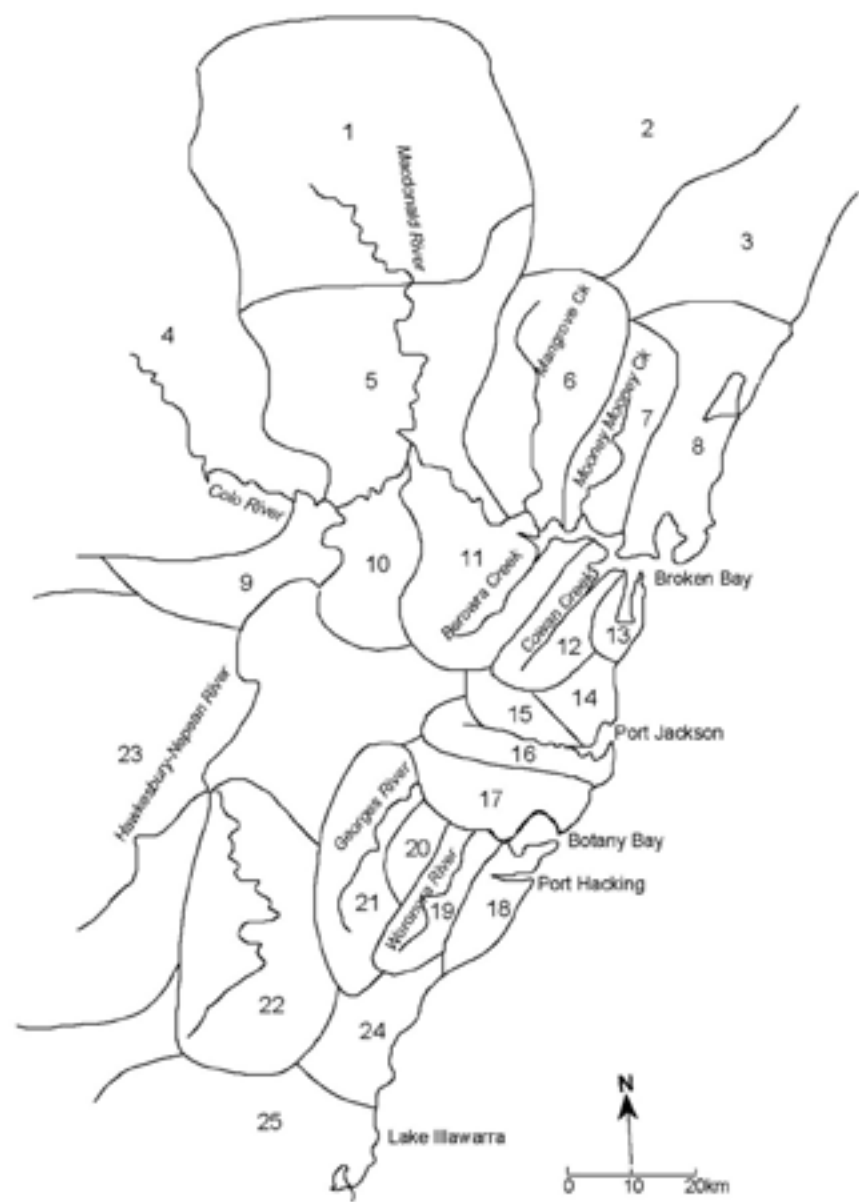


Figure 11.12: The 25 drainage basins defined across the Sydney region (refer Table 11.4).

Central Macdonald

Outliers

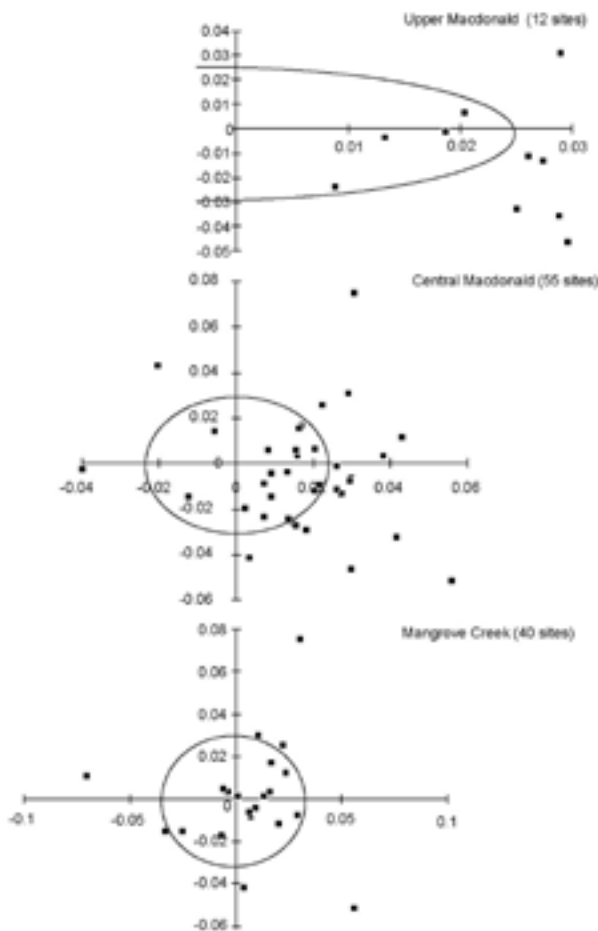
Core: 49%	7.1%	32%
	3.6%	57%

This group of 55 sites is the most homogenous. It includes the sites along the Boree Track (a known access route). There is again a strong emphasis on tracks and anthropomorphic figures (the positive quadrants), and a number of sites which have birds only. Material objects (spears, clubs) also figure strongly. There are very few marine depictions. At one site (#172) there are plain fish, eels and turtles.

# Mangrove Creek

		Outliers
Core: 37.5%	8%	60%
	8%	24%

This group of 40 sites are the least homogenous in this language area. Outlier sites here are mostly in quadrant B, with a strong focus on terrestrial animals and material objects. Anthropomorphs and birds also figure strongly.



**Figure 11.13: Bivariate plots, CA results. Darkingung language area - Upper Macdonald, central Macdonald and Mangrove Creek drainage basins.**

## 2) the Guringai/Darug language boundary (drainage basins 10 - 13)

The purported boundary between these two language areas is Berowra Creek (Figure 3.1). Both banks of this estuarine waterway were surveyed during the Rock Art Project (McDonald 1990b). Vertical engravings were located on both banks of this creek, and the art on both sides (within 40m distance and 10m elevation) was observed to be very similar. This analysis tested the Berowra Creek boundary and found that the sites on either side of the creek do demonstrate differences.

**DARUG**

## Outliers

Core: 35%	18.2%	<b>45.5%</b>
	13.6%	22.7%

**GURINGAI**

## Outliers

Core: 45%	27%	19%
	16%	<b>38%</b>

The 34 *Darug* sites are less homogeneous than the 182 *Guringai* sites. There is also a general change in focus between the more unusual sites in the two areas (cf. quadrants B + C). More land animals are found in the *Darug* sites and more tracks, birds and marine compositions occur in the *Guringai* sites. The drainage basins reveal considerable variability within these groups.

**Cattai**

## Outliers

Core: 50%	<b>33.3%</b>	<b>33.3%</b>
	0%	<b>33.3%</b>

This area has only six sites, and thus the results are treated tentatively (Figure 11.14). Half of these sites fall in the core zone and there is one each in three of the quadrants. The outlier sites have fish and eels, land animals and anthropomorphs and material objects.

**(Darug) Berowra**

## Outliers

Core: 32%	15.8%	<b>47.4%</b>
	15.8%	21%

This group of 28 sites are on the left bank of Berowra Creek. These sites are quite heterogeneous with the motif focus on terrestrial animals (quadrant B: Figure 11.15). There are many sites with single macropods. Anthropomorphs and material objects (particularly shields) are a common combination. Culture heroes and profile anthropomorphs are also present. Vertical engravings are common.

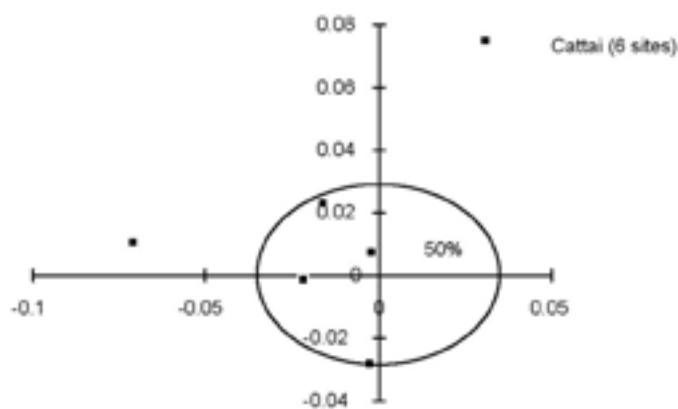


Figure 11.14: Cattai Drainage Basin. Bivariate plot of CA results.

(Guringai) Berowra	Outliers	
	21.7%	13%
Core: 46%	17.4%	47.8%

This group of 42 sites is more homogeneous than those found on the western side of this drainage basin. The outlier sites here are different to those on the left bank of Berowra Creek (quadrant C: Figure 11.15), with a focus on anthropomorphs, mudoes, shields, culture heroes and other birds. There are more marine depictions (including whales) here. Vertical engravings are common.

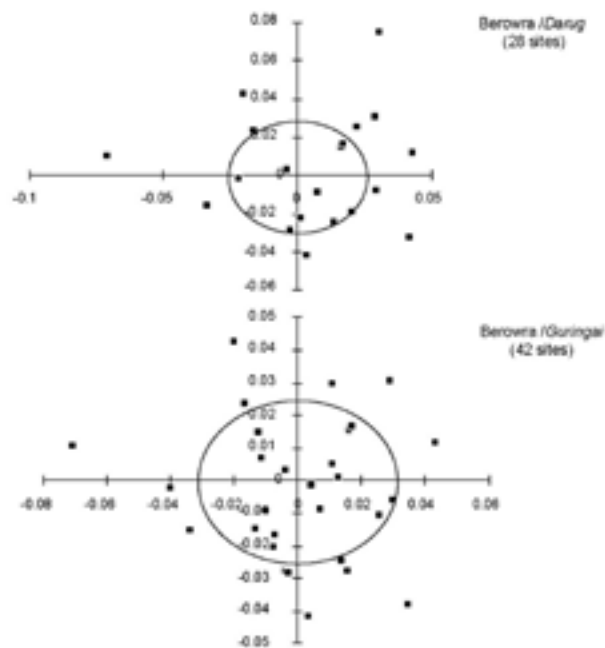


Figure 11.15: Berowra Drainage Basin (*Darug* and *Guringai* Language Areas). Bivariate plot of CA results.

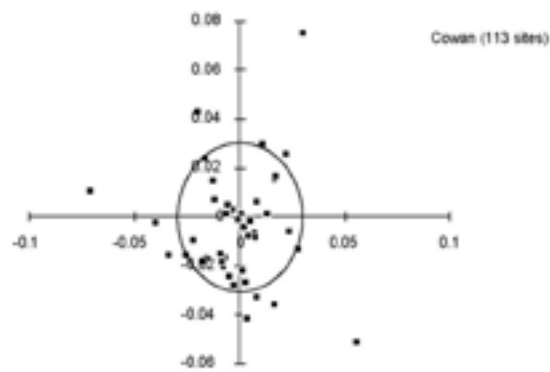


Figure 11.16: Cowan Drainage Basin. Bivariate plot of CA results.

Cowan		Outliers	
Core: 42%	21%	22.4%	
	13.4%	40.3%	

This group of 113 sites is quite homogeneous (Figure 11.16). Themes include a variety of anthropomorphs, birds and other material objects (particularly axes). There is a more even spread between quadrants A + B, with fish and whales as common as kangaroos, shields and boomerang combinations.

Pittwater		Outliers	
Core: 55.5%	66.7%	8.3%	
	25%	0%	

This group of 27 sites is the most homogenous of all those analysed (Figure 11.17). The focus here is heavily on marine animals (quadrant A), and many sites have fish only. There are also many whales.

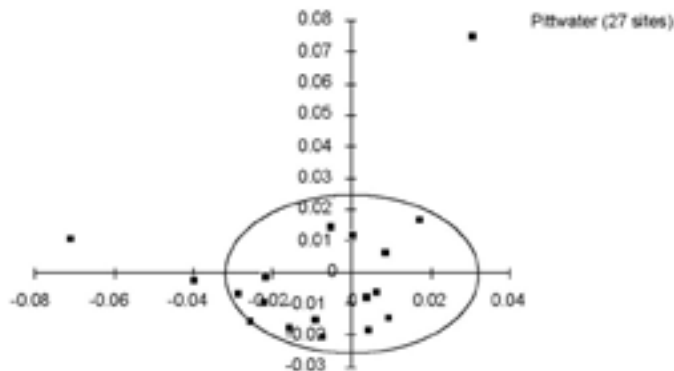


Figure 11.17: Pittwater Drainage Basin. Bivariate plot of CA scores.

### 3) The *Tharawal* language area (Basins 18 – 21)

This group of 50 sites south of the Georges River fall within the *Tharawal* language area. There are only a few sites from the western part of this area. The 11 Woronora sites represent a slightly more ‘inland’ focus, although this creekline is only 10km from the coast and its lower reaches are estuarine.

#### **THARAWAL**

		Outliers
Core: 20%	<b>44%</b>	30%
	10%	16%

This group of 50 sites is the least homogenous of those analysed in the region.

#### **Mill Creek/Georges River:**

		Outliers
Core: 75%	0%	0%
	0%	<b>100%</b>

The four sites in this drainage basin grouping represent too small a sample for these results to be meaningfully discussed. These results are included in the larger language group discussion.

#### **Woronora:**

		Outliers
Core: 9%	0%	<b>70%</b>
	0%	30%

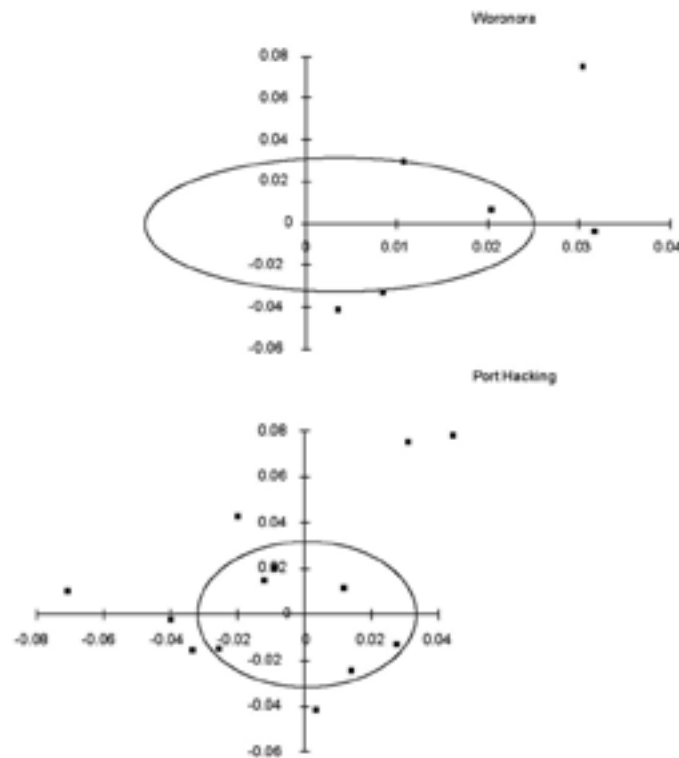
Sample size may also affect the results of this group (Figure 11.18). The 11 sites here are highly heterogeneous. There is a strong focus (in quadrant B) on kangaroos and other terrestrial animals and material objects. There are less anthropomorphs and tracks (human, roo and bird). There are no marine depictions.

#### **Port Hacking:**

		Outliers
Core: 17%	58.6%	10.3%
	<b>17.2%</b>	13.8%

This group of 35 sites is also highly heterogeneous and has a different outlier focus (in quadrant A) from the preceding *Tharawal* group. The main compositional focus here is with marine depictions (including whales) and material objects are also common. Most assemblages in this group are fairly small as is the motif range. The largest assemblage has 15 identifiable motifs; the greatest variety of motifs at any one site is six.





**Figure 11.18: *Tharawal* Language Area (Woronora and Port Hacking Drainage Basins). Bivariate Plot of CA Scores.**

### Conclusions

The *Darkingung* and *Guringai* language areas have the most homogenous engraving assemblages, followed by the engraved *Darug* assemblage. The engravings in the *Tharawal* language area are the least homogenous.

Internal variations across the *Darkingung* language area are relatively small. The upper and central Macdonald River sites are similar in terms of homogeneity and outlier focus (tracks). These sites are, however, different from the Mangrove Creek sites: which are slightly less homogenous and have a focus on terrestrial animals.

The *Darug* sites are more heterogeneous than either the *Darkingung* or the *Guringai* sites. Capell's language boundary along Berowra Creek is supported by this analysis. There are marked differences in the levels of variability, and dissimilar motif preferences.

The *Guringai* area is relatively homogenous, but there is still evidence for localised variability here. The Cowan sites are less homogenous than those from the Pittwater sample. The drainage basin analysis in this central part of the region demonstrates a clinal increase in variability as one moves west away from the coast.

The Mangrove Creek sites appear to be most like the *Darug* sites. Both groups are less homogenous than the *Darkingung* and *Guringai* sites generally. All three sets of sites, however, have different motif foci.

The *Tharawal* sites are markedly dissimilar to all other language groups. The sites are considerably more heterogeneous and the outlier foci are different. Comparison of two drainage basins with reasonable samples within this language area suggests differences between coastal and more inland sub-groups. While having different outlier foci, these two groups demonstrate the most variance of all groups analysed.

These analyses demonstrate a complex network of stylistic variability as defined by engraved motif preference across the region. Several contact language boundaries are supported

by these analyses: the east-west *Guringai-Darug* boundary and the northern *Tharawal* boundary. Sites within the *Darkinjung* language area, however, show some variability: with sites from Mangrove Creek more like those from the *Darug* language area.

This patterning is discussed after compositional features and the distribution of rare motifs are described.

### Ridge top versus vertical engraving sites

This research has identified a number of vertical engraving sites around the foreshores of Broken Bay and its main estuarine tributaries (Figure 11.19). The ethnohistoric literature indicates that this zone as a highly public one, and the sort of location where stylistic bounding behaviour is likely to be demonstrated (Wiessner 1990).

On the ridgelines and plateaux above these waterways are vast numbers of open engraving sites. The art sites at the bottom of cliffs and steep hillslopes provide a different social context from the open engraving sites on the less (economically) productive plateaux above. The sites close to the estuarine resources would have been accessed either by canoe or on foot around the foreshore (Figure 11.20, Figure 11.21).



**Figure 11.19: Two examples of vertical engraving sites from Berowra Creek (top) and Cowan Creek (bottom). Note the complexity of composition and shared line designs.**



Many of the ridgelines around the region are documented access routes (e.g. the Boree Track, Kulnura Ridge). Sites in these locations will provide a different kind of information, one which promotes social cohesion. Any sites which had ritual significance are also likely to have been located away from the main centres of subsistence economy in any particular social group's territory.

Analysis was undertaken in the *Guringai* language area (Cowan and Berowra drainage basins), comparing the ridgetop, hillside and valley bottom engraving sites. This area was selected because of the large sample of engraving sites generally, and because many vertical engraving sites have been found here too. Motifs were compared (Figure 11.22), and the CA results were re-sorted to determine the varying degrees of homogeneity of these locations. Hillside sites were included as these locations include a high number of the engraving sites.

There are 78 sites in ridgetop locations in this area. The average site size is 12 motifs/site. The average distance to permanent drinking water from these sites is 570m. The predominant motif in these locations is the *mundoe* (c.35%), followed by fish (15%) and men (8%).



**Figure 11.20: Smith's Creek, Ku-Ring-Gai Chase National Park. The red stencils (arrowed and inset) in this shelter must have been produced by artists standing in a canoe at high tide. Photo taken at low tide.**



**Figure 11.21: Shelter on Cowan Creek, the floor of which is in the littoral zone. An engraved outlined fish (inset) is located on the interior floor surface (arrowed).**

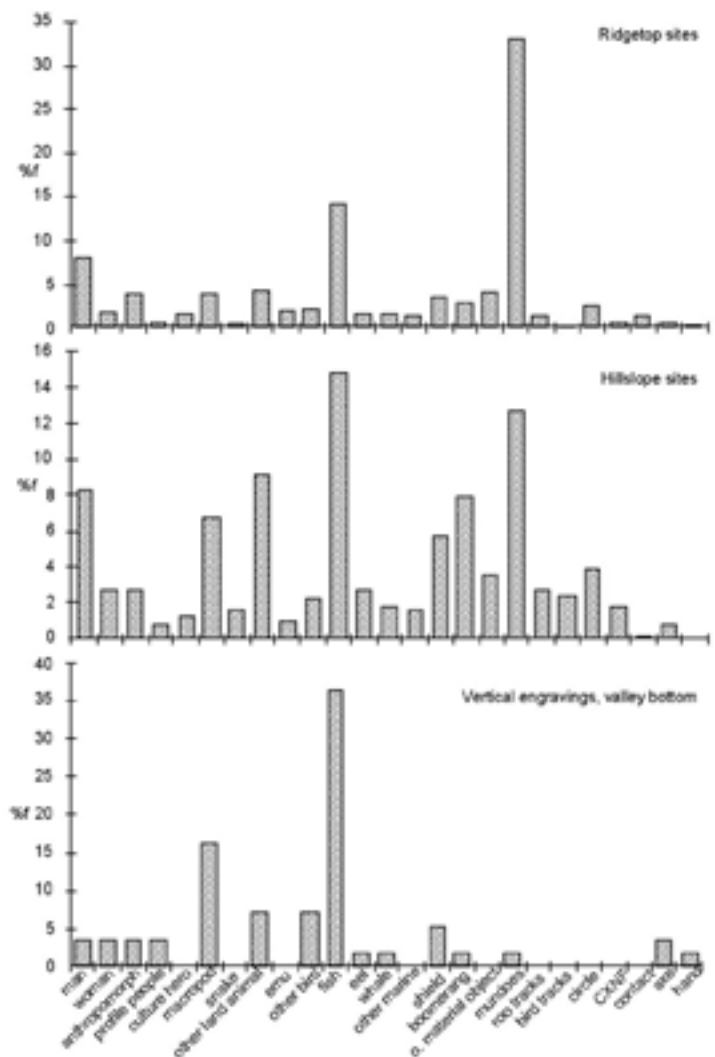


Figure 11.22: Motif histogram for engraving sites in ridgetop, hillslope and vertical engravings in estuarine valley bottom.

In the 63 hillslope sites the predominant motif is the fish (15%) followed by *mundoes* (12.5%), other land animals (9%), men and boomerangs (c.8%), macropods and shields (c.7%). The average distance to permanent drinking water from these sites is 460m.

There are 14 vertical engraving sites and these are generally smaller assemblages (av. 7.5 motifs/site). The average distance to drinking water from these sites is greater than from either of the other locations, for, while these are located next to the water's edge, Berowra and Cowan Creeks are saline and tidal. Fish motifs predominate (35%) in these locations, followed by macropods (15%). Missing motif classes include culture heroes, circles and contact motifs. *Mundoes* are present in a very small number of these sites (c.2%).

The differences in motif preferences on ridgetop and hill side locations are quite striking and cannot be explained in terms of sampling (Figure 11.22). The CA results reinforce engraving site differences in these landscapes (Figure 11.23).

Ridgetops

Outliers

Core: 45%	26.2%	21.4%
	9.5%	42.9%



This group is quite homogeneous, with its outlier focus in quadrant C. There is a slight subsidiary focus in quadrant A.

### Hillslopes

	Outliers	
Core: 48%	18.8%	18.8%
	18.8%	<b>43.8%</b>

This group of 62 sites has a similar level of homogeneity to the ridgetop sites, and the same outlier focus (quadrant C). The equal distribution between the three other quadrants indicates a broader range of subject combinations in these sites.

### Vertical sites, valley bottoms

	Outliers	
Core: 36%	33.3%	11.1%
	0%	<b>55.6%</b>

This group of 14 sites is the most heterogeneous, but has the same outlier focus as the other two groups.

The sites on the ridgetops and hillslopes are more homogenous than those around the water's edge. While there are demonstrated differences in degrees of homogeneity, however, the outlier foci in these three locations are very similar. In other words, the graphic vocabulary of people operating in these different landscapes, is the same. This result is as would be expected within the one language area and suggests that these sites being used by the same group(s) of people in a range of different social or information contexts.

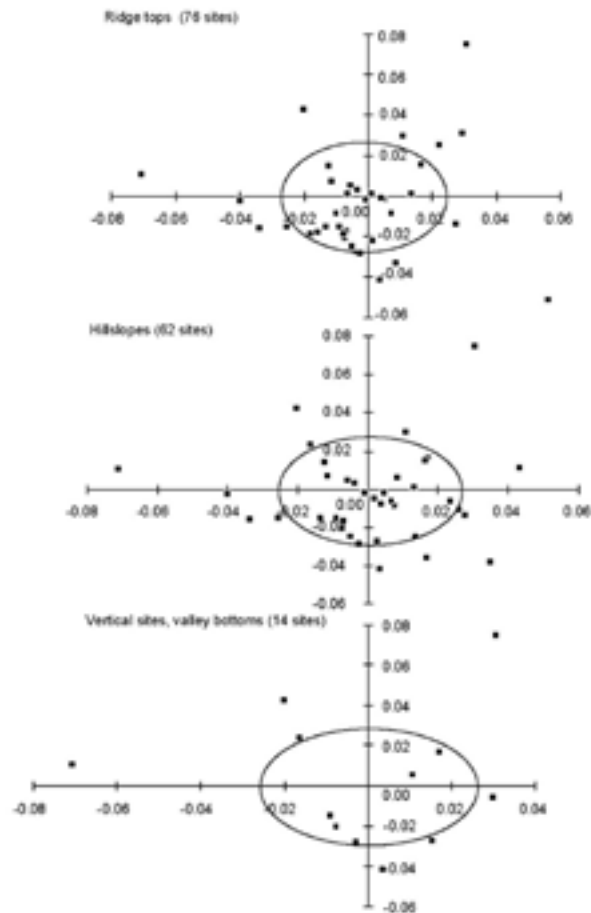
### Rare Motifs

Rare and unique motifs were analysed to establish their geographic distributions. It was hoped that this type of investigation would elucidate localised stylistic traits. Analysis concentrated on non-economic motifs in an effort to reduce environmental influences.

The analysis of how many times an individual motif occurred at any engraving site in the region demonstrated some interesting results (Table 11.5; Figure 11.24).

The motifs which occur at the most sites in the region are fish and macropods (c.35%) followed by men and other land animals. Mundoes – while the most numerous engraved motif in the region - are only present at 22% of engraving sites. This result indicates that certain motifs are concentrated in a few sites - while other motifs are more widely dispersed (relatively fewer motifs are placed on many more sites). This analysis focussed on concentrated rare motifs (i.e. ones which are relatively rare and which occur on few sites), and on dispersed motifs (i.e. relatively rare but fairly widely distributed).

The distribution of these motifs was plotted (Figure 11.25 to Figure 11.28), the percentages of sites with each motif type were calculated by language area (Table 11.6). These results were compared with the percentage results for each language area so that relative significance could be determined. To test the statistical significance of these differences, an approximate randomisation method (Noreen 1989, Wright 1991) was used on the figures (see Table 11.7).

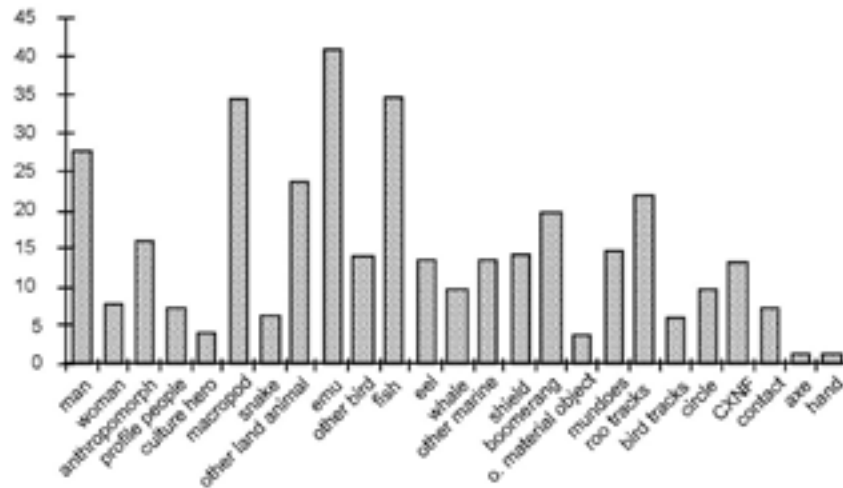


**Figure 11.23:** CA bivariate plots according to topographic location. *Guringai* language area: Berowra and Cowan drainage basins.

**Table 11.5: Engraving sites. Motif total, maximum incidence at any particular site, number of sites in the region with motif present, and % of sites with motif.**

Motif	Total	Max incidence	Sites with Motif present	% of Sites with Motif
Man	422	14	199	27.8
Woman	79	5	56	7.8
Anthropomorph	182	15	115	16.1
Profile Person	79	5	53	7.4
Culture Hero	36	2	29	4.1
Macropod	543	13	247	34.5
Snake	56	3	45	6.3
Other Land Animal	312	10	170	23.7
Emu	76	7	51	4.1
Other Bird	166	11	101	14.1
Fish	905	47	250	34.9
Eel	182	7	97	13.5
Whale	101	7	71	9.9
Other Marine	156	9	97	13.5
Shield	232	23	103	14.4
Boomerang	303	15	144	20.1
Axe	45	5	28	3.9
Other material object	218	13	106	14.8
Mundoe	1,360	99	157	21.9
Roo track	186	18	43	6.0
Bird track	541	95	71	9.9
Circle	309	17	96	13.4
CXNF	70	3	53	7.4
contact	36	11	11	1.5
hand	19	3	11	1.5





**Figure 11.24: Engraving component. Percentage of sites at which particular motifs appear.**

This analysis confirmed some of the disparities revealed by the previous analyses:

- There is a significantly higher proportion of profile figures and roo tracks and a significantly lower proportion of shields and axes in the *Darkingung* area.
- Shields and axes occur in significantly higher proportions in the *Guringai* area, while there are significantly fewer profile people and complex-non-figurative motifs in this area.
- In the *Darug* area, there are significantly higher numbers of profile people and complex-non-figurative motifs, and contact motifs and hands occur often.
- In the *Tharawal* area, there are significantly lower proportions of women, snakes, shields and axes.
- Significant differences are identified between language areas (Table 11.7). The differences and similarities between the *Guringai* and *Darkingung* groups are statistically significant. The differences (and similarities) between the *Guringai* sites and the *Darug* and *Tharawal* sites are also significant.

**Table 11.6: Rare Engraving Motifs. Distribution per Language Area (outstanding results in red and bold).**

Motif	Number (and %) of Sites with motif in each Language Area									
	<i>Darkingung</i>		<i>Guringai</i>		<i>Eora</i>		<i>Darug</i>		<i>Tharawal</i>	
Woman	12	21.8	40	72.7	0	0	2	3.6	<b>1</b>	<b>1.8</b>
Profile person	<b>26</b>	<b>49.1</b>	<b>22</b>	<b>41.5</b>	0	0	<b>5</b>	<b>9.4</b>	0	0
Culture hero	5	17.2	22	75.9	0	0	2	6.9	0	0
Snake	11	24.4	27	60.0	1	2.2	4	8.9	<b>2</b>	<b>4.4</b>
Shield	<b>11</b>	<b>10.7</b>	<b>88</b>	<b>85.4</b>	0	0	3	2.9	<b>1</b>	<b>1.0</b>
Axe	<b>3</b>	<b>10.7</b>	<b>23</b>	<b>82.1</b>	0	0	1	3.6	<b>1</b>	<b>3.6</b>
Roo tracks	<b>30</b>	<b>69.8</b>	<b>7</b>	<b>16.3</b>	0	0	4	9.3	2	4.7
CXNF	<b>17</b>	<b>32.1</b>	<b>24</b>	<b>45.3</b>	2	3.8	<b>6</b>	<b>11.3</b>	4	7.5
Contact	3	18.2	6	72.7	0	0	2	9.1	0	0
Hand	2	18.2	8	72.7	0	0	1	9.1	0	0
Total sample	2127	(19.5)	4699	(61.9)	245	(6.5)	360	(4.6)	245	(7.4)

**Table 11.7: Engraving sites. Significant values for rare motifs in the five language areas.**

Language Areas compared		Significance value
<i>Darkingung</i>	<i>Guringai</i>	<.001
<i>Guringai</i>	<i>Darug</i>	.013
<i>Guringai</i>	<i>Tharawal</i>	.027

These results confirm the localised character of the engraving assemblage in different areas of the Basin. The distributions of the rarer motifs also demonstrate some interesting connections.

Sites with culture heroes occur mostly in the western part of the *Guringai* territory and into the *Darkingung* territory. This

design link is not suggested by the CA results which show the overall foci to be quite different from these two areas. Profile anthropomorphs, axes and contact motifs have very similar distributions to the culture heroes. This will be discussed further below.

## Composition

Difference in composition were explored to provide further evidence of the types of cultural and/or stylistic choices (Sackett 1990) being made across the region. Shields and culture heroes were selected for this analysis.

### *Shields*

Previous archaeological analyses of shield designs have demonstrated stylistic patterning explicable in terms of trade and overall alliance systems (Dickens 1992, Hatte 1992; Morwood 1987). Local ethnohistoric evidence suggested that this motif type may provide ethnically-sensitive patterning, with commentators stating that the coastal peoples from around Sydney and further north carried distinctively patterned shields (Bellinghausen and Rossyisky in Barratt 1981; Enright 1900; Threlkeld in Gunson 1974). It was hoped that patterning in shield design distributions may indicate an interrelatedness of contact around the region.

Threlkeld described the construction of the region's wooden shields from around the Lake Macquarie area (*Awabakal/Guringai* language areas). These were:

three feet long by eighteen inches ... lozenge shaped, pointed at top and bottom, and pigeon breasted rather than flat. ... The shields are always painted with white pipeclay and are generally ornamented with a St George's Cross, formed by two bands two or three inches wide, one vertical the other horizontal, coloured red ... [Gunson 1974:68].

Rossyisky describes the wooden shields from the Sydney area similarly, although observing that 'they are daubed with *various* red and white figures' [(in) Barratt 1981:23, emphasis mine]. Bellinghausen's description confirms the colour usage as 'dry white colouring substance over which was painted red stripes' (in Barratt 1981:41; and see Enright 1900; Cave in Brayshaw 1986).

The engraved shields are fairly rare (232 total: 3% of the assemblage) and they are quite dispersed (found at 103 sites; 14%). A few sites have concentrations of this motif type: site# 45-3-376 has 23 shields; #45-6-705 has 15 (Figure 11.29). Most sites have one or two shields (average is 2 shields/site). These motifs are usually found on moderately large sites (average assemblage size = 22 motifs/site). The shield from one site (#45-6-689) was excluded as the motif was incomplete. The sample for this analysis came from 102 sites.

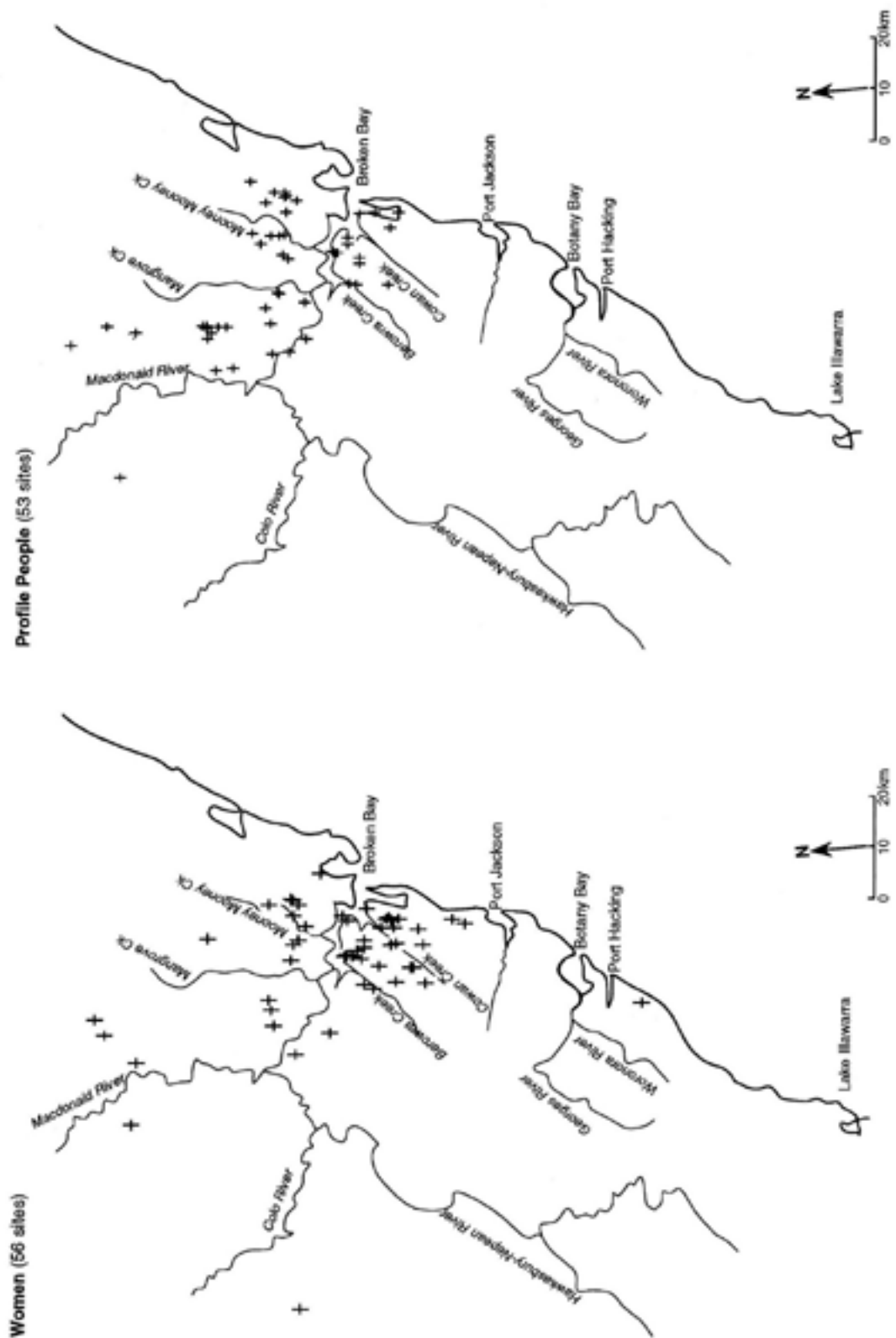


Figure 11.25: Distribution of sites with engraved women and profile people.

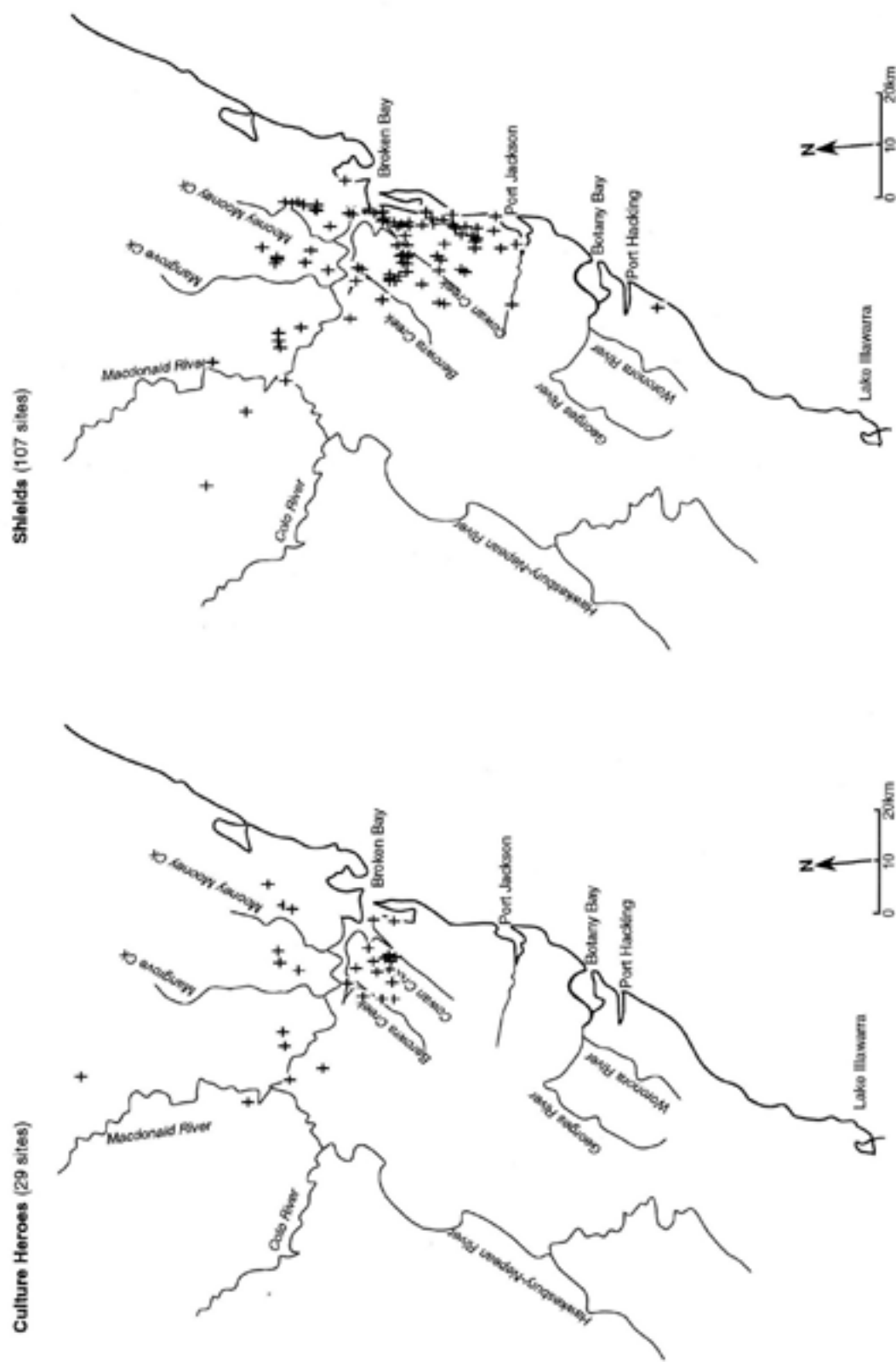
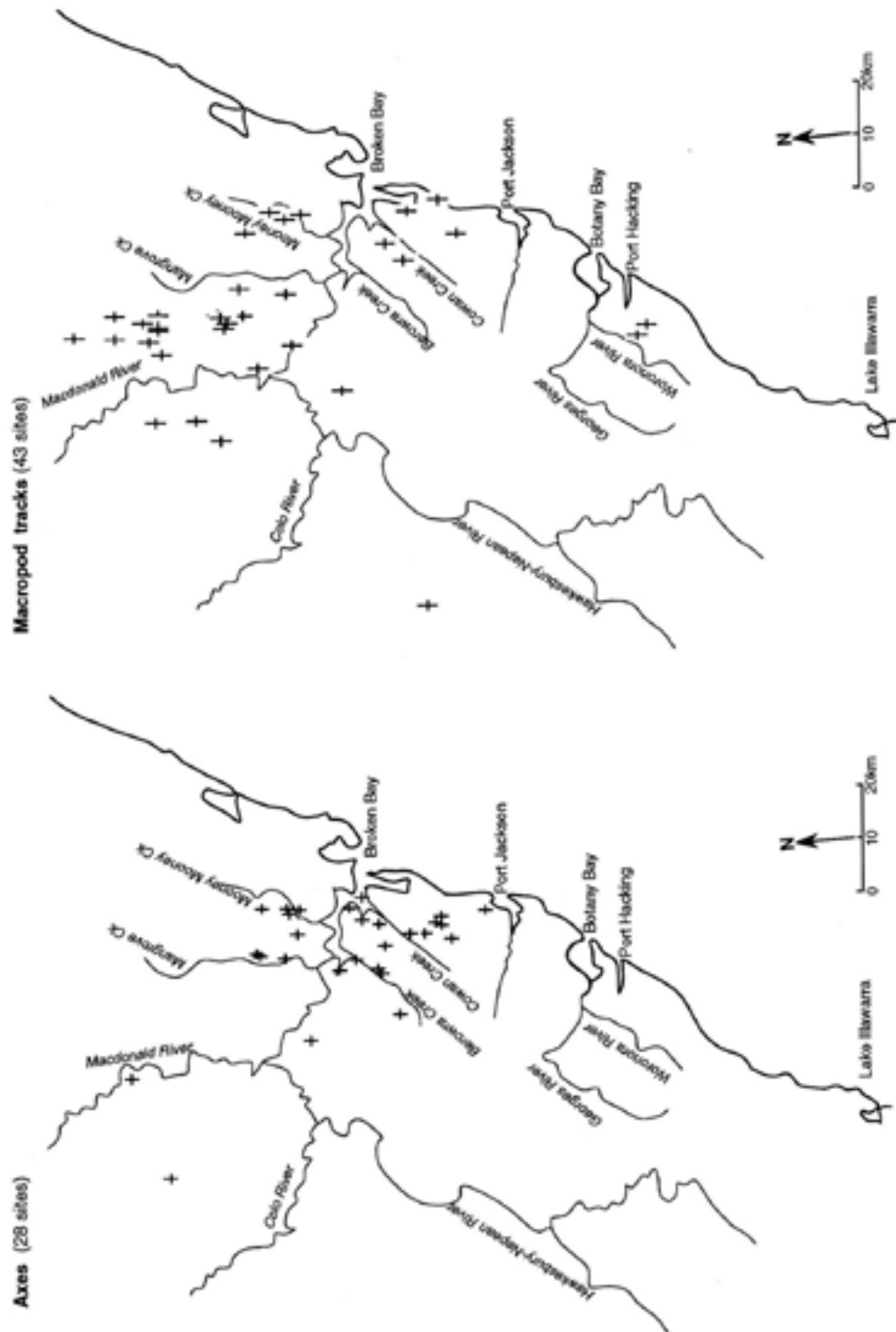


Figure 11.26: Distribution of engraving sites with culture heroes and shield motifs.



**Figure 11.27: Distribution of sites with engraved axe and macropod tracks.**

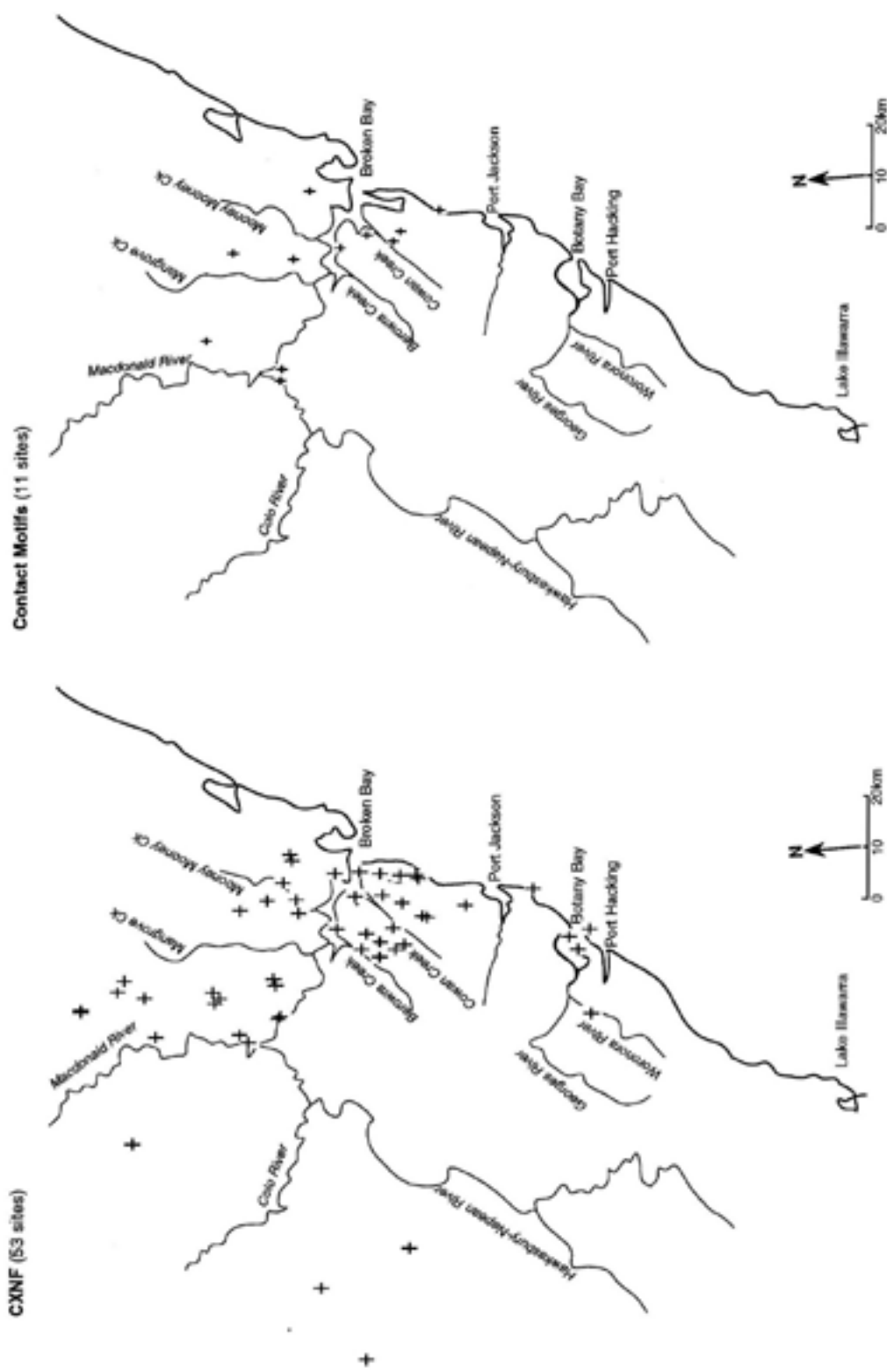


Figure 11.28: Distribution of engraving sites with complex-non-figurative and contact motifs.





**Figure 11.29: Site 575 (NPWS # 45-6-705) with 15 shield motifs and three boomerangs.**

Most shields (85.4%) are in the *Guringai* language area. *Darkingung* has the next highest number (10.7%) followed by *Darug* (2.9%) and *Tharawal* (1.0%). No engraved shields are recorded in the *Eora* language area.

Given the paucity of design options provided by ethnohistoric accounts, the engraved shield assemblage was inspected to determine design variety. Analysis revealed this to be considerably greater than suggested by Threlkeld's description. Twenty-six design categories (including undecorated) were identified (Figure 11.30). The designs consist mainly of horizontal and vertical line variations. A significant design element is a diamond shaped component at either or both of the shield's pointed end(s).

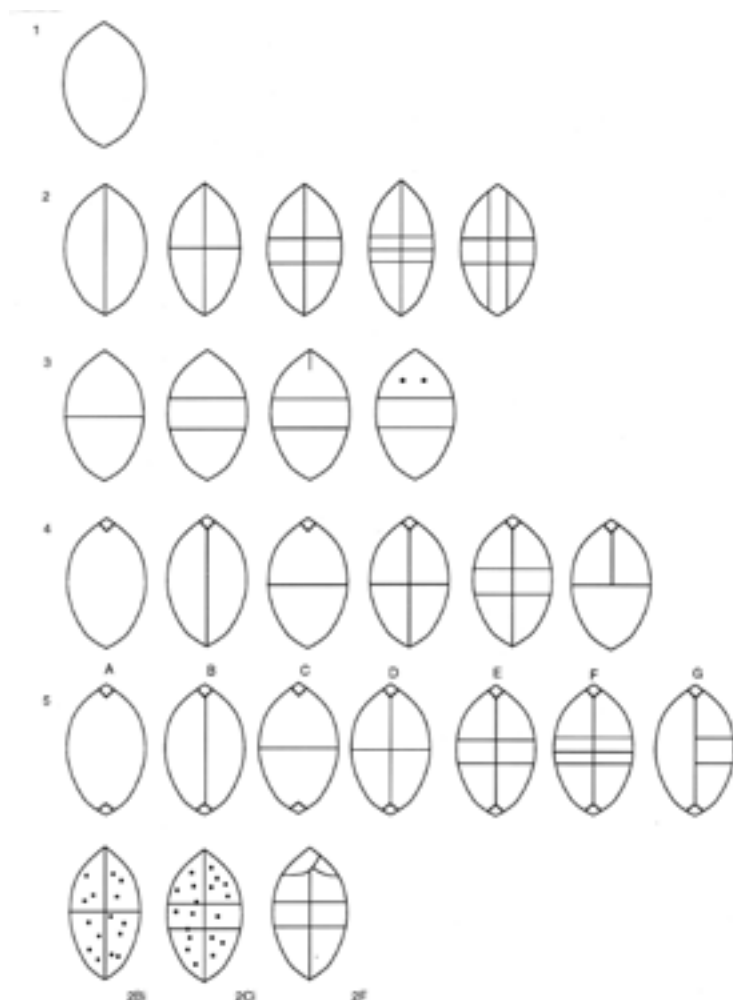
There are several unique varieties (designs 6 A-C) which are variations on design themes 2B and 2C. Two of these appear to be shields punctured by many spears (see Megaw 1993).

The two sites with multiple shield motifs (#'s 45-3-376, 45-6-705) are separated by considerable distance. One is north of the Hawkesbury River (Mangrove Creek drainage basin), the other is at Mosman (Middle Harbour drainage basin: Figure 11.31). The *Darkingung* site includes only design varieties 1, 2B and 2C. The *Guringai* site has seven design types (4A, 4D, 4E, 4F, 5B, 5E, and 2C) most of which have the diamond point decorative element at one or both ends.

First, sites with only a single design type present were analysed. It was hoped that this would facilitate clear focus on localised patterning in the design elements and reduce synchronic 'noise'. Threlkeld's description suggested that the 'St George cross' form (2B) would be the most common. This was not the case. Sites with multiple design types were excluded from this initial sort. Four major design themes were identified and these account for 62% of the sites with shields (Table 11.8).

**Table 11.8: Engraved sites. Shield Design Types according to language areas and drainage basins. Sites with single design types only.**

Language Area and Drainage Basins	Plain	%	2B	%	2C	%	4+5 variation	%	%f
<i>Darkingung</i> cent Macdonald	1	6.7	1	11.1	2	7.1			6.3
<i>Darkingung</i> Mooney	3	20.0							4.8
<i>Darug</i> Berowra	1	6.7			1	3.6			3.2
<i>Darug</i> Lane Cove					1	3.6			1.6
<i>Guringai</i> Mooney	1	6.7			4	14.3			7.9
<i>Guringai</i> Brisbane Water	2	13.3			5	17.9			11.1
<i>Guringai</i> Cowan	3	20.0	3	33.3	7	25.0	7	63.6	31.8
<i>Guringai</i> Pittwater			1	11.1	2	7.1			4.8
<i>Guringai</i> Middle Harbour	3	20.0	4	44.4	5	17.9	4	36.4	25.4
<i>Guringai</i> Lane Cove					1	3.6			1.6
<i>Tharawal</i> Port Hacking	1	6.7							1.6
Totals	15	(23.8)	9	(14.3)	28	(44.4)	11	(17.4)	63



**Figure 11.30: Range of shield designs present in the engraved component.**

Plain shields, as might be expected, are ubiquitous. They occur on both sides of the Hawkesbury River in *Guringai*, *Darkingung*, *Darug* and *Tharawal* sites. The distribution of the St George cross design (2B) was quite restricted. With the exception of one *Darkingung* site west of Mangrove Creek (on Flat Rocks Ridge), this design is confined to the Cowan, Pittwater and (particularly) Middle Harbour drainage basins: all *Guringai* language areas.

The double (horizontal) cross design (2C) is the most common design in the region. It occurs at 28 sites (in isolation) and at another 13 sites in combination with a variety of design forms. It occurs in *Guringai*, *Darkingung* and *Darug* areas.

The design with diamond elements at either end of the shield has a very restricted distribution. The eleven sites with this design element (in isolation) occur only in the *Guringai* area, in the Cowan and Middle Harbour drainage basins.

The two designs which appear to have the most potential for indicating inter- and intra-language contact were the St George (2B) variety and the diamond-end varieties (design types 4 and 5), both of which are restricted predominantly to the *Guringai* area. Next the distribution of these design elements in sites with combination shield designs was analysed. Again, a restricted distribution was found (Table 11.9). More than 90% of the sites with these designs were in the *Guringai* area, with the Cowan and Middle Harbour catchments containing 68% of these sites.

Shield designs exhibit highly localised characteristics. The *Guringai* language area contains the largest number of shields in the region and exhibits the greatest degree of design variability. There are localised design traits within this area. Cowan and Middle Harbour catchments contain the most shields and this is the design focus for both the diamond infill and double-cross varieties.

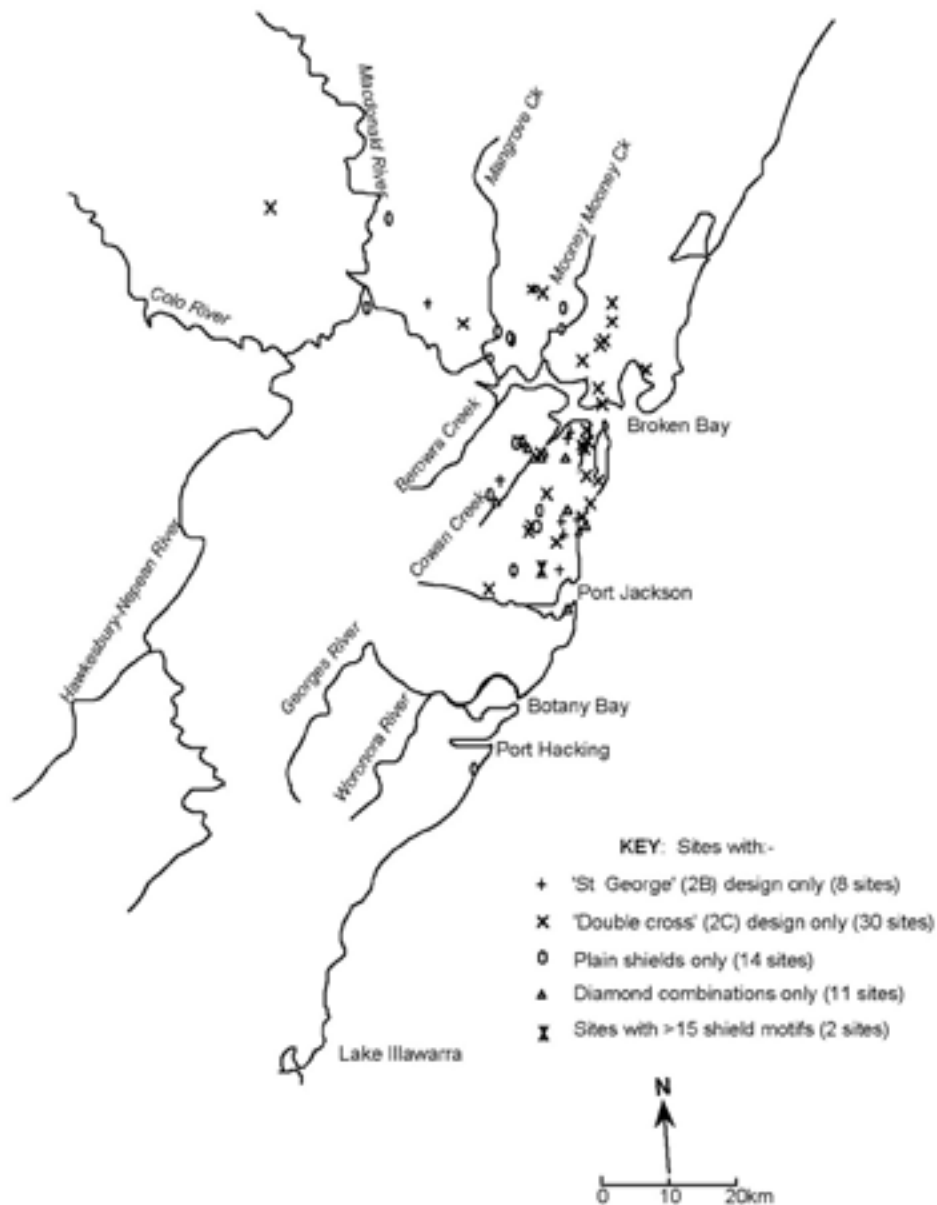


Figure 11.31: Distribution map of main shield designs.

**Table 11.9: Sites with engraved shield. Shields Distribution of mixed design types according to language areas and drainage basins. Type 2C, 4 and 5 varieties.**

Area	No.	%
<i>Darug</i> central Macdonald	1	4.5
<i>Darug</i> Berowra	1	4.5
<i>Guringai</i> Mooney	1	4.5
<i>Guringai</i> Brisbane Waters	3	13.3
<i>Guringai</i> Cowan	7	31.8
<i>Guringai</i> Pittwater	1	4.5
<i>Guringai</i> Middle Harbour	8	36.4
Totals	22	

In this instance, the ethnohistoric literature is highly inadequate with respect to both the design variability present and the distribution of these design elements. There may have been a major constriction in design elements used on shields at contact (and the St George Cross may have predominated as reported). Conversely, the subtleties of design variability were overlooked by early observers. If the former explanation is correct, then the ethnohistoric ‘present’ has little applicability in the prehistoric past, particularly in terms of ethnically significant designs. This would appear to be another

example of the inadequacies of European observation regarding the richness of Aboriginal culture in the region.

### *Culture Heroes*

At 29 sites across the region there are 36 culture heroes (Table 11.10). This motif differs from ordinary anthropomorphs on the basis of extreme size (mean length is 5.2m; standard deviation = 1.4m) and by the amount of infilled decoration. Some of these motifs are therianthropes (Flood 1987; McDonald and Veth 2006b) with animal features including bird's and/or snake's heads. The two main forms of culture hero are the '*Daramulan*' type (partially or fully in profile) and the '*Biaime*' type (in plan, with limbs akimbo). These types were named by McCarthy (1959a; following Mathews 1904, and see Clegg 1981) and a more recent analysis (Higgs 2003) has explored attribute variability in these motif forms.

A feature of this motif form suggests its cultural importance - or at least its continuation of use over time: evidence for multiple episode of engraving. More than half of these motifs have added features or altered outlines. The *Daramulan* figures appear particularly susceptible to change: many having a second leg added, and sometimes an arm or extra penis (Figure 11.33).

These motifs occur amongst a range of assemblage sizes. Some sites are extremely large (97 motifs), but there are also isolated examples e.g. with only a single culture hero present. The average size of sites with this motif present is 25.4 motifs/site. The average distance to drinking water from sites with these motifs is c.500m.

As indicated above, this motif is restricted to the *Guringai* (75%), *Darug* (8.3%) and *Darkinjung* (16.7%) language areas. Almost half of the motifs in the *Guringai* area are located in the Cowan drainage basin (Table 11.11).

Most of these motifs occur singly at sites, but are often paired. Some of these pairings are clearly male/female; others are male/male. Some sites include paired and/or transitional *Daramulan* and *Biaime* types (Figure 11.34).

The *Daramulan* type is heavily focussed (86%) in the *Guringai* area, while the *Biaime* form is distributed more widely (still 67% *Guringai*). The two *Daramulan*-type culture heroes located outside the *Guringai* area occur on major engraving sites (Devil's Rock Maroota, Flat Rocks Ridge) in places which could be argued are aggregation locales (Conkey 1980) - or at least on access routes where groups cohesion is being demonstrated.

**Table 11.10: Engraving sites. Culture heroes: compositional details.**

Site Number	Max length (m)	Type Biaime/ Daramulan	Animal features	Infill	Other features
37-6-8	2.7	B		dot	breasts, penis and foot added, fingers 1 hand, 2 eyes, headdress, 47 dots
45-2-16	6.8	D	bird head	heavy dot/linear	penis + leg added, ornate headdress, bird head
	5.0	B	-	heavy dot/linear	pointy ears headdress, male, dotted linear infill
45-2-45	3.3	B	-	heavy	two deep eyes, body linear infill waist band no hands or feet, conical head
	3.0	B	-	some lines	two deep eyes + 3 smaller ones, 4 dots in penis; toes on feet, stumpy arms
45-3-39	4.5	D	birdlike	linear	bird like with long rayed headdress. No foot visible. Waistband + linear infill
45-3-56	5.0	D	birdlike	linear	bird-like with long pointed headdress, 2 eyes + mouth. No foot visible
	4.5	D	birdlike	linear	bird like with rayed headdress, 4 eyes Waistband + 2 rows infill
45-3-99	8.3	B	-	lines dots	twisted perspective; penis to one side
45-3-110	3.2	D	birdlike	linear dots	leg with human foot, head twisted perspective w headdress. 2 eyes

Site Number	Max length (m)	Type Blaiame/ Daramulan	Animal features	Infill	Other features
45-3-168	5.7	D	bird head	lines on neck	emu like; 2 legs w feet and penis to side
45-3-228	6.0	B	long ears	lines	buttocks shown + 2 legs, enormous ears, breasts? under arms, + 5 eyes
45-3-232	5.6	B	bird head	lines	no arms, twisted perspective head, headdress
45-3-954	3.5	B	-	heavy linear	feet, fingers 1 hand, no penis or headdress, 2 eyes
45-3-1289	6.5	B	-	lines	eyes, headdress
45-6-42	4.7	D	-	lines	2 penises, eyes, headdress
45-6-44	4.6	B	-	lines	large head, no neck; 1 leg added; toes 1 foot only; single line headdress, 3 eyes
45-6-85	5.2	D	snake head	-	snake + other head with headdress. Human foot
45-6-284	3.4	B	-	linear	7 dots on face no ears; fingers + toes; fringed body infill, big penis; holding boomerang assoc. with long trail mundoes
45-6-290	5.3	B	-	lines	2 eyes, no feet
	6.0	D	snake/ bird	-	1 leg, sinuous neck, arm + axe added, profile leg
	6.0	B/D	snake head	-	2 legs, sinuous neck, 1 arm with axe, 2 legs with feet (1 added) penis added
45-6-312	5.0	B	pointy ears	linear design	fingers toes, facial features, holding a number of material objects, body design.
45-6-313	4.5	B	-	lines	very long arms and legs foot on one leg only, fingers, toes
45-6-315	6.0	B	-	lines	fingers + toes, waist + arm bands, small penis, looped headdress; associated with shields
45-6-316	5.3	B	-	many lines	horizontal + vertical infill; fingers on arms and legs, no neck, facial features, penis
	4.7	B	-	many lines	horizontal + vertical infill finger like appendages on arms and legs, no neck, facial features include an inverted 'smile', penis with infill
45-6-323	5.0	B	-	lines	hands + feet with fingers + toes, barbed arrow in side, crossed body lines, penis
45-6-324	6.3	D	bird like	lines	emu like with human foot, arm added
45-6-346	4.2	B	-	lines	rayed headdress, girdle + arm bands, 2 eyes
	3.2	B	-	lines	rayed headdress, girdle + arm bands, body design, 1 foot
45-6-412	6.7	D	-	lines	male with key shaped headdress
	5.5+	D	-	-	female, pointed breast, 5 eyes
45-6-434	5.7	B	-	lines	waist + armbands, penis, feet with toes, headdress, holding fish
45-6-436	9.3	D	-	lines	leg added on to penis, arms added onto head; headdress
45-6-890	6.2	D	bird head	lines	foot with toes, arm + hand with fingers added. Birdlike head with beak. Long meandering penis, 6 eyes, dot on heel

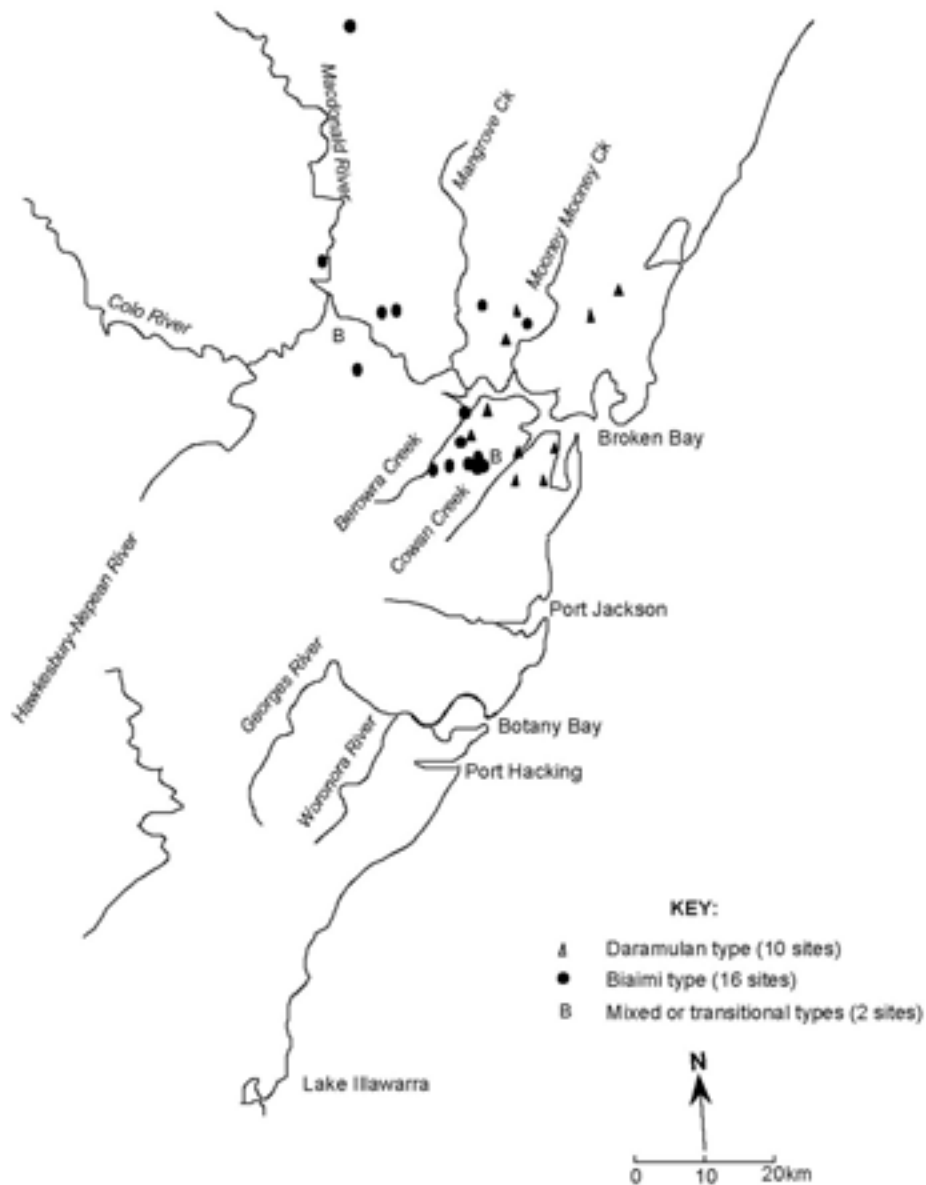
They focus of both culture hero forms in the *Guringai* area, with relatively minor examples in northerly and westerly language areas, suggests design (and social) contact between these three language areas, with design focus stemming from the *Guringai*.

A similar pattern was demonstrated by the shields. The distribution of these same motifs in the shelter art component is compared below, to determine whether these patterns hold for both media.

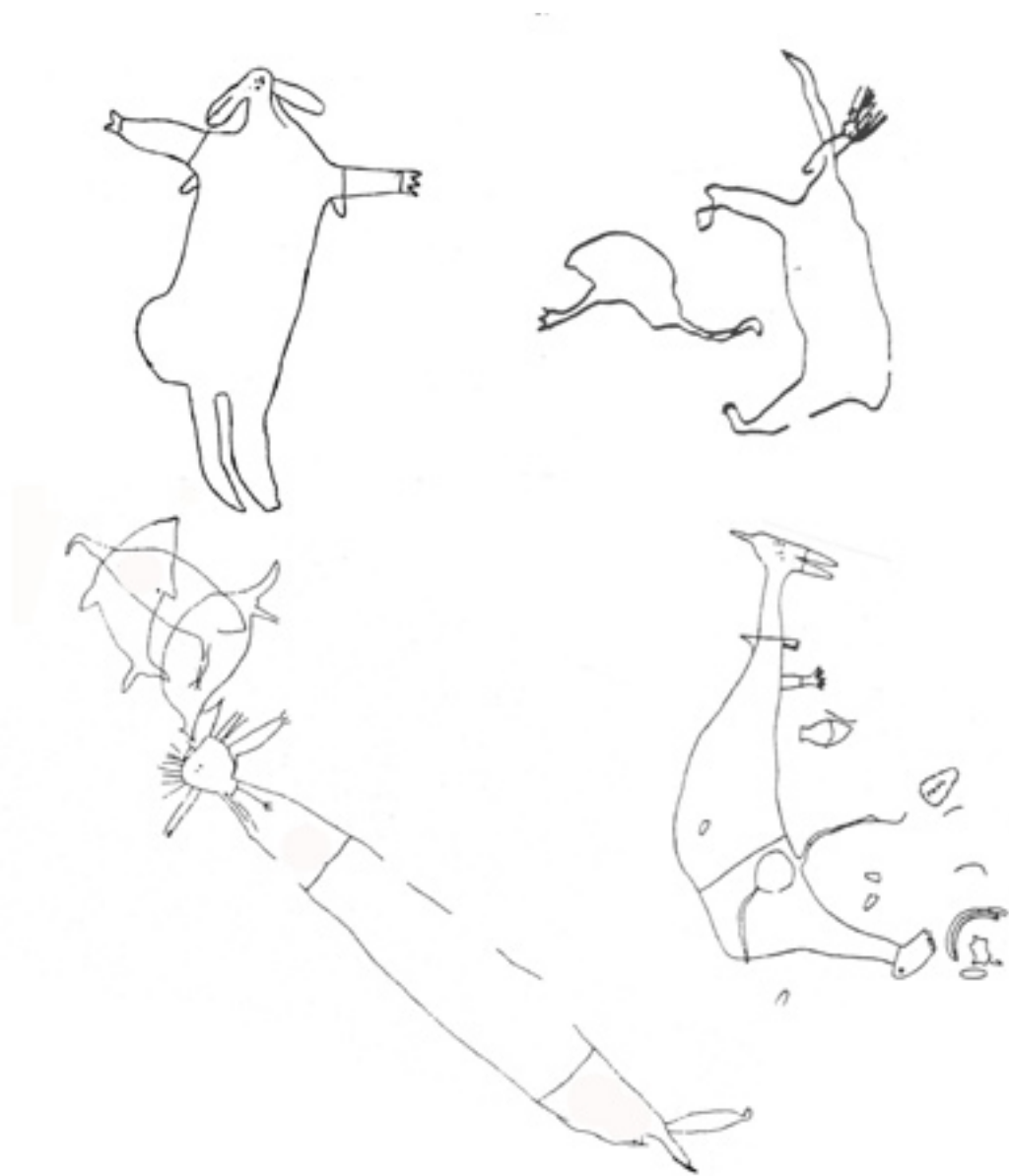
**Table 11.11: Daramulan and Biaime types, language areas and drainage basins.**

Area	Daramulan	%	Biaime	%	Total	%
<i>Darkingung</i> U McDonald			1	100	1	2.8
<i>Darkingung</i> C McDonald			4	100	4	11.1
<i>Darkingung</i> Mangrove	1	100			1	2.8
<i>Darug</i> Cattai			1	100	1	2.8
<i>Darug</i> Berowra	1	50	1	50	2	5.6
<i>Guringai</i> Mooney	1	50	1	50	2	5.6
<i>Guringai</i> Brisbane Waters	3	75	1	25	4	11.1
<i>Guringai</i> Berowra	3	60	2	40	5	13.9
<i>Guringai</i> Cowan	5	31.3	10*	62.5	16	44.4
Totals	14	(38.9)	21	(58.3)	36	100.1

\*one of these culture hero is half *Daramulan* and half *Biaime*.

**Figure 11.32: Distribution of Daramulan and Biaime type engraved motifs.**





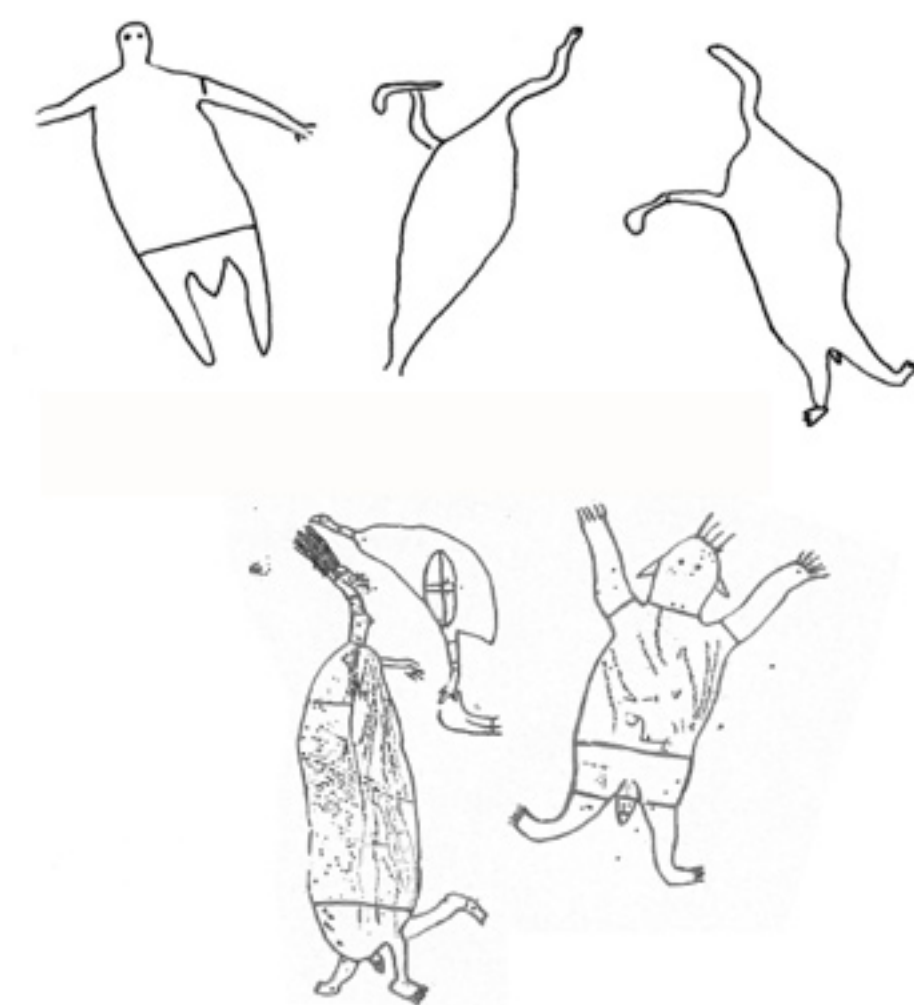
**Figure 11.33: Engraved Culture Heroes. Daramulan motifs which appears to have been altered over time (top to bottom, L to R; after McCarthy 1956: group 3, Figure V; McCarthy 1954a: Figure 7C; Campbell 1899: Plate XXV, Fig 4; McCarthy 1956: Group 3, Figure V).**

### Engraving sites: conclusions

While a cohesive style region, these analyses have identified stylistic variability in the engraved art of the Sydney region. This is distinctive only in the south of the Basin, where the previously identified style boundary of the Georges River is confirmed. In most parts of the region stylistic variation is clinal. It can be explained in terms of defined language areas, and can also be identified as localised variability based on drainage basins.

The *Darkingung* and *Guringai* language areas have the most homogenous engraving assemblages closely followed by the *Darug*. The engravings in the *Tharawal* area are the least homogenous. The *Guringai* sites consistently demonstrate the highest levels of homogeneity, but also provide evidence for internal variability: the Cowan sites are less homogenous than those from the Pittwater drainage basin. In this central part of the region there is a clinal increase in variability as one moves west, away from the coast.





**Figure 11.34: Paired and/or transitional *Daramulan* and *Biaime* motifs. Note that *Daramulan* below (on #45-2-16) has an altered outline also (top; from McCarthy and Hansen 1960: Figure 1; bottom; from McDonald 1986a: Figures 3 and 8).**

Analysis of the *Tharawal* sites reveals an assemblage which dissimilar from all others. The sites are significantly more heterogeneous and the outlier foci indicate a different thematic focus. Comparison of the two drainage basins with good samples here suggests differences between the coastal and more inland sub-groups.

The results demonstrate a complex network of stylistic variability as defined by motif preference. In some language areas, sites show levels of internal cohesion. Several of the proposed language boundaries are supported by these analyses. Berowra Creek could be the boundary between the *Darug* and *Guringai* groups – the art on either sides of this showing varying design focus. The northern boundary for *Tharawal* is also supported by these analyses with the identified style boundary at the Georges River.

The analysis of rare motifs confirms the localised character of engraving themes around the Basin. Culture heroes are focussed in the western part of the *Guringai* territory and reveal a design link with the *Darkingung* - confirming the CA results.

The study of composition on several rare motifs also revealed design contact between *Guringai*, *Darkingung* and *Darug* language areas. The source of this contact appears to stem from the *Guringai*. Design variability on shield motifs is extraordinarily diverse in the *Guringai* area, with both less motifs and a marked decrease in design options being practised outside this language area. These results will be discussed further in chapter 13.